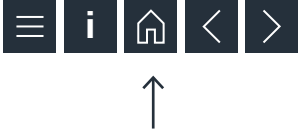
VERSION 4

UK Civil Aviation Authority

THE SKYWAY CODE

Launch



Use the buttons above and right to navigate through the document and look out for blue links in the text content for further actions.

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Enquiries regarding the content of this publication should be addressed to: GA@caa.co.uk – please use subject line 'Skyway Code'.

For the latest version of this document and details of changes included in Version 4 please visit www.caa.co.uk/skywaycode.

For best results when viewing on a tablet, save the *Skyway Code* to your device. Then download the Adobe Acrobat reader app from the Google Play or Apple App stores and open the Code up with the reader app.

Graphic design and layout by The Surgery.
www.ineedsurgery.com.

CONTENTS

QUICK MENU

FOREWORD

The *Skyway Code* was written for everyone who operates in the General Aviation environment, whether student pilot or seasoned professional. Even those yet to take their first lesson will find it good introductory reading. Whilst the focus is on powered flying, most is relevant to the entire GA community. Promoting mutual understanding of the different aviation activities makes the skies safer for all.

It is now more than six years since the launch of the first *Skyway Code*. The original was a significant endeavour to produce and involved reviewing numerous pages of regulation and safety guidance. The format has proved popular, with over 30,000 downloads from the website and many printed copies sold through third party vendors.

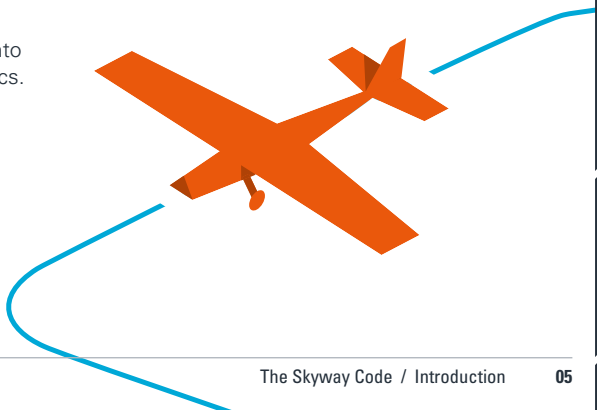
Particularly with changes to regulation, it is sometimes a struggle to keep the many CAA publications flying in the tight formation they should. More than three years have passed since the UK's departure from the EU, and whilst this has brought few changes for day-to-day flying, it has raised points of detail in need of explanation. Version 4 underlines our commitment to key documents being fresh and informative for readers.

The *Skyway Code* is as much about safety guidance as regulations. Version 4 incorporates a revised section on 'Safer Flying', with emphasis on human factors. It also sits alongside recent work to revitalise the longstanding GA 'Safety Sense Leaflets', which delve into greater detail on a range of important topics.

New and revised publications, no matter how good they may be, will only do so much by themselves. The messages and practices within need promotion and application. As winter 2023 approaches, we continue to work with community partners on safety initiatives and reflect on how to best assist GA pilots with managing the risks of their flying.

I would like to acknowledge and thank the many CAA staff and external stakeholders who have contributed to the *Skyway Code* over the last six years. Even pointing out the most minor of editorial issues makes it a better read for everyone, and your feedback on Version 4 is always welcome.

Michael MacDonald
Head of General Aviation



INTRODUCTION

The ***Skyway Code*** provides General Aviation pilots involved in non-commercial and flight training operations with practical guidance on the safety and regulatory topics relevant to their flying. Pilots of all aircraft categories, powered or unpowered, should find it useful.

The primary focus is:

SAFE AIRCRAFT OPERATIONS

SAFE USE OF AIRSPACE

- Flight under **Visual Flight Rules (VFR)**.
- Guidance on key regulations for GA.
- Version 4 reflects the latest requirements and best practice.

Readers should note the ***Skyway Code*** is guidance only and not a definitive statement of the law – in some places the legal text has been paraphrased for the purposes of clarity and explanation. UK Aviation Regulations are available at caa.co.uk/uk-regulations/. More information on key CAA policy guidance and documents may be found in section 11 – Finding out more.

KEEP UP TO DATE

For corrections or updates to content see **www.caa.co.uk/skywaycode**

PRE-FLIGHT CHECKLIST

Including:

01.

PRE-FLIGHT CHECKLIST

The checklist is a quick reference that supplements the more detailed information provided in later pages. You are encouraged to adapt for your own needs. Click on the arrows ⓘ to find out more:

PILOT

- ☐ **Licence and rating**, valid and carried. Including photo ID* for Part-FCL licences.
- ☐ **Medical certificate** or **declaration** valid and carried.
- ☐ **90 day rule** compliant (if carrying passengers).
- ☐ **Current to fly** under rules for club or group.
- ☐ **Fit to fly** – in good physical and mental health. ⓘ
- ☐ **Passengers** briefed. ⓘ

AIRCRAFT

- ☐ **Airworthy** condition.
- ☐ **Certificate of Airworthiness** or **Permit to Fly** valid, supported by a valid **Airworthiness Review Certificate** or **Certificate of Validity.**
- ☐ **Aircraft Equipment** (including survival) appropriate and operative.
- ☐ **Fuel and oil** adequate for the flight and any foreseeable diversion.
- ☐ **Mass, balance and performance** within limits for aircraft and aerodromes. ⓘ
- ☐ **Documents** required onboard. ⓘ
- ☐ **Insurance** valid.
- ☐ **Pre-flight inspection** complete.

*Should be passport or driving licence.

PRE-FLIGHT PLANNING

- ☐ **NOTAMs** checked for route, destination and alternate aerodromes.
- ☐ **Route planned.**
- ☐ **Weather conditions** checked and suitable.
- ☐ **Charts** current and reviewed.
- ☐ **Moving map device** current and route programmed.
- ☐ **Destination** and **alternate aerodromes** planned and adequate.
- ☐ **Prior permission** obtained for aerodromes (if applicable).
- ☐ **Border Force** and/or **Special Branch** notified (if applicable).
- ☐ **Overnight weather** checked for high winds, frost or snow (if aircraft to be left outside).
- ☐ **Flight plan** filed (required for international flight).

! Have you assessed the risks of the flight? Use the PAVE checklist.

Pilot, **A**ircraft, en**V**ironment, **E**xternal pressures – see p.123 for more details.

Chart updates, AIP, AICs and NOTAMs are available at **www.nats.aero/do-it-online/ais/**

UK Airspace restrictions are available on **08085 354802**

Subscribe to **Skywise** email notifications for the latest regulatory news and alerts – **skywise.caa.co.uk**

UK COMMS INFO

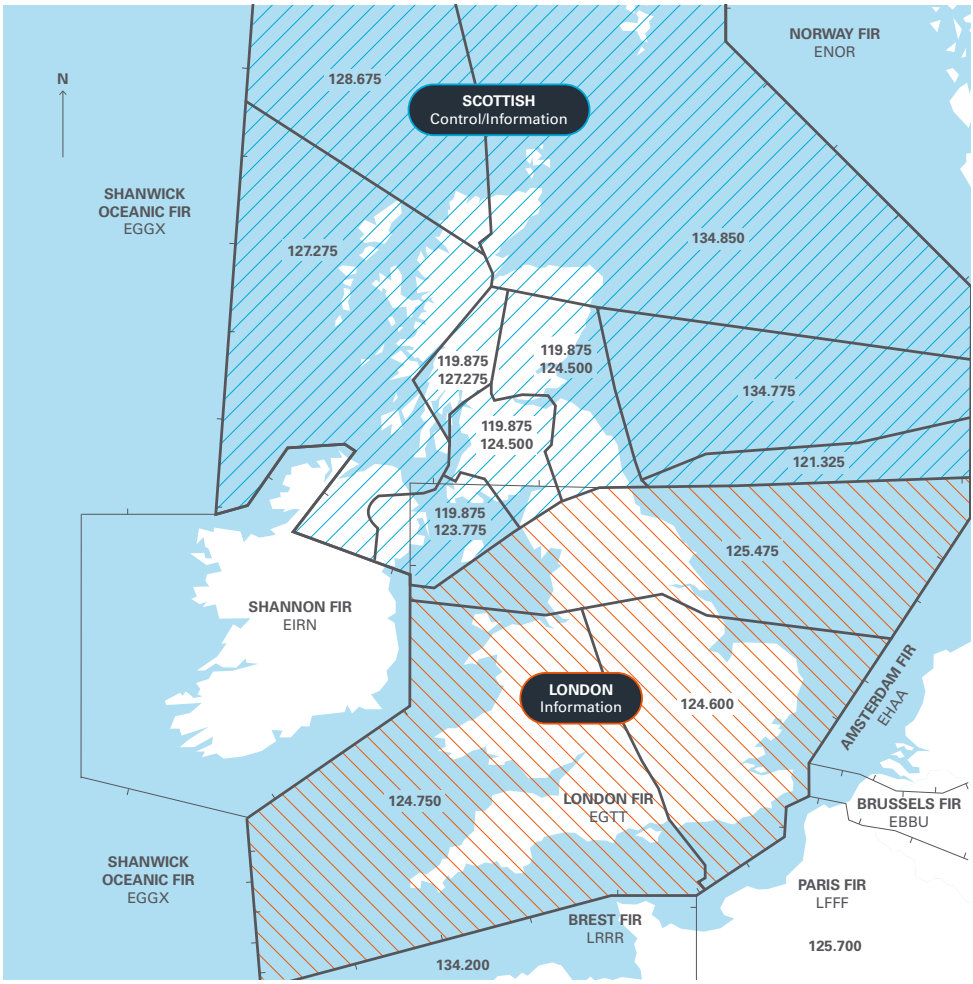
Including:

02.

UK COMMS INFO

Flight Information Regions

London and Scottish Information can provide a 'Basic Service' to all civil aircraft in UK airspace. Subject to capacity, other services such as opening flight plans or weather information are also available. Note London/Scottish Information are not equipped with surveillance (radar). Any transponder code assigned is for the awareness of other ATC units. For more details of UK Flight Information Services, see p.80.

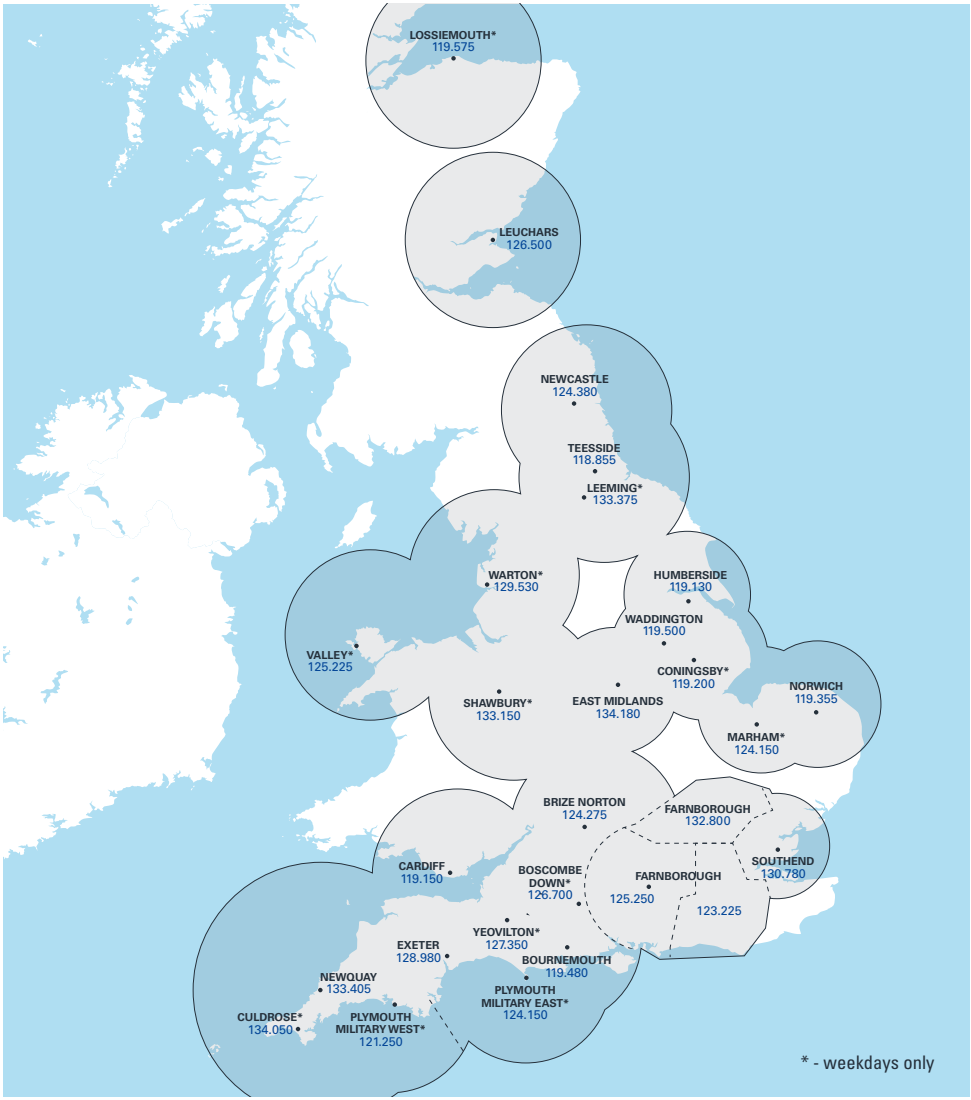


London FIS – all frequencies H24, SFC-FL195
Scottish FIS – all frequencies H24, SFC-FL245 except 119.875 available 0800-2000 local time SFC-FL55

UK COMMS INFO

Lower Airspace Radar Services

Lower Airspace Radar Service (LARS) units provide UK Flight Information Services (UK FIS) to aircraft outside controlled airspace up to and including FL100. Hours of operation will vary and service is always subject to ATC capacity. For more details of UK FIS, see p.80. Full details of LARS are found in ENR 1.6 of the AIP – search for 'Lower Airspace Radar Service' within the ENR 1.6 pages.



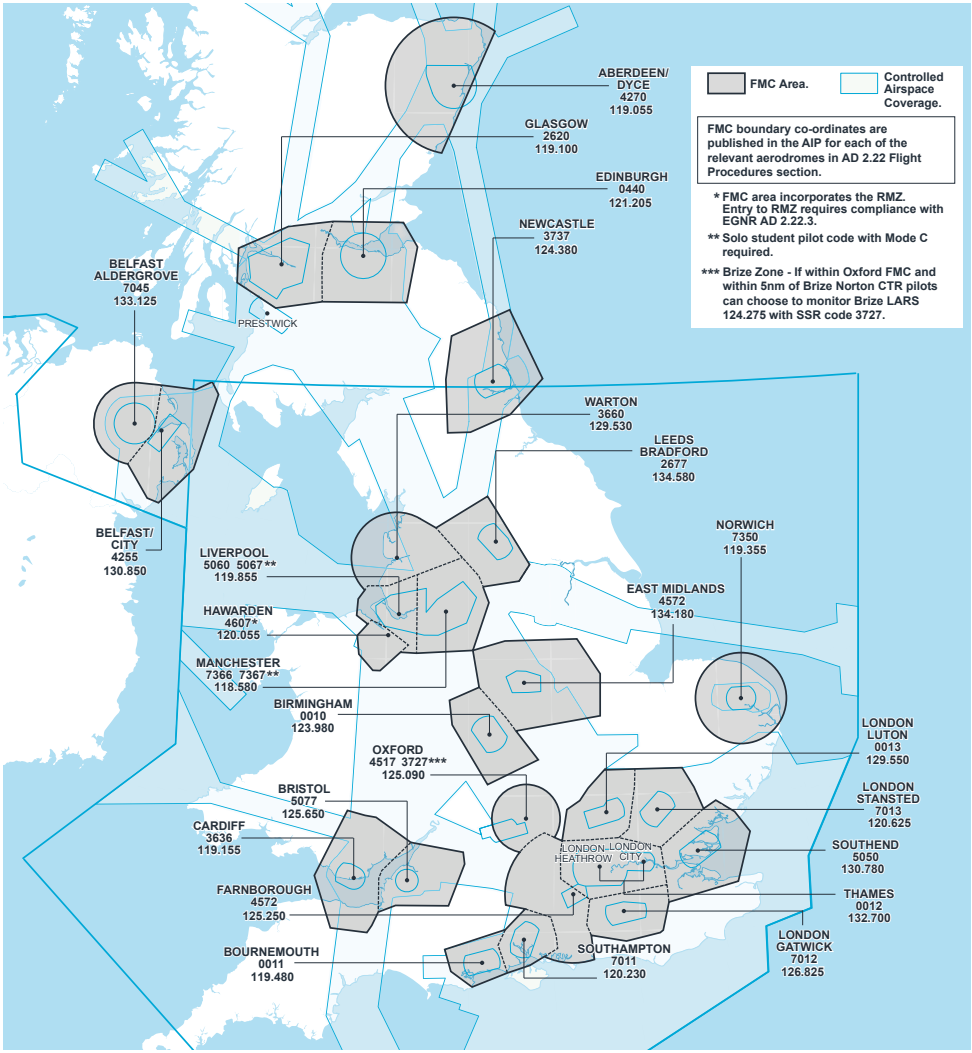
UK COMMS INFO

Frequency Monitoring Codes

Frequency Monitoring Codes (FMC) should be selected on your aircraft's transponder while monitoring the applicable ATC frequency, without having established radio communication.

Remember to return your transponder to the appropriate **conspicuity code** (VFR – 7000, IFR – 2000) when no longer monitoring the relevant frequency.

The chart below is based on ENR 6-80 in the AIP.



UK COMMS INFO

UK VOLMET frequencies

VOLMET is a continuous radio broadcast of aerodrome METAR reports. This can be useful for in-flight weather updates.

Main 135.375	South 128.6	North 126.6	Scottish 125.725
Amsterdam	Birmingham	Durham Tees Valley	Aberdeen
Brussels	Bournemouth	East Midlands	Belfast Aldergrove
Dublin	Bristol	Humberside	Edinburgh
Glasgow	Cardiff	Isle of Man	Glasgow
London Gatwick	Exeter	Leeds Bradford	Inverness
London Heathrow	Jersey	Liverpool	London Heathrow
London Stansted	London Luton	London Gatwick	Prestwick
Manchester	Norwich	Manchester	Stornoway
Paris Charles de Gaulle	Southampton	Newcastle	Sumburgh
	Southend		

Frequency Reference Cards

Frequency reference cards are designed to accompany the UK VFR charts. They include aerodrome frequencies, as well as many useful enroute ones.

They are downloadable from the VFR Charts page of the NATS AIS website.

KEY REGULATIONS

Including:

03.

KEY REGULATIONS

Assimilated law

On 1st January 2021 most existing European aviation regulation transferred into UK law. Such regulation formed part of the 'retained EU law', as established by the European Union (Withdrawal) Act 2018. Aircraft that were previously 'EASA aircraft' therefore continue to be subject to similar requirements to those in force while the UK was a member of the EU. From 1st January 2024 retained EU law is known as 'assimilated law', in accordance with the Retained EU Law (Revocation and Reform) Act 2023.

The distinction between 'EASA' and 'non-EASA' aircraft continues in UK law for the time being. From January 2021 the terms were replaced with 'Part 21[1]' and 'non-Part 21' aircraft respectively. Part 21 aircraft are regulated under the assimilated law and non-Part 21 aircraft under the Air Navigation Order (ANO) 2016.

The transposition of the EU aviation regulations also shifted the associated institutional responsibilities from the European Union Aviation Safety Agency (EASA) and the European Commission to the CAA and Department for Transport.

The UK may elect to maintain parity with some future European regulatory changes. This is not automatic, and the assimilated law remains based on the versions in force on 31st December 2020. Changes to the assimilated law will be subject to the UK legislative process, including public consultation where appropriate.

Version 4 of the *Skyway Code* reflects the legal position as of November 2023. For details of consultations and changes please subscribe to Skywise Alerts and monitor the CAA website.

UK BASIC REGULATION

UK Regulation (EU) 2018/1139 is known as the UK 'Basic Regulation'. It is the assimilated version of the EASA Basic Regulation. The Basic Regulation is the high-level primary legislation that sets out the essential regulatory requirements for areas such as personnel, aircraft and operations. The Basic Regulation also makes provision for more detailed regulations covering the different functional of areas of aviation. The regulations made under the UK Basic Regulation are referred to collectively as the 'Implementing Rules'.

UK AIRCREW REGULATION

Requirements for the licensing of aircrew are contained in **UK Regulation (EU) 1178/2011**, known as the UK Aircrew Regulation. The Regulation contains several annexes, including Part-FCL and Part-MED. Part-FCL contains the requirements and privileges for flight crew licences and ratings. A licence issued in accordance with UK Part-FCL is known as a Part-FCL licence. Part-MED contains medical certification requirements.

[1]The term 'Part 21 aircraft' derives from the Initial Airworthiness Regulation, UK Regulation (EU) 748/2012

Assimilated law

UK AIR OPERATIONS REGULATION

Operational requirements for Part 21 aircraft are contained in **UK Regulation (EU) 965/2012**, known as the UK Air Operations Regulation.

General aviation pilots are primarily concerned with the **Part-NCO** annex of the Air Operations Regulation. Part-NCO contains pilot responsibilities, operational rules and aircraft equipment requirements. It is applicable to non-commercial and flight training operations with 'other-than-complex motor-powered' Part 21 aeroplanes and helicopters.

'Complex motor-powered' aeroplanes and helicopters comply with more extensive requirements that are outside the scope of the *Skyway Code*. 'Complex' is as defined in the 2008 EASA Basic Regulation:

Aeroplanes	Helicopters
Maximum certificated take-off mass exceeding 5700 kg	Maximum certificated take-off mass exceeding 3175 kg
Certificated for a maximum passenger seating configuration of more than 19	Certificated for a maximum passenger seating configuration of more than 9
Certificated for operation with a minimum crew of at least two pilots	For operation with a minimum crew of at least two pilots
Equipped with at least one turbojet engine or more than one turboprop engine	-

SAILPLANE AND BALLOON REGULATIONS

Operational and licensing rules for Part 21 sailplanes and balloons became applicable in 2019. These regulations continue in the UK as assimilated law:

- Balloons – **UK Regulation (EU) 2018/395**
- Sailplanes – **UK Regulation (EU) 2018/1976**

The requirement to hold a pilot's licence in accordance with the assimilated law is currently deferred until 30th September 2025. Before this date, it is acceptable to fly a Part 21 balloon under the privileges of an ANO licence, or a Part 21 sailplane with the appropriate British Gliding Association (BGA) certificate.

Non-Part 21 gliders and balloons will continue to be regulated by the ANO 2016.

Assimilated law

UK CONTINUING AIRWORTHINESS REGULATION

Continuing airworthiness and maintenance requirements for Part 21 aircraft are contained in **UK Regulation (EU) 1321/2014**, known as the UK Continuing Airworthiness Regulation. Most owners or operators of Part 21 light aircraft will be concerned with the Part-ML annex of the regulation. More information about Part-ML is available in the Airworthiness Code and the Part-ML pages of the CAA website.

UK STANDARDISED EUROPEAN RULES OF THE AIR

The UK Standardised European Rules of the Air (UK SERA) is contained in **UK Regulation (EU) 923/2012**. Several amendments have been made to the assimilated version of SERA since 1st January 2021 and these are highlighted throughout the *Skyway Code* where applicable to GA operations. The requirements of SERA apply to all aircraft in UK airspace[2].

ACCEPTABLE MEANS OF COMPLIANCE

Acceptable Means of Compliance (AMC) and Guidance Material (GM) is designed to assist the reader in understanding and complying with regulations. AMC sets out the more detailed means by which compliance may be achieved. GM typically assists in understanding the meaning and interpretation of an implementing rule.

AMC is sometimes referred to as 'soft law'. To provide uniform implementation, the CAA has decided that AMC will constitute a means by which the requirements in the applicable assimilated law can be met. However, compliance may be demonstrated by other means as well.

AMC and GM are either published separately from the associated regulation, or in some cases may be provided within a consolidated document.

Air Navigation Order 2016

The **Air Navigation Order 2016** (ANO 2016) is a Statutory Instrument, made under the powers of the Civil Aviation Act 1982. The current ANO came into force in 2016 and contains high-level safety regulations applicable to all aircraft in UK airspace and persons involved in aircraft operations.

The ANO also sets out detailed regulations for the airworthiness and operation of non-Part 21 aircraft and associated personnel licensing. Pilot licences issued under the ANO are sometimes referred to as 'national' licences.

RULES OF THE AIR 2015

The **UK Rules of the Air Regulation 2015** is made under the ANO. The Regulation contains a small number of rules that are additional to those in SERA. It applies to all aircraft in UK airspace. The requirements relevant to GA are highlighted throughout the *Skyway Code*.

[2]SERA and the UK Rules of the Air 2015 also apply to UK registered aircraft outside UK airspace, but only to the extent that compliance does not conflict with the rules of the state in which the aircraft is flying

KEY REGULATIONS

What applies to my flying?

PART 21 VS NON-PART 21 AIRCRAFT

Part 21 aircraft would have been 'EASA aircraft' while the UK was still a member of the EU. Most modern factory built aircraft (other than microlights and gyroplanes) are considered Part 21.

Non-Part 21 aircraft are regulated by the UK Air Navigation Order (ANO) 2016. Vintage and ex-military aircraft, amateur built aircraft, microlights, gyroplanes are normally non-Part 21. Such aircraft will have a certificate of airworthiness or permit to fly issued under the ANO 2016, unless exempt from airworthiness certification.

Foot-launched aircraft such as hang gliders, paragliders and self-propelled hang or paragliders are also non-Part 21. A full description of the non-Part 21 criteria can be found in the CAA GA webpages.

PART-FCL VS ANO LICENCES

Part-FCL pilot licences are issued under the UK Aircrew Regulation and are required to fly Part 21 aeroplanes and helicopters. Part-FCL licences, issued while the UK was still a member of EASA, continue to be valid on UK-registered Part 21 aircraft. A Part-FCL licence may also be used to fly a non-Part 21 aircraft of an equivalent aircraft category and class. To fly a non-Part 21 aircraft requiring a type rating, you need a UK licence issued under the ANO.

Licences issued under the ANO may only be used to fly non-Part 21 aircraft, with the exception that you may use an ANO licence to fly a Part 21 aircraft under Part-NCO and within the privileges of the following ratings: Single Engine Piston (SEP), Simple Single Engine Aeroplane (SSEA), Self-Launching Motor Glider (SLMG) or Touring Motor Glider (TMG).

Aircraft		Licensing	Operational
	Part 21 Aeroplanes and Helicopters	Part-FCL	Part-NCO
	Non-Part 21 Aeroplanes, Helicopters and Gyroplanes	ANO 2016 – Part 6 & Schedule 8	ANO 2016 – Part 5 & Schedule 5
	Part 21 Sailplanes	Part-SFCL[1]	Part-SAO
	Non-Part 21 Gliders[2]	BGA Certificate	ANO 2016 – Part 5 & Schedule 5
	Part 21 Balloons	Part-BFCL[1]	Part-BOP
	Non-Part 21 Balloons	ANO 2016 – Part 6 & Schedule 8	ANO 2016 – Part 5 & Schedule 5

Note 1: A Part-SFCL (sailplanes) licence or Part-BFCL (balloons) licence is required by September 2025.

Note 2: Non-Part 21 gliders do not require a statutory pilot's licence. Pilots are encouraged to hold a certificate from the British Gliding Association (BGA). Foot-launched hang gliders and paragliders (including self-propelled) comply with the ANO rules applicable to non-Part 21 gliders.

Finding Regulations

UK regulations can be found at caa.co.uk/uk-regulations:

- For the assimilated law see Aviation Safety > Basic Regulation, the Implementing Rules and UK CAA AMC GM CS.
- For the Civil Aviation Act 1982 and associated regulations see Aviation Safety > Civil Aviation Act 1982, the ANO 2016, the Rules of the Air 2015, and the DG Regulations 2002

Within the UK Basic Regulation and Implementing Rules section, the regulations are separated into functional area such as Initial Airworthiness, Continuing Airworthiness, Air Operations or Aircrew.

AVIATION REGULATORY LIBRARY

The Aviation Regulation Library contains the consolidations of individual regulations, Acceptable Means of Compliance (AMC), Guidance Material (GM) and Certification Specifications (CS).

Both web-based and PDF document versions are available. Note these consolidations are produced by the CAA, reference should be made to legislation.gov.uk for the official legal text.

Regulation Title	UK Reg (EU) reference	Link to web page (html)
Acceptance of third-country certification of pilots	2020-723	Website
Additional Airworthiness	2015-640	Website
Aerodromes	139-2014	Website
Aircrew	1178-2011	Website
Air Operations	965-2012	Website
ATM ANS provision of services	2017-373	Website
ATCO Air Traffic Controllers	2015-340	Website
Balloons	2018-395	Website
Continuing Airworthiness	1321-2014	Website
Initial Airworthiness	748-2012	Website
Sailplanes	2018-1976	Website
Standardised Rules of the Air (SERA)	923-2012	Website
Surveillance Performance Interoperability	1207-2011	Website
TCO-Third Country Operators	452-2014	Website
UAS	2019-945	Website
UAS	2019-947	Website
UK ACAS Regulation	1332-2011	Website

CAA PUBLICATIONS

Throughout the *Skyway Code* reference is made to various Civil Aviation Publications (CAPs). CAPs can be found online via caa.co.uk/[capnumber] – for example caa.co.uk/cap413.

Operating and licensing rules

PILOT QUALIFICATIONS

Key info

For licensed flying activities, you are required to have a valid:

- Licence;
- Rating; and
- Medical certificate or declaration.

Licences and ratings

The following applies to both Part-FCL and UK ANO:

- Licences are non-expiring. There is no periodic administrative requirement to gain a new licence document.
- Changes to details such as name or address must be notified to the CAA, so that an updated licence document can be issued.

For types of flying that do not require a statutory pilot's licence, you should refer to the guidance on qualifications from the relevant governing body or association such as the British Gliding Association (BGA) or British Hang Gliding and Paragliding Association (BHPA).

Ratings endorsed on the licence for a particular aircraft must remain valid in order to fly. They are either assigned by class, such as 'single engine piston' (SEP) or for helicopters or larger aeroplanes, by type, such as 'PA46'. Ratings are issued with a validity period: in order to keep a rating valid it must be revalidated or renewed. The only exception to this is the Light Aircraft Pilot's Licence (LAPL) which has a system of endorsements and 'rolling validity' rather than ratings. There are also ratings that add additional privileges to that of the basic licence, such as a night or instrument rating.

Certificate of Revalidation records the ongoing validity of individual ratings endorsed on the licence. An examiner or authorised instructor must sign the Certificate of Revalidation on the licence when certifying the revalidation or renewal of a rating. The examiner or authorised instructor must also notify the CAA of the revalidation or renewal by completing and submitting the appropriate form.

Revalidation of a rating refers to the action taken to further extend its validity while within the existing validity period. Depending on the rating, this is normally achieved by an examiner (or in some cases a specially authorised instructor) either reviewing whether the appropriate flying experience has been obtained within the validity period or conducting a proficiency check flight.

Key differences between the requirements for Part 21 and non-Part 21 aircraft are highlighted where applicable:

ANO Only applicable to non-Part 21 aircraft

Part 21 Only applicable to Part 21 aircraft

Operating and licensing rules

Renewal refers to the reactivation of a rating after it has expired. For the renewal of ratings on Part-FCL licences, you will have to undergo an assessment to determine whether any refresher training is necessary, before conducting a proficiency check flight with an examiner.

Differences and familiarisation training refers to training that must be undertaken to fly different variants of aircraft within the same class or type. A variant may be an aircraft within a class (for example SEP) with additional features such as retractable undercarriage or variable pitch propeller, or different models of aircraft within a class or type that are sufficiently different from each other to require training. Differences training requires practical training on the aircraft, whereas familiarisation may only consist of gaining additional theoretical knowledge.

Medical and fitness to fly

You are required to hold a valid medical certificate, or if flying non-commercially and only within the UK, a medical declaration is sufficient for most light aircraft, within certain limitations. More details of medical options for private pilots can be found at www.caa.co.uk/ga.

> You must also be **fit to fly** on a particular flight. You must not be suffering from any illness or fatigue that might endanger the safety of the flight. See p.121 for guidance on pilot fitness.

Carrying passengers

> **90 day rule**: In order to carry passengers, you must have completed within the previous 90 days, three take-offs and landings as sole manipulator of the controls in the same type or class to be used on the flight. If carrying passengers at night, one of those takeoffs and landings must also have been at night, unless you hold an instrument rating.

> If flying on a UK ANO PPL or NPPL, you may fly with one other person who is also a pilot qualified on class or type, without having met the requirements of the 90 day rule. The other person must be informed of the fact that you are not current to carry passengers and you must make it clear you are the pilot in command. This is known in the ANO as the 'recent experience exception'. ANO

Note: Balloons have alternative passenger currency requirements.

Flight at night or under IFR

> Unless you have a night rating, you are not permitted to fly at night. In the UK, night is considered the period from 30 minutes after sunset to 30 minutes before sunrise.

> Unless you have an Instrument or Instrument Meteorological Conditions (IMC) rating, you are not permitted to fly under Instrument Flight Rules (IFR). You must remain within the VFR or Special VFR (as applicable) minima for the airspace you are flying in.

Flying on a foreign licence

Pilots wishing to fly a UK-registered Part 21 aircraft require a UK issued Part-FCL licence or validation. As of 31st December 2022, licences issued by EASA member states are no longer valid to fly UK-registered aircraft.

The holder of a valid and appropriate foreign ICAO licence may fly UK-registered non-Part 21 aircraft on non-commercial operations, without an individual licence validation.

Operating and licensing rules

PILOT IN COMMAND RESPONSIBILITIES

Key info

The following section based on:

- Part-NCO for Part 21 aeroplanes and helicopters; and
- Chapter 2 of Part 5 and Schedule 5 of the ANO 2016 for non-Part 21 aircraft.

Pilots of Part 21 gliders and balloons should refer to the Part-SAO and Part-BOP regulations respectively.

As **pilot in command** it is your responsibility to ensure the relevant requirements are met before and during the flight.

Responsibilities and conduct of the flight

- The general safety of the flight and those onboard;
- Complying with the regulations applicable to the flight, both of the state of registry and the state in which the flight takes place;
- Deciding whether to initiate, continue or terminate the flight, taking into account its ongoing safety;
- Determining whether you are fit to fly and not suffering from any illness, fatigue or other condition that will impair your performance and might render you unsafe to fly; and
- Defining the roles and duties of the aircraft's crew, including who is the PIC.

Prior to a flight you must be satisfied that:

- The flight can be safely made, taking into account the available information about the intended route and aerodromes to be used; and
- That all facilities, including operating sites and navigation aids that are required for the flight, are adequate for the intended operation.

Before making any take-off, approach or landing you must be satisfied that:

- The weather at the operating site and general condition of the take-off, approach or landing area would not prevent a safe departure or arrival.

Procedures

- You must operate the aircraft in accordance with its aircraft flight manual (AFM) and/or conditions of its permit to fly (as applicable); and
- Procedures must be in place for any reasonably foreseeable emergency.

Weather conditions

- You must only commence or continue a VFR flight if the information available indicates that at the place of departure, along the route and at the intended destination, conditions will be at or above VFR minima; and
- There is an alternative course of action available should the weather conditions prevent the completion of the flight as planned.

Operating and licensing rules

Fuel

- You must ensure sufficient fuel, oil, coolant or ballast (depending on the type of aircraft) is carried for the intended flight and a safe margin for contingencies.
- For aeroplanes and helicopters under Part-NCO, minimum fuel reserves are also required for VFR flight. Part 21
  - Aeroplanes:
    - By day, if remaining within sight of the aerodrome and returning to that aerodrome – 10 mins
    - By day – 30 mins
    - At night – 45 mins
  - Helicopters:
    - 20 mins

Aircraft and equipment

- You must ensure the aircraft is airworthy;
- Equipment required for the flight is fitted and serviceable;
- Any load is properly secured and would not prevent an emergency evacuation of the aircraft; and
- The aircraft's mass and balance will remain within the permitted range for the entirety of the flight.

Use of Oxygen

- You and other members of the crew must use oxygen continuously whenever the cabin altitude exceeds 10,000 ft for more than 30 minutes or any time above 13,000 ft.
- Passengers must use oxygen any time above 13,000 ft.
- Notwithstanding the above, Part-NCO gives the PIC flexibility to determine oxygen needs depending on how a lack of oxygen may affect the crew and/or passengers. This may allow flight above 10,000 ft without oxygen; however such a determination could also result in oxygen being used below 10,000 ft. Part 21

Survival equipment

- You must determine what survival equipment would be necessary to facilitate the survival of those in the aircraft, should a forced landing on either land or water occur; and
- Whether it is necessary for occupants to wear life jackets. If you are flying outside of gliding distance of land, you are required to carry one for each occupant.
- Aeroplanes and helicopters are required to have an Emergency Locator Transmitter (ELT). In aircraft up to six seats, a Personal Locator Beacon (PLB) may be carried instead. Part 21

Info: Aircraft equipment

For full aircraft equipment requirements refer to either:

Part-NCO (IDE) for Part 21 aircraft; or Part 21

Schedule 5 of the ANO for non-Part 21. ANO

Operating and licensing rules

Seating

- You must ensure at all times while in flight, at least one pilot is at the controls of the aircraft with their seatbelt fastened; and
- Except in the case of balloons, all passengers are seated with their seatbelts fastened during taxi, take-off, landing and any other time when necessary for their safety.

Carriage of documents

- For non-Part 21 aircraft flying within the UK, there are no document carriage requirements other than charts for navigation. ANO
- When exercising the privileges of a Part-FCL licence you must carry the licence document and photo ID with you at all times. This should be a driving licence or passport. Part 21
- For Part 21 aircraft, aeroplanes and helicopters under Part-NCO, you must always carry: Part 21
  - Aircraft flight manual;
  - Current charts;
  - Interception procedures;
  - Flight plan details (if one has been filed); and
  - Minimum Equipment List (if you operate with one).
- For international flights there are more extensive requirements, the details of which can found in the 'International Flight' chapter on p.161.

Passenger briefing

- You must ensure passengers are briefed on the emergency equipment and procedures for the flight; and
- If required for the flight, the use of oxygen equipment.

Guidance

Recommended contents of the passenger briefing:

- Safety when airside, propeller danger;
- Operation of the seatbelts;
- Operation of doors/canopy;
- Location of any emergency exits;
- Operation of life jackets, raft and ELT/PLB;
- Operation of the oxygen system;
- Actions in an emergency;
- Communicating during the flight, including sterile cockpit; and
- Comfort on the flight, including cabin temperature, pressure changes and the location of sick bags.

For more guidance see Safety Sense Leaflet 02- *Care of Passengers*.

Reporting of safety events

GA pilots are required to report certain safety occurrences that may happen while flying.

Such reports will be treated as confidential and reviewed for the purposes of improving flight safety. Any investigation of safety occurrences will always be conducted in accordance with the CAA 'Just Culture' policy.

Accidents and serious incidents must be reported to the Air Accidents Investigation Branch (AAIB).

More guidance on occurrence reporting is provided at www.caa.co.uk/cap382 and on p.143-146.

Specialised Operations

REGULATIONS

Part 21

Part 21 aircraft are subject to additional requirements when conducting 'Specialised Operations'. This includes activities such as aerobatic flights, parachuting and glider towing.

For non-commercial specialised operations the additional requirements are contained in NCO.SPEC – within the Part-NCO regulations. Commercial specialised operations and those with 'complex motor-powered aircraft' (see p.17) must comply with Part-SPO. Pilots and operators should also familiarise themselves with the factors that determine whether an operation would be considered commercial or not.

The majority of specialised operations are outside the scope of the *Skyway Code*, however some common GA activities, such as aerobatic flights, are included. If conducting an aerobatic flight, or any operation that may be considered 'specialised' you must familiarise yourself with the requirements.

In summary, NCO.SPEC requires you as **pilot in command** to:

- Conduct and document a risk assessment. This must assess the complexity of the activity to determine the hazards and associated risks of the operation and establish mitigating measures;
- On the basis of the risk assessment, develop a checklist appropriate for the intended operation; and
- Conduct a safety briefing with any crew or task specialists on board the aircraft covering operational procedures and emergencies. This may be accomplished by a suitable briefing at the commencement of the activity's operating season.

Full details of the requirements can be found in Part-NCO (or Part-SPO for commercial) of the UK Air Operations Regulation[1]. There is also guidance included on the conduct of risk assessments and development of checklists.

GLIDER TOWING GUIDANCE

Guidance on the safe conduct of glider towing can be found on the British Gliding Association (BGA) website at www.gliding.co.uk/safeaerotowing. Glider towing with Part 21 aircraft must also comply with the requirements of NCO.SPEC.

There are no specific items required for a glider towing checklist under NCO.SPEC, although it must be based on a risk assessment of the activity and specify the duties of the pilot in command and any other crew members involved in the operation.

[1]UK Regulation (EU) 965/2012

Specialised Operations

AEROBATIC GUIDANCE

Aerobatics offer the opportunity for pilots to learn new skills and improve their aircraft handling. Well executed aerobatics are also very satisfying to fly. However, they do bring additional risks that need to be considered and mitigated For more information see SSL 19 – Aerobatics.

Find a suitable instructor who is familiar with your chosen aircraft. They will likely cover most of what you need to know. Some basics to remember:

Aircraft suitability

- The aircraft must be cleared for aerobatic flight. Read all information in the AFM (or equivalent document) relevant to aerobatics. Know specifically what aerobatic manoeuvres are permitted.
- Know the applicable limitations for aerobatic flight. These include 'g' limitations, the V_A speed range (the maximum speed at which controls can be fully deflected without risk of damage) and the permitted mass and balance range for aerobatic flight.

Training

- For aerobatics conducted under the privileges of a Part-FCL licence, the pilot requires an aerobatic rating.
- With an ANO licence, there is no aerobatic rating required, however you are strongly recommended to receive training from an instructor with aerobatic instruction privileges prior to attempting to fly aerobatics.
- Only conduct manoeuvres that you have been instructed on and demonstrated the safe execution of.
- Be familiar with spin recoveries initiated from different parts of manoeuvres, the applicable escape actions should a manoeuvre not go to plan and start/recovery heights. Initially aerobatic instruction should be started around 5,000 ft above ground level (AGL), with all manoeuvres complete by 3,000 ft AGL.
- Proficiency will decay without regular practice, especially when experience is low. Take refresher training if you are out of practice.

Equipment

- The normal Part-NCO requirements to carrying a fire extinguisher, first aid kit and personal locater beacon (PLB) do not apply. These items may be removed from the aircraft when conducting aerobatic flights.
- Wearing a flying suit will allow you to carry pens and small charts without the risk of them coming loose in the cockpit.
- Sick bags are recommended for initial instructional flights and always take them if carrying passengers.
- It is not a legal requirement to carry a parachute, although it is recommended. Be familiar with its use and exit procedures from the aircraft.

Checks

For Part 21 aircraft, NCO.SPEC requires the development of a checklist for use on the operation. Specifically the checklist for **aerobatic flights** must include:

- Normal, abnormal and emergency procedures;
- Relevant performance data;
- Required equipment;

Specialised Operations

- Any limitations; and
- Responsibilities and duties of the pilot in command and if applicable, those of crew members and task specialists.

It is recommended to use an equivalent check list (airborne items should be memorised) for non-Part 21 aircraft as well.

When developing a checklist, the following practical items should be covered:

- Ensure you are strapped in securely and there are no loose articles in the cockpit.
- Control checks are very important. Check you have full rudder authority as part of your 'full and free' checks.
- '**HASELL**' is a useful mnemonic for remembering checks that must be carried out prior to commencement of aerobatic manoeuvres. Checks should be adapted to the aircraft you are flying. The following list gives considerations you should cover:
  - **Height** – commence at the height agreed with your instructor;
  - **Airframe** – landing gear up, flaps up, brakes off (sometimes having the brakes on can restrict rudder travel) and any other configuration requirements for your aircraft;
  - **Security** – all harnesses, doors and canopies secure. No loose articles;
  - **Engine** – engine configured correctly, for example mixture set, carb heat as required, correct fuel tank selected and fuel pump on if required;
  - **Location** – clear of airfields, congested areas, cloud and controlled airspace; and
  - **Look-out** – perform clearing turns in both directions and check above and below. Repeat look-out checks at regular intervals between manoeuvres.

Fitness for flight

- '**I AM SAFE**' can be used for any flight, adapted as required. See p.122 for more details.
- You must be in good physical and mental condition for aerobatic flight – rapid changes in altitude and g-force will make the flight even more unpleasant than a normal one if you are feeling unwell.
- Make sure you are well fed and hydrated, although do not have a large meal shortly before flying.
- G-tolerance will increase with practice – build tolerance over time. 4g or more will feel quite uncomfortable at first. Tensing stomach and leg muscles will help resist the forcing of blood to the lower body during positive g-force. Seek advice from an Aeromedical Examiner (AME) if you are unsure of the effect of aerobatics on any medical conditions you may have.
- Under NCO.SPEC you are allowed to take passengers on aerobatic flights. This can be exciting, but take account of their likely resilience to manoeuvres with increased g-force. Regularly check they are not feeling unwell.

PRE-FLIGHT PREPARATION

Including:

04.

PRE-FLIGHT PREPARATION

Introduction

It is recommended to check the weather forecast and NOTAMs a few days in advance of a planned flight. This will indicate the possible conditions and highlight any obvious restrictions such as air shows or aerodrome closures. Weather and NOTAMs must also be checked immediately prior to the flight.

Ensure you give yourself adequate time for pre-flight preparation, particularly if you are not flying regularly or are planning a more complex flight than usual. Find a quiet place that is free from distraction.

Mentally walk yourself through the flight using a **Threat and Error Management (TEM)** approach to identify any points that require additional attention. Using **PAVE** and **I AM SAFE** will also highlight any other risks, for example relating to pilot health or the aircraft.

Consider using a checklist of pre-flight items to avoid omitting anything – the list provided at the front of the *Skyway Code* is a recommendation that can be adapted to suit your own needs.

AIRCRAFT PROCEDURES

You should also consider whether you need to review operating procedures for the aircraft, for example:

- Indicated airspeeds and power settings for different stages of flight?
- Stall recovery actions or other emergency procedures?

See also the sections on Safer Flying and Emergencies.

VFR MOVING MAPS

The CAA promotes the use of VFR moving map devices for both pre-flight planning and in-flight navigation. Devices and any flight planning software must be kept updated, since there are frequent changes to airspace boundaries and other aeronautical information.

It is more effective to input the route and review all the relevant aeronautical information on the VFR moving map device prior to the flight, rather than simply switching it on when you go flying. The CAA also recommends pilots review and carry a paper chart, in case the device should fail. For more information on the use of VFR moving map devices, see SSL 29, available at www.caa.co.uk/safetysense.

Guidance

You should be familiar with the use of your VFR Moving Map device and not allow it to become an in-flight distraction.

Pre-flight information

AERONAUTICAL INFORMATION PUBLICATION

The official source of aeronautical information is the state Aeronautical Information Service (AIS).

AIS publishes the **Aeronautical Information Publication (AIP)**. This contains information of a permanent nature that is relevant to air navigation. The AIP conforms to international standards and is updated every 28 days.

- The UK AIP is available via the NATS AIS website.
- Most European AIPs can be found in the European Aeronautical Database (EAD) database – search for this online.

The AIP is split into:

- GEN – General operational, legal and administrative information;
- ENR – Enroute airspace; and
- AD – Aerodromes, with entries for all licensed or certificated ones in the UK.

There are also **AIP supplements** which contain temporary changes to the AIP, normally of a long duration. These are available alongside the AIP.

AERONAUTICAL INFORMATION CIRCULARS

AICs are notices relating to safety, navigation, technical, administrative or legal matters not included in the permanent information found in the AIP. AICs can be obtained from the same website as the AIP and are organised into five categories depending on the subject:

- White – Administrative;
- Yellow – Operational, including ATS facilities and requirements;
- Pink – Safety topics;
- Mauve – UK Airspace Restrictions; and
- Green – Maps and charts.

Yellow and Mauve are most relevant for pre-flight planning.

Briefing Sheets

Briefing Sheets are published by the CAA to notify temporary items of operational significance which for safety reasons are deemed necessary to promulgate outside the AIC publication schedule.

Briefing Sheets contain comprehensive text and/or graphics about the subject matter and which may typically be activated by NOTAM, or expand on a subject notified by NOTAM.

Where applicable the NOTAM and Briefing Sheet are also announced via the CAA Skywise notification platform.

Pre-flight information

NOTAMS

NOTAMs are notifications of temporary information (usually of less than 90 days duration), or permanent information not yet included in the AIP.

- The AIS site is the official source of NOTAMs in the UK. Use of the 'aerodrome brief', 'narrow route brief' and/or 'point brief' functions will help reduce the number of irrelevant NOTAMs displayed.
- As an aid to flight preparation and situational awareness, you are recommended to also use applications that allow NOTAMs to be overlaid on a graphical chart. The AIS website also incorporates a NOTAM map feature.
- You should always check the dates and times (which will be in UTC) of the AIP and AIC/ NOTAMs to determine whether they are relevant to the time at which you are flying.

Key info

You must check NOTAMs on the day of the flight – sometimes they may come out at short notice.

RESTRICTED AIRSPACE (TEMPORARY)

Restricted airspace (temporary) (see p.74 for depiction) may be established around large air displays or other significant public gatherings. Under the Restriction of Flying Regulations, entry to such airspace may be prohibited or restricted. This will normally be detailed in a 'Mauve' AIC. Read these AICs carefully to make sure you understand the nature of the restriction.

- Infringements of RA(T)s cause risk and disruption to the events they are intended to protect. This may include major airshows featuring high performance military aircraft such as the Red Arrows.
- Relevant RA(T)s will be listed in NOTAMs. If an RA(T) looks like it may impact on your intended flight, review the relevant AIC which will give more detail.
- An additional way to check for RA(T)s is the AIS information line on **08085 354802** – this provides a recorded message detailing the restrictions in effect on the day.

Restricted Areas (Temporary) are used to protect major airshows and other large public events.

Meteorology

AVAILABLE INFORMATION

Normal weather forecasts may be used for general planning. Within a few days of the intended flight, surface pressure charts give a useful indication of likely conditions. Conduct a detailed review of aviation weather forecasts prior to the flight.

The Met Office is the CAA designated source of aviation weather information in the UK and provides the following free products through the Aviation Briefing Service:

- Surface pressure charts;
- UK charts F214 (Winds aloft) and F215 (Significant weather);
- Near Europe charts F414 (Winds aloft) and F415 (Significant weather);
- TAFs and METARs;
- Satellite and rainfall imagery;
- GAMETs; and
- UK SIGMETs.

Pilot resource portal

The Met Office provides a knowledge resource section to help pilots understand aviation products and apply Threat and Error Management principles and basic meteorology, available at metoffice.gov.uk. There is also a useful guide to weather information available for download, known as 'GetMet'.

Info: You can register to access weather forecasts for free at metoffice.gov.uk

Met apps

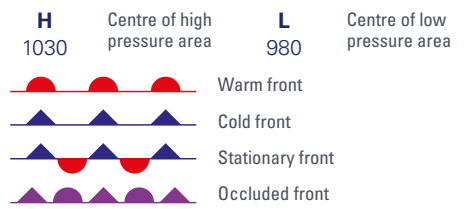
There is a range of apps and software that provide aviation weather information and integration into the flight planning process.

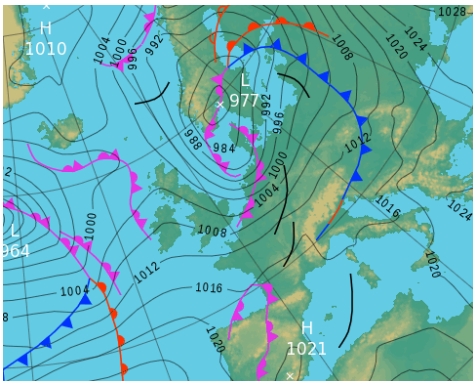
Always check the source data and understand whether information has been provided by a human forecaster or derived from weather models that may be unverified.

Surface pressure charts

Surface pressure charts become relevant around four days prior to the flight. They indicate the possible movement of weather fronts and surface pressure distribution. You should know which conditions are associated with the different directions from which air masses approach the UK. For example during the summer, air from Europe tends to be dry but hazy, whereas air from the Atlantic tends to bring rain and low cloud.

Chart Key





Meteorology

Metform 215

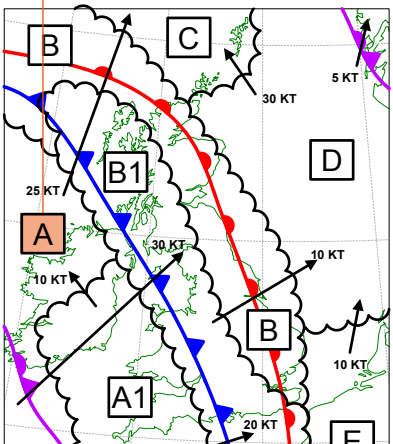
Metform 215 (F215) provides a forecast of in-flight weather conditions below 10,000 ft. It covers the British Isles for a 9-hour period centred on a fixed time. It is designed for use as either an area or route forecast. F415 is the version for near Europe.

The chart shows the forecast position, direction and speed of surface fronts and pressure centres at the fixed time shown in the chart's title box. Abbreviations used can be found in the Tables and Codes chapter (see p.157).

Zones of distinct weather are enclosed by continuous scalloped lines, each zone being identified by a letter.

Validity period = 0800 to 1700 UTC on 2nd day of the month (February 2017). Time of front/ zone positions = 1200 UTC.

Cloud cover, type and level above mean sea level. In this case there are two sets of clouds reported, one on each line. On the second line 020-030/040 indicates a base of between 2,000 ft and 3,000 ft with tops of 4,000 ft. XXX denotes tops above 10,000 ft. Symbols for associated ice or turbulence are also included.



All heights in 100s of feet above mean sea level

XXX means above chart upper limit
Speed of movement in KT
Hill FG implies VIS <200 M
Cloud amount (Oktas) FEW: 1-2 SCT: 3-4 BKN: 5-7 OVC: 8
MOD / SEV ICE
MOD / SEV TURB
TS / CB implies GR
FZ precipitation implies

This forecast may be amended at any time.
Issued by Met Office Exeter
Contact telephone 0370 900 0100
Forecaster: Duty Forecaster

at 020250 Z
F215

Met Office

Forecast Weather below 10000 FT

Valid 020800 to 021700 Z FEB 17 Fronts/zones valid at 021200 Z

AREA	SURFACE VIS AND WX	CLOUD	0 C
A	30 KM NIL ISOL (FRQ FRONT) 7 KM SHRA/BL SPRAY ISOL 2000 M +SHRA/+TSRA ⋀ (OCNL ⋀ **A1**) ISOL HILL FG	OCNL BKN/OVC AC Ψ ⋀ 080 / XXX FRONT OCNL SCT/BKN CU SC Ψ ⋀ ... ...015-030 / 080-XXX ISOL (EMBD FRONT) CB 015-025 / XXX ISOL SCT/BKN ST 008-012 / 015	050
B	20 KM NIL OCNL 7 KM RA/-RADZ ISOL 3000 M RADZ/(+RA MAINLY ... ... COLD FRONT) MTW MAX VSP 500 FPM AT 050 ⋀ (ISOL ⋀ **B1**) OCNL HILL FG	BKN/OVC AC AS Ψ ⋀ 080 / XXX BKN (LCA FEW/SCT LEE MON) CU SC... ... Ψ ⋀ 015-025 / 060-080 OCNL (ISOL LEE MON) SCT/BKN ST ... ...004-008 / 015	060-080
C	25 KM NIL ISOL 7 KM SHRA ISOL ⋀ ISOL HILL FG	OCNL BKN SC AC Ψ ⋀ 040-060 / XXX ISOL SCT/BKN CU SC ⋀ 020-030 / 040	060-080
D	15 KM NIL ISOL (OCNL FRONT) 7 KM ... ...RA/-RADZ/(FZRA NE OF FRONT) ISOL 3000 M RADZ/BR ISOL 800 M SN MON NORWAY ISOL 200 M FG/(FZFG LAN NE OF FRONT) ⋀ (ISOL ⋀ FAR NE) OCNL HILL FG	AREAS BKN AC Ψ ⋀ 080 / XXX MAINLY ... ... FRONT BKN/OVC CU SC Ψ (Ψ NORWAY) ⋀ ... ...015-025 / 060-080 AREAS BKN ST 003-006 / 015 (BASE ... ...000 FG/FZFG)	040 NE ... ...LCA... ...SUB-... ...ZERO... ...005- ... ...035 ... ...NE OF ... ...FRONT 080 SW
E	20 KM NIL ISOL 3000 M BR LAN MAINLY FAR E ISOL 200 M FG LAN FAR E OCNL ⋀ ISOL HILL FG	ISOL SCT SC AC Ψ ⋀ 040-080 / XXX ISOL (OCNL FAR E) SCT/BKN ST ... ...005-010 / 015 (BASE 000 FG)	060-080

Outlook Until 022359 Z: SIMILAR

Key

Time of issue = 2nd day of month at 0250 UTC

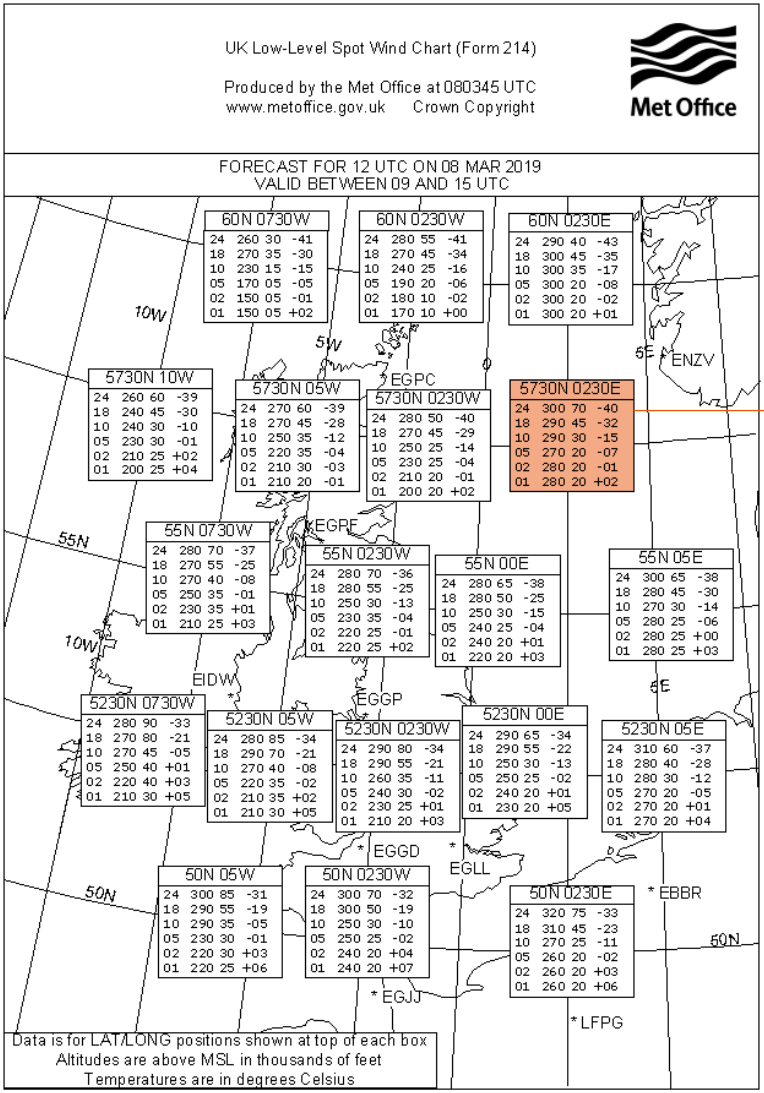
Visibility and weather.

0 degree isotherm; in this case 6,000 ft – 8,000 ft.

Meteorology

Metform 214

This provides forecast upper winds and temperatures. F414 provides the same for near Europe.



The top of the box gives the position of the 'spot' – which is normally at the intersection of the nearest LAT/LONG lines.

The four columns (left to right) cover:

- Altitude in 1,000s of feet
- Wind direction
- Wind speed
- Temperature

Meteorology

GAMET

GAMETs (General Aviation METeorological forecasts) are an abbreviated plain text forecast designed for low level general aviation users who operate over the UK. GAMETs replaced AIRMETs following a review undertaken by the Met Office and the CAA. The GAMET forecast is produced four times a day, divided into four regions of the UK.

GAMET **South East Region**
Issued on Monday 27 February 2023 at 03:08 UTC

Forecast region – in this example, the SE of the UK, and issue time.

Graphical reference of area of forecast.

Valid for 0800-1700 UTC

Period of forecast validity.

Met Situation Valid at 1200 UTC
MOD NE FLOW ACROSS THE REGION.

Summary of synoptic situation.

Strong wind warning
ISOL, MAINLY SEA COT FAR S, MEAN 15-20KT WITH GUSTS 25-30KT.

Summary of any expected hazardous conditions.

Freezing Level
GEN 2500FT, BUT 1500FT FAR SE.

Height above sea level of freezing level.

Weather Conditions

Zone 1

SE OF A SLOW-MOV LINE ST HELIER TO HASTINGS TO IPSWICH TO N5330 E00300:

GEN 40KM, WITH 0-5/8CUSC 2000-3000FT/4000-5000.
ISOL SEA WINDWARD COT, 8KM IN SHRA WITH 6/8CUSC 2000FT/7000.

WRNG: MOD ICE AND MOD TURB IN CLD.

Detailed forecast of conditions within the region covered by the forecast, often split into 'zones'.

Meteorologist: Aviation, Tel: 0370 900 0100

Meteorology

Wind

Norwich			
Height (above ground level) / time (UTC)	0900	1200	1500
1000ft	050 15 KT +03	050 15 KT +03	040 15 KT +03
3000ft	050 20 KT -02	050 20 KT -02	040 20 KT -02
6000ft	060 30 KT -05	070 25 KT -05	060 25 KT -05

Southampton			
Height (above ground level) / time (UTC)	0900	1200	1500
1000ft	040 20 KT +01	060 20 KT +03	050 20 KT +04
3000ft	060 30 KT -03	060 25 KT -03	050 20 KT -02
6000ft	060 35 KT -06	070 30 KT -03	080 30 KT -03

Oxford			
Height (above ground level) / time (UTC)	0900	1200	1500
1000ft	040 20 KT +01	050 20 KT +02	050 20 KT +03
3000ft	060 30 KT -03	060 25 KT -03	050 25 KT -02
6000ft	070 30 KT -04	070 30 KT -04	070 30 KT -04

Gatwick			
Height (above ground level) / time (UTC)	0900	1200	1500
1000ft	040 20 KT +01	050 20 KT +02	050 20 KT +03
3000ft	060 30 KT -04	060 25 KT -03	050 25 KT -03
6000ft	060 35 KT -05	070 30 KT -03	070 30 KT -04

Spot wind and temperature forecasts for representative locations.

Regional Outlook (Valid 1800-2400 UTC)
SIMILAR.

UK Extended Outlook (Valid 0000-2400 UTC)
HIGH PRESSURE WILL REMAIN CENTRED OVER N SCOTLAND GIVING LARGELY SETTLED CONDITIONS AND A LIGHT TO MOD NE FLOW.

WDSPR SCT/BKN CUSC WITH ISOL SHRA, OCNL UPSLOPES IN E. RISK SHSN ON MON. ISOL ST AND HILL FG. OCNL RA/SHRA DEVELOPING IN FAR SE ON TUESDAY. ISOL BR/FG/FZFG DEVELOPING IN N OVERNIGHT. MAINLY VAL SCOTLAND. POSSIBLE ISOL HVY SHRA THROUGH ENGLISH CHANNEL TUESDAY PM.

WINDS LIGHT TO MOD N OR NE, LCA STRONG NEAR CHANNEL COT.

Regional outlook for the following 6 hours.

UK outlook for the following 24 hours.

Meteorology

TAFs and METARs

Full details of abbreviations used in TAFs and METARs are available in the Tables and Codes chapter (see p.157).

- TAFs are forecasts; METARs are reports of the actual weather.
- 24 or 30 hour TAFs are often produced for larger aerodromes. These will give an indication as to when particular weather will be present and when it is expected to change. Look at several in the relevant area to build a better picture of the likely weather situation.
- If there is uncertainty in the forecasts, for example if the time of a change in the weather cannot be confidently predicted, or there are periods where 'PROB30' or 'PROB40' are used, examine the overall weather situation more thoroughly.
- TAFs/METARs give the cloud base in relation to the ground level at the reporting aerodrome – take account of that when comparing them to the planned altitude of your route.
- Looking at TAFs/METARs on a map presentation rather than a list will make it easier to build a weather picture. The Met Office website includes this feature.

Example TAF:

EGHI 121954Z 1221/1223 34008KT 9999 SCT025 TEMPO 1221/1223 8000 PROB30 1221/1223 3000 BR MIFG

- **121954Z** refers to the time of issue – 1954 UTC on 12th day of the month;
- **1221/1223** refers to period of the forecast – 2100 UTC to 2300 UTC on 12th day of the month;
- **34008KT** is the wind – blowing from 340° at 8 kts;
- **9999** is the visibility – when visibility is quoted as 10 km or more, it is reported as '9999'. When lower than 10 km, it will be reported as the actual visibility in metres.
- **SCT025** is the cloud cover. In this case 'SCT' means coverage of 3 to 4 oktas (eighths) of the sky. '025' means 2,500 ft above aerodrome level (AAL). Unless the cloud is cumulonimbus or towering cumulus, the type is not reported.
- **TEMPO** means (within the given time period) a condition of a temporary nature. So in this case the visibility is expected to temporarily reduce to 8000 m at some point between 2100 UTC and 2300 UTC.
- **PROB30** means 30% probability of the following conditions occurring. Only PROB30 and PROB40 are used in the UK. So in this case there is a 30% probability that between 2100 UTC and 2300 UTC the visibility might be 3000 m in mist (BR) and shallow fog (MIFG).

A METAR uses a similar format, with a time of report at the beginning rather than a validity period. METARs are normally updated every half an hour, although may be updated more frequently if the weather changes significantly in a short period of time.

SIGMETs

SIGMET – 'Significant Meteorological Information' is a special weather advisory of severe weather phenomena that might affect the safety of all aircraft in the area, such as severe thunderstorms, mountain waves, icing or turbulence.

Meteorology

AIRFRAME ICING

If you enter visible moisture when the outside air temperature is 0 °C or less, ice may form on the aircraft. Ice has a very detrimental effect on aircraft performance, so must be avoided, unless the aircraft is approved for flight in icing conditions. The worst airframe icing will normally occur between 0 °C and –15 °C.

Always remove any frost, ice or snow from the aircraft before flight. Ensure the pitot probe and static ports are clear of contamination.

ENGINE ICING

The most significant icing risk to GA aircraft equipped with carburettor engines is 'carb icing'.

It is caused by the lowering of the pressure (and therefore temperature) in the aircraft's carburettor as the fuel air mixture is drawn through the venturi and towards the throttle valve. As the temperature lowers, the water vapour in the fuel air mixture will condense and freeze, preventing delivery of the mixture to the engine.

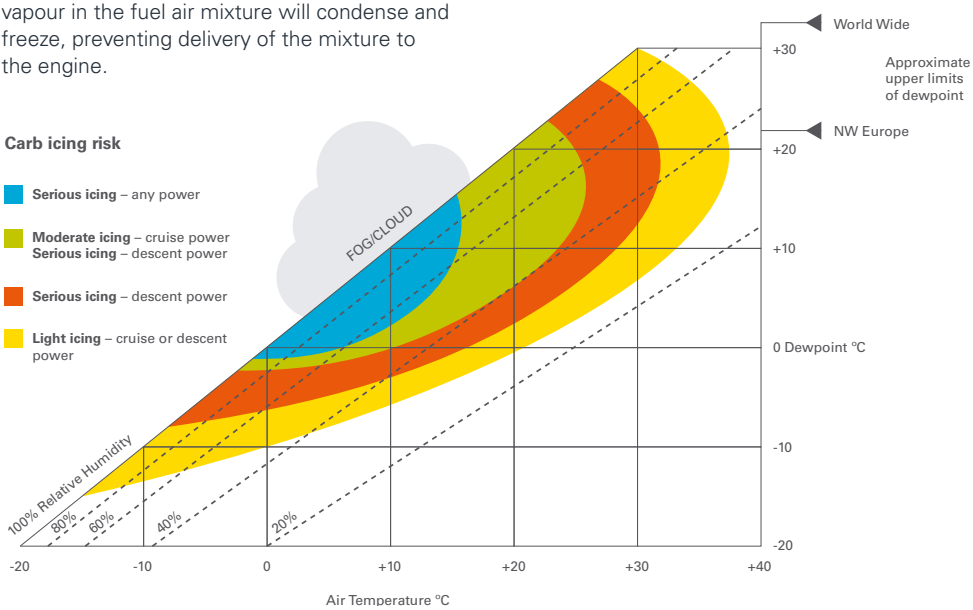
Carb icing often forms outside visible moisture, particularly when the relative humidity is high. It is more likely to occur at lower power settings, although under some conditions it can occur at any power setting.

You should refer to the Aircraft Flight Manual (AFM) for your aircraft for specific details of carb icing and the use of the carb heat function to prevent it.

Fuel injected engines do not suffer in the same way, although it is possible to get ice forming around air intakes, potentially restricting air flow into the engine. Use of the 'alternate air' function may be necessary to ensure sufficient air flow to the engine.

Piston Engine Icing

For more info see the SSL 14 >



Meteorology

MAKING THE WEATHER DECISION

You should have a good understanding of the overall weather conditions before you go flying and particularly how the weather may evolve during the flight.

You should understand the conditions associated with common weather features, including:

- Warm and cold fronts;
- High and low pressure systems; and
- Thunderstorms.

VFR minima

For operations in class G airspace, the VFR minima may allow an in-flight visibility as low as 1,500 m, provided you remain clear of cloud. The cloud height is often the limiting factor – in conditions of 1,500 m visibility, the cloud height would normally force you to fly dangerously low.

The legal minima (see p.66) are not a good reference point for decision making because safe VFR flight normally ceases to be possible long before the visibility is that poor. They are limits not targets.

Above 3,000 ft AMSL, there are circumstances in which VFR flight is permitted without sight of the surface. However, if you do not hold an instrument rating (IR) or IMC rating, you must not enter the clouds and you must be certain of being able to descend visually at your destination.

Cloud base and ceiling

- 'Cloud ceiling' refers to the lowest cloud that covers more than half the sky – so broken (BKN) or overcast (OVC) cover constitutes a cloud ceiling.
- 'Cloud base' refers to the lowest visible cloud, so includes few (FEW) or scattered (SCT) cloud.

Consider the possible cloud base and ceiling at different stages of the flight and how it will impact your ability to remain in VMC.

How low is too low?

Consider the following factors:

- What is the purpose of the flight?
- What are the terrain and obstacles like along the route?
- Is the weather getting better or worse in the direction you are going?
- What will it be like at your destination?

Guidance

Remember to compare the cloud height figures at aerodromes with nearby terrain. TAFs and METARs give cloud levels in height above aerodrome elevation. A 1,500 ft cloud ceiling could be shrouding the tops of nearby hills.

Meteorology

Guidance

VFR flight with a cloud ceiling of **1,500 ft** or less above ground level (AGL) requires particular attention to terrain and obstacles. Flight below **1,000 ft AGL** is normally only suitable for circuits around the aerodrome or local flying in areas you are familiar with.

Going any significant distance at low level, even with reasonable visibility below cloud, is likely to involve close encounters with hills, radio masts, wind turbines and other hazards. You may also meet military aircraft practicing their low level flying – for which military pilots are specially trained. You must also ensure you do not breach the low flying rules (see p.59).

Visibility

Even if the cloud ceiling is high enough, you still need sufficient in-flight visibility to control the aircraft visually, navigate and avoid other aircraft. The F215 chart and TAFs/METARs will give an indication of surface visibility, but actual in-flight visibility can only be judged while in the air.

Guidance

VFR flight when the surface visibility is being reported as less than **5 km** is not recommended. You are unlikely to have a clear horizon to control the aircraft, and navigating visually will be difficult.

Be aware that during periods of warm and high pressure weather, the visibility is often poor due to haze, especially towards the sun. During the winter, low sun can also dramatically reduce forward visibility.

Wind

Consider the wind conditions. If significant crosswinds are anticipated for take-off or landing, ensure you are confident with the correct technique. If in doubt, practice with an instructor.

High winds aloft are not inherently hazardous, but winds above 35 kts or so are often indicative of bumpy conditions – maintaining accurate height and heading may be challenging. It is also important to take account of strong headwinds when calculating fuel requirements.

Planning the route

PILOTS LOG

It is recommended to produce a Pilot's Log ('PLOG'), either electronically or on paper. A PLOG should consist of information such as:

- Headings, distances and times for each route leg
- Radio frequencies
- Planned altitudes
- Safety altitudes
- Fuel plan

If using a VFR moving map device or electronic flight planning software, the format may differ from a paper PLOG, however the basic information should be similar and readily available in flight.

All calculations should be gross error checked for mistakes, such as confusion of 030° vs 300° or similar.

Always ensure the PLOG reflects the latest winds aloft information.

Plotting your route on a paper VFR chart may assist you in noting additional hazards. If your moving map device fails in-flight (for example due to overheating or a depleted battery), a plotted chart will be a useful backup.

HAZARDS AND AIRSPACE

- Select the most appropriate radio frequency for each stage of the flight. Consider the use of UK Flight Information Services (UK FIS).
- Note potential hazards such as aerodromes, danger areas, parachute zones or glider sites.

- Note the altitudes to which the relevant hazards are applicable, for example glider cable launches.
- Some of the busiest GA aerodromes in the UK do not have an Air Traffic Zone (ATZ). Anticipate the traffic you may encounter in the vicinity.
- Details of Danger and Restricted areas are listed in the notes of the UK VFR charts. A Danger Area Crossing Service (DACS) or information via telephone may be available to facilitate safe passage.
- More details of airspace hazards can be found in the Airspace chapter (see p.70-79) and in the ENR section of the AIP.
- VFR traffic may congregate around prominent visual landmarks, Visual Reference Points (VRPs) or navigation beacons creating a collision hazard. Planning to fly around them can reduce the risk, although watch out for nearby airspace.

Planning the route

ALTITUDE SELECTION

Guidance

The risk of airborne conflict may be reduced by avoiding 'whole number' cruising altitudes such as 3,000 ft, and instead selecting more random ones like 4,200 ft or 5,400 ft.

Consider the weather, terrain and airspace when selecting an altitude. Flying higher may provide advantages such as:

- Better view for navigation;
- Greater range in the event of an engine failure;
- Traffic density may reduce with altitude;
- Less turbulence;
- Improved true airspeed and fuel burn; and
- Improved radio reception.

Maximum elevation figure

On the VFR chart the large digits in each box created by the lat/long lines, known as the **'maximum elevation figure' (MEF)**, represent the higher altitude of:

- The highest obstacle in the box; or
- The highest terrain +300 ft.

3^2 = 3,200 ft

The derivation of the MEF is that obstacles less than 300 ft above ground level are not always captured in aeronautical data – hence the addition of 300 ft if there are no other obstacles in the box that are 300 ft or higher.

If there are obstacles of more than 300 ft these will be captured and they can be assumed to be the highest points in that area. They do not have any additional margin included.

Safety altitude

The MEF should alert you to the highest obstacle in the vicinity of your route, although you should also study the area at least 5 NM either side of your planned track to find the most relevant terrain and obstacles.

There is no requirement for VFR flight to have a safety altitude, however it is appropriate to add a 500 ft or 1,000 ft margin over the highest obstacle or terrain in the vicinity of your planned track.

If you are qualified to fly under IFR, consider planning the flight as such from the outset – if you encounter IMC, you will already have a terrain safe altitude or level.

Guidance

Note safety altitudes below which you will not descend due to weather without reversing course or diverting.

Planning the route

VFR cruising levels

The Standardised Rules of the Air (UK SERA) specify VFR cruising altitudes for flight above 3,000 ft AGL – the principle being that you fly at a particular altitude or level, depending on your direction. VFR cruising levels are not mandatory in the UK and in busy airspace, randomisation of cruising altitudes may be safer.

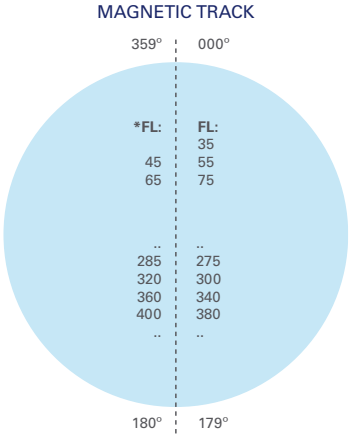
In some European states VFR cruising levels are mandatory, check the AIP of the applicable state. VFR levels start at FL35/3,500 ft and escalate every 1,000 ft thereafter. IFR levels start at 2,000 ft and also escalate every 1,000 ft. When flying in class E airspace (for example in Europe), mandatory cruising levels are the means by which IFR and VFR traffic are separated.

Descent planning

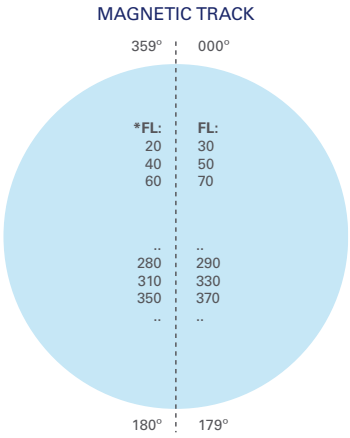
An effective rule of thumb is to allow 3 NM for every 1,000 ft of height you need to lose. So a descent from 10,000 ft would take approximately 30 NM.

This assumes ground speed x five = approximate required rate of descent. So if travelling at 100 kts ground speed, around 500 ft/min is the required rate of descent and equates to an approximatively three degree descent angle.

VFR CRUISING LEVELS



IFR CRUISING LEVELS



*If below the transition altitude (see p.92), the levels should be flown as altitudes, ie 3,500 ft, 4,500 ft and so on.

Planning the route

PLAN TO AVOID INFRINGEMENTS

Guidance

When flying near controlled airspace (CAS), there are a number of steps you can take to avoid becoming one of the hundreds of pilots that infringe CAS every year.

For more information please see the section on Infringements in the 'Safer Flying' section.

Study your route and options carefully, noting the boundaries of controlled airspace. Vertical limits often vary over a short distance and are not as obvious as horizontal ones.

The CAA encourages GA pilots to request a transit of CAS if appropriate. You should also have a backup plan in case the desired transit is unavailable.

If intending to remain clear of CAS, mark a route on your chart or moving map device that clearly avoids it – ad hoc navigation around edges and corners will result in too much attention being focused inside the cockpit or towards the ground, at the expense of your lookout scan.

Guidance

The CAA recommend a margin of 2 NM or 200 ft vertically, when remaining clear of CAS, Danger or Restricted Areas, ATZs or similar airspace- known as 'Take 2'.

If flying close to controlled airspace, plan to contact the relevant ATC unit and request a UK FIS. This will make ATC aware of your presence and if you do infringe, the impact can be mitigated more effectively.

As an alternative to requesting a UK FIS, using a Frequency Monitoring Code (FMC) will improve situational awareness and allow ATC to contact you in the event of a possible infringement. See p.13 for details.

Identify the most relevant QNH to use during each phase of the flight. The regional altimeter pressure setting (RPS) will normally underread you actual altitude, carrying the risk of vertical infringement. It is recommended to use a relevant aerodrome QNH instead. During the notified hours of all CTRs, CTAs, TMAs (and the areas below them), the airspace does not form part of the altimeter setting region for the RPS.

It is not recommended to use IFR waypoints for VFR navigation. They are often located on the boundaries of controlled airspace or as part of instrument approach or departure procedures – potentially generating a conflict or infringement risk.

It is better to create user waypoints that coincide with recognisable geographical features, this will improve situational awareness in the event of a loss of GNSS signal or moving map device failure.

If conducting general handling in the local area you may not always be focused on your position. To mitigate the risk of infringement:

- Determine altitudes that you must not go above (or below, as the case may be) to avoid infringing;
- Pick prominent ground features to orientate yourself around or mark points beyond which you must not go; and
- Always include 'airspace' in any 'HASELL' or similar checks before conducting manoeuvres.

Planning the route

TRANSIT OF CAS

Prior planning will increase your chances of obtaining a transit of CAS:

- Have a plan B in the event that a transit is unavailable.
- For CTRs, check for preferred VFR routes. These may be published in the relevant aerodrome AIP entry under AD 2.22 – Flight Procedures.
- Note any Visual Reference Points (VRP) near the airspace – ATC may ask you to report your position at or relative to a VRP.
- Consider the possible traffic flows within the airspace. Crossing at right angles to the main runway and close to the overhead may avoid conflict with aerodrome traffic, since you will be above it. At lower levels, airliners normally descend at a slower rate than they climb.
- Plan the point at which to request the transit – 10 minutes prior to the boundary is reasonable. ATC may ask you for an ETA at the zone boundary, so calculate this on your PLOG. Consider creating user waypoints in your VFR Moving Map device.
- Be prepared to be given a different route or altitude to the one you requested.

Know the hazards and features of your plan B – for example towns or landmarks near the boundaries of controlled airspace or ATZs that you may have to cross or avoid. Often overflying with sufficient vertical clearance is an effective avoidance.

Aerodrome planning

INFORMATION

Details of aerodromes are found within the AD section of the AIP, including information on runway characteristics, air traffic services and opening hours. The AIP only includes licensed or certificated aerodromes.

Details of some unlicensed aerodromes can be found in commercially available flight guides. The information provided for unlicensed aerodromes, particularly runway distances and obstacles, will normally be less detailed than for a licensed or certificated aerodrome, and may not have been verified. Always apply caution when conducting performance calculations.

At a licensed or certificated aerodrome, it can normally be assumed that there will not be any hazardous obstacles in the approach or departure paths. However this cannot be assumed for unlicensed aerodromes. Particularly for smaller strips, a briefing from the owner or operator of the site is essential.

LOCAL HAZARDS AND PROCEDURES

There is considerable variation in the local rules and procedures for different aerodromes. Procedures may be in place to limit environmental impact and/or accommodate different aircraft speeds in the circuit pattern.

Guidance

Understand the local environment. Common differences include circuit height and direction, noise abatement procedures and the level of air traffic service provided. A mix of traffic, for example helicopters, gliders or parachuting will require specific procedures for safe operation.

When visiting an unfamiliar aerodrome, you should consider/enquire about:

- Is prior permission (PPR) by telephone required?
- Are there any specific local operating procedures that should be followed? For example, if the aerodrome is close to or inside controlled airspace.
- Surface type and condition. If grass, is it long, wet and/or soft?
- How much useable length is there for take-off and landing?
- Are there any obstacles around the runway that might require consideration? Power cables, winch launching or trees are common ones. At some sites take-off and/or landing is only possible in one direction due to obstacles or terrain.
- What is the prevailing wind, are there any buildings or obstructions that might create unusual turbulence on approach?
- Are there any noise abatement procedures or noise sensitive areas to be avoided?
- Any other hazards that you need to be aware of? For example, surfaces near the runway that may be unsuitable for aircraft movement.

For more information on flying into small airstrips, see the 'Strip Sense' safety sense leaflet at www.caa.co.uk/safetysense.

You should conduct a similar exercise for any alternate aerodromes you may need. Considering alternate aerodromes is often overlooked in GA flying, however doing so will give you increased confidence to divert should weather conditions or other circumstances change.

PRE-FLIGHT PREPARATION

Mass and balance

Key info

It is illegal to operate an aircraft outside its permitted mass and balance range and doing so risks poor performance and control difficulties. The mass of the aircraft must also be known for performance calculations.

The AFM or equivalent document for your aircraft will contain tables and/or graphs for calculating the total mass of the aircraft and its centre of gravity (CG) position. The figures must be specific to your airframe rather than generic ones for the aircraft type.

There are various types of tables or graphs, but they all use the concept of different loading positions for the aircraft, for example 'front seats', 'rear seats' or 'baggage compartment'.

Item	Mass (kg)	Arm (metres aft of datum)	Moment (kg metres)
Empty aircraft	700	2.22	1,554
Front seats	160	2.05	328
Rear seats	70	2.98	208.6
Baggage compartment	15	3.63	54.45
Fuel	100*	2.41	241
Totals	**1045**		**2386.05**

*In order to convert the volume of fuel on board into a mass, you need to know the fuel's specific gravity. Avgas is typically 0.72 kg/litre and Jet A-1 0.82 kg /litre.

The table above is a typical example of how to calculate a C of G position for a light aircraft. To complete the calculation use the following process:

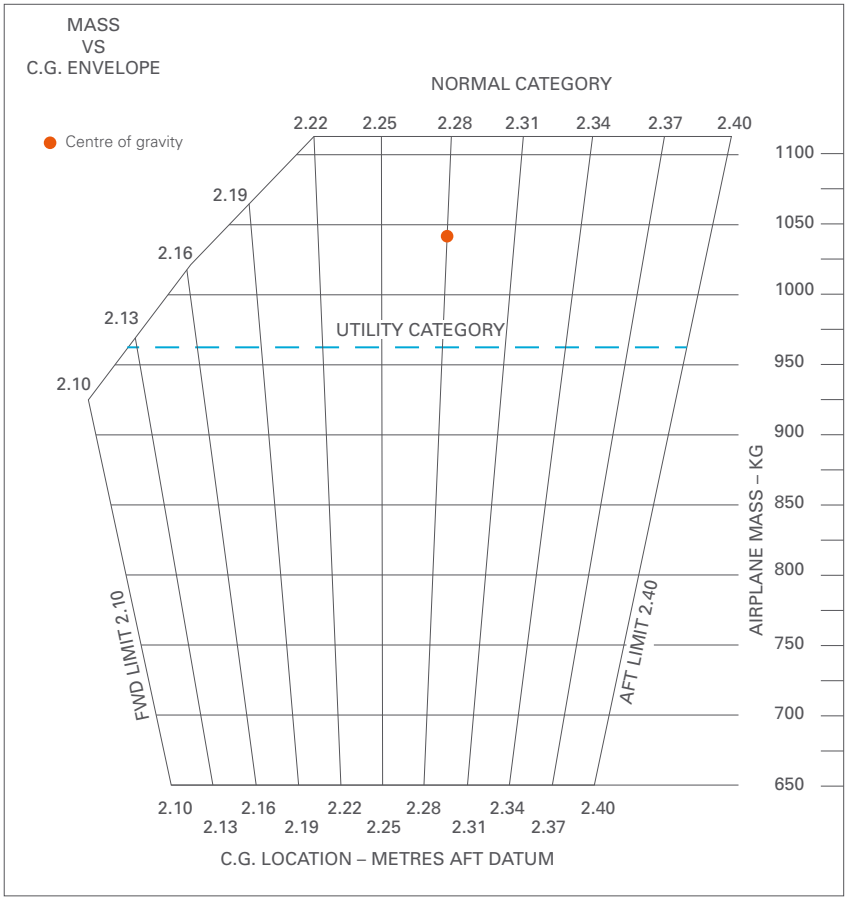
- Multiply the mass of each loading point (including the empty mass) in the 'Mass' column by its distance from the datum in the 'Arm' column. Place the result in the 'Moment' column;
- Add together all of the masses and add together all of the moments;
- Divide the total moments by the total mass. This generates a centre of gravity position.

$$\frac{\text{Moment (2386.05)}}{\text{Mass (1045)}} = \text{C of G (2.28)}$$

Mass and balance

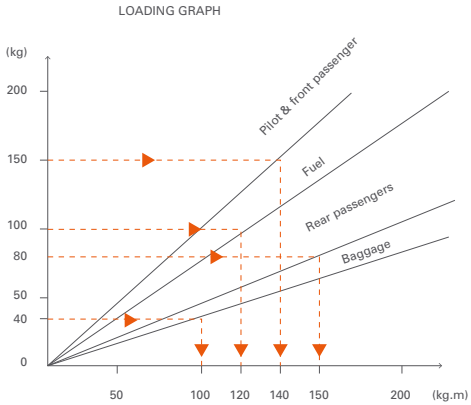
To determine that the CG and mass combination is within limits, place it on the envelope graph – below is an example for a typical light aircraft.

In this case, the mass and centre of gravity is well within the permitted range. However, note that the mass is not within the utility category area of the graph, so certain manoeuvres may not be permitted. Check the AFM for more details.



Mass and balance

Some AFMs use a 'loading graph' type depiction which avoids having to multiply the individual masses and distances together. Be familiar with the details in your aircraft.



GUIDANCE

When considering the mass and balance of your aircraft, take account of the following factors:

- Know approximately how much your aircraft can carry before approaching mass and balance limits – avoid planning to carry unrealistic loads. In most light aircraft it is not possible to fill both the fuel tanks and the seats. If in doubt, always perform a mass and balance calculation.
- Sense-check calculations. Electronic flight planning applications make the process of calculating mass and balance very quick, but they are only as good as the information entered. Be suspicious if you seem to be able to load more than normal.
- Account for everything – when adding up the mass of the aircraft make sure you account for everything onboard. Miscellaneous items such as bags should be included in whichever loading point they are closest to.
- Passenger mass – ensure you know the mass of your passengers, including clothing and other accessories they may be carrying.
- Stay within limits throughout the flight – on some aircraft it is possible to go outside of limits by burning fuel, for example if you start with a very forward centre of gravity. Run calculations for both takeoff and landing. Note any differences between maximum take-off mass and landing mass.
- Permitted manoeuvres – some aircraft are only permitted to carry out certain manoeuvres when within a narrower range of mass and centre of gravity positions. For example, an aircraft might have separate limits for aerobatic and normal flight. Be familiar with your AFM.

Guidance

Electronic flight planning software can be programmed with the mass and balance information for your aircraft, however it must have the correct parameters entered. Run a few practice calculations against the AFM before using them for real.

Aircraft performance

USEABLE RUNWAY LENGTHS

Declared runway lengths for the purpose of performance calculations can be found in an aerodrome's AIP entry.

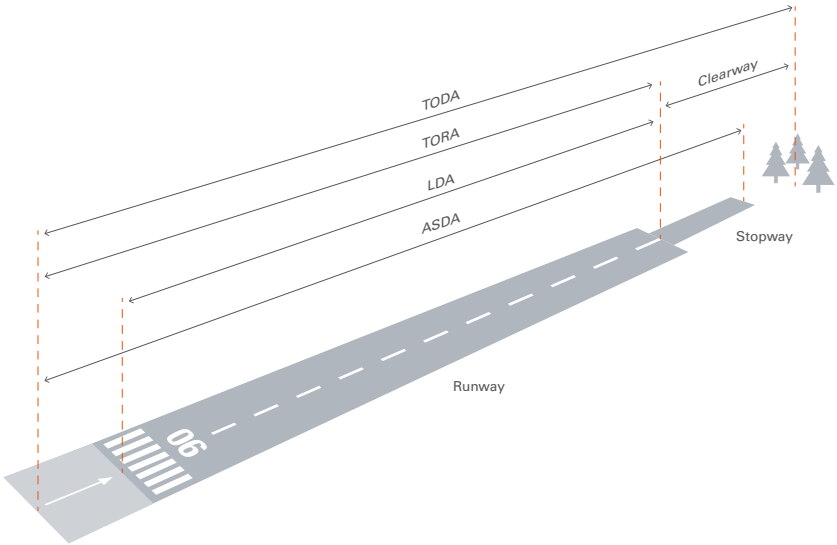
- **Take-off run available (TORA)** is the length of the runway surface that the aircraft can use during the ground run of the take-off.
- **Take-off distance available (TODA)** includes the TORA plus any 'clearway' distance inside the aerodrome boundary within which the aircraft may safely climb.
- **Accelerate stop distance available (ASDA)** is the length of the runway surface available for the take-off run, plus any 'stopway' the runway may have. The stopway is not normally designed to support the regular movement of aircraft, however it may be used to bring the aircraft to a stop in the event of an aborted take-off.
- **Landing distance available (LDA)** is the runway length available for landing.

Unlicensed aerodromes normally only publish the total length of the runway surface, not all of which will necessarily be usable, especially for landing.

You will need to make a judgement on the basis of local assessment as to what the usable lengths of the runway surface will be for your aircraft.

Guidance

Use the AFM for your aircraft to determine performance requirements. The calculated figures from the AFM should never be greater than the distances available. You are also recommended to use the safety factors specified on the next page.



Aircraft performance

TAKE-OFF AND LANDING PERFORMANCE

Guidance

It is acceptable to operate your aircraft with a good working knowledge of it's performance, without necessarily conducting calculations for every take-off or landing.

It is essential to perform a calculation if there are significant changes from your normal operating mass or environmental conditions:

- Extra weight such as a high fuel load, another person or baggage;
- Higher temperature;
- Lower pressure;
- Higher aerodrome elevation;
- The surface is wet and/or slippery; or
- Shorter runway and/or different surface from normal.

The AFM should be consulted for determining the take-off and landing performance figures. The figures will normally have been achieved using a new aircraft and a proficient pilot. In practice you should anticipate the aircraft underperforming these figures.

Careful note should be made of any criteria used in the figures. For example, if it quotes the distances being achieved with 'maximum braking' or 'full power prior to brake release' you should take account of the fact that you may not do so under normal circumstances.

For a given day you should take the relevant conditions and apply them using the aircraft's AFM graphs. The table below gives an approximate indication as to the changes to performance you should expect for the different variables. The figures could also be used if very minimal performance data was available for the aircraft.

Performance changes

For every	Take-off distances	Landing distances
10% weight increase	x 1.2	x 1.1
1,000 ft increase in elevation	x 1.1	x 1.05
10 °C increase in temperature	x 1.1	x 1.05
Tailwind component 10% of lift-off speed	x 1.2	x 1.2
2% of Slope (uphill)	x 1.1	-
2% of Slope (downhill)	-	x 1.1

Note: If calculating multiple factors, they should be multiplied together, for example 1.2 x 1.1.

Aircraft performance

Most take-off, climb and landing graphs use a 'reference line' system to reach a performance figure for the given conditions. You must be familiar with the graphs applicable to your aircraft.

The graphs normally work left to right and commence with a vertical line that starts at the outside air temperature for the day in question:

1. Draw the line up from the relevant temperature until it meets the reference line for the pressure altitude. Interpolate as necessary between the lines.

2. Pressure altitude refers to the altitude displayed with 1013 hPa set on the altimeter. You must translate the aerodrome elevation into a pressure altitude, by calculating the altimeter reading with 1013 hPA set. For example, if the elevation is 500 ft and the QNH is 1000 hPa, it would display 851 ft with 1013 hPa set – (assuming 27 ft per hPa).

3. Once at the correct pressure altitude, draw a line horizontally from that point, across to the next section of the graph (usually mass). Draw another vertical line originating from the applicable take-off mass.

4. Follow the reference line (interpolate between the lines as necessary) until it intersects with the vertical line originating from the take-off mass. This sets the point from which to draw the next horizontal line towards the last section of the graph, usually the wind component.

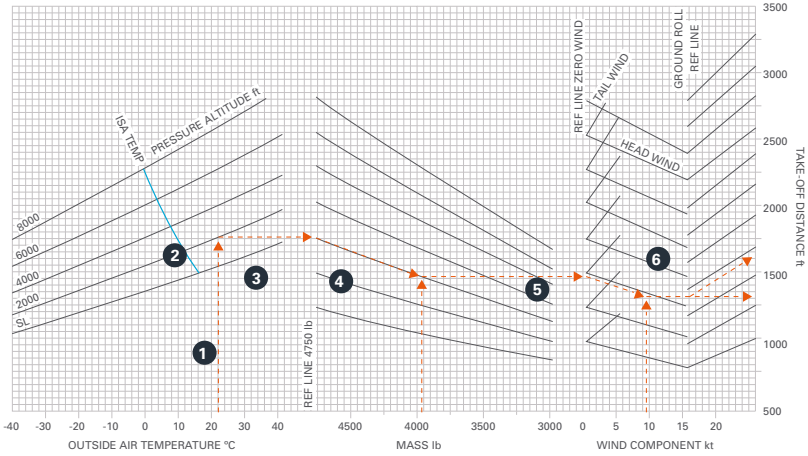
5. Using the same method as before, follow the reference lines to the applicable wind component.

6. On the example graph, both takeoff run (ground roll) and distance are indicated. Some AFMs separate the take-off run and distance into different graphs. Understand the difference between the two figures.

Take-Off – Normal Procedure

ASSOCIATED CONDITIONS	
POWER	2800 rpm 40 IN MAP
FLAPS	UP
RUNWAY	PAVED, LEVEL DRY SURFACE
LIFT-OFF	79 kt IAS
OBSTACLE AT	79 kt IAS
COWL FLAPS	HALF OPEN

EXAMPLE	
OAT	21°C
PRESSURE ALTITUDE	2000 ft
TAKE-OFF MASS	3969 lb
HEAD WIND COMPONENT	9 kt
TAKE-OFF GROUND ROLL	1350 ft
TAKE-OFF DISTANCE OVER 50 ft OBSTACLE	1650 ft



Aircraft performance

Once you have calculated the aircraft's take-off and landing performance, it is recommended you add the following safety margins to cover any degraded performance, imperfections in surface condition or pilot technique. Some factors (for example grass) may be stated in the aircraft's AFM, in which case use the ones for your aircraft. The general safety factors are similar to those that are required to be applied by commercial air transport operators. It is not recommended to operate if the factored distances required exceed those available.

Safety factors		
Condition	**Take-off**	**Landing**
Dry grass (up to 20 cm)	x 1.2	x 1.15
Wet grass (up to 20 cm)	x 1.3	x 1.35
Wet paved surface	-	x 1.15
Soft ground or snow	x 1.25	x 1.25
General safety factors*	x 1.33	x 1.43
***Note**: You should apply this after the application of the other applicable factors.		

CLIMB PERFORMANCE

It is not recommended to fly if under the prevailing conditions, the aircraft will climb at less than:

- 500 ft/m for a typical single piston engine aircraft; or
- 150 ft/m in the event of engine failure on a twin.

If an aircraft only achieves 500 ft/m in the initial climb, turbulence and imperfect technique may further reduce performance – risking a stall and loss of control.

It may be beneficial to know your climb gradient, as well as your rate of climb. This can be calculated approximately by:

$$\frac{\text{Rate of climb (ft/m)}}{\text{Ground speed (kts)}} = \text{Climb gradient (\%)}$$

Guidance

The aircraft's 'Vy' speed gives best rate of climb. 'Vx' gives best angle of climb, it is slower than Vy and gives a better climb gradient for obstacle clearance.

Fuel management

Guidance

Fuel burn and range figures can be found in the AFM. You should have a good working knowledge of your aircraft's fuel burn at different power settings.

The amount of fuel reserve carried should be proportionate to the nature of the intended flight. For example, if not leaving the aerodrome circuit it is acceptable to land with less fuel than when flying to another destination.

Part 21 aircraft are required to have certain fuel reserves (see p.24). Reserves are not specified for non-Part 21 aircraft other than 'sufficient', although you are not recommended to land with less than 30 minutes fuel for a VFR flight.

For longer flights or if carrying reduced fuel due to mass and balance, pay particular attention to the following factors:

- Fuel burn during the climb. For example, if heavy and in conditions of a high density altitude, climbs will take longer and burn more fuel;
- Selection of cruising altitude and resultant true airspeed;
- Winds aloft and ground speed; and
- Diversion options if fuel burn is higher than anticipated.

Incorporate fuel burn into your PLOG calculations and/or flight plan on your VFR Moving Map device. Regularly check anticipated fuel burn against actual.

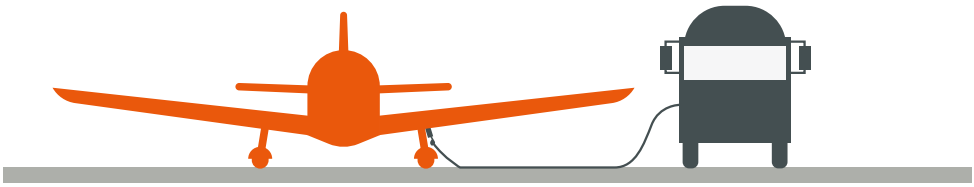
On most GA piston engines, the fuel/air mixture control can be leaned for cruise at any altitude. Leaning is an important element of engine and fuel management. Know the AFM procedure for your aircraft.

Fuel gauges in most GA aircraft are not sufficiently reliable for the purposes of flight planning or pre-flight confirmation of fuel onboard. Physically examining the fuel levels with a method appropriate to the aircraft (such as a dipstick) is the best way of assessing the fuel onboard. However in flight, low fuel gauge readings should never be ignored.

A fuel totaliser (if fitted) is a useful indicator of fuel burn. However, for the purpose of calculating fuel remaining it is dependent on the initial fuel level being correct. It only measures fuel consumed by the engine rather than the content of the fuel tanks and would not detect a leak.

Guidance

Several GA accidents have been caused by misconfiguration of aircraft fuel systems – if the aircraft has multiple fuel tanks and selectors, you must understand how to configure and manage them correctly.



Flight plans

Key info

A flight plan is the transmission of information to air traffic service units (ATSU) regarding the intended route of a particular flight or portion of a flight.

Flight plans are either:

- Full flight plans, which are filed through the Aeronautical Fixed Telecommunication Network (AFTN); or
- Abbreviated flight plans, which may be passed by radio or telephone.

FULL FLIGHT PLAN

Details of how to file a full VFR flight plan using the AFPEx system are contained in the 'International Flying' chapter (see p.163).

Most flight planning applications also offer integrated flight plan filing and guidance on AFTN addressing. A full flight plan may be filed for any flight, but it is a requirement for flying internationally. It is also recommended to file one if:

- Flying over water, more than 10 NM from the UK coastline;
- When flying to the Scottish Highlands and Islands aerodromes; and
- Over other sparsely populated areas where search and rescue might be difficult.

ABBREVIATED FLIGHT PLAN

An abbreviated flight plan is essentially the passing of information to an ATSU for a particular portion of your flight either by telephone or over the radio. For example this might be on departure from an aerodrome or when requesting a clearance to cross controlled airspace.

Unlike a full flight plan, an abbreviated flight plan will not be transmitted to any other ATSU.

REQUIREMENT FOR A FLIGHT PLAN

You are required to file a flight plan in the following circumstances:

- Any flight across international borders, unless otherwise prescribed by the relevant states;
- Any flight that is subject to an air traffic control service – for example entering controlled airspace or departing from a controlled aerodrome; and
- When leaving the vicinity of an aerodrome at night.

The practice commonly known as 'booking out'[1] would fulfil the requirement to submit an abbreviated flight plan for the purposes of leaving the vicinity of the aerodrome at night. If there is no ATSU to receive your details, you should file a full flight plan.

For the purposes of transiting controlled airspace an abbreviated flight plan is normally acceptable.

Guidance

Prior to the European Rules of the Air (SERA) coming into force, there was a requirement under the UK Rules of the Air 2007 to 'give notice' of a landing or departure to the relevant aerodrome authorities. This procedure was commonly known as 'booking in/out'. The rule no longer exists, however it is still common practice at aerodromes in the UK to report details such as persons onboard and fuel endurance to the aerodrome authorities, prior to departure.

AIRSPACE

Including:

05.

AIRSPACE

Essential Rules of the Air

The 'Rules of the Air' must be followed by all aircraft when in flight; they provide for the safe interaction between airspace users and the protection of third parties on the ground. In this section we have brought together the key regulations relevant to VFR operations.

Key info

As **pilot in command** you are responsible for ensuring your aircraft remains in compliance with The Rules of the Air.

The rules are set out in ICAO Annex 2 and legally applied in the UK through:

- UK Standardised Rules of the Air (UK SERA);
- The UK Rules of the Air Regulations 2015; and
- General permissions issued by the UK, where SERA permits national discretion over certain requirements.

EUROPEAN RULES

The European SERA apply throughout the airspace of EU member states, with some national differences. State-specific variations can normally be found in the ENR section of the relevant AIP: ENR 1.2- Visual Flight Rules, ENR 1.7- Altimeter Setting Procedures and ENR 1.8- Regional Supplementary Procedures.

You must always comply with both the rules applicable from the aircraft's state of registry and those of the state in which you are flying, whichever is more limiting. In the case of a conflict of requirements, the rules of the state in which you are flying take precedence.

FINDING REGULATIONS

The Aviation Regulatory Library contains the version of SERA applicable in the UK.

UK specific general permissions or exemptions relevant to SERA can be found in ORS4 – www.caa.co.uk/ors4.

For more information about the UK's implementation of SERA see www.caa.co.uk/sera.

The UK Rules of the Air Regulations 2015 can be found at www.legislation.gov.uk or in the CAA's consolidation, CAP 393 – www.caa.co.uk/cap393.

For the version of SERA applicable within the EU, look on www.easa.europa.eu/regulations.

The European AIS Database (EAD) contains links to European AIPs.

Essential Rules of the Air

RESPONSIBILITIES OF THE PILOT-IN-COMMAND

Section 2 of Part-SERA specifies that:

- The PIC shall have the final authority as to the disposition of the aircraft while in command;
- The PIC is always responsible for operation of the aircraft in accordance with SERA, regardless of whether they are manipulating the controls. The PIC may depart from the rules in SERA if absolutely necessary in the interests of safety; and
- Before a flight the PIC shall be familiar with all available information appropriate to the intended operation. Preflight action for flights away from the vicinity of an aerodrome, and for all IFR flights, shall include careful study of available weather reports and forecasts, considering fuel requirements and an alternative course of action if the flight cannot be completed as planned.

Use of Psychoactive Substances

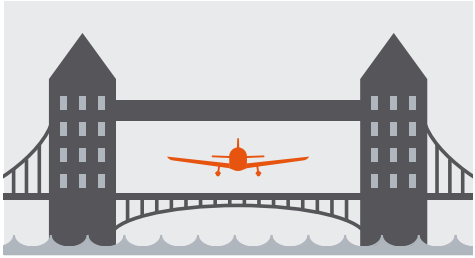
No person whose function is critical to the safety of aviation (safety-sensitive personnel) shall undertake that function while under the influence of any psychoactive substance, by reason of which human performance is impaired. No such person shall engage in any kind of problematic use of substances.

RULES FOR THE PROTECTION OF THIRD PARTIES

These rules are to protect people or property on the ground from aircraft operations. See Section 3 of SERA for more details.

Negligent or reckless operation

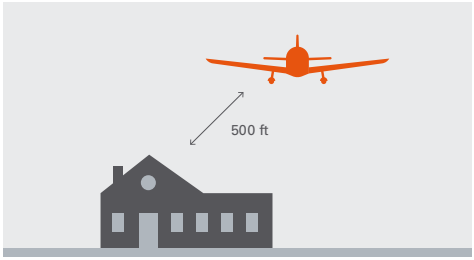
- Do not fly in a manner that would endanger either people or property.

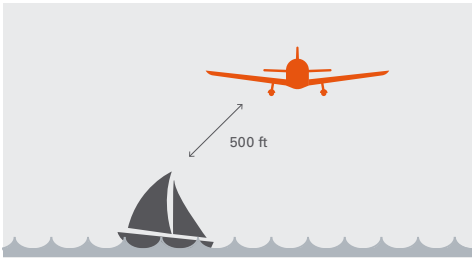


Essential Rules of the Air

RULES FOR THE PROTECTION OF THIRD PARTIES

Low flying and congested areas



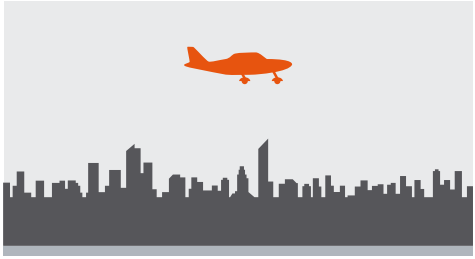


> **Unless necessary for taking off or landing, do not fly closer than 500 ft to any person, vessel, vehicle or structure.**[1]

There are some **UK-specific** exceptions to the above that permit certain manoeuvres (other than take-off or landing) to be conducted closer than permitted under the general 500 ft rule. These include:

- Practising approaches at an aerodrome, but without intending to land;
- Helicopters practising manoeuvres within the boundaries of an aerodrome, provided they do not come within 60 meters of a person, vessel, vehicle or structure that is outside the aerodrome boundary;
- Picking up or dropping of towing apparatus at an aerodrome;
- Gliders hill soaring; or
- If permission has been issued by the CAA for specific circumstances or events – such as for an air display.

Full details can be found in the ORS4 section within the CAA website www.caa.co.uk/ors4.



> **Unless necessary for taking off or landing, do not overfly congested areas or open-air assemblies of people below a height that in the event of an emergency occurring, would permit a landing to be made without causing a hazard to people or property on the ground.**

[1]The standard rule under ICAO is for a VFR flight to not fly below **500 ft above ground level**, unless taking off or landing. When flying abroad be aware that this requirement may apply.

Essential Rules of the Air

> **Unless necessary for taking off or landing, when flying over congested areas or open air assemblies of people, you must not fly lower than 1,000 ft above the highest obstacle within 600 m of the aircraft.**

There are some **UK-specific** general permissions that allow aircraft to fly below 1,000 ft above the highest obstacle within 600 m of the aircraft:

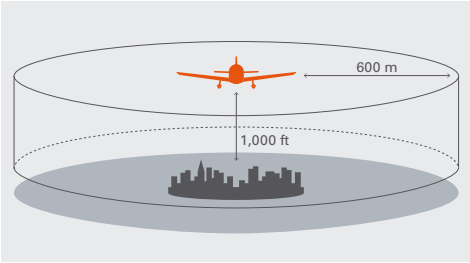
- If following a specific route published in the AIP (for example the low level VFR routes near Manchester and Liverpool airspace) and complying with the specific conditions associated with that route;
- Flying under a Special VFR clearance; or
- A balloon that becomes becalmed while over a congested area and is compelled to land as a result.

You must still be able to land in the event of an emergency without causing hazard to people or property on the ground.

Full details can be found in the ORS4 section within the CAA website www.caa.co.uk/ors4.

Guidance

In the event of an engine failure, single engine aircraft should be able to glide clear of any congested areas. You should not rely on being able to land in parks or other open spaces within congested areas, since there may be people on them.



The UK Rules of the Air Regulations 2015 also specify that you must not:

- Take-off or land within a congested area, unless either at an aerodrome and in accordance with procedures in the AIP, or at a site other than an aerodrome with the specific permission of the CAA;
- Take-off or land within 1,000 m of an open air assembly of more than 1,000 people, unless at an aerodrome and in accordance with procedures notified by the CAA, or at a site other than an aerodrome in accordance with procedures notified by the CAA and with the written permission of the organiser of the assembly;
- Carry out aerobatic flights over congested areas; or
- Carry out test or experimental flying over congested areas in an aircraft that does not have a valid certificate of airworthiness.

There are specific procedures for balloons taking off and landing in congested areas. Full details can be found in the ORS4 section within the CAA website www.caa.co.uk/ors4.

Notes:

Aircraft on a national permit to fly may be additionally restricted from flying over congested areas by the conditions of their permit.

'Congested area' in relation to a city, town or settlement, is any area which is substantially used for residential, industrial, commercial or recreational purposes.

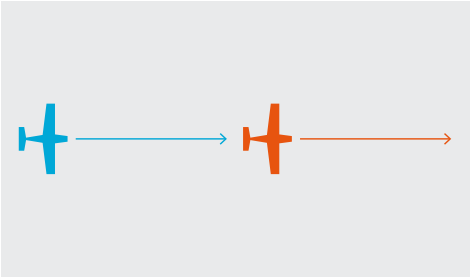
'Notified' means set out with the authority of the CAA in a document published by or under an arrangement entered into with the CAA and entitled 'United Kingdom Notam' or 'United Kingdom Aeronautical Information Publication'.

Essential Rules of the Air

RULES FOR THE PREVENTION OF COLLISIONS

The following rules are primarily to avoid collisions between aircraft.

Proximity of aircraft

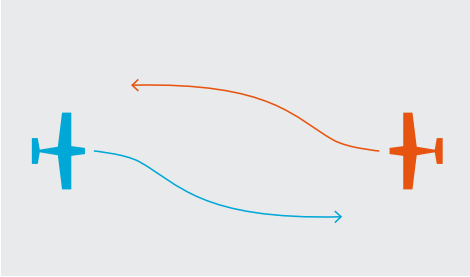


> Do not intentionally fly close to other aircraft so as to cause a collision hazard.

This does not precludе formation flying agreed between the PIC of each aircraft prior to flight.

SERA.3135 contains rules applicable to formation flights.

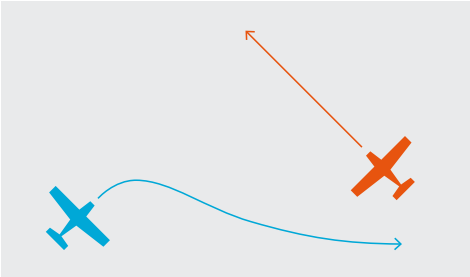
Rights of way in the air



> If approaching another aircraft head on, such that there is a risk of collision, both aircraft shall turn right to avoid each other.

Head-on: Alter course to right

> If converging with another aircraft, the aircraft that has the *other* on its right must give way.



Converging: On the right, in the right

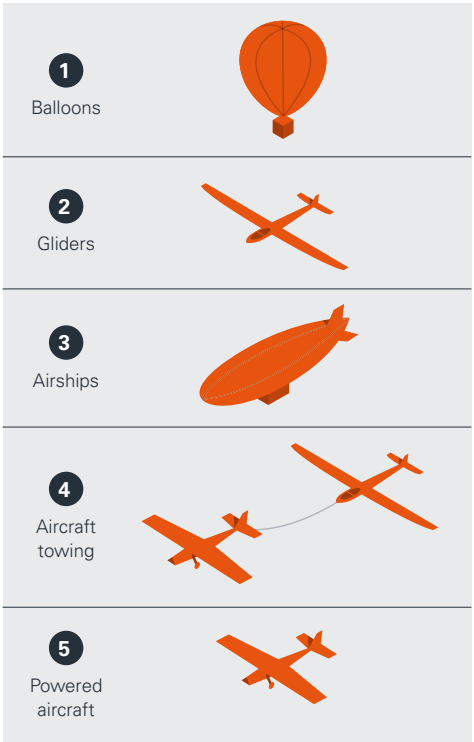
Guidance

If viewing the situation from above, this could be thought of as "on the right, in the right".

Essential Rules of the Air

When aircraft of different categories are converging, priority should be afforded in the following order:

- Powered, heavier-than-air, aircraft (for example aeroplanes or helicopters), must give way to airships, gliders and balloons;
- Airships must give way to gliders and balloons;
- Gliders must give way to balloons; and
- Powered aircraft must give way to aircraft that are towing other aircraft or objects.



Guidance

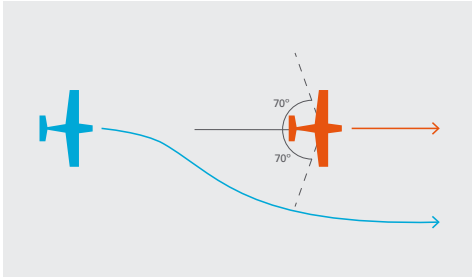
There was previously a requirement in the UK Rules of the Air that if following a line feature such as a road, railway or coastline, you must fly to the right of that feature.

This is no longer a mandatory rule, however it is still considered good practice, particularly if following the coast.

- **When one aircraft is overtaking another, the aircraft *being overtaken* has right of way. Overtaking aircraft shall pass to the right, and keep clear of the other aircraft until the manoeuvre is complete.**

  An overtaking situation exists when an aircraft is approaching from behind another aircraft, and is within an angle of 70° from either side of its extended centre line.

  Sailplanes may pass to either the left or right, but the principle that the aircraft *being overtaken* has right of way remains the same.

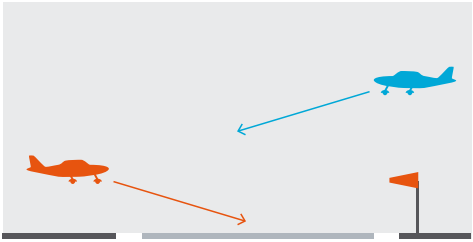


Overtaking: Overtake to right

Essential Rules of the Air

> **An aircraft in flight, or operating on the ground or water, shall give way to aircraft that are landing or in the final stages of an approach to land.**

When two aircraft are approaching an aerodrome for landing, the one at a lower height shall have priority. This rule should not be used to cut in front of another aircraft that is already established on final approach. Powered aircraft shall give way to gliders when landing.



Landing: Blue aircraft gives way

> **If an aircraft is compelled to land due to an emergency, other aircraft must give way.**

> **An aircraft taxiing on the manoeuvring area of an aerodrome shall give way to aircraft taking off or about to take off.**

Rights of way on the ground

> If approaching another aircraft head on, such that there is a risk of collision, both aircraft shall stop and turn right to avoid each other.

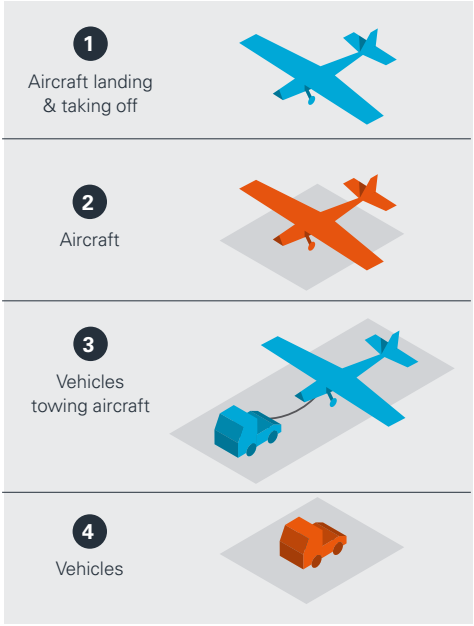
> If converging with another aircraft, the aircraft that has the *other* on its right must give way. 'On the right, in the right.'

> When one aircraft is overtaking another, the aircraft *being overtaken* has right of way. On the ground, overtaking aircraft may pass to the left or right.

> Emergency vehicles proceeding to the assistance of an aircraft in distress have priority over all other surface traffic.

> Vehicles and vehicles towing aircraft must give way to aircraft.

> Vehicles must give way to vehicles that are towing aircraft.



Visual and Instrument Flight Rules

Key info

Under the Rules of the Air, all flying is conducted in accordance with either the:

- Visual Flight Rules (VFR); or
- Instrument Flight Rules (IFR).

VISUAL FLIGHT RULES

You may fly under Visual Flight Rules (VFR) when in 'visual meteorological conditions' (VMC). Flying under VFR essentially means you may fly and manoeuvre as you wish, subject to the Rules of the Air and clearance to enter controlled airspace.

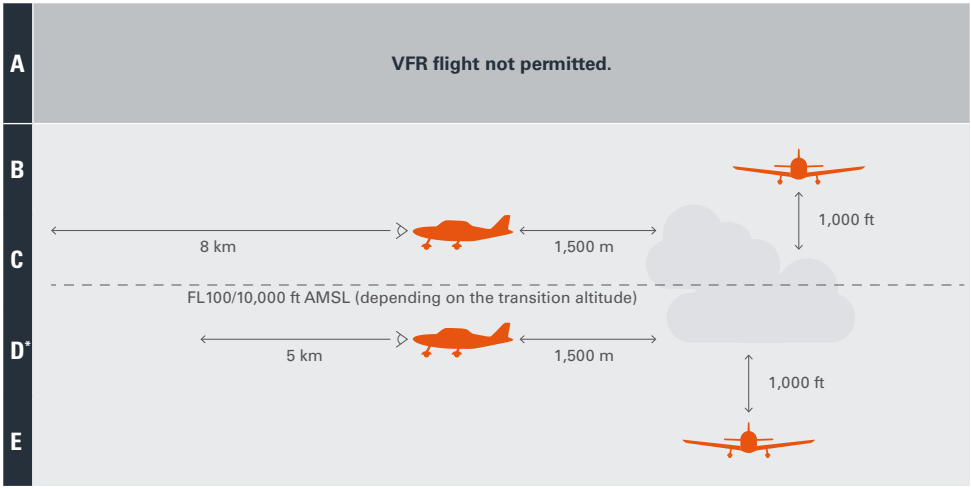
The principle of VFR flight is that you have enough flight visibility to control the aircraft by visual references and avoid collisions with other aircraft.

VMC minima primarily correspond to the amount of visibility and clearance from cloud required to avoid other traffic in different classifications of airspace. For example in Class E airspace, the cloud separation requirements are designed to prevent IFR traffic encountering VFR traffic in proximity to cloud.

Full details of the airspace classifications used in the UK can be found on p.69. The table below details the SERA VMC minima. For more information see Section 5 of SERA.

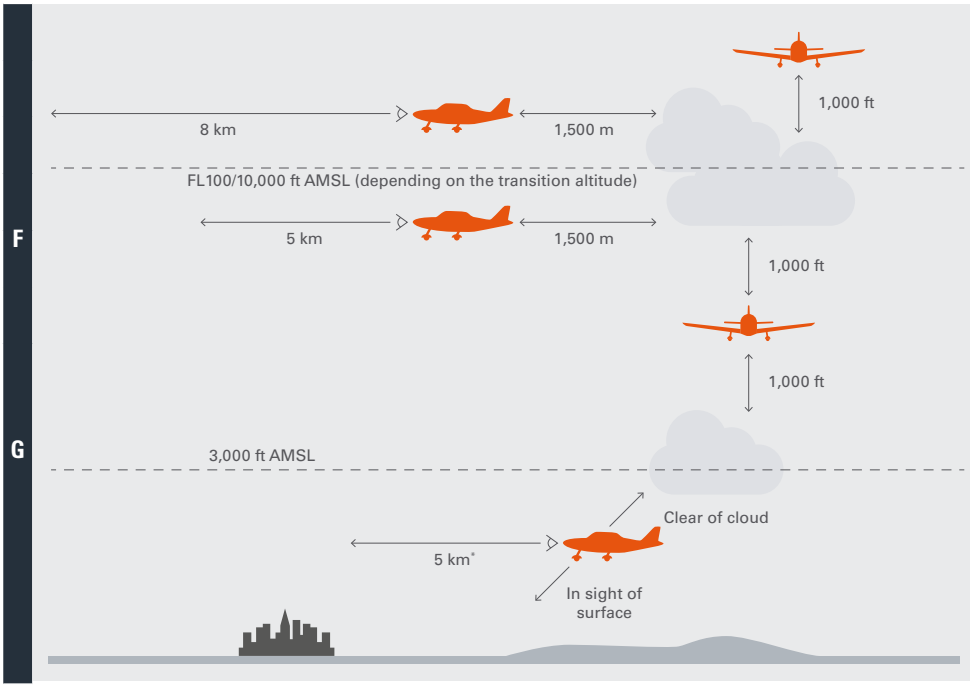
ENR 1.2 of the AIP contains more details on the VFR and IFR. For UK permissions issued under SERA, see www.caa.co.uk/ors4.

SERA VMC MINIMA



***Class D exception:** Under the following circumstances you may fly 'clear of cloud' in class D airspace, without complying with the specific cloud separation distances: by day at or below 3,000 ft AMSL, in sight of the surface and at 140 kts IAS or less. 5 km visibility is still required, except for helicopters for which 1,500 m is required. Note this is a UK difference from Part-SERA as applies in the EU.

Visual and Instrument Flight Rules



Altitude band	Airspace class	Flight visibility	Distance from cloud
At and above 10,000 ft AMSL/FL100	A B C D E F G	8 km	1,500 m horizontally 1,000 ft vertically
Below 10,000 ft AMSL/FL100 and above 3,000 ft AMSL, or above 1,000 ft above terrain, whichever is the higher	A B C D E F G	5 km	1,500 m horizontally 1,000 ft vertically
At and below 3,000 ft AMSL, or 1,000 ft above terrain, whichever is the higher	A B C D** E	5 km	1,500 m horizontally 1,000 ft vertically
	F G	5 km*	Clear of cloud and with the surface in sight

VFR is not permitted in class A airspace, inclusion of VMC minima is for reference only.

***Class G exception:** In UK class G airspace the 5 km requirement may be reduced to 1,500 m, if flying by day, in sight of the surface and at 140 kts IAS or less.

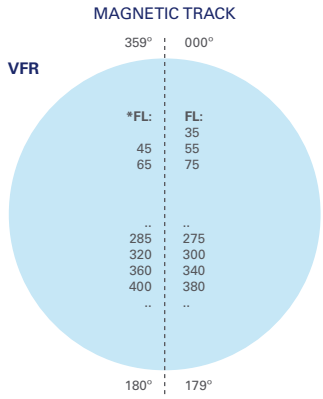
****Class D exception:** Under the following circumstances you may fly 'clear of cloud' in class D airspace, without complying with the specific cloud separation distances: by day at or below 3,000 ft AMSL, in sight of the surface and at 140 kts IAS or less. 5 km visibility is still required, except for helicopters for which 1,500 m is required. Note this is a UK difference from Part-SERA as applies in the EU.

Visual and Instrument Flight Rules

In addition to the VMC minima, VFR flights must also comply with the following:

- A VFR flight may not take-off or land at an aerodrome within a control zone (CTR), or enter the aerodrome traffic zone or circuit when the reported conditions at that aerodrome are less than:
  - cloud ceiling of 1,500 ft; or
  - ground visibility of 5 km.

  This applies to CTRs of all airspace classifications. If these conditions are not met, you may request a Special VFR clearance instead (see p.68).
- Unless authorised, VFR flights may not operate above FL195 or at transonic or supersonic speeds.
- SERA contains VFR cruising levels. These are not mandatory in the UK, but may be required in other states when operating more than 3,000 ft above ground level (AGL).



*If below the transition altitude, the levels should be flown as altitudes, ie 3,500 ft, 4,500 ft and so on.

VFR at night

Under SERA, a state may permit VFR flight at night. See ENR 1.2 of the relevant AIP for more details. VFR at night in the UK is permitted under the following conditions:

- The in-flight visibility and cloud separation requirements are the same as by day, except that the reduced visibility minima of 1,500 m in class G airspace is not permitted.
- The cloud ceiling must be 1,500 ft or more.
- In airspace classes B-G, when at or below 3,000 ft AMSL, or 1,000 ft above terrain, whichever is the higher, you must be in sight of the surface.
- You must not fly below:
  - 500 ft above the ground or water, or 500 ft above the highest obstacle within a 150 m (500 ft) radius of the aircraft; and
  - 1,000 ft above the highest obstacle within a 600 m radius of the aircraft when over the congested areas of cities, towns or settlements or an open-air assembly of persons.
- If leaving the vicinity of the aerodrome, a flight plan must be submitted. This may be an abbreviated plan submitted to an ATSU.
- You must make use of an air traffic service if it is available.

Guidance

Enroute obstacles that are 150 m (490 ft) or more above ground level must be lit at night. This is normally by a steady red light on the highest point.

Visual and Instrument Flight Rules

Special VFR

Special VFR (SVFR) is a provision that allows flight in a control zone (CTR), when weather conditions are below VMC minima, but without having to comply with the IFR. SVFR flights are subject to the ATC separation from IFR flights and other SVFR flights.

The minimum permitted conditions for a pilot to accept a SVFR clearance from ATC are:

- Clear of cloud and in sight of the surface;
- In flight visibility of not less than 1,500 m, or 800 m in the case of a helicopter; and
- 140 kts or less indicated airspeed.

Additionally, in order for ATC to issue a clearance to take off or land at an aerodrome within the control zone, the reported conditions at that aerodrome must not be less than:

- Ground visibility of 1,500 m, or 800 m in the case of a helicopter; or
- Cloud ceiling of 600 ft.

Special VFR at night

Under SERA, Special VFR at night may be permitted by individual states. Special VFR at night is permitted in the UK. For other states, consult ENR 1.2 of the relevant AIP.

Guidance

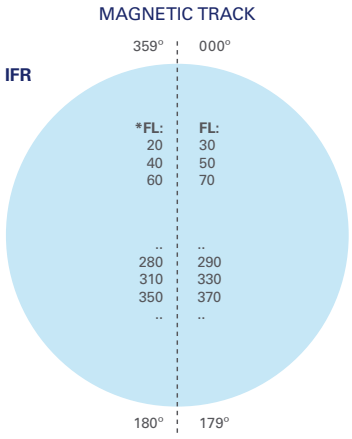
SVFR is permitted in the local flying areas (LFA) of certain aerodromes, without an individual SVFR clearance from ATC. This arrangement may apply when a GA aerodrome is located within the CTR of a larger airport. The associated SVFR minima may differ from standard. Details should be published in the relevant aerodrome (AD) AIP entry.

INSTRUMENT FLIGHT RULES

You must fly under IFR if conditions are below the VMC minima for the airspace (unless in a CTR and in receipt of a SVFR clearance). In the case of class A airspace, flight must always be conducted under IFR. In order to fly under IFR you must hold a valid instrument flying qualification.

The IFR require you to:

- Except when necessary for take-off or landing, fly at a level at least 1,000 ft (2000 ft in mountainous areas) above the highest obstacle located within 8 km (5 NM) of the aircraft.
- When flying outside controlled airspace, fly in accordance with the IFR cruising levels. In the UK these apply above 3,000 ft AMSL.



*If below the transition altitude, the levels should be flown as altitudes, such as 3,000 ft, 4,000 ft and so on.

Airspace classifications

The International Civil Aviation Organisation (ICAO) defines classifications of airspace A to G. Classes A, C, D, E and G are notified in UK airspace. The table below explains the characteristics of the airspace classifications, as implemented in the UK.

A	**Where**	Most airways; London/Manchester TMAs.
	Flight Rules	IFR only, VFR flight not permitted.
	Clearance	ATC clearance required.
	Air Traffic Service	Air Traffic Control service for all flights.
	Separation	Separation provided between all flights.

C	**Where**	Mostly above FL195 and some airways.
	Flight Rules	IFR and VFR permitted. VFR is not normally permitted above FL195. Specific arrangements for glider operations in Temporary Reserved Areas apply.
	Clearance	ATC clearance required.
	Air Traffic Service	Air Traffic Control service for all flights.
	Separation	Separation provided between IFR flights and between IFR flights and VFR flights. VFR flights are provided with traffic information. Traffic avoidance advice is available on request to VFR flights on other VFR flights.

D	**Where**	Most aerodrome CTRs and CTAs. Some TMAs and lower levels of selected airways.
	Flight Rules	IFR and VFR flight permitted. SVFR permissible in CTRs.
	Clearance	ATC clearance required.
	Air Traffic Service	Air Traffic Control service for all flights.
	Separation	Separation provided between IFR flights, between SVFR flights, and between IFR and SVFR flights. VFR flights are not provided with separation but are provided with traffic information. Traffic avoidance advice is available on request to IFR flights on VFR flights and to VFR flights on IFR and other VFR flights.

E	**Where**	Scottish airways and some CTAs.
	Flight Rules	IFR and VFR flight permitted.
	Clearance	ATC clearance not required for VFR flight, pilots encouraged to contact ATC.
	Air Traffic Service	Air Traffic Control Service provided to IFR flights and UK Flight Information Services (see p.80) (FIS) are available to VFR flights.
	Separation	Separation provided between IFR flights. VFR flights are not required to receive an Air Traffic Service and are not provided with separation. IFR flights may receive information on known VFR traffic.

G	**Where**	Areas not classified as controlled airspace.
	Flight Rules	IFR and VFR flight permitted.
	Clearance	ATC clearance not required.
	Air Traffic Service	UK FIS (see p.80) may be available. All traffic may receive Basic or Traffic services. IFR traffic may additionally receive a Deconfliction service.
	Separation	No separation provided. Traffic information or collision avoidance may be received in accordance with the UK FIS service provided.

A speed limit of 250 kts IAS applies when below 10,000 ft AMSL in class D, E, F and G.

Airspace hazards and restrictions

Guidance

There are many different users of uncontrolled airspace, powered or unpowered, civil or military, GA or commercial air transport. They all have different operational needs, but share a common interest in flying safely. All users should fly in a manner that minimises hazard and inconvenience to others.

The following section describes some of the main airspace hazards and restrictions GA pilots should be aware of and how they are depicted on VFR charts. For more information review the VFR chart legend and the ENR section of the AIP.

AERODROME TRAFFIC ZONES

An aerodrome traffic zone (ATZ) is a cylindrical block of airspace, established around an aerodrome.

- 2 NM when the longest runway is 1,850 m or less; or
- 2.5 NM when the longest runway is more than 1,850 m.

The details of how to operate correctly within an ATZ when landing or departing at an aerodrome are addressed in the 'Aerodrome Operations' chapter (see p.97).

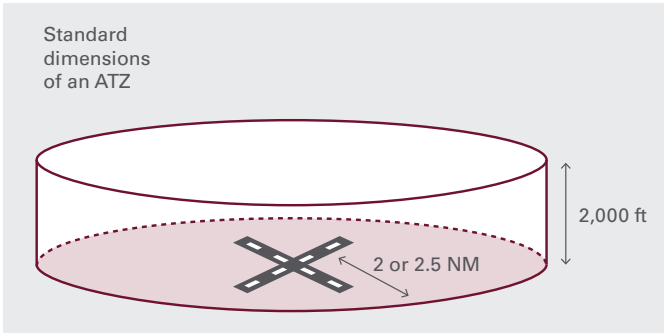
It is acceptable to cross an ATZ during enroute flight, provided you comply with Rule 11 of the Rules of the Air 2015. Announce your intentions on the applicable radio frequency and do not conflict with aerodrome circuit traffic. If the aerodrome provides an air traffic control service, permission is required to enter the ATZ.

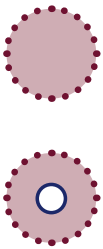
UK AIP, ENR 2.2 lists the hours during which Rule 11 applies to ATZs at military aerodromes.

AERODROMES WITHOUT ATZ

Some aerodromes without an ATZ are denoted on the chart with an outer circle around the aerodrome symbol and a letter 'T' or 'U'.

The 'T' indicates intensive use for training flights. The 'U' means unusual activity such as aerobatics or formation flying takes place. It is preferable to avoid overflight of these aerodromes. If passing nearby, consider making contact on the applicable radio frequency.





2 NM ATZ shown with aerodrome symbol

Airspace hazards and restrictions

MILITARY AIR TRAFFIC ZONES

A military air traffic zone (MATZ) is not controlled airspace to civilian aircraft. However, a MATZ may contain high performance military aircraft and before entering, it is strongly recommended to make contact with the relevant ATC unit. A MATZ will contain an ATZ within it, for which the normal rules for an ATZ apply.

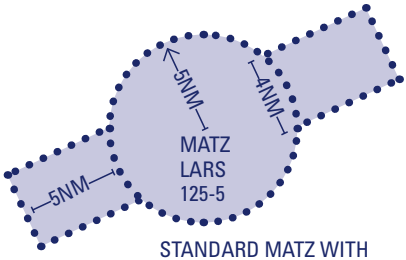
Crossing a MATZ

If you wish to cross a MATZ, you should contact the relevant ATSU prior to entry and request a 'MATZ penetration service' with your proposed route. 10 minutes flying time before the MATZ boundary is reasonable.

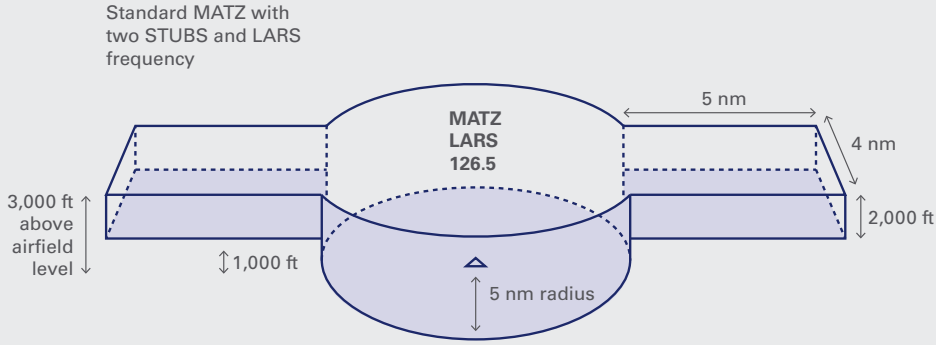
The controller may ask if you can adopt a different route or altitude that would enable better separation with other activity in the MATZ. You should accommodate if possible.

The important thing is that the controller is aware of your intentions. Use the standard 'freecall' (see p.81) format for initiating contact, adapted as required.

MATZ are often inactive at weekends, although you should always attempt a call to check the status. If there is no response from the assigned frequency after two attempts you may enter with caution, however you should never enter the ATZ within the MATZ without a positive clearance to do so.



STANDARD MATZ WITH TWO STUBS AND LARS



Airspace hazards and restrictions

Aerodrome traffic

Aircraft operating near military aerodromes are not confined to the MATZ. This could include aircraft approaching to land or operating in what is known as the 'radar training circuit' (RTC). The RTC is a pattern flown by aircraft around the aerodrome for the purpose of practising radar approaches.

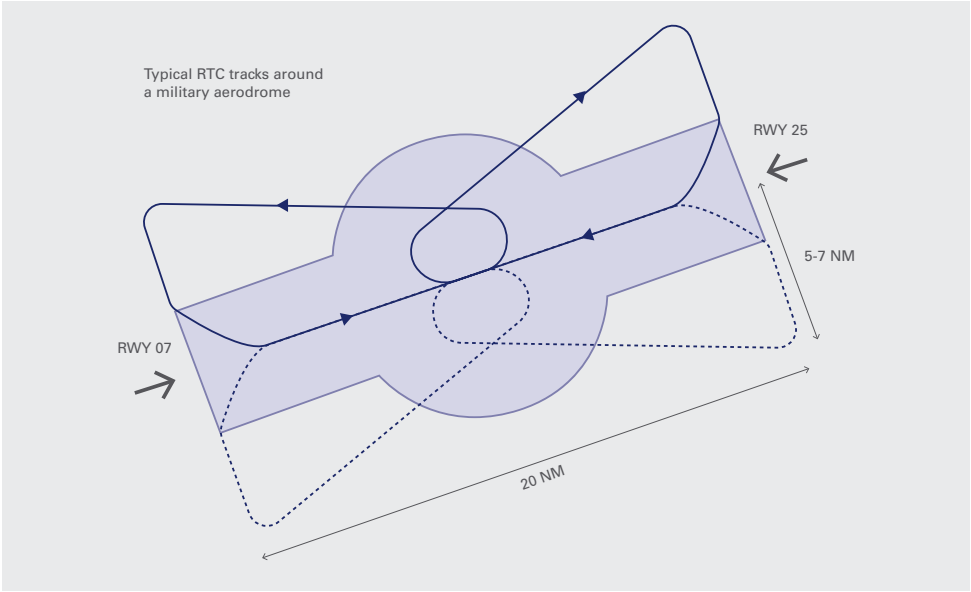
The standard RTC sequence is:

- Take off and climb to a height of between 1,500 ft and 2,500 ft;
- Vectoring around the pattern;
- Alignment and descent with the final approach track and glidepath; and
- Landing or low approach and go-around.

It is primarily the downwind and base leg elements which protrude beyond the MATZ, so it is a good idea to contact the relevant MATZ frequency if transiting these areas.

In addition to traffic in the RTC, arriving aircraft joining the final approach track may come from any direction, but similar to the RTC pattern, will likely be vectored onto a 90° base leg and then a 40° intercept angle to join the final approach track.

Fast jet traffic will often approach aerodromes at high speed and therefore need a large turn radius to line up with the runway. The final approach may commence outside of the MATZ. This is then followed by a 'run and break' manoeuvre to lose speed and a close-in circuit to land.



Airspace hazards and restrictions

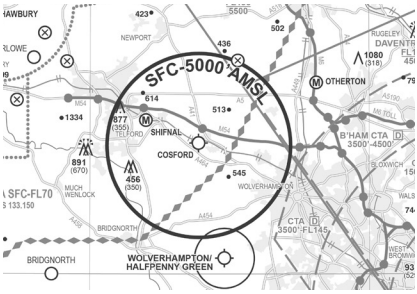
Example MATZ crossing request	
For more details of radiotelephony (RT) procedures please see CAP 413 – www.caa.co.uk/cap413 and SSL 22 – *Radiotelephony for General Aviation Pilots*.	
Explanation	**Example exchange**
Commencing the call with the request gives the controller the opportunity to consider if they can immediately respond or whether to instruct the caller to "standby". It also allows the controller to consider what information will need to be passed back to the aircraft before having to process the entire message – for example most ATSUs will have a series of squawk codes to be issued depending on what service is being provided to the aircraft.	 **"Boscombe Zone, G-DOME, request Basic Service and MATZ penetration."**
Assuming the controller is ready to process your request, they will likely respond by asking you to "pass your message". If they reply "standby" there is no need to acknowledge this, they will try and call you when able. It does not imply a rejection of your request; it just means they are not able to immediately respond to it.	 **"G-DOME, Boscombe Zone, pass your message."**
Use the standard "freecall" format to tell the controller what you are doing.	 **"G-DOME, PA28 from Old Sarum to Bristol overhead Alderbury, altitude 2,200 ft, QNH 1009, VFR, direct track Bristol."**
Note that the giving of a squawk code does not necessarily mean that you have been radar-identified. It may be a generic squawk for all traffic receiving a 'Basic Service' on that frequency.	 **"G-ME, Roger, squawk 2650, Basic Service."**
Service level and squawk codes must always be read back by the aircraft.	 **"Squawk 2650, Basic Service, G-ME."**
When crossing a MATZ you will normally be given the aerodrome QFE to set, since the vertical dimensions of the MATZ are defined relative to the aerodrome elevation.	 **"G-ME, MATZ penetration approved at 1,800 ft on Boscombe QFE 997 hectopascals, report entering the MATZ."**

Airspace hazards and restrictions

Example MATZ crossing request	
Explanation	**Example exchange**
Crossing altitude and QFE must be read back, however requests to report at certain places can simply be acknowledged with 'wilco'.	**"MATZ penetration approved at 1,800 ft on Boscombe QFE 997 hectopascals, wilco, G-ME."**
Remember to report as requested.	**"G-ME entering the MATZ."**
	"G-ME, Roger, report leaving."

RESTRICTED AIRSPACE (TEMPORARY)

> Restricted airspace (temporary) is often established around large air displays, significant public gatherings or a major incident or accident. The details of these are published in Aeronautical Information Circulars (AICs) and activated by NOTAM.



TRANSPONDER MANDATORY ZONE

> A TMZ is an area established within which all aircraft must be equipped with the type of transponder specified for a particular zone, and operate in accordance with any required instructions.

> UK TMZs normally require a mode S transponder (see p.90). Aircraft not equipped with mode S must request the permission of the relevant ATSU before entering.

> Details of individual TMZs can be found in GEN 1.5 and ENR 2.2 of the AIP.

RADIO MANDATORY ZONE

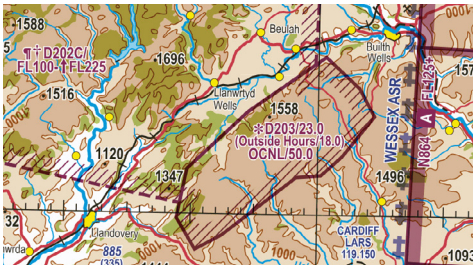
> An RMZ is an area established within which all aircraft must establish two-way communication over or monitor (as determined for the individual RMZ) the relevant radio communication frequency. Use the freecall (see p.81) format to establish contact.

> Details of individual RMZs can be found in GEN 1.5 and ENR 2.2 of the AIP.

Airspace hazards and restrictions

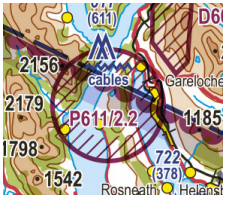
DANGER AREAS

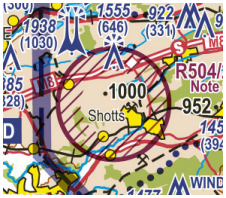
- A danger area is a published area within which activity hazardous to aviation may be encountered. Flight within danger areas may be prohibited by local bylaws.
- Details of activity periods can normally be found in ENR 5.1 of the AIP. There is often a frequency and/or telephone number in the notes of the VFR chart from which the status of the danger area may be obtained. The status may also be obtained from either a local ATC unit or London/Scottish Information, as applicable to the region.
- If unauthorised entry to a danger, restricted or prohibited area is detected, red and green pyrotechnics may be fired from the ground to warn the aircraft.
- Some danger areas also offer a 'danger area crossing service' (DACS), which may allow a tactical crossing clearance to be issued. Details can be found in the AIP or in the notes of the VFR chart.
- Establishing that a Danger Area is 'cold' or obtaining a crossing service may allow a more direct route. If in doubt, remain outside. Danger areas with a broken boundary are activated by NOTAM.



PROHIBITED OR RESTRICTED AREAS

- A prohibited area is an area within which flight is entirely prohibited.
- A restricted area is an area within which some flying is restricted – for example, sometimes they only apply to certain categories of aircraft. These conditions can be found in the notes of the VFR chart and in ENR 5.1 of the AIP.
- The altitude to which they extend is stated in thousands of feet AMSL. '2.2' is therefore 2,200 ft.





WIND TURBINES

- Caution should be taken when operating near wind turbines since older units may not be lit in accordance with recent CAA policy guidelines.
- Some LED obstacle lights fall outside the spectrum visible through night-vision goggles, therefore pilots using goggles should use extra caution when flying in the vicinity of obstacles at night.
- Numerals in italics indicate obstacle elevation AMSL. Numerals in brackets indicate height above ground level.

Airspace hazards and restrictions

GLIDER AND PARACHUTE SITES

Guidance

You should never overfly a glider site below the specified winch launch altitude. You may encounter a vertical winch cable.

Winch launching involves the glider being launched by a cable from the ground. The cable tows the glider to flying speed along the ground and continues to pull it forward once airborne, giving a very steep climb angle. The winch cable is then released when the glider has reached sufficient altitude.

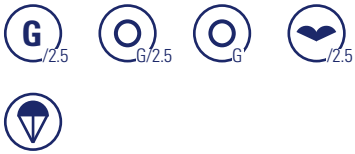
Glider sites with winch launching activities are marked on the VFR chart. The maximum altitude to which winch launching takes place is indicated in thousands of feet. For example, '2.5' means 2,500 ft AMSL.

Where there is gliding without winch launching, there is no altitude indicated on the chart symbol. In this case gliders are normally launched by aerotow, so you may encounter powered aircraft towing gliders near the site. Aerotowing and winch launching activities often take place at the same site.

Pilots of powered aircraft should also be aware that gliders often congregate at locations away from the launching site. In good 'thermaling' conditions many gliders may converge in a single location. If you can see one, there will likely be others.

Remember that under the Rules of the Air, powered aircraft must give way to gliders and other powered aircraft towing gliders.

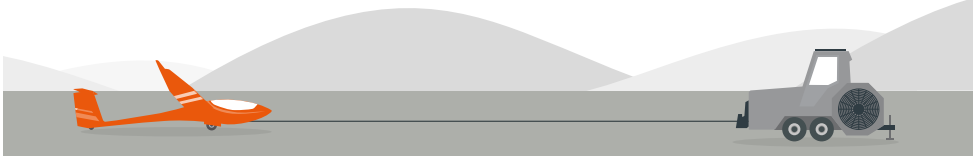
Parachuting sites may be active up to FL150. You should remain clear unless you are able to confirm that a site is inactive through contact with the relevant ATSUs or drop zone frequency. Drop zone contact details can be found in ENR 5.5 of the UK AIP.



AREAS OF INTENSE AERIAL ACTIVITY

Areas of intense aerial activity (AIAA) signify areas in which aerial activity is particularly high. This might include low flying military aircraft and/or aircraft performing high energy manoeuvres. You should make use of UK FIS where available (consider a Traffic Service), maintain a good lookout and use an electronic conspicuity device.

Aerial Tactics Areas (ATAs) are also marked in the same way. The same principles apply, although the traffic encountered is more likely to be manoeuvring military aircraft.



Airspace hazards and restrictions

INSTRUMENT APPROACHES

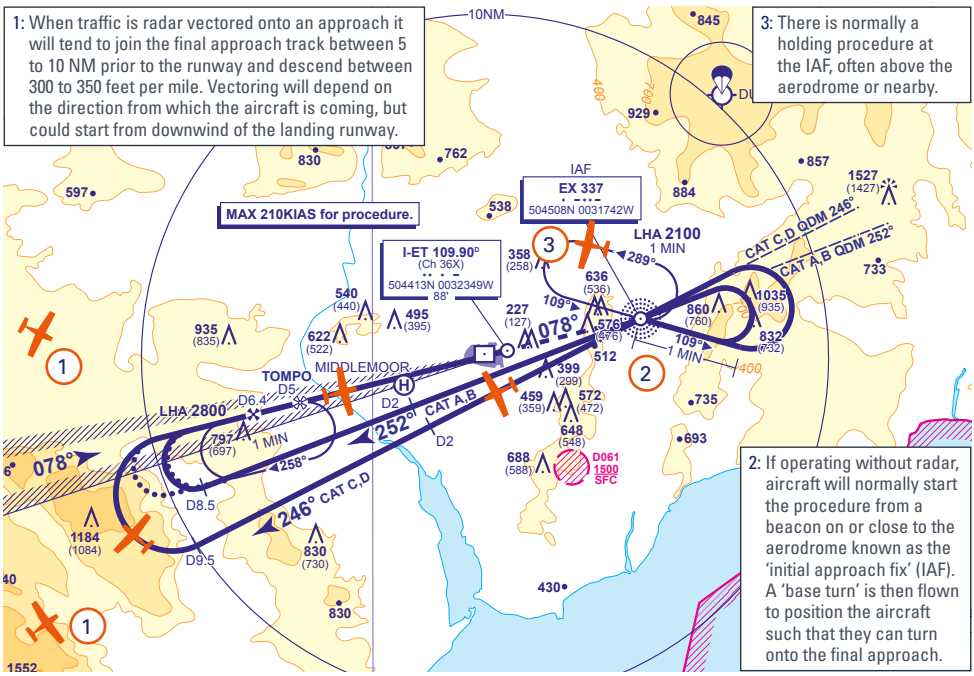
Some aerodromes outside controlled airspace have instrument approach procedures (IAPs). These are defined sequences of waypoints that guide aircraft to the final approach track. Details of IAPs can be found in entries for individual aerodromes in AD of the AIP.

IAPs are often used in VMC, especially by commercial air transport aircraft and those conducting instrument training.

Larger commercial air transport traffic will have reduced capability to 'see and avoid' due to the limitations of visibility from the cockpit. Aircraft also tend to descend further away from the aerodrome and make larger radius turns when conducting IAPs than when making a visual approach.

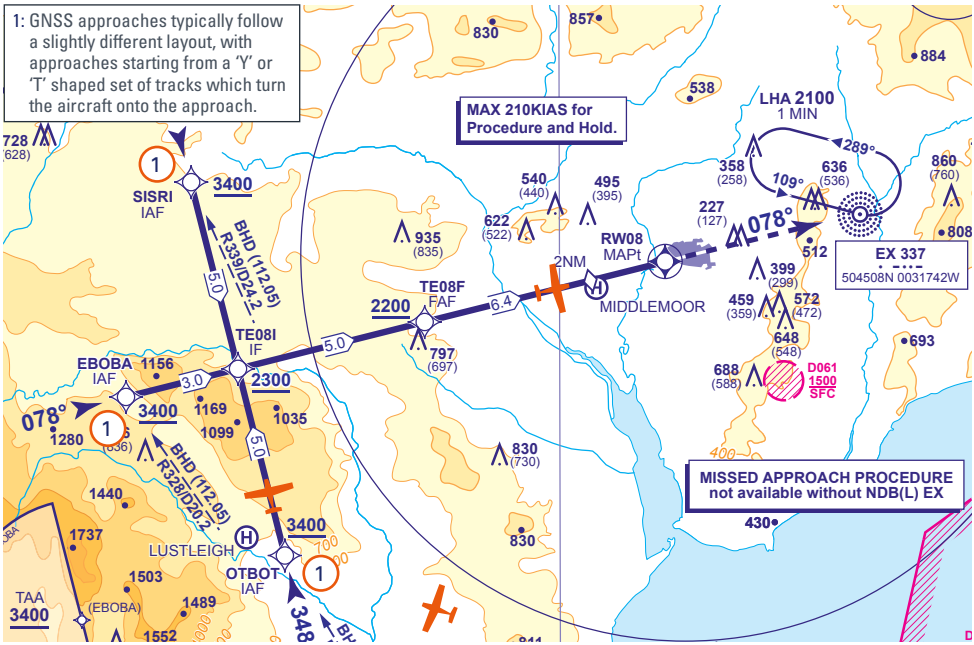
VFR traffic operating near aerodromes outside controlled airspace should be aware that there may be IFR traffic using IAPs and should avoid crossing them at similar altitudes to that of the procedure, unless talking to the relevant ATSU.

IAPs outside controlled airspace are indicated by 'feathered arrows'. Note the feathers only align with the main instrument runway. There may also be approaches to other runways. Pilots are recommended to contact the aerodrome ATSU if flying within 10 NM of an aerodrome marked with IAP feathers.



A typical Instrument Landing System (ILS) approach established outside controlled airspace. In this case Exeter airport.

Airspace hazards and restrictions



A typical RNAV (GNSS) approach established outside controlled airspace. In this case Exeter airport.

UK LOW FLYING SYSTEM

Military low flying takes place across most of the UK, between 2,000 ft and 100 ft AGL. The highest concentrations are normally below 1,000 ft AGL and GA pilots are strongly recommended to remain above this height during enroute flight. Areas of Intense Aerial Activity (AIAA) and Aerial Tactics Areas (ATA) also contain increased concentrations of activity.

More details of the UK Low Flying System are available in ENR 6-20 and ENR 6-21 of the UK AIP. The Ministry of Defence publishes a monthly tactical training area timetable.

VHF LOW LEVEL FREQUENCY

There may be circumstances in which civil aircraft are operating in proximity to military low flying activity. The VHF Low Level Common Frequency was made permanent in June 2023 and is available for both civil and military aircraft when operating below 2,000 ft AGL in class G airspace. The frequency is **130.490 MHz**.

You should normally prioritise obtaining a UK Flight Information Service or other appropriate air traffic service. However, there may be locations or altitudes where this is not possible, and use of the Low Level frequency will improve situational awareness.

Airspace hazards and restrictions

Users of the Low Level frequency should make blind calls including:

- Call sign;
- Aircraft type (and number, in case of formations);
- Position relative to reference points identifiable to other pilots (using cardinal or inter-cardinal directions);
- Altitude;
- Heading;
- Next significant reference point.

Calls should be made when:

- It is safe and suitable;
- When entering the UK LFS;
- At significant turning points;
- Approaching well-known/recognisable physical features;
- Any other time when it would be beneficial for safety.

UNMANNED AIRCRAFT SYSTEMS

The number of unmanned aircraft systems (UAS) or 'drones' operating in the UK is growing. The term UAS also includes traditional model aircraft flown by remote control.

UAS operations normally take place up to 400 ft and within visual line of site of the operator. The UAS operator is responsible for looking out for conflicting traffic, however pilots of manned aircraft should also be aware that their responsibility to 'see and avoid' other traffic includes unmanned aircraft, even if they are small and difficult to identify.

GA pilots operating below 500 ft should be aware that encounters with legitimate UAS operations in the open FIR are a distinct possibility. There are also some model aircraft flying sites where operations are permitted up to 1,500 ft AMSL – details are in ENR 5.5 of the AIP. The sites are normally not marked on VFR charts, although may appear in flight planning applications and/or moving map devices with an aeronautical database.

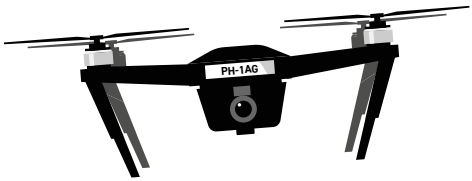
UAS operations involving the aircraft operating beyond visual line of site of the operator will normally be segregated from manned air traffic by use of temporary danger areas or restricted airspace – the details of these will be published by NOTAM in the normal way for temporary regulated airspace.

The *Skyway Code* does not address detailed rules for the operation of UAS – for more information about operating UAS see caa.co.uk/drones.

Key resources for UAS requirements include:

- CAP 722 – Guidance on UAS operations in the UK; and
- UAS regulations via the Aviation Regulatory library.

Most UAS operators and remote pilots are required to register with the CAA via the DMARES Registration Page.



AIRSPACE

UK Flight Information Services

UK FIS may be available from:

- Lower Airspace Radar Services (LARS);
- Other ATC units; and
- Area Control Centres – London or Scottish Information (Basic Service only).

When flying outside controlled airspace, situational awareness and safety will be enhanced by use of UK FIS.

Scottish and London Information do not have surveillance capability; the squawk code issued is for the situational awareness of other ATSUs.

Within the UK FIS there are four types of air traffic service. Terrain avoidance remains the responsibility of the pilot.

Basic Service

A Basic Service is intended to offer the pilot maximum autonomy and is available to IFR flights in Class G airspace, or VFR flights in Class E and Class G airspace. If the ATCO or FISO are aware of airspace activity that may affect your flight they will tell you; however, this is subject to their workload and the avoidance of other traffic is solely the pilot's responsibility. **Maintain a good lookout.**

Traffic Service

Under a Traffic Service, an ATCO will use radar to provide you with detailed traffic information on specific conflicting aircraft; they will not provide you with deconfliction advice, regardless of your meteorological conditions. A Traffic Service is available to IFR flights in Class G airspace, or VFR flights in Class E and Class G airspace.

Deconfliction Service **IFR only**

Only available to IFR flights in Class G airspace. An ATCO will use radar to provide you with detailed traffic information on specific conflicting aircraft and advice on how to avoid that aircraft. However, the pilot retains responsibility for collision avoidance; you can opt not to follow the ATCO's advice.

Procedural Service **IFR only**

A Procedural Service is an ATS for IFR traffic only. In addition to the provisions of a Basic Service, the controller provides restrictions, instructions, and approach clearances, which if complied with, shall achieve deconfliction minima against other aircraft participating in the Procedural Service. The Procedural Service is typically provided by ATSUs without surveillance capability (eg radar) to IFR flights arriving or departing an aerodrome. Neither traffic information nor deconfliction advice can be passed with respect to unknown traffic.

For more details of UK FIS see CAP 774 – www.caa.co.uk/cap774 and CAP 1434 – www.caa.co.uk/cap1434.

AIRSPACE

UK Flight Information Services

WHAT SERVICE TO ASK FOR?

- GA pilots operating under VFR should request either a 'Basic' or 'Traffic' service.
- In good weather conditions there is potentially a greater likelihood of mid-air collision, due to increased traffic density. Consider requesting a 'Traffic Service' for increased situational awareness.

REQUESTING A SERVICE

Use the standard 'freecall' format when requesting a UK FIS. The initial call should address the ATSU (station name), followed by your callsign and request (for example Basic Service). When instructed to "pass your message", give your information in the following order:

- **Who you are** – callsign and aircraft type;
- **What you are doing** – point of departure and destination, route or area of operation and/or intentions;
- **Where you are** – position, altitude/level and flight rules. Use a reference point such as a major town or aerodrome; and
- **What you want** – if required, provide more detail on your request (such as requested routing).

Radiotelephony

For more info see the SSL 22

Example request for 'Basic Service'	
For more details of radiotelephony (RT) procedures please see CAP 413 – www.caa.co.uk/cap413 and SSL 22 – *Radiotelephony for General Aviation Pilots*.	
Explanation	**Example exchange**
Commencing the call with the request allows the controller to consider whether they can immediately respond, or instruct the caller to "standby". It also helps the controller anticipate what information will need to be passed back to the aircraft before having to process the entire message – for example most ATSUs will have a series of squawk codes to be given out, depending on the service provided provided to the aircraft.	**"Boscombe Zone, G-DOME, request Basic Service."**

UK Flight Information Services

Example request for 'Basic Service'	
Explanation	**Example exchange**
If the controller is ready to process your request, they will likely respond by asking you to "pass message". If you receive a reply "standby" there is no need to acknowledge this: the controller will try and call you when able. It does not imply a rejection of your request; it just means they are not able to immediately respond to it.	**"G-DOME, Boscombe Zone, pass your message."**
Use the standard "freecall" format, setting out more details of your flight. There is no need to repeat the original service request (e.g. for Basic Service).	**"G-DOME, PA28 from Thruxton returning to Thruxton, intending to carry out general handling between Andover and Newbury. 2 NM north of Andover, altitude 2,300 ft, QNH 1023, VFR."**
Note that the controller has not identified the aircraft – this is not a requirement of providing a Basic Service. The squawk code may be generic to all aircraft on a Basic Service from that ATSU, such that other units can identify who the aircraft is in contact with. You should not expect traffic information while in receipt of a Basic Service. Outside controlled airspace it is standard practice to give the regional pressure setting (RPS) (see p.91) when providing a service. You are not obliged to use RPS, and particularly if there is a risk of vertically infringing nearby airspace, you should ask for and set the relevant local QNH. The RPS will be lower and therefore under-read your actual altitude.	**"G-ME, Roger, squawk 2650, Basic Service, Portland 1019, report general handling complete."**

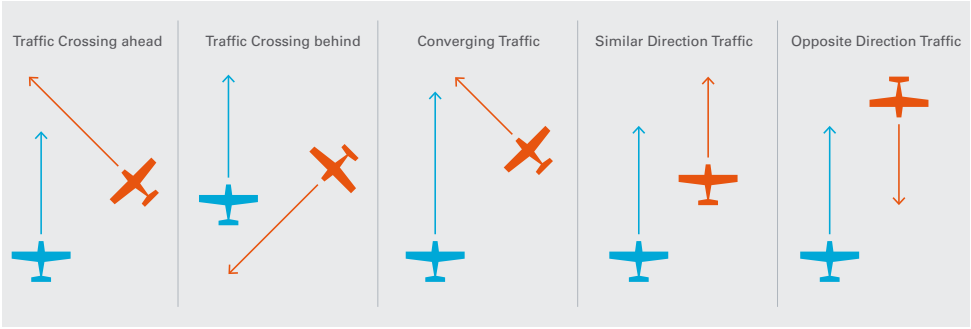
UK Flight Information Services

Example request for 'Basic Service'	
Explanation	**Example exchange**
The type of service, pressure setting (even if not using it) and squawk code should be read back. Instructions to report at a particular point in the future can be acknowledged with "wilco" – meaning you will comply. Service, pressure setting, squawk and reporting instruction is a significant amount of information to process – the controller may break this into two calls. If you do not record everything the first time, reply (for example) "say again squawk" or "say again all after pressure setting". You may abbreviate your callsign once the controller has done so.	**"Squawk 2650, Basic service, Portland 1019, wilco, G-ME."**
When under a Basic Service the controller may pass information pertinent to the safe conduct of the flight. This is NOT specific traffic information; it is general information taking into account the area you are operating in, and is subject to controller workload.	**"G-ME, be aware there is a glider competition around Rivar Hill, large concentrations of gliders in the area up to 4,000 ft."**
Information relevant to your flight may be acknowledged with "Roger".	**"Roger, G-ME."**
Report as instructed.	**"G-ME, general handling complete, returning to Thruxton."**
The controller will state the termination of the service and remind you to squawk the relevant conspicuity code (VFR: 7000).	**"G-ME, Roger, service terminated, squawk conspicuity."**
The instruction to "squawk conspicuity" must be read back.	**"Squawk conspicuity, G-ME."**

UK Flight Information Services

Example 'Traffic Service'	
Use the 'freecall' format to request a 'Traffic Service'. The controller will pass radar derived traffic information relevant to your flight.	
The standard format for calling traffic is position, range, relative movement and (if available) altitude.	**"G-ME, traffic one o'clock, 4 miles, crossing right to left ahead, indicating 400 ft above."**
You may respond with "Roger" while you look for the traffic.	**"Roger, G-ME."**
It will assist the controller if you report the traffic is in sight (or not sighted).	**"Traffic in sight, G-ME."**
The controller can provide an update should you lose sight of the traffic.	**"Traffic no longer in sight, G-ME."**
-	**"G-ME, previously reported traffic now 10 o'clock, 2 miles, indicating 300 ft above."**

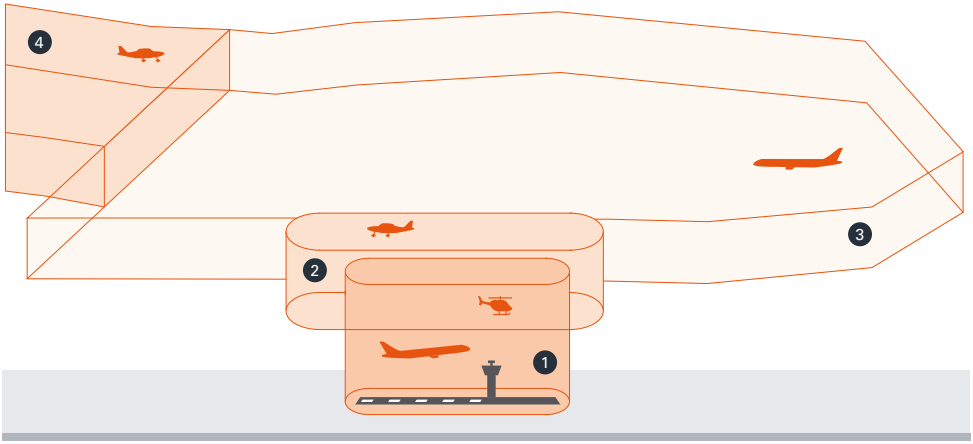
When passing traffic information the controller will use the following terms to describe the relevant movement:



Controlled airspace operations

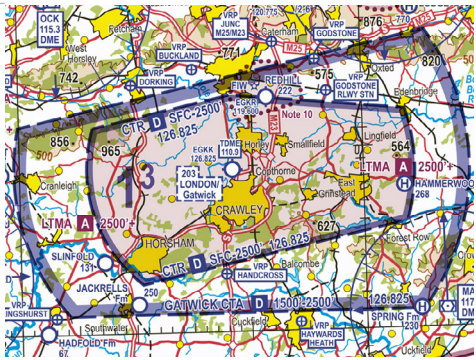
The table on p.69 sets out the characteristics for the different classifications of airspace. The majority of controlled airspace that GA pilots will encounter in the UK is class D – used in most control zones (CTRs) and control areas (CTA) around aerodromes.

As well as the different classifications, controlled airspace is made up of different structures.



1 Control zone (CTR)

CTRs are established around aerodromes, with the shape normally orientated around the length of the main runway. In the UK CTRs are normally class D airspace and extend from the surface to around 2,500 ft AMSL or higher.



AIRSPACE

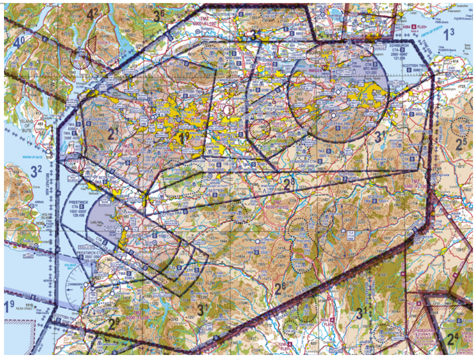
Controlled airspace operations

2 Control area (CTA)

CTAs overlay CTRs and extend further beyond the aerodrome. The base is normally around 1,500 ft AMSL. They are normally class D, however some higher or larger CTAs are class A.

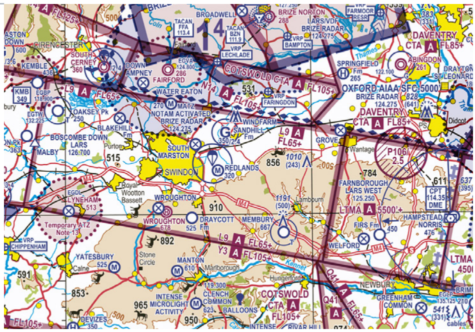
3 Terminal manoeuvring area (TMA)

TMAs cover areas where there may be several busy aerodromes close together; for example the London, Manchester or Scottish TMAs. They are normally class A, although the Scottish TMA is an exception.



4 Airways

Airways link different parts of the airspace structure together. Airways have designations consisting of letters and numbers. They are normally class A. Some airways in Scotland are class E combined with a transponder mandatory zone (TMZ), allowing VFR access without an ATC clearance.



Controlled airspace operations

REQUESTING TRANSITS

Guidance

GA pilots sometimes avoid controlled airspace, when it would be more efficient and potentially safer to obtain a transit.

If it appears advantageous and reasonable to do so, confidently request a transit of CAS. If not, plan a route that minimises the risk of infringement.

Air traffic controllers should make every effort to accommodate requests that are consistent with the safe and orderly flow of traffic.

Advantages of obtaining a controlled airspace transit include:

- Reduces the distance of the flight;
- May reduce the risk of airborne conflict;
- May reduce the risk of infringement:
  - There is a shared understanding of the intended route, enabling the controller to plan interactions with other traffic; and
  - The risk caused by distraction is reduced – rather than navigating around the edges of controlled airspace, the aircraft is now cleared to enter along a defined area and/or route.

Within class D airspace there is no requirement for ATC to apply formal separation between VFR traffic and other VFR or IFR traffic, only the provision of traffic information. Whilst ATC will not issue instructions that create a direct conflict, they may rely on VFR traffic visually maintaining a safe distance from other aircraft.

Recommendations for obtaining a transit:

- Request to transit via any preferred VFR routes. These are normally published in the aerodrome AIP entry, AD 2.22 – Flight Procedures.
- Give the controller reasonable time to respond to your request. 10 minutes flying time from the intended entry point is ideal.
- Sound proficient on the radio and concisely articulate your request. Use the standard 'freecall' (see p.81) format (adapted as required). This will give the controller confidence that you will comply with the conditions of the clearance.
- Listen out on the relevant frequency before calling – if the zone controller sounds busy with aerodrome traffic, you may not be granted a transit that conflicts with the arrival or departure routes. However, crossing the aerodrome overhead at right angles to the runway may be easier to accommodate.

Guidance

If you are denied access to airspace or refused an air traffic service you can complete the online form: FCS 1522 – UK Airspace Access or Refusal of ATS Report

The CAA use this data to inform airspace change proposals and post implementation reviews. They can also intervene if an area of controlled airspace is not being appropriately resourced.

Controlled airspace operations

Example request to transit controlled airspace	
For more details of radiotelephony (RT) procedures please see CAP 413 – www.caa.co.uk/cap413 and SSL 22 – *Radiotelephony for General Aviation Pilots*.	
Explanation	**Example exchange**
Commencing the call with the request allows the controller to consider whether they can respond immediately, or instruct the caller to "standby". It also allows the controller to consider what information will need to be passed back to the aircraft before having to process the entire message – for example most ATSUs will have a series of squawk codes to be given out, depending on what service is being provided to the aircraft.	**"Solent Radar, G-DOME, request Basic Service and zone transit."**
Assuming the controller is ready to process your request, they will likely respond by asking you to "pass your message". If the controller replies "standby" there is no need to acknowledge this: they will try and call you when able. It does not imply a rejection of your request; it just means they are not able to immediately respond to it.	**"G-DOME, Solent Radar, pass your message."**
Use the standard "freecall" format, spelling out more detail on your desired zone transit. There is no need to repeat the original service request (e.g. for Basic Service) but give more detail on your zone transit request if appropriate.	**"G-DOME, PA28, from Compton Abbas to Shoreham. 2 NM south of Alderbury, altitude 2,300 ft, QNH 1022. Request transit via Romsey and Bishop's Waltham."**
Depending on what service you have requested and/or whether the controller anticipates giving you a clearance, they may reply by giving you a squawk code. The controller may ask you to "ident", which means after selecting the squawk, press the ident key on the transponder. This draws their attention to you on the radar screen.	**"G-DOME, Roger, Basic Service, squawk 3646 with ident."**

Controlled airspace operations

Example request to transit controlled airspace	
Explanation	**Example exchange**
The type of service and squawk code must be read back.	**"Basic Service, squawk 3646 with ident, G-DOME."**
If the transit request is straightforward then the clearance will likely be given shortly after identification, although **remain clear until given a clearance.** If you are approaching the zone boundary and you still have not received a clearance, it may be appropriate to enquire as to whether a clearance is likely. Consider your alternative route, should a clearance not be forthcoming. If a clearance is not available, positively alter course away from the airspace and monitor your moving map device to ensure that you remain clear of controlled airspace.	**"G-ME, identified 10 NM west of Southampton, cleared to cross the zone VFR, not above altitude 2,000 ft, Southampton QNH 1024. Report entering the zone at Romsey."**
Read back the clearance with any altitude limits or other conditions as received. Instructions, such as to report at certain points in the future may be acknowledged with the word "wilco". You may abbreviate your callsign once the controller has done so.	**"Cleared to cross the zone, VFR, not above altitude 2,000 ft, QNH 1024, wilco, G-ME."**
Report as instructed.	**"G-ME, entering the zone at Romsey."**
Unless they have any further instructions, the controller will just acknowledge. The controller may apply a 'Radar Control Service'- this requires a read-back.	**"G-ME, Roger, report leaving the zone at Bishop's Waltham."**
-	**"Wilco, G-ME."**

Transponder use

MODES AND CODES

Key info

- Squawk 7000 (VFR) or 2000 (IFR) as the conspicuity code;
- Select mode 'C' at all times so that your altitude is displayed; and
- If 'listening in' on a frequency, use a relevant frequency monitoring code (see p.13).

Non-normal situations:

- **7700** – Emergency code. Should be selected as soon as practical if the aircraft is suffering an emergency.
- **7600** – Radio failure.
- **7500** – Unlawful interference.
- **0030** – Lost.

More details on transponder procedures can be found at Section 2 of ENR 1.6 of the AIP.

FREQUENCY MONITORING CODES

Frequency Monitoring Codes (previously Listening Squawks) are a situational awareness tool that benefit both pilots and air traffic controllers. They allow the identification of aircraft that are monitoring a particular radio frequency. Using an FMC may mitigate the risk of airspace infringement.

- Listen out on the applicable frequency;
- Set your transponder to the corresponding FMC; and
- Remember to squawk the appropriate conspicuity code when no longer monitoring the frequency.

MODE S REQUIREMENTS

All aircraft must normally be equipped with Mode S 'Elementary Surveillance' capability in the following circumstances:

- Within class A or C airspace;
- Above FL100; or
- Within transponder mandatory zones (TMZ).

Aircraft without Mode S may enter a TMZ with the approval of the relevant ATSU. Additional Mode S requirements also apply for aircraft above 5,700 kgs MTOM or flying under IFR.

There are some areas in which gliders may fly above FL100 without Mode S – details of these areas can be found in ENR 1.1 and 5.2 of the AIP.

Full details of Mode S carriage requirements can be found in GEN 1.5 of the AIP.

If an aircraft is fitted with a serviceable transponder, it is a requirement under SERA for it to be selected on (including altitude reporting) at all times. The only exceptions are if in compliance with ATC direction or local procedure, or when in airspace not requiring transponder carriage, turning off the transponder is permitted if necessary to conserve electrical power.

Turning off a serviceable transponder and will cause increased risk to other airspace users. Doing so in the event of infringing controlled airspace will also increase the likely sanction.

Altimeter setting procedures

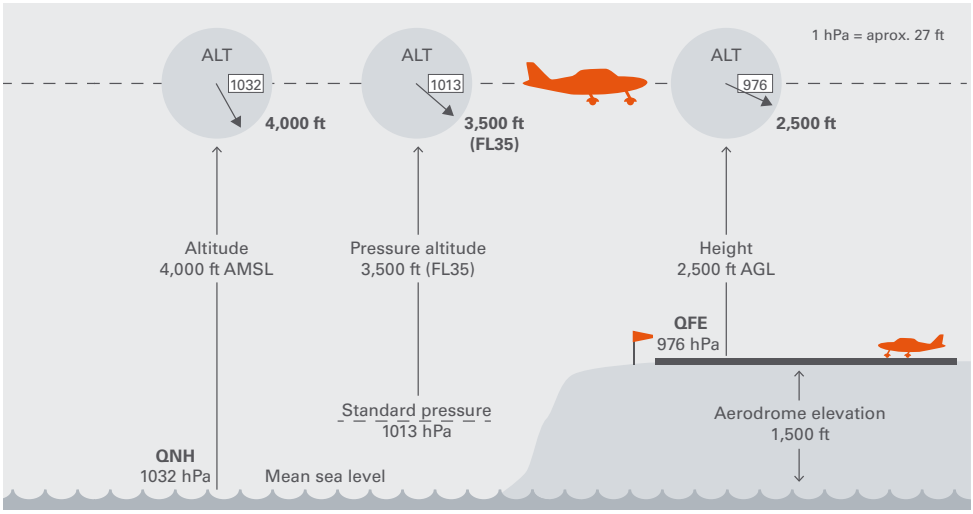
PRESSURE SETTINGS

There are four types of altimeter settings used in the UK. The altimeter is set in hectopascals (hPa):

- **QNH** – indicates altitude above mean sea level (AMSL). When on the ground at an aerodrome, it should indicate the known elevation AMSL.

- **Regional pressure settings (RPS)** – is the lowest forecast pressure in a particular altimeter setting region (ASR). The UK has 21 ASRs, which have geographical names such as 'Portland' or 'Cotswold'. Using the RPS will normally result in a lower altimeter reading than actual, unless you are at the low pressure point of the ASR. Full details of the UK's altimeter setting regions can be found in ENR 6 of the AIP.
- **QFE** – indicates height above aerodrome level, so when on the ground at an aerodrome, the QFE is the pressure setting when the altimeter is at zero.
- **Standard** – the 'standard' pressure setting is 1013 hPa. It is used above the transition altitude. With 'standard' set on the altimeter, you refer to your vertical position as a 'flight level' (FL). Setting 1013 hPa also indicates your 'pressure altitude'.

Altimeter settings example:



Altimeter setting procedures

TRANSITION ALTITUDE

The transition altitude (TA) is the altitude above which the vertical position of an aircraft is expressed in terms of flight level (FL) rather than altitude. It is not mandatory in the UK for VFR flights (it is a requirement for IFR) to change to FLs above the TA, however it may be required in other states.

- Outside controlled airspace, the transition altitude in the UK is normally 3,000 ft AMSL.
- Within and below areas of controlled airspace, the TA is normally either 5,000 ft or 6,000 ft AMSL. ENR 1.7 of the AIP contains details for individual locations.

The lowest FL available for VFR traffic is normally FL35, although depending on the local QNH and transition altitude, this may be higher. The lowest available FL is known as the 'transition level'. The transition level must always be at least 1,000 ft above the TA.

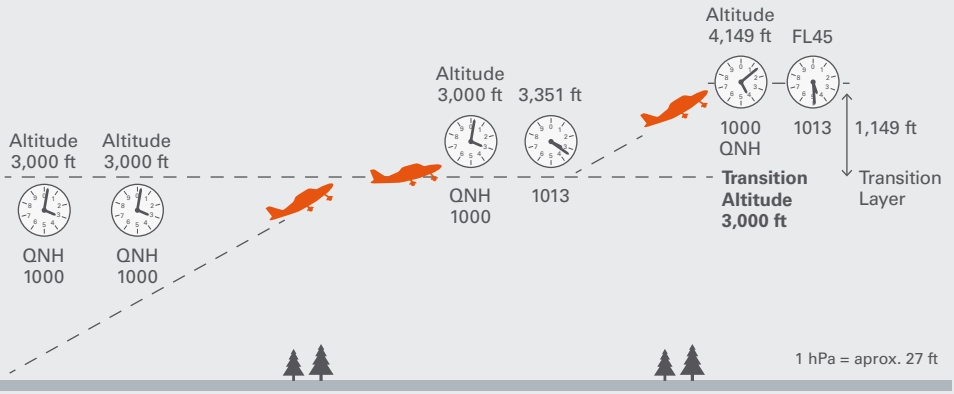
RECOMMENDED PROCEDURES

- You should normally use the most relevant QNH to your route or area of operation. Only use the RPS if there is no local QNH available.
- When transiting below or in the vicinity of controlled airspace boundaries defined as an altitude, you should use the QNH setting applicable to the airspace.
- When transiting below or in the vicinity of controlled airspace defined as a flight level, you should use 1013 hPa.
- Larger aerodromes will use QNH for both take-off and landing.

Key info

Full details of UK altimeter setting procedures can be found in ENR 1.7 of the UK AIP.

To illustrate the relationship between QNH and FLs, one altimeter is left on the QNH, while the other is adjusted to 1013 at the transition altitude.



On this day the QNH is 1000 hPa. When the aircraft reaches the transition altitude (3,000 ft AMSL in this example) and 1013 hPa is set, the altimeter will read 3,351 ft. Assuming the aircraft is travelling westbound, the lowest available VFR FL is 45.

AERODROME OPERATIONS

Including:

06.

AERODROME OPERATIONS

Correct use of procedures is important for safe aerodrome operations. Most GA aerodromes are 'uncontrolled', meaning pilots must operate safely amongst other airspace users, without direction from air traffic control.

Aerodrome communications

RADIO COMMUNICATIONS

There are different levels of service provision for radio communications at aerodromes, ranging from SafetyCom, which relies on self-announcement and separation by pilots, to an aerodrome control service provided by an air traffic controller. It is important that pilots understand the different levels of provision and the associated procedures and responsibilities.

SafetyCom – callsign 'Traffic'

SafetyCom is a common traffic advisory frequency for use at aerodromes that do not have an assigned frequency. It is currently **135.480 MHz** and may be used within 10 NM and/or up to 1,000 ft above the traffic circuit at an aerodrome. Aircraft should announce their position and intentions at the normal points using the callsign "[aerodrome name] traffic". Repeating the name of the aerodrome at the end of the transmission further mitigates the risk of confusion when aerodromes are in close proximity to each other.

Air/Ground Communication Service – callsign 'Radio'

Air/Ground Communication Service (AGCS) is the most limited form of air/ground communication available at an aerodrome. The AGCS operator may provide traffic and basic weather information to pilots operating in the vicinity of the aerodrome. Such traffic information is based primarily on reports made by other pilots. Whilst information provided by the radio operator may be used to assist a pilot in making a decision, the safe conduct of the flight remains the pilot's responsibility.

The callsign is the normally "[aerodrome name] radio". When operating in the AGCS environment, the principle is that aircraft announce their position and separate themselves from other aircraft in accordance with the Rules of the Air and any published aerodrome procedures. Only carry out a manoeuvre (such as taxiing, take-off or landing) if you are satisfied it is safe to do so and will not conflict with other traffic.

The AGCS operator has no power to issue clearances or issue instructions to aircraft either on the ground or in the air, although clearances may be relayed from an ATC unit and messages passed on behalf of the aerodrome operator.

Aerodrome communications

Aerodrome flight information service – callsign 'Information'

The Aerodrome Flight Information Service (AFIS) is essentially a Flight Information Service provided at an aerodrome. It is a higher level of service than AGCS; however it remains a source of information rather than control. In the UK, AFIS may issue mandatory instructions to aircraft and vehicles on the ground, up until a runway holding point. AFIS units do not issue instructions to aircraft in the air, however they may request position reports that are consistent with the aerodrome's published traffic procedures. Note that outside the UK, AFIS does not normally issue instructions to aircraft on the ground.

The callsign is "[aerodrome name] Information"; for example 'Duxford Information'. It is still your responsibility to be satisfied that every action is safe and to announce your position and intentions while operating at the aerodrome.

Aerodrome control service – callsign 'Tower'

Some aerodromes have an Aerodrome Control Service within the ATZ, provided by an air traffic control tower. Within the ATZ, compliance with ATC instructions both on the ground and in the air is mandatory. The callsign is "[aerodrome name] Tower"; for example 'Wycombe Tower'. When arriving at such an aerodrome you should call 15 NM or 5 minutes flying time from the ATZ boundary, whichever is greater, and request joining instructions – this will give the controller time to plan your arrival. Larger aerodromes may also have a ground control frequency – callsign 'Ground'.

Aerodrome approach control service – callsign 'Approach'

An Approach Control Service may be provided at an aerodrome either inside or outside controlled airspace. If the aerodrome has approach control, you should make contact at least 15 NM or 5 minutes flying time from the ATZ boundary, whichever is greater.

As you approach the ATZ, the approach controller will normally pass you to the aerodrome control (callsign 'Tower') for landing.

The callsign is the location name followed by the suffix 'Approach' or 'Radar' (if a radar approach unit); for example 'Shoreham Approach' or 'Bournemouth Radar'.

ATIS

Automatic Terminal Information Service (ATIS) is a continuous recorded information message usually found at larger aerodromes. It is updated regularly and gives aerodrome information such as:

- Runway in use
- Type of instrument approach to expect (if applicable)
- Weather conditions
- QNH
- Any other pertinent information or hazards, such as closed taxiways.

Each update will be allocated an alphabetic reference, such as 'Information Alpha'. On initial contact with the aerodrome control tower the pilot must include the reference letter of the information copied.

Aerodrome communications

AERODROME LIGHT SIGNALS

The suit of light signals originate from a time when less aircraft were equipped with a radio, and ATC might routinely use light signals to control aircraft.

If you experience radio failure, look out for light signals that may be used to communicate between the ground (for example from the control tower) and aircraft.

Aerodrome to aircraft communication		
Light signal displayed	**Meaning if in flight**	**Meaning if on the ground**
Steady red	Give way to other aircraft and continue circling	Stop
Steady green	Clear to land	Clear for take-off
Red flashes	Do not land: aerodrome not available for landing	Move clear of landing area
Green flashes	Return for landing. Clearance to land will be given in due course	Clear to taxi
White flashes	Land at this aerodrome and proceed to apron, clearance to land will be given in due course	Return to starting point on the aerodrome
Red pyrotechnic	Notwithstanding any previous instructions, do not land for the time being	-

Acknowledgment of light signals by aircraft		
Time of day	**In flight**	**On ground**
Day time	Rocking aircraft's wings, except if on base or final approach	Moving the aircraft's ailerons or rudder
Night time	Flashing on and off twice the landing lights or navigation lights	Flashing on and off twice the aircraft's landing lights or navigation lights

Arrival and departure procedures

OPERATING RULES

The following rules apply to operating at aerodromes. Those relating to landing and take-off, flight within the ATZ and movement on uncontrolled aerodromes are based on Rules 10, 11 and 12 of the UK Rules of the Air Regulations 2015.

Part-SERA

SERA.3225 sets down the following rules for operating at aerodromes. They apply regardless of whether there is a notified ATZ. You must:

- observe other traffic for the purpose of avoiding collision;
- conform with or avoid the pattern of traffic formed by other aircraft (the aerodrome traffic circuit);
- except for balloons, make all turns to the left when approaching for a landing or taking off, unless otherwise indicated by the aerodrome; and
- except for balloons, land and take off into the wind, unless safety or other operational considerations determine otherwise.

Landing and take-off

Rule 10:

- You may not land on a runway that is occupied by another aircraft, unless authorised by an air traffic control unit; and
- In the case of a powered aircraft, after landing, you must move clear of the landing area as soon as possible.
- If take-offs and landings are not confined to runways, you must:
  - when landing, leave clear to your left any other aircraft that is in the process of landing, has already landed or is about to takeoff;
  - make turns to the left, provided you do not interfere with other traffic; and
  - in the case of a powered aircraft, when taking up position for take-off, leave clear on your left any aircraft which has already taken off or is about to take off.
- The landing and take-off rules do not apply to balloons.

Rules for the ATZ

Rule 11:

During the notified hours of watch of either the ATC, AFIS or AGCS, an aircraft must not operate within an ATZ unless:

- If there is an aerodrome control service, permission has been given for the flight to be conducted safely; or
- If there is an AFIS or AGCS, appropriate information has been obtained from the AFIS or AGCS to allow the flight to be conducted safely within the ATZ.
- A continuous watch must be kept on the appropriate radio frequency or for visual signals.
- If equipped with a radio, information on the aircraft's position and height must be transmitted upon entering or leaving the ATZ.

Movement on uncontrolled aerodromes

Rule 12:

You must not taxi on the manoeuvring area of an uncontrolled aerodrome without the permission of either:

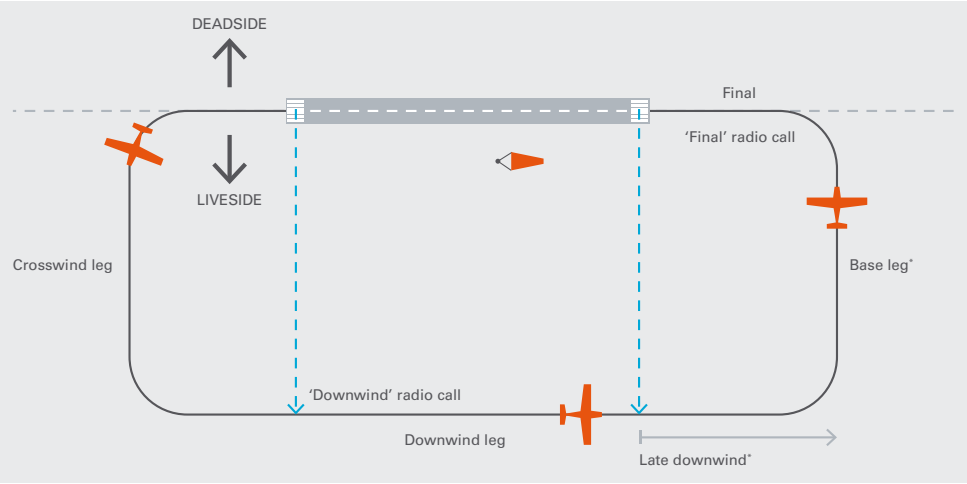
- The person in charge of that aerodrome[1]; or
- The AFIS unit, if notified as being in operation.

[1] This permission is usually implied by operating in accordance with normal aerodrome procedures and any local terms and conditions that may apply.

Arrival and departure procedures

THE AERODROME TRAFFIC CIRCUIT

The 'circuit' consists of the flight pattern that aircraft make around the aerodrome when taking off or landing. This guidance focuses on the uncontrolled aerodrome environment.



*Announce these positions if it would enhance situational awareness or if calls were not possible at the standard positions.

Circuit guidance

- Joining aircraft must normally give way to traffic already established in the circuit.
- Maintain a good lookout. Be flexible in responding to changes in the traffic situation.
- Conform to the standard circuit pattern. Understand how the visual picture of the runway should appear from your aircraft at different stages of the circuit.
- Announce your position at the standard points and whenever you feel it will enhance the situational awareness of others – for example announcing that you are on base leg or late downwind.
- Always make position calls, even if you are unaware of any other traffic operating at the aerodrome. If there is no AGCS or AFIS, make 'blind calls' on frequency. Non-radio aircraft are also a possibility, so maintain a good lookout.
- If in doubt regarding aerodrome circuit procedures, confirm understanding via telephone or over the radio. AFIS or AGCS will not issue instructions to aircraft in the air, however they should be able to clarify local requirements.

Arrival and departure procedures

PROCEDURES FOR DEPARTING TRAFFIC

Key info

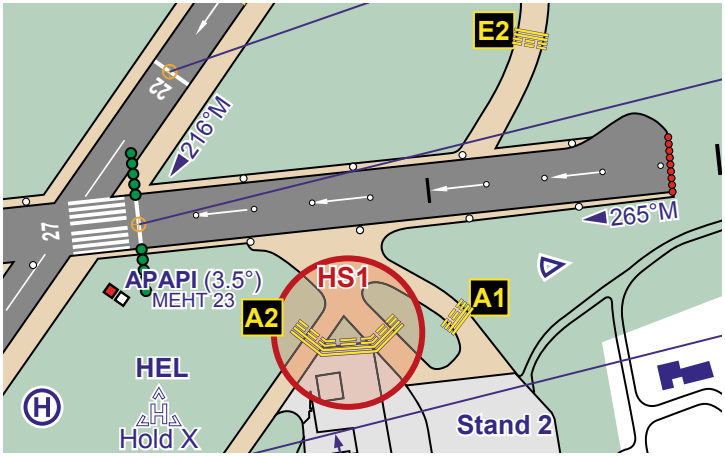
At an aerodrome with an AGCS, AFIS or ATC, you should call for airfield information prior to taxiing to the runway. This will normally include:

- Runway in use;
- Circuit direction; and
- QNH or QFE.

At larger aerodromes there may be an ATIS frequency, on which information for operating at the aerodrome will be included. The letter reference of the ATIS information should be given on first contact with ATC.

- At aerodromes with an AGCS, it is the pilot's responsibility to determine whether they can safely taxi on the aerodrome. Having reviewed the aerodrome chart you should announce your intentions to taxi, giving details of the route and holding points as necessary.
- You do not need to request a taxi clearance at an aerodrome with an AGCS. However, you must have the permission of the person in charge of the aerodrome before taxiing on the apron or manoeuvring area. This permission is normally implicit if operating within the terms and conditions of the aerodrome detailed in the AIP entry, or the local procedures published for an unlicensed aerodrome.
- At an aerodrome with an AFIS you must request taxi instructions. AFIS only gives instructions to aircraft on the ground and the pilot must still ensure it is safe to comply with them.
- At a controlled aerodrome you must request permission to taxi. Larger controlled aerodromes may have a ground frequency – for example 'Bournemouth Ground'. Otherwise the initial call should be made to the tower.
- At larger aerodromes the taxiways may be confusing, so taxi slowly, carry an up to date chart and do not be afraid to stop and ask for clarification.
- Some moving map devices or panel mounted GNSS navigators include georeferenced aerodrome charts – these can be very helpful for situational awareness.
- Once at the runway holding point, complete all necessary power and/or pre-take off checks before reporting "ready for departure". At an aerodrome with AFIS, this is the point at which the service reverts to information only – it is the pilot's responsibility to ensure it is safe to enter the runway and take off.
- Particularly in a high wing aircraft, manoeuvre so that you have a good view from the holding point of the approach path. This may require you to stop at an angle, pointing in the direction of arriving traffic.
- At an aerodrome with an air traffic control service, you must not enter the runway without a clearance. This will either be take-off clearance or an instruction to "line up and wait", with the take-off clearance coming later.
- On departure, you must report leaving the ATZ.

Arrival and departure procedures



Holding points that are particularly vulnerable to runway incursion are marked on aerodrome charts as 'hot spots' and circled in red. The layout of taxiways at these points may be confusing and therefore pilots may be more prone to unintentionally entering the runway environment without clearance.

Example AGCS communications – flying the circuit	
For more details of radiotelephony (RT) procedures please see CAP 413 – www.caa.co.uk/cap413 and SSL 22 – *Radiotelephony for General Aviation Pilots*.	
Explanation	**Exchange**
On first call use both your full callsign and that of the station being addressed. If there is more than one apron, giving your position will help the radio operator identify where you are.	**"Thruxton radio, G-DOME, PA28 on the main apron, request taxi information for circuits."**
The radio operator should then give you the relevant aerodrome information.	**"G-DOME, Thruxton radio, runway in use 07, left hand circuit, QNH 1024."**
Information such as runway in use, circuit direction and QNH requires read-back.	**"Runway in use 07, left hand circuit, QNH 1024, G-DOME."**
Once satisfied it is safe to taxi, announce your intentions.	**"G-DOME, taxiing holding point W for runway 07."**
The radio operator may pass any relevant traffic information, but do not rely on this – an AGCS operator is required to have a contentious view of the manoeuvring area.	**"G-ME, Roger."**

Arrival and departure procedures

Example AGCS communications – flying the circuit	
Explanation	**Exchange**
Once you have completed all pre-take off checks, announce you are ready to depart. Note that it is NOT correct to report "ready for take-off".	**"G-ME, holding point W, ready for departure."**
The AGCS operator should pass information on known traffic that may affect your flight. However, it is still your responsibility to check that the runway and final approach are clear.	**"G-ME, Roger, traffic is a PA28 reported final, surface wind 090°/14 kts."**
Only use the word 'take-off' when announcing that you are about to do so.	**"Roger, taking off, G-ME."**
Once established in the circuit, make standard position calls. Adding your intention (for example touch-and-go or landing) to the downwind call will assist the situational awareness of others, particularly in a busy circuit.	**" G-ME, downwind 07, touch and go (or to land)."** **"G-ME, Roger".** **"G-ME final, touch-and-go (or to land)."** **"G-ME, Roger".**
Once on the ground, report when you have vacated the runway and continue to announce your taxi intentions.	**"G-ME, runway vacated at W, taxiing to the main apron."**
-	**"G-ME, Roger".**

Arrival and departure procedures

Example AFIS communications – departure	
For more details of radiotelephony (RT) procedures please see CAP 413 – www.caa.co.uk/cap413 and SSL 22 – *Radiotelephony for General Aviation Pilots*.	
Explanation	**Exchange**
On first call use both your full callsign and that of the station being addressed.	 **"Duxford Information, G-DOME, PA28 on the eastern apron, request taxi for VFR flight to Old Sarum."**
The FISO will give you the QNH, runway in use and taxi instructions.	 **"G-DOME, Duxford Information, taxi holding point Echo for runway 24L, left hand circuit, QNH 1024."**
The taxi instructions, runway in use, circuit direction and QNH must be read back.	 **"Taxi holding point Echo for runway 24L, left hand circuit, QNH 1024. G-DOME."**
Once at the hold and any necessary checks complete, report "ready for departure". Note that it is not correct to report "ready for take-off".	 **"G-DOME, holding at Echo, ready for departure."**
The phrase "take-off at your discretion" indicates the point at which the FISO is no longer giving you instructions. You are responsible for determining whether it is safe to take off. You should carefully check that the approach and runway are clear before entering.	 **"G-ME, Roger, no reported traffic, surface wind 260°/14 kts, take-off at your discretion."**
The term 'take-off' should only be used to announce that you are about to take-off (in an AGCS or AFIS environment) or reading back a take-off clearance from an aerodrome controller.	 **"Taking off runway 24L, G-ME."**
Once airborne and transitioning to enroute flight, you should report leaving the frequency/ ATZ at the appropriate time. It is good practice to let the current station know the frequency you are changing to.	 **"G-ME, leaving the ATZ to the south west at 2,000 ft, changing to Luton Approach 129.55."**

Arrival and departure procedures

PROCEDURES FOR ARRIVING TRAFFIC

Follow any specific arrival procedures published for the aerodrome. For example, some aerodromes will nominate a Visual Reference Point (VRP) for the arrival route.

Radio contact with the aerodrome should be made around 10 minutes prior to arrival. On initial contact you should be passed:

- Runway in use;
- Circuit direction; and
- QNH or QFE.

At controlled aerodromes you will normally be instructed to join in a particular manner, such as 'join overhead' or 'join downwind'.

At uncontrolled aerodromes you must plan your arrival join, taking into account local procedures and the prevailing traffic situation. Announce your entry to the ATZ and joining intentions. Know the correct circuit height. This may vary depending on day of the week or aircraft type.

If the aerodrome has an ATIS, include in your initial call the information letter and QNH you have copied.

Guidance

To increase visual conspicuity, it is recommended to turn on landing lights when approaching the aerodrome.

Strip Flying

For more info see the SSL 12

Maintaining separation

- Control your speed and circuit width to integrate with other traffic. Deploy flaps and land gear as required.
- If you cannot maintain adequate separation from other aircraft, break off the circuit and rejoin from the dead side. Do not orbit in the circuit for spacing, unless directed to do so at a controlled aerodrome.
- If required to go around due to traffic ahead or on the runway, make the decision in good time. Cross to the dead side as you climb away and rejoin the circuit on the cross wind leg or as appropriate to the situation.
- Fly a stable approach at the correct speed, rate of descent and aligned with the runway. If your approach becomes unstable, do not hesitate to go around.
- Helicopters and larger GA aircraft may create wake vortex – causing control difficulties for others. For more information, see SSL 15 – *Wake Vortex*.

Unattended Aerodromes

If operating at an unattended aerodrome, announce your position and intentions via 'blind call' on the aerodrome radio frequency. For aerodromes without an assigned frequency, use Safetycom on 135.480 MHz.

Consider the safety implications of arriving at an unattended aerodrome. It is recommended to nominate a 'responsible person' who can notify the authorities and/or proceed to the aerodrome if you do not make contact after the estimated arrival time. Carrying an ELT or PLB (mandatory for Part 21 aircraft) is also advisable.

Smaller unlicensed aerodromes and strips may have special procedures for arrival.

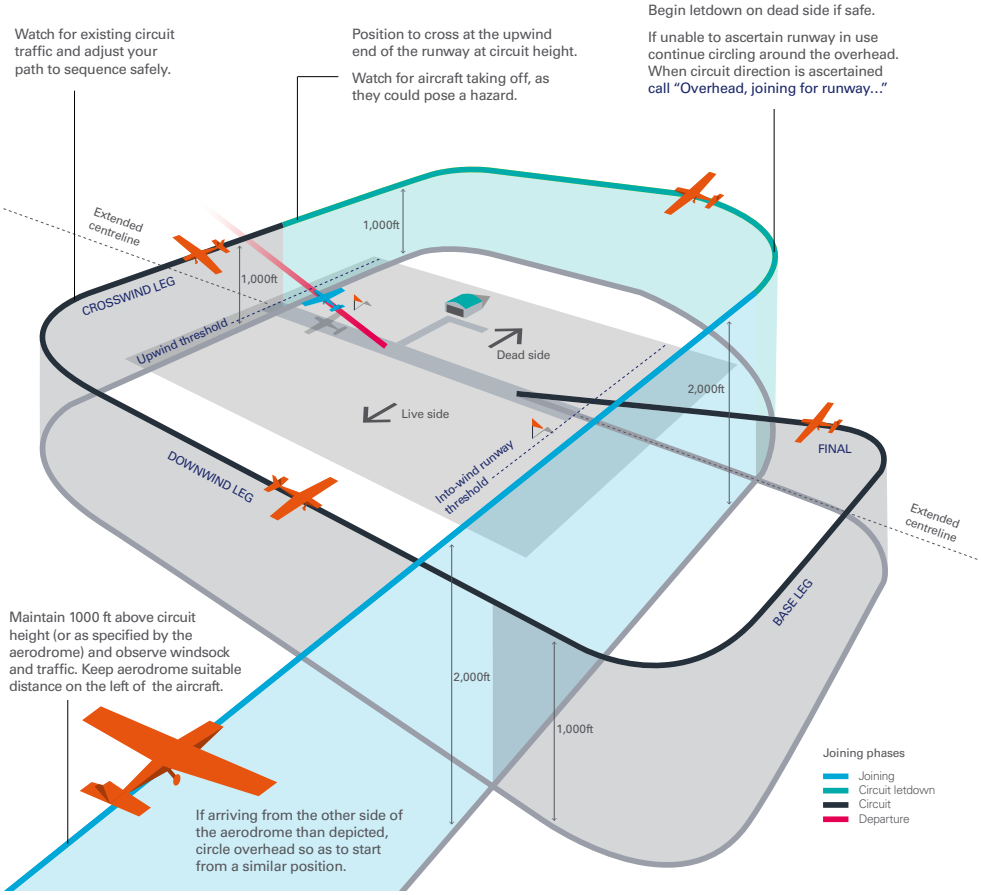
Arrival and departure procedures

Joining procedures

Guidance

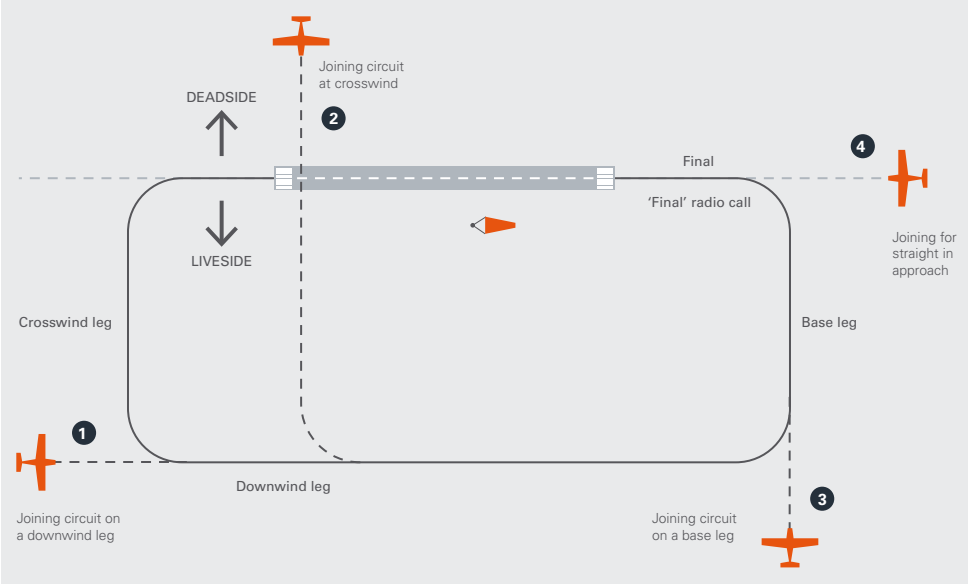
The 'overhead' join is the recommended joining procedure for uncontrolled aerodromes. It allows you to observe traffic in the circuit prior to entry.

Standard overhead joins are not possible at all aerodromes. Always check local procedures.



Arrival and departure procedures

In addition to the overhead join there are other options for joining the circuit, if traffic conditions allow. Aerodromes will sometimes publish a preferred joining route. Always check local procedures.



1 **Downwind join:** joining the circuit parallel to the runway in the downwind direction. It is important to observe for conflicting traffic that may be coming from the crosswind leg. If in doubt about cutting in front of another aircraft, reduce speed and/or manoeuvre to fit in behind.

There may also be aircraft on the downwind leg that are directly ahead of you and therefore difficult to identify. The danger is that you join closer to the runway and then turn base inside other traffic, without realising you have cut in front of them.

2 **Crosswind (midfield) join:** joining at circuit height from the dead side, at 90° to the runway. You then turn downwind to join the circuit direction. Watch out for traffic already established on the downwind leg or traffic in the initial climb below you.

3 **Base leg join:** joining directly to the base leg of the circuit. Watch the downwind leg carefully and ensure that you have not joined on the inside of any traffic that is already on the base leg.

4 **Straight-in approaches** are not recommended since they do not give much opportunity to observe conflicting circuit traffic. If making a straight-in approach, report 'long final' at 4 NM and 'final' at 2 NM.

Arrival and departure procedures

Example AFIS communications – arrival	
For more details of radiotelephony (RT) procedures please see CAP 413 – www.caa.co.uk/cap413 and SSL 22 – *Radiotelephony for General Aviation Pilots*.	
Explanation	**Exchange**
As per contacting an enroute ATSU, including the request in the initial call will help the FISO respond appropriately.	**"Duxford Information, G-DOME, 10 NM south of Duxford, request join."**
The FISO should respond with the relevant aerodrome information.	**"G-DOME, Duxford Information, runway 24L in use, left hand circuit, QFE 1019."**
Runway in use, circuit direction and QHN/QFE must be read back.	**"Runway 24L, left hand circuit, QFE 1019, G-DOME."**
Announce entry into the ATZ.	**"G-DOME, entering the ATZ from the south at 1,500 ft"**
The request to report downwind is not an instruction as you would receive from an air traffic controller. It is a reporting request that is consistent with local procedures. The FISO may give you traffic information in the circuit, although it should be treated as advisory only.	**"G-ME, Roger, report joining downwind."**
Requests may be acknowledged with 'wilco'. While you should follow published aerodrome procedures, AFIS cannot issue instructions to aircraft in the air. It is your decision as to how to execute the arrival join.	**"Wilco, G-ME."**
-	**"G-ME, joining downwind."**
-	**"G-ME, Roger, currently one on final. Report final runway 24L."**

Arrival and departure procedures

Example AFIS communications – arrival	
Explanation	**Exchange**
-	**"Wilco, G-ME."**
	"G-ME, final 24L."
The term "land at your discretion" is used by AFISOs to aircraft on final. It emphasises that it is the pilot's decision whether to land or not. It is not a landing clearance as you would receive from an aerodrome controller. You should ensure the runway is clear before landing.	**"G-ME, Roger, land at your discretion, wind 280°/9 kts."**
-	**"Roger, G-ME."**
In the UK, AFISOs issue taxi instructions to aircraft on the ground.	**"G-ME, taxi to the end of the runway, vacate at Delta and then to the western apron."**
If you are unsure of the assigned route, stop and ask for clarification, although do not stop on the runway.	**"Vacate at Delta and taxi to the western apron, G-ME."**
If necessary, confirm the correct parking location.	**"G-ME, request parking."**
-	**"G-ME, park between the brown PA28 and the yellow Super Cub."**
-	**"Roger, between the brown PA28 and the yellow Super Cub, G-ME."**

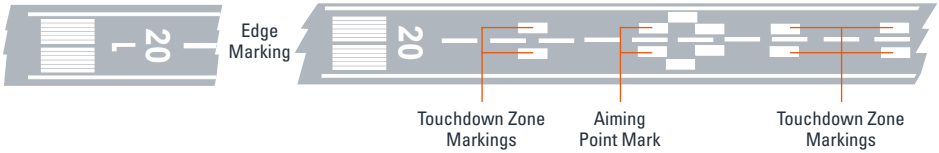
Visual communications and signage

RUNWAY MARKINGS

Visual Runways
– LDA < 1200 m

Non Precision Approach Runways, Visual Runways of LDA
>1200 m and where Threshold requires emphasis

Precision Approach Runways



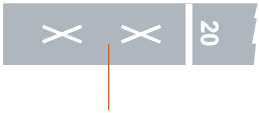
Permanently Displaced Threshold Pre-Threshold Markings

Pre-threshold area of runway fit for movement of aircraft and available as starter extension for take-off but not available for landing

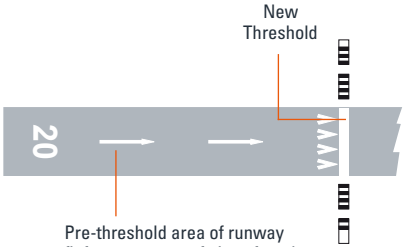
Pre-threshold area of runway fit for use as a stopway by aircraft landing in the opposite direction but not fit for normal movement of aircraft

Visual communications and signage

Temporarily Displaced Threshold and Pre-Threshold Markings



Pre-threshold area of runway unfit for the movement of aircraft and unsuitable as stopway



Pre-threshold area of runway fit for movement of aircraft and available as starter extension for take-off but not available for landing

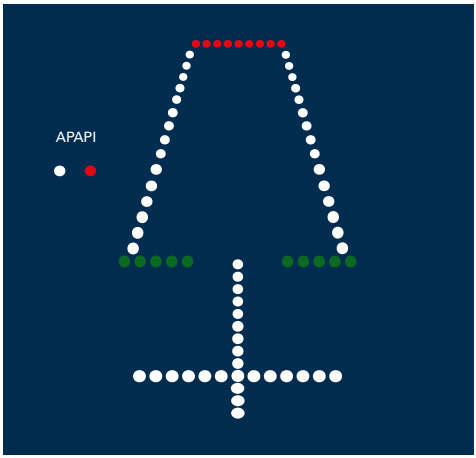
LIGHTING

Runway lighting

A typical lighting installation for GA runways includes:

- Green threshold lighting;
- White edge lighting; and
- Red end lighting.

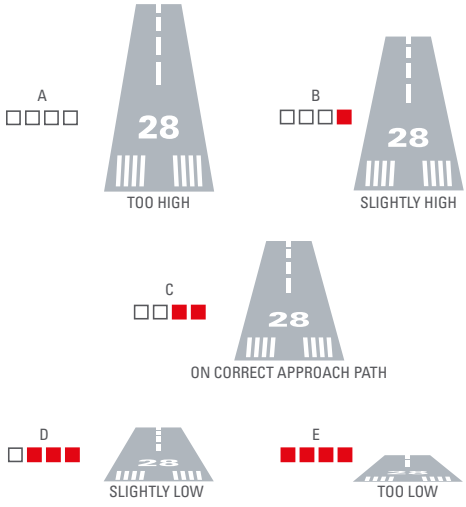
Some runways may also be equipped with a simple approach lighting system, consisting of white lights in a single 'T-bar' layout. This aids visual acquisition of the runway in poor visibility.



Visual communications and signage

Precision Approach Path Indicators (PAPIs)

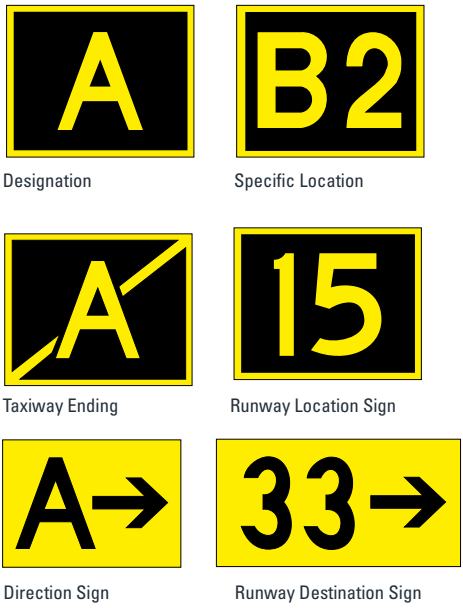
PAPIs indicate whether you are on the correct approach angle to the runway. They are normally set at between 3° and 4°. Most GA aerodromes will have a two light system (APAPI), when on the correct slope, one light is white and the other light is red. Larger aerodromes typically have a four light system.



TAXIWAY SIGNS AND MARKINGS

Location and destination signs

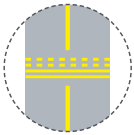
Signs allow specific locations or directions to be identified. Taxiways are normally identified by a letter, for example 'Alpha' or 'Bravo'. Specific locations such as holding points are normally indicated with a letter and number combination.



Visual communications and signage

Mandatory signs and holding points

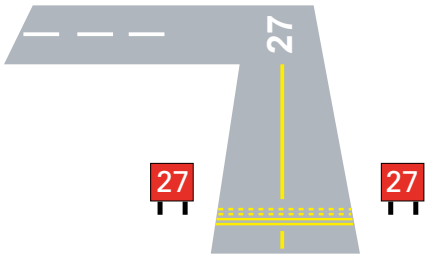
Mandatory instruction signs are indicated by white letters on a red background. The most common example being runway entry points. Entry points at either end of a runway will refer to the end of the runway (for example 27) at which the entry is located. At intermediate points of entry, both runway directions are indicated.



Runway Taxi-Holding Position marking pattern 'A' identifying the last holding position prior to entering runway

You must not pass mandatory signs without permission from ATC (in the case of a controlled aerodrome) or at an uncontrolled aerodrome without having checked the runway and final approach is clear and announced your intentions to enter the runway.

Accompanying the sign will also be ground markings which indicate the holding point, consisting of two solid yellow lines followed by two dashed lines on the runway side of the markings.



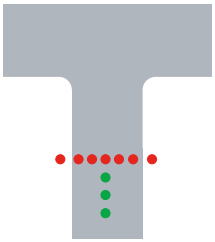
Larger aerodromes may also have 'guard lights' – normally these are placed in pairs either side of a runway holding point and alternately flash yellow.

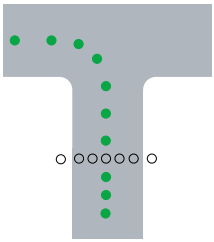
Visual communications and signage

Stop bars

At larger controlled aerodromes you may encounter 'stop bars'. These are red lights that are positioned across the taxiway, normally prior to entering a runway. You must not cross a red stop bar. ATC will switch them off after giving a clearance to cross or enter the associated holding point. The red bar should then be replaced with a green centreline marking that leads past it.

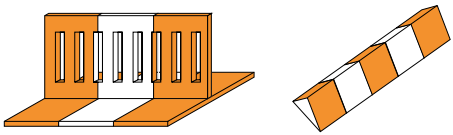
ATC should not normally ask you to cross an illuminated stop bar. If ATC issue an instruction that involves crossing an illuminated stop bar, you must seek clarification.

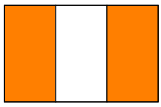

Stop Bar On


Stop Bar Off

Boundary markers

Orange and white markers are sometimes used to mark the boundary of areas unfit for the movement of aircraft and/or the boundary of the aerodrome.


Area unfit for the movement of aircraft


Aerodrome boundary

AERODROME GROUND SIGNALS

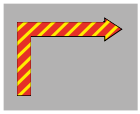
Ground to air visual signals date from the time when many aircraft did not have radios. Ground signals therefore had to be read from the air to ascertain information such as the direction of the landing runway.

Ground to air signals are normally located in the 'signal square'. The signal square will contain signs that display information about aerodrome operations. If arriving non-radio, observe the signal square from overhead and plan your join accordingly.

Visual communications and signage

A horizontal white or orange landing T in the signal square indicates the direction to be used by aircraft for landing and taking off – parallel to the shaft of the T towards the cross arm.

The landing direction/runway in use may also be displayed in a prominent place on the control tower using black digits on a yellow background.



A right hand arrow of conspicuous colour in the signal square indicates that turns are to be made to the right before landing and after take-off. This means adopt a right hand circuit pattern. In the absence of a signal or other information to the contrary, a left hand circuit pattern is the norm.

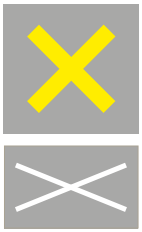
A red square with one yellow diagonal displayed in the signal square indicates that special precautions must be observed in approaching to land or in landing, for example due to the poor state of the manoeuvring area.

A red square with two yellow diagonal displayed in the signal square indicates that landings are prohibited.

A horizontal white dumb-bell displayed in the signal square indicates that aircraft are required to land, take-off and taxi on runways and taxiways only.

A horizontal white dumb-bell with black stripes indicates that while take-offs and landings are confined to runways only, other manoeuvres need not be confined to runways or taxiways.

A double white cross displayed in the signal square indicates that gliding operations are taking place at the aerodrome.



A cross on the surface of a runway (white) or taxiway (yellow) indicates an area unfit for the movement of aircraft.

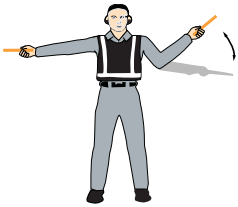
A black letter C against a yellow background indicates the place at which a pilot can report to the air traffic control unit or to the person in charge of the aerodrome. At most GA aerodromes, visiting pilots should report to this point after arrival.

Marshalling signals

When visiting larger aerodromes you may be directed to your parking location by a marshaller. The following pages cover most of the signals likely to be used for operations with light aircraft. Details of all signals can be found in Appendix 1 of SERA.

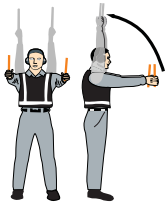
Description: Raise right hand above head level with wand pointing up; move left-hand wand pointing down toward body.

Meaning: Wingwalker/ guide -This signal provides an indication by a person positioned at the aircraft wing tip, to the pilot/marshaller/ push-back operator, that the aircraft movement on/off a parking position would be unobstructed.



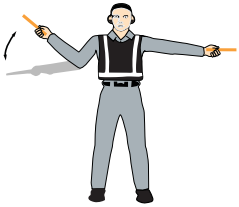
Description: With right arm and wand extended at a 90-degree angle to body, make "come ahead" signal with left hand. The rate of signal motion indicates to pilot the rate of aircraft turn.

Meaning: Turn left (from pilot's point of view).



Description: Raise fully extended arms straight above head with wands pointing up.

Meaning: Identify gate.

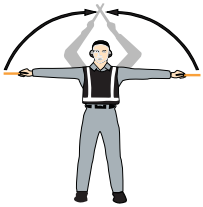


Description: With left arm and wand extended at a 90-degree angle to body, make "come ahead" signal with right hand. The rate of signal motion indicates to pilot the rate of aircraft turn.

Meaning: Turn right (from pilot's point of view).

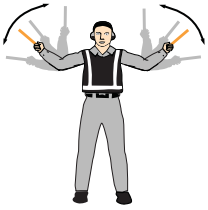
Description: Point both arms upward, move and extend arms outward to sides of body and point with wands to direction of next signalman or taxi area.

Meaning: Proceed to next signalman or as directed by tower/ground control.



Description: Fully extend arms and wands at a 90-degree angle to sides and slowly move to above head until wands cross.

Meaning: Normal stop.



Description: Bend extended arms at elbows and move wands up and down from chest height to head.

Meaning: Straight ahead.

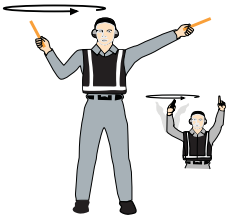
Description: Abruptly extend arms and wands to top of head, crossing wands.

Meaning: Emergency stop.

Marshalling signals

Description: Raise hand just above shoulder height with open palm. Ensuring eye contact with flight crew, close hand into a fist. Do Not move until receipt of "thumbs up" acknowledgement from flight crew.

Meaning: Set brakes.



Description: Raise right arm to head level with wand pointing up and start a circular motion with hand; at the same time, with left arm raised above head level, point to engine to be started.

Meaning: Start engine(s).

Description: Raise hand just above shoulder height with hand closed in a fist. Ensuring eye contact with flight crew, open palm. Do not move until receipt of "thumbs up" acknowledgement from crew.

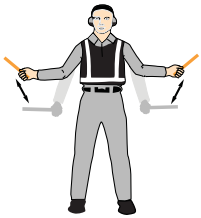
Meaning: Release brakes.

Description: Extend arm with wand forward of body at shoulder level; move hand and wand to top of left shoulder and draw wand to top of right shoulder in a slicing motion across throat.

Meaning: Cut engine(s).

Description: With arms and wands fully extending above head, move wands inwards in a "jabbing" motion until wands touch. Ensure acknowledgement is received from flight crew.

Meaning: Chocks inserted.

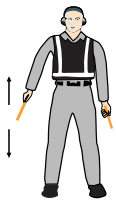


Description: Move extended arms downwards in a "patting" gesture, moving wands up and down from waist to knees.

Meaning: Slow down.

Description: With arms and wands fully extended above head, move wands outward in "jabbing" motion. Do not remove chocks until authorised by crew.

Meaning: Chocks removed.



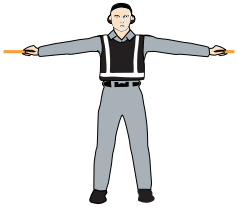
Description: With arms down and wands toward ground, wave either right or left wand up and down indicating engine(s) on left or right side respectively should be slowed down.

Meaning: Slow down engine(s) on indicated side.

Marshalling signals

Description: With arms in front of body at waist height, rotate arms in a forward motion. To stop rearward movement, use signal 6(a) or 6(b).

Meaning: Move Back.

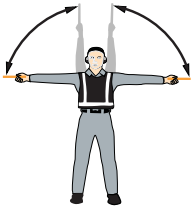


Description: Fully extend arms and wands at a 90-degree angle to sides.

Meaning: Hover.

Description: Point left arm with wand down and bring right arm from overhead vertical position to horizontal forward position, repeating right-arm movement.

Meaning: Turns while backing (for tail to starboard).

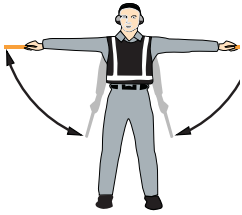


Description: Fully extend arms and wands at a 90-degree angle to sides and, with palms turned up, move hands upwards. Speed of movement indicates rate of ascent.

Meaning: Move upwards.

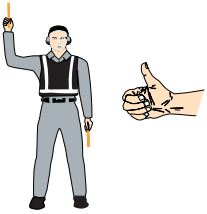
Description: Point right arm with wand down and bring left arm from overhead vertical position to horizontal position, repeating left-arm movement.

Meaning: Turns while backing (for tail to port).



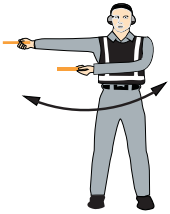
Description: Fully extend arms and wands at a 90-degree angle to sides and, with palms turned down, move hands downwards. Speed of movement indicates rate of descent.

Meaning: Move downwards.



Description: Raise right arm to head level with wand pointing up or display hand with "thumbs up"; left arm remains at side by knee.

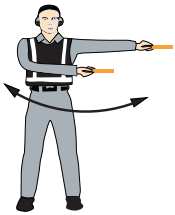
Meaning: Affirmative/all clear-This signal is also used as a technical/servicing communication signal.



Description: Extend arm horizontally at a 90-degree angle to right side of body. Move other arm in same direction in a sweeping motion.

Meaning: Move horizontally left (from pilot's point of view).

Marshalling signals

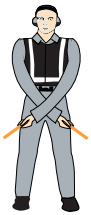


Description: Extend arm horizontally at a 90-degree angle to left side of body. Move other arm in same direction in a sweeping motion.

Meaning: Move horizontally right (from pilot's point of view).

Description: Perform a standard salute with right hand and/or wand to dispatch the aircraft. Maintain eye contact with flight crew until aircraft has begun to taxi.

Meaning: Dispatch aircraft.

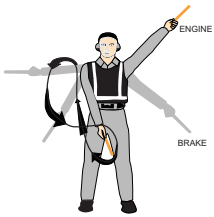


Description: Cross arms with wands downwards and in front of body.

Meaning: Land.

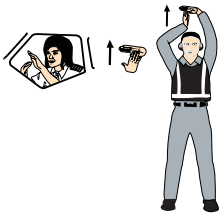
Description: Extend right arm fully above head and close fist or hold wand in horizontal position; left arm remains at side by knee.

Meaning: Do not touch controls (technical/servicing communication signal).



Description: Move right-hand wand in a "fanning" motion from shoulder to knee, while at the same time pointing with left-hand wand to area of fire.

Meaning: Fire.

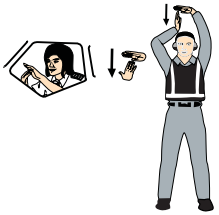


Description: Hold arms fully extended above head, open left hand horizontally and move finger tips of right hand into a touch open palm of left hand (forming a "T"). At night, illuminated wands can also be used to form the "T" above head.

Meaning: Connect ground power (technical/servicing communication signal).

Description: Fully extend arms and wands downwards at a 45-degree angle to sides. Hold position until aircraft is clear for next manoeuvre.

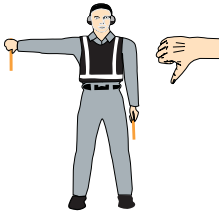
Meaning: Hold position/ stand by.



Description: Hold arms fully extended above head with finger tips of right hand touching open horizontal palm of left hand (forming a "T"); then move right hand away from the left. Do not disconnect power until authorised by flight crew. At night illuminated wands can also be used to form the "T" above head.

Meaning: Disconnect power (technical/servicing communication signal).

Marshalling signals



Description: Hold right arm straight out at 90 degrees from shoulder and point wand down to ground or display hand with "thumbs down"; left hand remains at side by knee.

Meaning: Negative (technical/servicing communication signal).

Description: Extend both arms at 90 degrees from body and move hands to cup both ears.

Meaning: Establish communication via interphone (technical/ servicing communication signal).

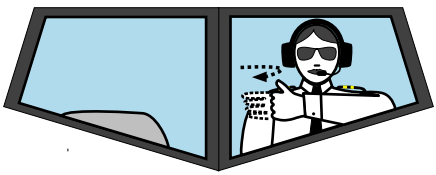
Description: With right arm at side and left arm raised above head at 45 degree angle, move right arm in a sweeping motion towards top left shoulder.

Meaning: Open/close stairs (technical/servicing communication signal). This signal is intended mainly for aircraft with the set of integral stairs at the front.

Meaning of Signals made by Pilot to Marshaller

Description: Raise arm and hand with fingers extended horizontally in front of face, then clench fist.

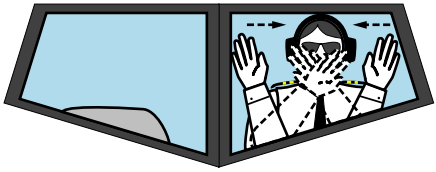
Meaning: Brakes engaged.



Description: Raise arm with fist clenched horizontally in front of face, then extend fingers.

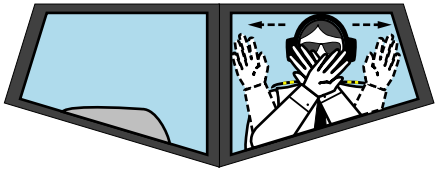
Meaning: Brakes released.

Marshalling signals



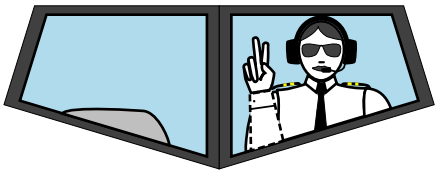
Description: Arms extended palms facing outwards, move hands inwards to cross in front of face.

Meaning: Insert chocks.



Description: Hands crossed in front of face, palms facing outwards, move arms outwards.

Meaning: Remove chocks.



Description: Raise the number of fingers on one hand indicating the number of the engine to be started. For this purpose the aircraft engines shall be numbered as follows, No. 1 engine shall be the port outer engine, No. 2, the port inner engine, No. 3, the starboard inner engine and No. 4, the starboard outer engine.

Meaning: Ready to start engine indicated.

SAFER FLYING

Including:

07.

SAFER FLYING

Human factors continue to play a role in most GA accidents. Many could have been avoided by better decision making and management of risk. Even for those accidents in which the primary cause was technical failure, human performance often still affects the outcome.

The study of human factors gives insight into improving flight safety. This chapter explores ways to do so, including threat and error management (TEM) and airmanship. It is not the intention to provide a rigid process to follow, but to make you think about how to be a safer pilot. CAP 737 – *Flight-crew human factors handbook* contains more detail. Whilst written for the multi-pilot environment, many of the concepts are relevant to single-pilot aircraft as well.

Intertwined with the issue of human factors, a recurring threat in GA flying is lack of recent flying experience. Whilst time and resource may limit the amount of flying available, it is important to acknowledge this threat and manage it accordingly. This chapter also examines some common risk areas, such as loss of control and mid-air collision.

Pilot fitness

MEDICAL CONDITIONS AND INJURY

You must not fly if you are aware of any decrease in medical fitness that may affect your ability to safely exercise the privileges of your licence. This could include injury, medical treatment or the use of medication, both prescription and non-prescription. You may not be aware of the effects of a particular condition or medication, so if in doubt seek the advice of an Aeromedical Examiner (AME).

If you hold a Medical Certificate, you must seek aeromedical advice in the following circumstances:

- Surgical operation or invasive procedure;
- The regular use of any medication;
- Significant injury involving incapacity to act as flight crew;
- Significant illness involving incapacity to act as flight crew;
- Pregnancy;
- Hospital or medical clinic admission; and
- First requirement for correcting lenses.

If you have made a Pilot Medical Declaration, it is recommended to seek the advice of an AME if you are in any doubt as to your continued fitness to fly.

Less serious ailments such as the common cold or hay fever would not normally require aeromedical advice (unless taking medication) but may still have an impact on your fitness to fly. Any significant congestion of the nose, sinuses or ears has the potential to cause pain while flying and is best avoided.

SAFER FLYING

Pilot fitness

PREFLIGHT HEALTH

You must become effective at self-assessment and determining whether you are 'fit to fly'. Plan an adequate sleep opportunity of at least eight hours prior to the day of a flight. Fatigue is often cumulative – most healthy people can absorb one or two nights of reduced sleep, but chronic lack of sleep will have longer term effects and cannot be rectified in a single night. Avoid late nights and excessive use of personal electronic devices immediately before bed.

Flying should not take place less than 8 hours after any alcohol consumption. If you have consumed significant quantities, you may have to wait for up to 24 hours for the alcohol to leave the body. The UK legal blood alcohol limit for flying is 20 milligrams per 100 ml – note this is a quarter of the limit for driving in England and Wales. Eat a healthy meal of moderate size, within several hours of the flight. Avoid excessive carbohydrates that may cause a rapid increase and subsequent fall in blood sugar levels.

I AM SAFE

The following mnemonic is recommended for assessing fitness to fly:

I	**Illness** *Do I have any symptoms that might affect my ability to fly?*
A	**Attitude** *Am I emotionally ready and fully focussed on the flight?*
M	**Medication** *Am I taking any prescription or over-the-counter drugs that might affect my performance?*
S	**Stress** *Am I under pressure or have any worries and anxieties?*
A	**Alcohol** *Have I been drinking within the last 24 hours?*
F	**Fatigue** *Am I tired or not adequately rested?*
E	**Eating** *Am I adequately nourished?*

DURING THE FLIGHT

When making decisions about the ongoing conduct of the flight, consider your fatigue and alertness levels. If travelling a long distance, consider diversion options if you feel fatigued.

Ensure you remain nourished and hydrated. For longer flights, take water and food that is practical to consume in the aircraft. Wear comfortable clothing appropriate for the conditions. During winter it is recommended to carry heavier clothing, in the event of heater failure or having to make a forced landing.

If flying at higher altitudes, be alert for symptoms of hypoxia – including feeling drowsy, lightheaded or even euphoric. You should use oxygen above cabin altitudes of 10,000 ft. Above 5,000 ft, the use of oxygen may improve night vision.

It is recommended to carry a carbon monoxide (CO) detector in the aircraft, preferably with an audio alerting function. Exhaust manifold leaks are always a possibility and CO poisoning is believed to have been a factor in several light aircraft accidents.

Aeronautical decision making

PREFLIGHT

Using a preflight planning checklist will ensure you do not forget to review any key information. Identify if there are any threats or potential errors that require mitigation or may influence whether to modify, delay or cancel the flight. The decision to commence the flight is sometimes the most critical one – when making this decision, consider the cumulative effect of the different risk factors.

The **'PAVE'** checklist provides a structured approach. The following are some example factors to consider:

- ☐ **P**ilot – recent experience, fitness to fly, I AM SAFE
- ☐ **A**ircraft – airworthiness, limitations for the conditions
- ☐ En**V**ironment – weather, aerodrome limitations, terrain
- ☐ **E**xternal pressures – time pressure, delays, passengers

Gather as much information about the operating environment as possible – understand the detail of all relevant NOTAMs and weather information. Build a picture of the weather conditions and how they might evolve during the flight. Know the threats associated with different weather systems. Identify possible diversion aerodromes should the weather prevent safe passage to the planned destination. It is not always sufficient to assume you will be able to return to your destination.

Always ask the 'what if?' question – for example what if the weather is worse than forecast or your departure is delayed for some reason. Take positive decisions in response to information – do not proceed while 'waiting to see what happens' or 'hoping it will be OK'.

Avoid pressure to commence or complete the flight at a certain time – for example, if delays create unacceptable consequences such as being late for work the next day, consider how this will influence your decision making. Manage the expectations of any passengers who may not understand the impact of weather or technical issues with the aircraft.

Plan a flight that is appropriate for your current level of experience and practice – if you have not flown recently, a less complex flight in good weather is appropriate. Factors such as marginal weather, complex airspace or taking passengers may increase the risk of distraction and error. You do not want the flight to become a source of stress.

If flying early in the morning, check the weather forecast and NOTAMs the evening before. You must still conduct a review on the day, however a check the day before will orientate you for the flight and help avoid any unwelcome surprises.

Give yourself adequate time to prepare for the flight and allow for factors that might cause delays and time pressure before departure.

Arrive at the airfield in good time and conduct a thorough check of weather, NOTAMs and the aircraft. Remove as many distractions as possible and avoid diverting your attention to anything unrelated to the flight. Even if you have already checked the weather before arriving at the airfield, you should always conduct a final check before departure.

Aeronautical decision making

STRESS AND FATIGUE

If feeling stressed, fatigued or otherwise ensure about your fitness to fly, defer the flight to another day, or fly with an instructor if appropriate.

Flying must often compete with other priorities and influences in life. Whilst it can be a healthy way to enjoy some leisure time, it is important that before flying you are well rested and not preoccupied with unrelated matters.

During times of high emotional stress associated with bereavement or other life changing events, it may be prudent to refrain from flying – your capacity to focus may be reduced below a safe level. Work, family or other life related pressures may also bring stress levels to an undesirable level, and you must consider the potential impact on your flying. Symptoms of significant or chronic stress may include poor sleep, loss of appetite, indigestion, feeling irritable, poor concentration or loss of energy.

INFLIGHT

Inflight decision making will be improved by having sound aircraft handling skills, preflight preparation and knowledge of procedures and the operational environment.

You want to keep as much of your mental capacity as possible for maintaining situational awareness and making decisions, rather than having to focus on controlling the aircraft or processing information that should have been assimilated on the ground.

Always think at least a few minutes ahead of the aircraft and consider what decisions may need to be made. For example, whether to cross or avoid controlled airspace or dealing with another airspace hazard. Use periods of inactivity to complete routine tasks such as cruise checks or fuel system management.

Monitor the weather conditions and respond appropriately to any unexpected developments. Recognise when the conditions may be turning against you and require a new course of action – for example being continually forced lower or having to navigate around convective activity. Situational awareness of the wider weather picture will improve your decision making – consider in which directions the weather may be worsening or improving.

Do not think only in terms of the destination or departure point – in a potential VFR into IMC scenario you may need to find a diversion aerodrome in a different direction.

Emergency and non-normal situations will have varying degrees of time available for decision making – engine failure or other severe malfunctions of the aircraft require the application of well-rehearsed emergency procedures and there is often limited time for analysis.

Other non-normal situations may allow more time. Use this effectively – unless the aircraft is in immediate danger, it is usually better to pause and assess the situation before reacting. Good knowledge of aircraft systems will support this. Weather related situations may require consideration of different options – use resources such as air traffic control to gather information or provide navigational assistance.

Aeronautical decision making

HAZARDOUS ATTITUDES

Even though you may be an amateur pilot, it is important to approach flying with a professional attitude. The assessment of human factors in aviation accidents has identified five 'hazardous attitudes' that may lead to poor decision-making and the failure to properly assess and control the risks of a flight.

The Five Hazardous Attitudes	Antidote
Anti-authority: "Don't tell me." This attitude is found in people who do not like anyone telling them what to do. In a sense, they are saying, "no one can tell me what to do." They may be resentful of having someone tell them what to do or may regard rules, regulations, and procedures as silly or unnecessary. However, it is always your prerogative to question authority if you feel it is in error.	**Follow the rules. They are usually right.**
Impulsivity: "Do it quickly." This is the attitude of people who frequently feel the need to do something, anything, immediately. They do not stop to think about what they are about to do, they do not select the best alternative, and they do the first thing that comes to mind.	**Not so fast. Think first.**
Invulnerability: "It won't happen to me." Many people falsely believe that accidents happen to others, but never to them. They know accidents can happen, and they know that anyone can be affected. However, they never really feel or believe that they will be personally involved. Pilots who think this way are more likely to take chances and increase risk.	**It could happen to me.**
Macho: "I can do it." Pilots who are always trying to prove that they are better than anyone else think, "I can do it–I'll show them." Pilots with this type of attitude will try to prove themselves by taking risks in order to impress others. While this pattern is thought to be a male characteristic, women are equally susceptible.	**Taking chances is foolish.**
Resignation: "What's the use?" Pilots who think, "What's the use?" do not see themselves as being able to make a great deal of difference in what happens to them. When things go well, the pilot is apt to think that it is good luck. When things go badly, the pilot may feel that someone is out to get them or attribute it to bad luck. The pilot will leave the action to others, for better or worse. Sometimes, such pilots will even go along with unreasonable requests just to be a "nice guy."	**I'm not helpless. I can make a difference.**

SAFER FLYING

Threat and Error Management

Threat and error management (TEM) is a more structured approach to how pilots can assess and control factors that may impact the safety of a flight. It is not necessary for GA pilots to have a detailed understanding of TEM theory, however the concept will assist you in thinking about how to better anticipate and manage threats to safe flight or errors that may reduce safety margins. TEM does not aim to eliminate threats or errors, but manage them more effectively.

The practice of TEM is sometimes described as 'defensive flying'. This has similarities with defensive driving, which emphasises observation and anticipation of the surrounding environment. The old saying 'a superior pilots uses his superior judgement to avoid situations which require the use of his superior skill' reflects a similar approach.

TEM has three elements: threats, errors and undesired aircraft states. Threats and errors have the potential to cause undesired aircraft states. An undesired aircraft state is when the aircraft is in an unsafe attitude, configuration or location.

THREATS

A threat is normally something beyond the direct influence of the pilot that may reduce safety margins and therefore needs consideration or mitigation. Threats normally fall into three categories: anticipated, unanticipated and latent.

Anticipated threats are factors that you should be aware of in advance, such as a poor weather forecast, high densities of VFR traffic, a short runway or some known fault with the aircraft.

Unanticipated threats cannot be specifically anticipated, but a good pilot will consider the possibility of them in advance. For example, aircraft malfunction, unforecast poor weather or unplanned runway closure.

Latent threats could include external time pressure, fatigue, insufficient pilot skill, knowledge or poor attitude to safety. In an organisational context, factors such as poor standards or safety culture would also be a latent threat to safe operations.

ERRORS

Errors are defined actions or inactions by the pilot (or other operational personnel) that lead to a potential reduction in safety. Unmanaged and/or mis-managed errors may lead to undesired aircraft states. Errors are broadly considered to be either aircraft handling, procedural or communication. Errors often occur due to the failure to manage threats effectively.

Aircraft handling errors may be addressed by better training and a self-awareness of skill level – most GA pilots do not fly that often and therefore loss of aircraft handling skills is a significant risk. Procedural and communication errors are often the result of insufficient checklist discipline or proficiency with radio telephony.

A common cause of all error types is distraction and/or mental overload. VFR flight in complex airspace and around busy aerodromes often involves high workload. This can be mitigated by better planning and anticipation, task prioritisation and removal of unnecessary distraction.

The CAA has identified distraction and interruption in GA flying as a common source of errors.

Distraction and Interruption

For more info see the SSL 31 >

Airmanship

The concept of airmanship predates the modern study of human factors. More recent attempts at defining the term provide a useful model for pilot proficiency and improvement. If TEM and aeronautical decision making can be thought of as concepts to manage risk and take decisions before and during a flight, airmanship is more the discipline of being a good pilot in general. The practice of good airmanship should be an aspiration for all aviators. SSL 1 – *Good Airmanship Guide* discusses practical steps for good airmanship in GA flying.

UK Regulation (EU) 1178/2011 (the UK Aircrew Regulation) defines 'Airmanship' as:

'The consistent use of good judgement and well-developed knowledge, skills and attitudes to accomplish flight objectives.'

A 2003 BAE Systems training paper proposed that the foundations of airmanship consist of:

Knowledge	Aircraft, environment, risk
Skill	Physical, cognitive, communication, management and team
Attitudes	Professionalism, discipline, self-improvement, knowledge of hazardous attitudes

Safety resources

The General Aviation Safety Council (GASCo) produce a 'personal currency chart' which can be downloaded from their website – www.gasco.org.uk.

Learn from the experiences and mistakes of others. Many GA magazines reproduce accident reports or feature articles on decision making scenarios. Maintain an interest in current thinking on GA safety issues. The CAA's *Clued up* magazine (available for free on the CAA website – search online at www.caa.co.uk) contains a wealth of information in this area.

Some GA Associations and flying schools have pilot proficiency schemes approved under the CAA's Pilot Recognition for Operational Up-skilling and Development (PROUD) framework. These schemes are a good way to challenge yourself and improve your flying. Search for "CAA PROUD" online to find out more.

A range of safety guidance material is available from the CAA and external organisations. Most GA safety content is available via the GA Unit homepage at www.caa.co.uk/ga and includes the Safety Sense Leaflets, Clued Up magazine and a range of other publications, podcasts and video animations. For more details see Finding out more.

Maintaining skills

The average GA pilot only flies about 30 hours per year. You may be surprised at how quickly handling skills and recollection of operating procedures fade, particularly if overall experience is low. Challenges such as higher winds, unfamiliar aerodromes or complex airspace may quickly make a lack of recent experience more apparent.

Be realistic about your current skill level – whilst you should not be afraid of taking on more challenging flights, some refresher training with an instructor may be prudent beforehand.

BUILDING EXPERIENCE

Experience should improve your confidence and understanding of different conditions and operational challenges. As you become more confident, plan longer flights but balance this with a cautious attitude and take advice if you are unsure of anything. Flying with a more experienced pilot may be beneficial, but always be clear about who is pilot in command. Pursuing training towards additional ratings will make your flying more interesting and make you a better pilot.

Be wary of allowing bad habits to creep in, such as poor checklist discipline or imprecise control of speed and/or altitude in your flying. Avoid complacency or the reinforcement of risky behaviour – do not start to believe things such as 'the weather is never as bad as forecast' or that overloading the aircraft is ever acceptable.

Most GA pilots with a single engine piston (SEP) rating or similar are required to have had an hour's flying with an instructor every two years. Use this time to revise manoeuvres such as short field landings, steep turns or practice forced landings. If undertaking a proficiency check, note any areas of weakness and discuss them with the examiner – even if you pass the check, consider further training to improve your skills.

After any significant break from flying, set aside time to thoroughly review speeds and procedures for your aircraft and any other subjects you may need to revise. Take instruction as required and wait until you are completely comfortable before taking passengers again.

If flying a different aircraft for the first time, review the AFM and find a suitable instructor who can train you on the type. Memorise relevant speeds and procedures.

KEEP IMPROVING

A good pilot should be confident and diligent, whilst maintaining a healthy degree of self-critique. Be realistic about your capabilities and reflect on areas for possible improvement. Areas to consider include:

- Knowledge of weather and operational threats such as airspace hazards;
- Aircraft knowledge, for example normal and emergency procedures, system knowledge such as avionics or fuel;
- Improvement of flying skills such as unusual attitudes, crosswind technique, slow flight;
- Decision making before and during the flight – for example weather, fatigue or other operational pressures; and
- Decision making in emergency situations, such as partial engine failure or VFR flight into IMC.

Staying in control

Common issues in loss of control accidents include:

- Distraction;
- Poor handling technique;
- Turbulence and/or crosswinds;
- Challenging operating sites; and
- Continued VFR into IMC.

Distraction comes from a variety of sources, but a common one is being distracted by an issue during a critical phase of flight that leads the pilot to neglect controlling the aircraft:

- Manoeuvring in the circuit while preparing to land;
- Attempting to shut open doors or canopies while close to the ground;
- Attempting to diagnose cockpit warnings or other system issues; or
- Engine failures, or in the case of gliders, winch launch failures.

The most important message is to fly the aircraft. Even an engine failure is unlikely to be fatal if the aircraft arrives at the ground under control in a level attitude. Issues such as open doors or warning lights can normally wait until the aircraft is at a safe altitude and the flight path is stable.

Guidance

- Know the correct speeds for your aircraft in all phases of flight, including stall (clean and with flap) and best glide.
- The stall always happens at the same angle of attack, which as g-loading increases, will occur at a higher airspeed. In a 2g manoeuvre the stalling angle of attack occurs at a 41% higher airspeed.
- Be proficient in slow flight and stall recognition/recovery techniques.
- Landing in crosswinds and/or turbulent conditions requires good handing skills – conduct additional training if you are not confident in this area.

Challenging landing sites, such as small strips, often feature in loss of control accidents, underlining the need to apply extra caution:

- Have you calculated your performance requirements?
- Are there obstacles that might need avoiding on approach or climb out?
- Runways tend to be shorter and narrower, how precise is your touch down technique?
- Even small amounts of turbulence or crosswind can make speed control and touchdown precision much more challenging. How proficient are you?
- Low sun can make judging height and distance to touch down challenging. Is that likely to be an issue on arrival?

Loss of Control

For more info see the SSL 30

Strip Flying

For more info see the SSL 12

Avoiding collisions

Key info

More than 100 'airproxes' are reported to the UK Airprox Board every year.

Almost all mid-air collisions occur in good VMC and at relatively low level, reflecting the circumstances in which traffic density tends to be higher. Around half of mid-air collisions in the UK happen near aerodromes, many in the circuit.

The avoidance of collisions in uncontrolled airspace is achieved as much by the 'big sky' as it is by 'see-and-avoid'. Even when operating an effective visual scan, most pilots will not achieve a 100% traffic detection rate, especially if the conflicting aircraft is outside the area normally visible from the cockpit. The risk of collisions can never be mitigated entirely, however by taking a number of precautions you can improve the odds in your favour.

MITIGATIONS

Certain areas of uncontrolled airspace in the UK have high volumes of VFR traffic, particularly during the summer.

- Avoid obvious 'choke points' around radio beacons or other significant features commonly used for navigation. You may wish to load VFR reference points (VRPs) into your VFR moving map device, however you should avoid direct overflight.
- Avoid aerodromes or other hazardous airspace reservations like glider sites. Note the cable launch heights on your chart. Be aware gliders do not confine themselves to the overhead of their operating sites or the immediate vicinity of it. Gliders will often congregate around an area of thermals – if you see one, there will likely be others.
- Hang gliders and paragliders often launch from hill sites facing into wind, sometimes in large numbers. These sites are not always shown on charts, and some are activated by NOTAM. An active site may contain many gliders circling in 'gaggles' and they may depart on cross country routes, normally in a downwind direction.
- Randomise your cruising levels. There is no requirement in the UK for VFR flights to follow 'semi-circular' rules (although there may be in other states), so fly at different altitudes such as 2,200 ft instead of round numbers such as 2,000 ft.
- Avoid crossing the final approach track of aerodromes outside controlled airspace, even if outside the ATZ. The feathered arrows on charts indicate the instrument approach paths of larger aerodromes – aircraft descend along these at around 300 ft per NM.
- Be familiar with aerodrome joining, circuit and departure procedures. Many GA aerodromes have non-standard arrangements.
- Be clear about your position and intentions – many airproxes at uncontrolled aerodromes result from a lack of clear communication as to the position and intentions of aircraft.

For more information on collision avoidance, see SSL 13.

Avoiding collisions

THE VISUAL SCAN

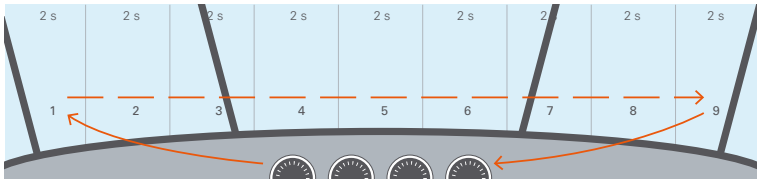
Despite the recognition of its flaws, an effective 'lookout' will go a long way to mitigating the risk of collision. Ensure the windscreen or canopy is clean – a dead insect might obscure the dot of a conflicting aircraft. It is usually easier to remove dead insects immediately after a flight, which also saves time for when you (or someone else) next go flying.

For VFR operations, you should have your eyes inside the cockpit no more than 25% of the time. The rest of the time you should be looking outside. Provided you hold a steady visual attitude, the aircraft will maintain altitude while you look outside. Adopting a systematic approach to scanning the view outside the cockpit will help you maintain an effective lookout and give you time to periodically check direction and altitude on instruments.

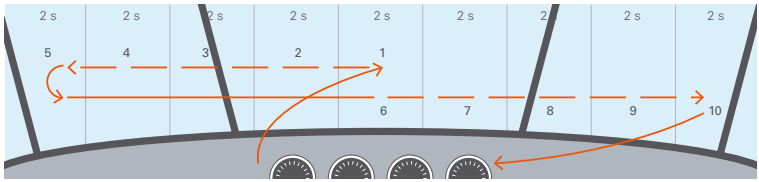
- You should move your eyes (and head as necessary) in short and regularly spaced movements that bring successive areas of the sky into the central visual field. You should pause for at least a second to refocus on the new area and detect any aircraft. The centre of focus should shift by about 10° per movement. 15° is around the normal width within which the eyes can focus on a particular area, so 10° allows for some overlap. The eyes struggle to detect movement while the head is moving, so be sure to stop moving your head when refocusing on a new area.

There are two methods that have been identified as being effective lookout techniques:

- **Side to side scanning method:** Start at the far left of your visual area and make a methodical sweep to the right, pausing for a couple of seconds in each 'block' of the viewing area to focus your eyes. At the end of the scan, return to and scan the instrument panel and then repeat the external scan.
- **Front-to-side scanning method:** Start in the centre block of your visual field, move to the left, focusing very briefly on each 'block', then swing quickly back to the centre block after reaching the last block on the left and repeat the action to the right. Then, after scanning the instrument panel, repeat the external scan.



Side-to-side scanning method



Front-to-side scanning method

Avoiding collisions

- 'Block' means an area that can be focused on at one time in the normal field of view.
- Inevitably there will be times when you need to keep your eyes in the cockpit for longer than is ideal – for example, to change a radio frequency or check engine instrumentation. Try not to get fixated inside, and look back outside every few seconds. Consciously re-establish the scan once the interruption has passed.
- If you are flying with another pilot, or a passenger you have educated on 'looking out', tell them you are going 'heads down' so that they know to keep a good lookout.
- Peripheral vision can be effective at detecting movement, but the greatest collision risk often comes from aircraft that do not appear to move relative to your position. If you detect an aircraft that does not move relative to your position, there may be a collision risk – alter course in accordance with the Rules of the Air (see p.62).
- You should not turn the aircraft without looking in the relevant direction first. In a high wing aircraft, the wing should be lifted prior to turning, to ensure there is no hidden traffic. While climbing you should periodically weave the nose of the aircraft to reveal any traffic hidden by the raised nose attitude.

USE OF ATS

Talking to ATC and obtaining a Traffic Service will also reduce the risks. Remember that a Basic Service does not include specific traffic information.

- You should always consider which of the nearby ATSUs will provide the best information on other traffic – for example, if passing close to an aerodrome, it may be best to contact them.

ELECTRONIC CONSPICUITY

Electronic Conspicuity (EC) is technology by which the position of aircraft can be detected electronically, either by ATC surveillance systems (such as radar) or other aircraft. EC plays a role in allowing different aircraft to safely share airspace and prevent collisions. This section gives a brief introduction to the subject.

Transponders

The transponder is the most common device by which aircraft emit their position electronically. Transponders work on the principle of transmitting a four-letter code after being 'interrogated' by a signal from a secondary radar station on the ground. Different levels of detail are included in this signal depending on the mode. 'A' is the most basic, 'C' includes altitude information and 'S' includes a more advanced 24-bit code that is unique to the aircraft. Enhanced Mode S also allows the transmission of information on the aircraft's flight path.

Most powered aircraft in the UK are equipped with a transponder, however the cost and electrical power requirement mean that many aircraft, particularly unpowered ones, are not equipped.

Guidance

It is a legal requirement that if your aircraft is equipped with a transponder, you should use it to its full capabilities. This gives ATC more information that via a primary radar contact, and also allows you to be detected by the Traffic Collision Avoidance Systems (TCAS) on larger aircraft.

Avoiding collisions

ADS-B

More recent technologies such as ADS-B (Automatic Dependent Surveillance – Broadcast) have the potential to bring forms of EC to a much wider audience than available with traditional transponder technologies, since they require less electrical power. ADS-B works on the principle of taking the aircraft's position from a navigation source (for example the aircraft's GPS) and then broadcasting it (known as ADS-B 'Out') for ADS-B receivers (known as ADS-B 'In') to detect. It has the advantage of allowing low powered EC devices to share position information with each other.

In 2017 the CAA indicated that ADS-B using 1090 MHz is the preferred national system for improving EC equipage in the UK General Aviation fleet. More information is available in AIC Yellow 141/2019 published in December 2019 – *Enabling ADS-B Out in the UK General Aviation Fleet.*

EC for General Aviation

A range of measures and information has been made available by the CAA to facilitate the adoption of EC devices and reduce mid-air collisions.

EC Devices can be either permanently installed in an aircraft or portable. Many EC systems for GA transmit and/or receive ADS-B in some form, although there are other systems such as 'FLARM' and 'Pilot Aware' that can receive ADS-B on 1090 MHz but use different (non-aeronautical) bands to transmit position information.

Pilots using EC devices should be aware of their functionality and limitations. Devices are not always interoperable with each other and may use different parts of the radio spectrum for transmitting signals.

EC technology continues to evolve and expand. GA pilots are strongly encouraged to familiarise themselves with the subject.

Guidance

An EC device is a safety aide, it must not replace keeping a good lookout for other aircraft or proper preflight planning.

It is very important that you are familiar with how to use your EC device and its limitations. It must be correctly integrated with your flying, such that it does not become a distraction or hazard.

Finding out more

- EC for General Aviation – www.caa.co.uk/ec
- Special Edition of 'Clued Up' Magazine on EC – www.caa.co.uk/cap2000
- Technical Standards for EC devices – www.caa.co.uk/cap1391

VISUAL CONSPICUITY

Use of lights and aircraft colour can have an influence on how effectively you can be seen by other aircraft. Strobes and anti-collision beacons should be on at all times after entering the runway environment. Landing lights should be on once approaching an airfield and at all times when in areas of high traffic density.

Colours like black are actually more likely to show up against the ground or sky, whereas white or patterns that break up the outline of the aircraft will tend to visually merge into a predominantly grey background. If you are based in an area of high traffic density, consider what impact the colour of your aircraft may be having on your visibility to other aircraft.

Avoiding Airspace Infringements

Key info

An airspace infringement is the unauthorised entry of an aircraft into notified airspace. This includes controlled airspace (CAS), prohibited or restricted airspace, active danger areas, aerodrome traffic zones (ATZ), radio mandatory zones (RMZ) and transponder mandatory zones (TMZ).

An airspace infringement has the potential to be a serious safety incident and could lead to a mid-air collision.

An essential aspect of preventing airspace infringements is effective pre-flight planning.

A respected flight instructor once said to ***"never carry out a flight that has not been flown first on your dining room table"*** meaning that detailed and effective pre-flight planning is essential. Do not get airborne without a plan and a secondary plan.

Other methods of reducing the probability, or consequences, of an airspace infringement include:

- **Use a VFR moving map device.** In the vast majority of airspace infringements, pilots are found to not be using a moving map or not using one correctly. This is particularly evident during instructional flights where workload is high and distractions more likely.

  It is essential that functions of the equipment are understood and the settings are correctly configured to enable updates and warnings to be available both pre- and in-flight.

  Many platforms for moving maps are also ideal for use with Electronic Conspicuity devices to help avoid mid-air collisions.

  Ensure software and databases are up to date. Plan your route carefully on the moving map, both horizontally and vertically, checking airspace, and NOTAM activity. When using them in the cockpit, ensure that they are located where they can be seen without obscuring external lookout. Pay attention to alerts and have a back-up plan in case they fail due to overheating or power failure. Why not replicate your route by drawing lines on the standard 1:500,000 or 1:250,000 VFR charts?

- Plan to remain 200 ft from the base of CAS (or 200 ft over the top of an ATZ or Danger, Prohibited or Restricted areas) and/or 2 NM from the edge of any notified airspace. This will allow for time to react to inadvertent deviations of heading or level that could result in an infringement.

  In turbulent conditions, it may be necessary to increase the 200 ft margin when remaining below CAS. When considering your altitude also ensure that you are using the most appropriate altimeter setting for the area. Remember that the Regional Pressure Setting (RPS) offered by some ATSUs is the lowest forecast pressure setting for an altimeter setting region. Care must also be taken to note where the base of CAS changes between an altitude and a Flight Level.

- **Obtain a UK Flight Information Service.** Pilots can obtain a UK FIS from a number of Air Traffic Service Units around the UK; details can be found at LARS Frequencies and in the relevant sections of the UK AIP in the Aerodrome Section.

Avoiding Airspace Infringements

> **Use an FMC.** If you do not want to obtain a service from ATC, use a Frequency Monitoring Code. Subject to workload, ATC will endeavour to provide a timely warning if an aircraft looks like it will infringe, but this is subject to ATC capacity and not guaranteed.

  Pilots intending to employ FMCs should:

  - select the appropriate frequency and ensure the volume and reception quality are adequate, before selecting the corresponding FMC;
  - select the FMC using ALT (Mode C) if the transponder is so equipped;
  - listen out for any transmissions with the aircraft's callsign or position;
  - ensure you remain within transmission range of the relevant ATSU.

> Apply **Threat and Error Management** when planning and flying.

  TEM is the practice of thinking ahead to predict/identify and avoid threats and errors and manage them. Understanding TEM will enable a pilot to think and plan, in advance, for the eventualities that can lead to an airspace infringement. Threats are the events or things that occur outside your control which require your attention if infringements are to be avoided such as airspace, NOTAM, weather, distraction and navigation equipment failure.

  Errors are the actions or inactions that lead to a deviation from the plan resulting in an airspace infringement such as misidentification of land features, a failure to maintain your planned altitude or flying an inaccurate heading. By spending time on the ground, pre-flight, to consider these factors you will be better prepared for the things that can go wrong in the air.

  Understand the role of distraction and how it can lead to inadvertent infringement of controlled airspace. Try to recognise the potential for distractions including those from passengers, unfamiliar equipment or its malfunction, aircraft problems, weather or stress. Ensure that you positively shift attention back to flying, operating and navigating the aircraft.

For more information on Distraction in GA flying, see SSL 31.

As part of pre-flight planning and general up-skilling, review the Airspace and Safety Initiative website (https://airspacesafety.com) for information on infringement hotspots and prevention resources.

Information on how the CAA addresses incidents involving airspace infringements can be found at www.caa.co.uk/cap1404.

Distraction in General Aviation Operations

For more info see the SSL 31 >

EMERGENCIES

Including:

08.

EMERGENCIES

The following chapter is intended to be a guide to dealing with emergency situations. It is not intended to replace procedures for specific aircraft, for which you should review the AFM and memorise as required.

Key principles

- **Know your aircraft** – memorise the AFM checklists relating to time critical emergencies.
- **Fly the aircraft** – accidents often happen when a non-lethal problem distracts from the task of flying the aircraft. Always adjust the flight path to maintain a safe flying speed.
- **Assess the situation** – once the aircraft is under control, take a moment to assess the situation; do not jump to conclusions about what the problem is or how to respond to it.
- **Declare an emergency** – if in doubt, declare an emergency in good time. It is easier to cancel a distress call if the situation is later resolved than wait until it may be too late. If not talking to an ATSU at the time, make the call on **121.5 MHz**.

Mayday or Pan call format

- **Distress: "Mayday, Mayday, Mayday"**
- **Urgency: "Pan Pan, Pan Pan, Pan Pan"**

Followed by:

- **Name of station being addressed**
- **Aircraft call sign**
- **Aircraft type**
- **Nature of emergency**
- **Intentions**
- **Position, Altitude, Heading**
- **Any other relevant information, such as pilot qualifications or persons on board**
- After exchanging information and intentions with ATC, you may wish to defer further communication on the radio until after landing. Ending a call 'Mayday out' indicates that you do not need a further reply.
- Select 7700 on your transponder – doing so will highlight to other ATSUs that an aircraft in the area is experiencing an emergency.
- There is no ICAO requirement to include pilot qualifications in a distress message. However, this information should be included whenever possible in UK emergency messages as it may help the controller to plan a course of action best suited to the pilot's ability.

Distress and Diversion Cell (D&D)

- The Distress and Diversion Cell (D&D) is the emergency centre based at the London Area Control Centre. D&D have the ability to provide accurate position fixes using Direction Finding (DF).
- The service is available 24hrs a day to pilots flying within UK airspace who are in distress, in urgent need of assistance, or experiencing difficulties (for example unsure of position) which could lead to a state of emergency.
- The service is also available for practice calls, provided that no real emergency is in progress on the UHF or VHF distress frequencies.
- Position fixes can be obtained instantaneously on transmission:
  - Within the London FIR- at and above 3,000 ft AMSL over land east of Wales and south of Manchester, reducing to 2,000 ft AMSL within 40nm of Heathrow; and
  - Within the Scottish FIR- at and above 8,500 ft AMSL, reducing to between 2,000 ft and 5,000 ft over the sea and lowland areas.
- Below these altitudes DF coverage may still be available depending on obstacles / atmospheric conditions / distance from DF receivers.

Sample exchange calling D&D for a Practice Pan	
Explanation	**Exchange**
Always listen out before transmitting, to ensure there are no other calls in progress. Repeating the **Practice PAN** statement three times ensures that other units or aircraft monitoring the frequency are aware that it is a not a real emergency call.	**"Practice PAN, Practice PAN, Practice PAN, London Centre, G-DOME, Practice PAN."**
If the controller is ready to process your practice request, they will respond by asking you to "pass details when ready".	**"G-DOME, London Centre, Practice PAN acknowledged, pass details when ready."**
Have prepared a concise description of your practice emergency and assistance request.	**"Practice PAN, G-DOME, [state nature of practice emergency and assistance required]."**

Sample exchange calling D&D for a Training Fix	
Explanation	**Exchange**
Always listen out before transmitting, to ensure there are no other calls in progress.	**"Training Fix, Training Fix, Training Fix, G-DOME, request Training Fix."**
The controller display uses Ordnance Survey mapping to enable position reports with reference to towns/villages/geographical features.	**"G-DOME, London Centre, your position is.... Do you require further assistance?"**

Lost

With the widespread use of VFR moving map systems, cases of being completely lost are thankfully rarer than they once were. However, such systems are not universally carried, and even if they are (which is recommended), they can be misinterpreted or fail.

- If in contact with an ATSU that has radar, ask them to clarify your position.
- If not in contact with an ATSU, call Distress and Diversion on **121.5** and ask for assistance.
- Prior to establishing contact with either an ATSU or D&D, squawk **0030** – this will alert other ATSUs that there is a lost aircraft.
- Orbit near any prominent landmarks that could be described to ATC. Do not continue to fly aimlessly.

Loss of communications

- Many apparent communication failures are caused by incorrect setting of the radios – check basic issues like volume, squelch, frequency and audio selector panel settings, before concluding you have actually experienced a radio failure.
- If you have lost communications, set 7600 on the transponder, maintain VMC and consider whether the flight can continue safely without the radio. It may be advisable to divert to a quiet aerodrome outside of controlled airspace.
- Once overhead an aerodrome, observe the signal square and circuit. Watch for other traffic and any light signals from the ground. Land once you believe it is safe to do so and report your landing to the relevant ATSU as soon as possible.
- A good mitigation against loss of communications is to carry a handheld radio and suitable headset adaptor. However, these often have short range, particularly at low level.

Electrical failure

- Alternator failure is a common cause of electrical failure. Depending on condition, you might have power for a limited period (perhaps 20 minutes) from the battery.
- Minimise use of electrical power (for example lights) to prolong battery life. Try to maintain VMC and proceed to the nearest suitable aerodrome.
- Expect to lose radio communications once the battery fails.
- Know which systems in your aircraft are electrical, for example flaps, and be prepared to land without them.

Engine failure

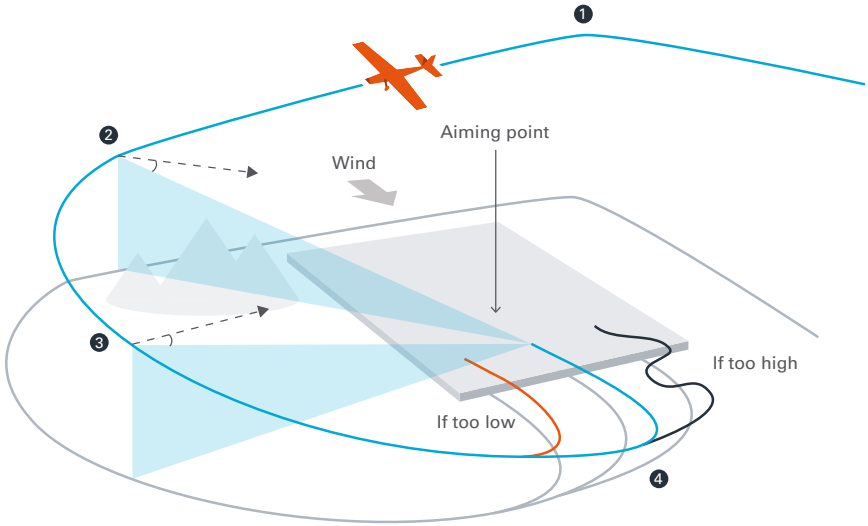
GUIDANCE

- Know your best glide speed and procedures for your aircraft.
- Particularly at low level, focus on maintaining speed and control. Provided you keep the aircraft at flying speed and under control, engine failures are unlikely to be fatal.
- If a failure happens shortly after take-off, landing ahead is safer than attempting to turn back. Assess the area immediately in front of you and pick the place that is likely to cause the least damage.
- If you have some height, check for common causes of failure such as fuel tank selection or carb icing – know the specific drill for your aircraft.
- Partial engine failures can confuse the decision making process. Assess whether the failure is likely to become worse – for example if rapidly losing oil pressure, the engine may not run for much longer. Take a positive decision to either put down in a field or continue to an aerodrome, depending on your judgement of the problem.
- The Australian ATSB have published useful advice on partial engine failures in single engine aircraft titled: Managing partial power loss after takeoff in single-engine aircraft. https://www.atsb.gov.au/publications/2010/avoidable-3-ar-2010-055/.

FIELD SELECTION

- If required to conduct a forced landing in a field, assess:
  - **Wind direction** – try to land into wind;
  - **Size** – the bigger the better;
  - **Surroundings** – avoid power lines or other obstructions;
  - **Shape** – square gives the best range of touch down options;
  - **Surface** – grass is one of the better surfaces, ploughed fields or crops are less desirable since they may flip the aircraft; and
  - **Slope** – avoid significant slopes.
- You should consider what would happen in the event of a forced landing – for example if planning to fly over the Scottish mountains in the winter, it would be prudent to have warm clothing and appropriate provisions in the aircraft, including cooking apparatus.

Engine failure



An effective forced landing technique is that of the 'constant aspect' approach. The full pattern assumes a height of around 2,000 ft or more, although the main principle applies at any height. If you are sitting on the left side of the aircraft, it is easier to complete in a left hand direction.

1. Enter the pattern at a point appropriate to your height, adjusting the horizontal distance from the field as required. If you are at 2,500 ft AGL or above, you should be able to arrive abeam the field with enough height to fly a circuit pattern around it.

2. At around 45° to the intended landing spot, assess the visual angle to it. The aim is to keep that visual angle (the 'constant aspect') the same until touch down. As you are turning around the landing site, if the angle starts to shallow, move closer. If it steepens, widen the turn to take you further away.

3. Fly an arc around the edge of the field, tightening or widening the turn to keep the visual angle constant. If you intend to land with full flap or lower the landing gear, aim further into the field to account for the extra drag once they are deployed.

4. As you approach the field adjust the turn as necessary and side slip or S-turn if too high. Once configured for landing, ensure as much as possible (magnetos, master switch, fuel etc) is switched off.

Fire

ON THE GROUND

- Know your aircraft's procedures for responding to fire on the ground.
- The most likely time is when starting the engine. Be prepared to cut the mixture, turn off the fuel and vacate the aircraft.
- It is often recommended that you keep cranking the engine and (once the mixture and fuel is selected off) open the throttle fully. This should draw the fire back into the engine. However, if the fire has not stopped shortly after cutting the mixture, vacate the aircraft and move upwind.

IN THE AIR

- The engine or electrical system are the most likely sources of fire.
- In a single engine aircraft, shut down and perform a forced landing as soon as possible. If the fire does not go out, lowering landing gear, flap and/or slide slipping are ways to lose altitude faster.
- Electrical fires can sometimes be prevented by early detection and isolation of the source – for example if a circuit breaker pops, be wary of resetting it and never reset more than once – it may cause a fire.
- If a burning smell is detected, try to determine if it is coming from a particular source and if electrical, isolate by pulling the relevant circuit breaker. If it gets worse, turn off the master switch and land as soon as possible.

Ditching

Ditching characteristics vary between aircraft – know the procedures for your aircraft.

- If you have determined that the carriage of lifejackets is required, it is strongly recommended to wear them in the aircraft. Always fasten the seat belt over the life jacket assembly, to allow for easy removal of the belt after a ditching.
- It is recommended that you carry a liferaft if crossing any significant body of water – such as the English Channel. Especially during the winter months, you are unlikely to survive for more than an hour immersed in the water unless wearing a survival suit.
- For more details see Safety Sense Leaflet 21: Ditching Light Aircraft on Water, available at www.caa.co.uk/safetysense.

Ditching Light Aircraft on Water

For more info see the SSL 21 >

Incident and accident reporting

If you experience a safety incident, you may be legally obliged to report it. In all cases the information shared with the relevant organisations will be treated as confidential (not anonymous). Accidents, serious incidents and Airproxes are subject to public reports, but without identifying the persons involved. All investigations into aviation safety events will be conducted in accordance with 'Just Culture' principles.

AIR ACCIDENT INVESTIGATION BRANCH

Accidents or serious incidents must be reported as soon as practicable to the Air Accident Investigation Branch (AAIB) in Farnborough on **01252 512299**. Accidents must also be reported to the Police. For more information see www.aaib.gov.uk.

In the event of the death or incapacitation of the pilot in command, the responsibility to report passes to the operator. In many GA accidents, the pilot is also the operator, in which case it would fall to others aware of the aircraft's flight, for example aerodrome or air traffic control staff.

Pass as much of the following information as possible to AAIB:

- the type, model, nationality and registration marks of the aircraft;
- the names of the owner, operator and hirer (if any) of the aircraft;
- the name of the commander of the aircraft;
- the date and time (UTC) of the accident or serious incident;
- the last point of departure and the next point of intended landing of the aircraft;
- the position of the aircraft in relation to some easily defined geographical location;
- the number of:
  - crew on board and the number killed or seriously injured;
  - passengers on board and the number killed or seriously injured; and
  - other persons killed or seriously injured as a result of the accident.
- the nature of the accident or serious incident and the extent of damage as far as is known.

Definition of an accident

"Accident" means an occurrence associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight and such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time it comes to rest at the end of the flight and the primary propulsion system is shut down, in which:

- a person is fatally or seriously injured as a result of:
  - being in the aircraft;
  - direct contact with any part of the aircraft, including parts which have become detached from the aircraft; or
  - direct exposure to jet blast;

Incident and accident reporting

except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or

- the aircraft sustains damage or structural failure which adversely affects the structural strength, performance or flight characteristics of the aircraft, and would normally require major repair or replacement of the affected component;

  except for engine failure or damage, when the damage is limited to a single engine, (including its cowlings or accessories), to propellers, wing tips, antennas, probes, vanes, tires, brakes, wheels, fairings, panels, landing gear doors, windscreens, the aircraft skin (such as small dents or puncture holes) or minor damages to main rotor blades, tail rotor blades, landing gear, and those resulting from hail or bird strike, (including holes in the radome); or

- the aircraft is missing or is completely inaccessible.

Definition of serious injury

"Serious injury" means an injury which is sustained by a person in an accident and which involves one of the following:

- hospitalisation for more than 48 hours, commencing within 7 days from the date the injury was received;
- a fracture of any bone (except simple fractures of fingers, toes, or nose);
- lacerations which cause haemorrhage, nerve, muscle or tendon damage;
- injury to any internal organ;
- second or third degree burns, or any burns affecting more than 5% of the body surface; or
- verified exposure to infectious substances or harmful radiation.

Definition of serious incident

"Serious Incident" means an incident involving circumstances indicating that there was a high probability of an accident and is associated with the operation of an aircraft, which in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time it comes to rest at the end of the flight and the primary propulsion system is shut down.

The incidents listed below are typical examples of serious incidents. The list is not exhaustive and only serves as a guide to the definition of 'serious incident':

- A near collision requiring an avoidance manoeuvre or when an avoiding manoeuvre would have been appropriate to avoid a collision or an unsafe situation.
- Controlled flight into terrain (CFIT) only marginally avoided.
- An aborted takeoff or a takeoff using a closed or engaged runway, a taxiway or unassigned runway.
- A landing or attempted landing on a closed or engaged runway, a taxiway or unassigned runway; or
- Gross failure to achieve predicted performance during takeoff or initial climb.

Incident and accident reporting

- All fires and/or smoke in the cockpit, in the passenger compartment, in cargo compartments or engine fires, even though such fires were extinguished with extinguishing agents.
- Any events which require the emergency use of oxygen by the flight crew.
- Aircraft structural failure or engine disintegration, including uncontained turbine engine failure, which is not classified as an accident.
- Multiple malfunctions of one or more aircraft systems that seriously affect the operation of the aircraft.
- Any case of flight crew incapacitation in flight.
- Any fuel state which would require the declaration of an emergency by the pilot.
- Runway incursions classified with severity A. The 'Manual on the Prevention of Runway Incursions' (ICAO Doc 9870) contains information on the severity classifications.
- Take-off or landing incidents, such as undershooting, overrunning or running off the side of runways.
- System failures, weather phenomena, operation outside the approved flight envelope or other occurrences which caused or could have caused difficulties controlling the aircraft.
- Failure of more than one system in a redundancy system which is mandatory for flight guidance and navigation.
- The unintentional or, as an emergency measure, the intentional release of a slung load or any other load carried external to the aircraft.

OCCURRENCE REPORTING

Some safety incidents must be reported to the CAA under the Occurrence Reporting regulations[1]. This is often known as 'Mandatory Occurrence Reporting' (MOR). Reports are filed using the ECCAIRS[2] format via www.aviationreporting.eu. For more guidance see SSL 32 – *Occurrence Reporting for General Aviation*.

You should report any occurrence that you feel could have an impact on aviation safety. This will ensure that we always review and learn from events. The reporting requirements are only mandatory for Part 21 aircraft, however pilots of non-Part 21 aircraft are strongly encouraged to report similar incidents via the same portal.

If the incident occurred while working or operating for an organisation required to have an internal reporting system, you should use the organisation's system, which will process the report and file an MOR via ECCAIRS.

The following non-exhaustive list includes key occurrence types that must be reported by the pilot in command:

- Airspace infringement;
- Declaration of emergency;
- Fire or fume events;
- Loss of control;
- Collision or near collision on the ground or in the air with another aircraft, the ground or obstacle;

[1]Regulation (EU) No 376/2014
Commission Implementing Regulation (EU) 2015/1018

[2]ECCAIRS stands for European Co-ordination Centre for Accident and Incident Reporting Systems

Incident and accident reporting

- Runway incursion or excursion;
- Engine failure;
- Unintended entry into IMC;
- Bird or other wildlife strike;
- Lighting strike that damaged the aircraft;
- Icing (including carb icing) which could have endangered the aircraft; and
- Severe turbulence which caused injuries or required the aircraft to be checked for damage.

There are also some that are specific to balloon and glider incidents, for example ejection of occupants from the basket or winch launch related incidents. See the Occurrence Reporting Regulation for more details.

Glider pilots who are members of the BGA should use the organisation's incident and accident reporting system and guidance. Its use complies with the Occurrence Reporting requirements.

Note: There is sometimes overlap between reporting requirements for the different organisations and regulations – the AAIB and Occurrence reporting requirements are mandated by regulation and you must report in accordance with both (as applicable) for a particular incident.

AIRPROX BOARD

An Airprox is a situation in which, in the opinion of a pilot or air traffic services personnel, the distance between aircraft as well as their relative positions and speed have been such that the safety of the aircraft involved may have been compromised.

The Airprox Board is a joint CAA and Military Aviation Authority (MAA) organisation responsible for receiving, analysing and publishing reports of Airproxes.

More information on reporting an Airprox or reviewing Airprox Board reports can be found at www.airproxboard.org.uk.

CHIRP

The Confidential Human Factors Incident Reporting Programme (CHIRP) is an independent flight safety reporting programme, the aim of which is to contribute to the enhancement of flight safety in the UK's commercial and general aviation industries. It can be used by engineers and technical staff involved with design and manufacturing processes, flight and cabin crew members, air traffic controllers, maintenance/engineering personnel and individual aircraft owners/operators.

It is designed to complement other mandatory reporting requirements by providing a means by which individuals are able to raise safety-related issues of concern without being identified to their peer group, management, or the regulatory authorities.

CHIRP publishes regular compilations of reports submitted, so that the issues identified and lessons learnt can be shared with all those interested in reading them. Any names, dates, locations and aircraft registrations are removed from the published reports.

More information and to submit a report can be found at www.chirp.co.uk.

Incident and accident reporting

JUST CULTURE

'Just Culture' is defined in the Occurrence Reporting Regulation[1] as:

"A culture in which front-line operators or other persons are not punished for actions, omissions or decisions taken by them that are commensurate with their experience and training, but in which gross negligence, wilful violations and destructive acts are not tolerated."

Just Culture describes how human mistakes and errors are dealt with in a way that is fair to the individuals concerned and prioritises the improvement of overall safety above punitive measures. Human errors will occur, and resolution should take precedence over blame.

An early example of what we would now think of as a Just Culture statement hung above the shop floor of a World War II Hawker factory:

"A fault revealed voluntarily will be treated leniently but a fault concealed may lead to serious consequences for the workman, not to mention the pilot."

Most descriptions of Just Culture focus on scenarios within organisations – for example how the management of maintenance organisations or flight schools deal with errors and incidents that may be committed by their employees or other individuals under their direction. Such descriptions emphasise that employees must feel able to report openly and investigations should focus on improving safety within the organisation rather than assigning blame. This applies to all organisations in the aviation system, including those in GA.

Just Culture for GA

GA organisations should have a Safety Policy which covers reporting and how reports of incidents are dealt with in the organisation. Such processes should reflect a Just Culture. In practice, means:

- both individuals and management are open about incidents and errors, such that everyone learns from them;
- this openness focuses on learning rather than people being made 'an example of'; and
- when the competence of individuals is found to be below the required standard, solutions focus on retraining rather than demotion or dismissal.

Just Culture is also relevant to individual GA pilots or others working outside of an organisation. Some scenarios in which Just Culture will likely be relevant:

- when individuals report directly to the CAA;
- when individuals working for an organisation need to report internally or when organisations need to deal with incidents;
- when the CAA needs to investigate the competence of individuals; and
- when someone wishes to 'blow the whistle' regarding a safety issue.

The principles of Just Culture apply when reporting incidents directly to the CAA, or if an incident becomes subject to investigation. Those involved in GA should also feel able to report genuine safety concerns (sometimes known as whistle blowing) knowing that they will be treated confidentially.

[1]REGULATION (EU) No 376/2014

Incident and accident reporting

Note that confidential is not the same as anonymous – the CAA strongly discourages people from submitting reports anonymously, since it limits the ability to follow up for more detail or meaningfully investigate them.

Benefits of reporting

Just Culture is important because an open and honest reporting culture improves flight safety. This has obvious benefits to everyone involved in aviation. As a GA pilot, you can contribute to this by reporting incidents when required, or when you feel that a report may contribute to flight safety.

In the GA environment, it may appear that the benefit of reporting an incident, that would otherwise go unnoticed, is negligible – unlike in an organisation, it may seem that individual reports are unlikely to 'make a difference'. This is not the case – an effective reporting system is a key element of improving safety. It may be that individual reports do not make a large difference, but overall reporting will contribute to the analysis of safety trends and help shape future CAA safety policy.

Dealing with human error

It is important to acknowledge that Just Culture does not translate as 'no blame' – in reality, many incidents lie somewhere between two extremes of errors that are commensurate with experience and those which stem from gross negligence.

Systems that aim to improve safety must apply the principles of Just Culture to a variety of different errors and incidents. Individuals should always be treated fairly, if however an incident reveals a lack of competence, appropriate retraining must be applied by the organisation involved or directly by the CAA. This retraining should be relevant to the incident in question and focus on restoring the individual to the appropriate level of competence.

Incidents that clearly include a disregard for risk or poor attitudes and behaviours will be treated more harshly and may result in a loss of privileges, or in extreme cases, criminal prosecution.

Interception procedures

It is a requirement for Part 21 aircraft flying under Part-NCO and for all aircraft flying internationally to carry the interception procedures specified in ICAO Annex 2 (Rules of the Air) and the SERA. These are reproduced below.

SERA.11015 Interception

- **(a)** Except for intercept and escort service provided on request to an aircraft, interception of civil aircraft shall be governed by appropriate regulations and administrative directives issued by Member States in compliance with the Convention on International Civil Aviation, and in particular Article 3(d) under which ICAO Contracting States undertake, when issuing regulations for their State aircraft, to have due regard for the safety of navigation of civil aircraft.
- **(b)** The pilot in command of a civil aircraft, when intercepted, shall:
  - **(1)** immediately follow the instructions given by the intercepting aircraft, interpreting and responding to visual signals in accordance with the specifications in Tables S11-1 and S11-2;
  - **(2)** notify, if possible, the appropriate air traffic services unit;
  - **(3)** attempt to establish radio-communication with the intercepting aircraft or with the appropriate intercept control unit, by making a general call on the emergency frequency 121.5 MHz, giving the identity of the intercepted aircraft and the nature of the flight; and if no contact has been established and if practicable, repeating this call on the emergency frequency 243 MHz;
  - **(4)** if equipped with SSR transponder, select Mode A, Code 7700, unless otherwise instructed by the appropriate air traffic services unit;
  - **(5)** if equipped with ADS-B or ADS-C, select the appropriate emergency functionality, if available, unless otherwise instructed by the appropriate air traffic services unit.

Table S11-1: Signals initiated by intercepting aircraft and responses by intercepted aircraft

Series	INTERCEPTING Aircraft Signals	Meaning	INTERCEPTED Aircraft Responds	Meaning
1	DAY or NIGHT — Rocking aircraft and flashing navigational lights at irregular intervals (and landing lights in the case of a helicopter) from a position slightly above and ahead of, and normally to the left of, the intercepted aircraft (or to the right if the intercepted aircraft is a helicopter) and, after acknowledgement, a slow level turn, normally to the left (or to the right in the case of a helicopter) on the desired heading.	You have been intercepted. Follow me.	DAY or NIGHT — Rocking aircraft, flashing navigational lights at irregular intervals and following.	Understood, will comply.

Note 1 Meteorological conditions or terrain may require the intercepting aircraft to reverse the positions and direction of turn given above in Series 1.

Note 2 If the intercepted aircraft is not able to keep pace with the intercepting aircraft, the latter is expected to fly a series of race-track patterns and to rock the aircraft each time it passes the intercepted aircraft.

Interception procedures

Table S11-1: Signals initiated by intercepting aircraft and responses by intercepted aircraft

Series	INTERCEPTING Aircraft Signals	Meaning	INTERCEPTED Aircraft Responds	Meaning
2	DAY or NIGHT — An abrupt breakaway manoeuvre from the intercepted aircraft consisting of a climbing turn of 90 degrees or more without crossing the line of flight of the intercepted aircraft.	You may proceed.	DAY or NIGHT — Rocking the aircraft.	Understood, will comply.
3	DAY or NIGHT — Lowering landing gear (if fitted), showing steady landing lights and overflying runway in use or, if the intercepted aircraft is a helicopter, overflying the helicopter landing area. In the case of helicopters, the intercepting helicopter makes a landing approach, coming to hover near to the landing area.	Land at this aerodrome.	DAY or NIGHT — Lowering landing gear, (if fitted), showing steady landing lights and following the intercepting aircraft and, if, after overflying the runway in use or helicopter landing area, landing is considered safe, proceeding to land.	Understood, will comply.

Table S11-2: Signals initiated by intercepting aircraft and responses by intercepted aircraft

Series	INTERCEPTED Aircraft Responds	Meaning	INTERCEPTING Aircraft Signals	Meaning
4	DAY or NIGHT — Raising landing gear (if fitted) and flashing landing lights while passing over runway in use or helicopter landing area at a height exceeding 300 m (1 000 ft) but not exceeding 600 m (2 000 ft) (in the case of a helicopter, at a height exceeding 50 m (170 ft) but not exceeding 100 m (330 ft)) above the aerodrome level, and continuing to circle runway in use or helicopter landing area. If unable to flash landing lights, flash any other lights available.	Aerodrome you have designated is inade-quate.	DAY or NIGHT — If it is desired that the intercepted aircraft follow the intercepting aircraft to an alternate aerodrome, the intercepting aircraft raises its landing gear (if fitted) and uses the Series 1 signals prescribed for intercepting aircraft. If it is decided to release the intercepted aircraft, the intercepting aircraft uses the Series 2 signals prescribed for intercepting aircraft.	Understood, follow me. Understood, you may proceed.
5	DAY or NIGHT — Regular switching on and off of all available lights but in such a manner as to be distinct from flashing lights.	Cannot comply.	DAY or NIGHT — Use Series 2 signals prescribed for intercepting aircraft.	Understood.
6	DAY or NIGHT — Irregular flashing of all available lights.	In distress.	DAY or NIGHT — Use Series 2 signals prescribed for intercepting aircraft.	Understood.

Interception procedures

> **(c)** If any instructions received by radio from any sources conflict with those given by the intercepting aircraft by visual signals, the intercepted aircraft shall request immediate clarification while continuing to comply with the visual instructions given by the intercepting aircraft.

> **(d)** If any instructions received by radio from any sources conflict with those given by the intercepting aircraft by radio, the intercepted aircraft shall request immediate clarification while continuing to comply with the radio instructions given by the intercepting aircraft.

> **(e)** If radio contact is established during interception but communication in a common language is not possible, attempts shall be made to convey instructions, acknowledgement of instructions and essential information by using the phrases and pronunciations in Table S11-3 and transmitting each phrase twice:

Table S11-3

Phrases for use by INTERCEPTING aircraft			Phrases for use by INTERCEPTED aircraft		
Phrase	Pronunciation[1]	Meaning	Phrase	Pronunciation[1]	Meaning
CALL SIGN	KOL SA-IN	What is your call sign?	CALL SIGN (call sign)[2]	KOL SA-IN (call sign)	My call sign is (call sign)
FOLLOW	FOL-LO	Follow me	WILCO	VILL-KO	Understood, will comply
DESCEND	DEE-SEND	Descend for landing			
			CAN NOT	KANN NOTT	Unable to comply
YOU LAND	YOULAAND	Land at this aerodrome	REPEAT	REE-PEET	Repeat your instruction
			AM LOST	AMLOSST	Position unknown
PROCEED	PRO-SEED	You may proceed			
			MAYDAY	MAYDAY	I am in distress
			HIJACK[3]	HI-JACK	I have been hijacked
			LAND (place name)	LAAND (place name)	I request to land at (place name)
			DESCEND	DEE-SEND	I require descent

1 In the second column, syllables to be emphasised are underlined.
2 The call sign required to be given is that used in radiotelephony communications with air traffic services units and corresponding to the aircraft identification in the flight plan.
3 Circumstances may not always permit, nor make desirable, the use of the phrase 'HIJACK'.

Interception procedures

- **(f)** As soon as an air traffic services unit learns that an aircraft is being intercepted in its area of responsibility, it shall take such of the following steps as are appropriate in the circumstances:
  - **(1)** attempt to establish two-way communication with the intercepted aircraft via any means available, including the emergency radio frequency 121.5 MHz, unless such communication already exists;
  - **(2)** inform the pilot of the intercepted aircraft of the interception;
  - **(3)** establish contact with the intercept control unit maintaining two-way communication with the intercepting aircraft and provide it with available information concerning the aircraft;
  - **(4)** relay messages between the intercepting aircraft or the intercept control unit and the intercepted aircraft, as necessary;
  - **(5)** in close coordination with the intercept control unit take all necessary steps to ensure the safety of the intercepted aircraft;
- **(g)** As soon as an air traffic services unit learns that an aircraft is being intercepted outside its area of responsibility, it shall take such of the following steps as are appropriate in the circumstances:
  - **(1)** inform the air traffic services unit serving the airspace in which the interception is taking place, providing this unit with available information that will assist in identifying the aircraft and requesting it to take action in accordance with (f);
  - **(2)** relay messages between the intercepted aircraft and the appropriate air traffic services unit, the intercept control unit or the intercepting aircraft.

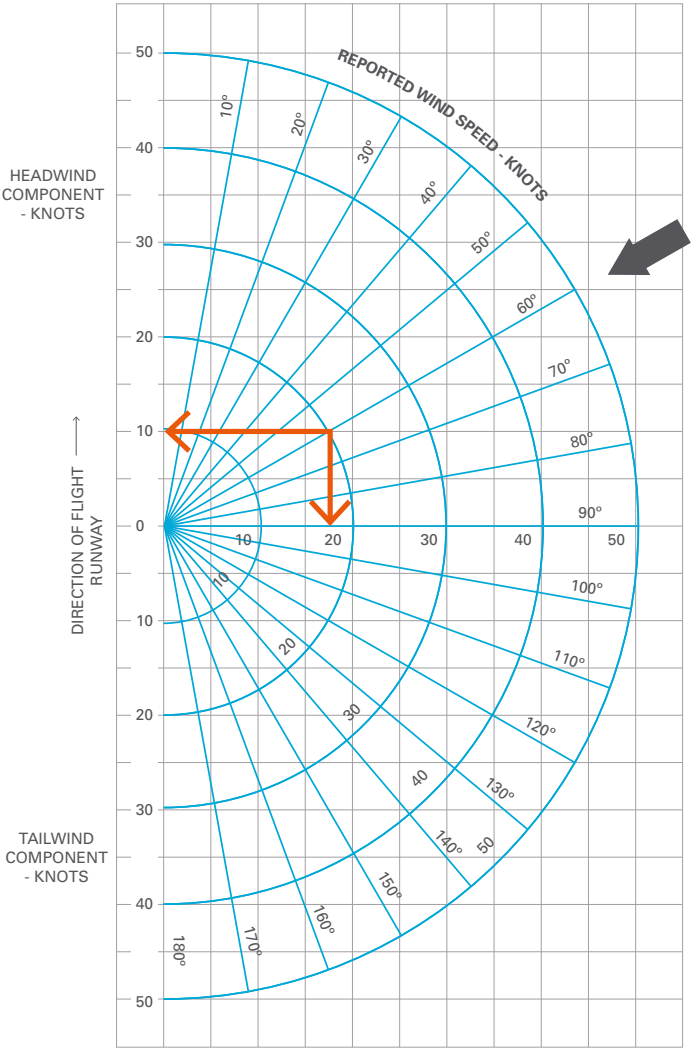
TABLES AND CODES

Including:

09.

TABLES AND CODES

Crosswind component



EXAMPLE:

WIND SPEED 20 KNOTS. ANGLE BETWEEN RUNWAY AND DIRECTION OF WIND 60°. CROSSWIND COMPONENT - 17 KNOTS. HEADWIND COMPONENT - 10 KNOTS.

Morse code

Phonetic alphabet and Morse code			
Letter	Code	Word	Pronunciation
A	• –	Alfa	AL FAH
B	– • • •	Bravo	BRAH VOH
C	– • – •	Charlie	CHAR LEE or SHAR LEE
D	– • •	Delta	DELL TAH
E	•	Echo	ECK OH
F	• • – •	Foxtrot	FOKS TROT
G	– – •	Golf	GOLF
H	• • • •	Hotel	HOH TEL
I	• •	India	IN DEE AH
J	• – – –	Juliett	JEW LEE ETT
K	– • –	Kilo	KEY LOH
L	• – • •	Lima	LEE MAH
M	– –	Mike	MIKE
N	– •	November	NO VEM BER
O	– – –	Oscar	OSS CAH
P	• – – •	Papa	PAH PAH
Q	– – • –	Quebec	KEH BECK
R	• – •	Romeo	ROW ME OH
S	• • •	Sierra	SEE AIR RAH
T	–	Tango	TANG GO
U	• • –	Uniform	YOU NEE FORM or OO NEE FORM
V	• • • –	Victor	VIK TAH
W	• – –	Whiskey	WISS KEY
X	– • • –	X-ray	ECKS RAY
Y	– • – –	Yankee	YANG KEY
Z	– – • •	Zulu	ZOO LOO

Morse code

Phonetic alphabet and Morse code		
Numeral or numeral element	Code	Pronunciation
1	• – – – –	WUN
2	• • – – –	TOO
3	• • • – –	TREE
4	• • • • –	FOW-er
5	• • • • •	FIFE
6	– • • • •	SIX
7	– – • • •	SEV-en
8	– – – • •	AIT
9	– – – – •	NIN-er
0	– – – – –	ZE-RO
Decimal Thousand		DAY-SEE-MAL TOU-SAND

Distance, weight and volume

Conversion Table			
1 kg	= 2.205 lb	1 lb	= 0.454 kg
1 inch	= 2.54 cm	1 cm	= 0.394 in
1 foot	= 0.305 m	1 metre	= 3.28 ft
1 Imp gal	= 4.546 litres	1 litre	= 0.22 Imp gal
1 US gal	= 3.785 litres	1 litre	= 0.264 US gal
1 Imp gal	= 1.205 US gal	1 US gal	= 0.83 Imp gal

Abbreviations

AAIB
Air Accidents Investigation Branch

AAL
Above Aerodrome Level

ACC
Area Control Centre

ADS-B
Automatic Dependent Surveillance-Broadcast

AFIS
Aerodrome Flight Information Service

AFM
Aircraft Flight Manual

AFTN
Aeronautical Fixed Telecommunication Network

AGCS
Air/Ground Communication Service

AGL
Above Ground Level

AIAA
Area of Intense Aerial Activity

AIC
Aeronautical Information Circular

AIP
Aeronautical Information Publication

AIS
Aeronautical Information Service

AMC
Acceptable Means of Compliance

AME
Aeromedical Examiner

AMSL
Above Mean Sea Level

ANO
Air Navigation Order

ATA
Aerial Tactics Aera

ATCO
Air Traffic Control Officer

ATIS
Automatic Terminal Information Service

ATO
Approved Training Organisation

ATS
Air Traffic Service

ATSU
Air Traffic Service Unit

ATZ
Aerodrome Traffic Zone

BGA
British Gliding Association

BHPA
British Hang gliding and Paragliding Association

CAP
Civil Air Publication

CFIT
Controlled Flight into Terrain

CHIRP
Confidential Human Factors Reporting Programme

CTA
Control Area

CTR
Control Zone

D&D
Distress and Diversion cell

DACS
Danger Aera Crossing Service

DF
Direction Finding

DTO
Declared Training Organisation

EASA
European Aviation Safety Agency

EC
Electronic Conspicuity

ECCAIRS
European Coordination Centre for Accident and Incident Reporting Systems

ELT
Emergency Locator Beacon

FIR
Flight Information Region

FISO
Flight Information Service Officer

FMC
Frequency Monitoring Code

GASCo
General Aviation Safety Council

GM
Guidance Material

GNSS
Global Navigation Satellite System

IAP
Instrument Approach Procedure

ICAO
International Civil Aviation Organization

IFR
Instrument Flight Rules

Abbreviations

IMC
Instrument Meteorological Conditions

LAPL
Light Aircraft Pilot Licence

LARS
Lower Airspace Radar Service

MAA
Military Aviation Authority

MATZ
Military Air Traffic Zone

MEF
Maximum Elevation Figure

MOR
Mandatory Occurrence Report

NM
Nautical Mile

NOTAM
Notice to Airmen

PIC
Pilot in Command

PLB
Personal Locator Beacon

PPL
Private Pilot Licence

RA(T)
Restricted Airspace (Temporary)

RMZ
Radio Mandatory Zone

RPAS
Remotely Piloted Aircraft Systems

RPS
Regional Pressure Setting

RT
Radio Telephony

RTC
Radar Training Circuit

SEP
Single Engine Piston

SERA
Standardised European Rules of the Air

SLMG
Self-Launching Motor Glider

SSEA
Simple Single Engine Aeroplane

SVFR
Special Visual Flight Rules

TA
Transition Altitude

TEM
Threat and Error Management

TL
Transition Level

TMA
Terminal Manoeuvring Area

TMG
Touring Motor Glider

TMZ
Transponder Mandatory Zone

UAS
Unmanned Aerial Systems

UK FIS
UK Flight Information Service

UK LFS
UK Low Flying System

UTC
Coordinated Universal Time

VFR
Visual Flight Rules

VMC
Visual Meteorological Conditions

VRP
Visual Reference Point

METEOROLOGY

AT
At

AUTO
Automated report

BC
Patches

BECMG
Becoming

BKN
Broken clouds (5-7 oktas)

BL
Blowing

BLW
Below

BR
Mist

BTN
Between

CAT
Clear air turbulence

CAVOK
Ceiling and visibility OK

CB
Cumulonimbus

CC
Cirrocumulus

CI
Cirrus

CLD
Cloud

CLR
Clear

Abbreviations

COR
Correction

COT
At the coast

CS
Cirrostratus

CU
Cumulus

DEG
Degrees

DP
Dew point

DR
Drifting

DS
Dust storm

DU
Widespread dust

DZ
Drizzle

EMBD
Embedded

FEW
Few clouds (1-2 oktas)

FC
Funnel cloud

FG
Fog

FM
From

FPM
Feet per minute

FRQ
Frequent

FU
Smoke

FZ
Freezing

G
Gust

GAMET
General Aviation Meteorological Forecast

GEN
Generally

GND
Ground

GR
Hail

GS
Small hail/snow pellets

H
High pressure centre

HPA
Hectopascals

HZ
Haze

IC
Ice crystals

INTSF
Intensifying

ISOL
Isolated

JTST
Jet stream

KM
Kilometres

KT
Knots

L
Low pressure centre

LAN
Inland (or over land)

LCA
Locally

LSQ
Line squall

LTG
Lightning

LV
Light and variable

LYR
Layer(s) layered

M
Less than 0° (temperature)

M
Less than lowest reportable RVR

M
Metres

MAX
Maximum

METAR
Meteorological Aerodrome Report

MI
Shallow (for example mist or fog)

MNM
Minimum

MOD
Moderate

MON
Above or covering mountains

MPS
Metres per second

MS
Minus

MSL
Mean sea level

MTW
Mountain wave

NAT
North Atlantic

NC
No change

NCD
No cloud detected (auto reports only)

NDV
No directional variation

NIL
None

NM
Nautical miles

NOSIG
No significant change

Abbreviations

NS
Nimbostratus

NSC
No significant cloud

N, S, E, W, NE, SW, SSW etc
North, South, East, West, North East etc

NSW
No significant weather

OCNL
Occasional

OVC
Overcast (8 oktas)

PL
Ice pellets

PO
Dust devils

PRFG
Fog banks

PROB
Probability

PS
Plus

PSYS
Pressure system

PY
Spray

RA
Rain

RMK
Remarks

RVR
Runway visual range

RWY
Runway

SA
Sand

SC
Stratocumulus

SCT
Scattered (3-4 oktas)

SEA
At sea

SEV
Severe

SFC
Surface

SG
Snow grains

SH
Showers

SIG
Significant

SIGMET
Significant Meteorological Information

SKC
Sky clear

SN
Snow

SP
Snow pellets

SPECI
Special report

SQ
Squalls

SS
Sandstorm

ST
Stratus

STNR
Stationary

T
Temperature

TAF
Terminal Aerodrome Forecast

TCU
Towering cumulus

TEMPO
Temporarily

TL
Until

TOP
Cloud top

TROP
Tropopause

TS
Thunderstorm

TURB
Turbulence

U
Upward (tendency in RVR)

UP
Unidentified precipitation (auto reports only)

VA
Volcanic ash

VAL
In valleys

VC
In the vicinity (of the aerodrome)

VIS
Visibility

VRB
Variable

VSP
Vertical speed

VV
Vertical visibility

WDSPR
Widespread

WRNG
Warning

WS
Wind shear

WSPD
Wind speed

WX
Weather

Z
Zulu Time (UTC/GMT)

INTERNATIONAL FLIGHT

Including:

10.

INTERNATIONAL FLIGHT

Foreign requirements

The European Aeronautical Database (EAD) is the common source of European AIPs – www.ead.eurocontrol.int. Despite harmonisation of rules through ICAO and EASA, there are still local variations. Some common ones to look out for include:

- Airspace equipage requirements vary across Europe. GEN 1.5 of the relevant AIP is normally the best source of information for a particular state's requirements.
- Throughout Europe the Standardised Rules of the Air (SERA) will apply, however some national variations still exist. Check the subsections of ENR 1 of the relevant AIP for requirements such as cruising levels and VFR at night.
- Unlike the UK, many states make widespread use of class E airspace. The visibility and cloud separation minima for VFR flight are higher than in class G (see p.66). Know which airspace class you will be flying in.
- Be familiar with the charts you are using and the meaning of the different symbols and airspace – fines for infringing controlled airspace or danger areas can be very high.
- The standard radio service to ask for enroute is normally the **'Flight Information Service'** (FIS) – look for 'Information' frequencies on the charts to contact. Most states do not have subcategories of FIS such as 'Basic' or 'Traffic'.
- In many states VFR flight plans need to be closed on arrival, otherwise overdue action may be initiated. If landing at an aerodrome without an ATSU, you may have to call a regional ATC centre by phone to close the flight plan.
- At smaller aerodromes the radio communications may be conducted in the local language. The aerodrome's AIP entry should indicate the languages used. Only use such aerodromes if conversant in the applicable language.

Many flying clubs or schools offer a so called 'cross-channel check flight' which will be a valuable exercise for understanding the additional considerations for flying abroad.

The principles of pre-fight planning remain the same when flying abroad, although you should pay additional attention to NOTAMs and carefully read the AIP entries of the foreign aerodromes you are visiting. Commercially produced VFR flight guides are available for some states.

CROSSING WATER

Flying abroad from the UK invariably involves crossing water. You should consider the following:

- Fly as high as possible;
- Wear lifejackets;
- Carry a life raft and know how to deploy it correctly;
- For longer crossings and/or during times of lower sea temperatures, consider an immersion suit – it will increase your chances of survival in a ditching; and
- It is a requirement for all powered Part 21 aircraft and balloons to carry an ELT or PLB, regardless of whether the flight is international or not. Other states may also apply this requirement to non-Part 21 aircraft.

More information on ditching considerations can be found in SSL 21 – Ditching Light Aircraft on Water. www.caa.co.uk/safetysense.

INTERNATIONAL FLIGHT

VFR Flight Plans

It is a requirement to file a flight plan for international flights. For more information on UK flight planning procedures, see ENR 1.10 of the UK AIP. If using the flight planning facilities of another state, ENR 1.10 of the relevant AIP should be consulted.

FILING

Most flight plan filing is now done online, either using the Assisted Flight Planning Exchange Service (AFPEX) or other online flight planning services. These systems interface with the Aeronautical Fixed Telecommunication Network (AFTN). It is worth doing some research into which platform you find easiest to use.

- More information on AFPEX and registering to use the system is available at www.flightplanningonline.co.uk. There is a helpdesk service available for AFPEX through the Civil Aviation Communications Centre (CACC) at Swanwick on **+44 (0)1489 612792** or **0845 6010483**.
- If for some reason you are unable to access the internet and are not at an airfield with an ATSU capable of submitting your FPL, you may fax it to the CACC at Swanwick on **01489 612793**.
- A flight plan should be filed 60 minutes or more prior to the estimated off-blocks time. If filing a plan prior to the day of the flight you should include the date of the flight in item 18 of the FPL form – for example DOF/070922 would be 22nd September 2007.
- If you are delayed by more than 30 minutes from the filed departure time, you must submit a delay message, either through an ATSU, AFPEX or the AFPEX helpdesk.
- It is possible to file a full flight plan in-flight through London or Scottish Information, but this this should not be considered the default method. A request should be commenced with 'I wish to file an airborne flight plan'.

ADDRESSING

Addressing is the mechanism by which the relevant FIR authorities and ATSUs for your flight receive your flight plan. It is done by entering addressing codes at the top of the flight plan form.

It is recommended that you follow the guidance available for addressing in AFPEX at www.flightplanningonline.co.uk and in the online flight plan form itself. This will aid addressing the flight plan correctly to those units connected to the AFTN. Flight plans should normally be addressed to:

- Departure, destination and alternate aerodromes – ICAO code followed by ZTZX (for example EGKKZTZX would be Gatwick);
- In the UK, the London FIR – EGZYVFRT and/or Scottish FIR – EGZYVFRP;
- For certain UK destinations, specific additional addressees listed in ENR 1.11 of the UK AIP;
- Any other ATSUs en-route you wish to make aware of your flight; and
- Any foreign FIRs that you are passing through.

Further specific addressing details can be found in section ENR 1.11 of the AIP for the relevant state.

INTERNATIONAL FLIGHT

VFR Flight Plans

FORM COMPLETION AND ROUTING

There is further guidance available on the AFPEX website for completion of the FPL form. Follow links to help and training at www.flightplanningonline.co.uk. In general, the flight plan routes should be described using:

- Waypoints, VORs or bearings and distances from them – e.g. DVR16010, which indicates a position 160° and 10 NM from DVR VOR; or
- Lat/Long positions such as 5114N00122W.

These points should normally be not more than 30 minutes flying time apart. Do not use aerodrome designators.

In the case of crossing the FIR boundary into/from French airspace, the crossing point (for example ORTAC is a common one) should be included in the route, and the elapsed flight time to the FIR boundary included in Item 18 of the FPL form. For example, EET/LFFF0145 would indicate you planned to cross into the relevant Paris FIR 01:45 minutes into the flight.

ACTIVATION AND CLOSURE

A VFR flight plan needs activating on departure. If departing from an aerodrome with an ATSU, they should be able to activate it for you, assuming they are connected to the AFTN. If in doubt ask before departure. Alternatively:

- Ask another ATSU to do so over the radio (subject to their capacity), for example London or Scottish Information; or
- Nominate someone to activate it after you have departed by phoning the AFPEX Helpdesk.

Once the departure message has been received, the destination aerodrome calculates the aircraft's estimated time of arrival (ETA).

Procedures relating to flight plan closure vary depending on destination:

- If you land at your destination, the ATSU at the aerodrome should close the flight plan for you. If you fail to arrive or make communication, the ATSU will start overdue action after 30 minutes beyond the ETA. If you land at another aerodrome you must inform your original destination otherwise they may commence overdue action.
- In the UK, if arriving outside the hours of operation of the destination aerodrome's ATSU, or if there is no ATSU connected to the AFTN, then overdue action will **not** be initiated in the event of failure to arrive. It is therefore strongly recommended to nominate someone who will phone the AFPEX Helpdesk in the event of you failing to arrive when planned – this is referred to as nominating a 'responsible person'.
- Outside the UK, if arriving at an aerodrome without an active ATSU, it is usually a requirement for the pilot to close the flight plan with the regional ATC centre or flight planning office. Overdue action may be initiated if this has not been done and could result in a heavy fine. Contact details can normally be found in ENR section 1.10 of the AIP for the relevant state, or in commercially available VFR flight guides.

INTERNATIONAL FLIGHT

Documents

Depending on the type of aircraft you are flying, the requirements may vary. The following list will generally cover everything that would be required under EASA or ICAO regulations:

- Approved Flight Manual;
- Original Certificate of Registration;
- Original Certificate of Airworthiness (or permit to fly);
- Noise certificate;
- Aircraft radio licence;
- Insurance certificate;
- Journey log;
- Flight plan details;
- Current charts;
- Interception procedures;
- Minimum Equipment List (if you operate with one);
- Operating permission (if applicable);
- Flight crew licences; and
- Passports for all onboard.

Customs, immigration and police

UK REQUIREMENTS

If making an international flight to or from the UK, or within the Common Travel Area, you must notify the Border Force and/or police (often referred to as 'Special Branch'). This is done using the General Aviation Report (GAR) form, either via the online portal or by emailing it to:

ncu@hmrc.gov.uk (National Co-ordination Unit).

The GAR form includes details of the aircraft, flight and those onboard. It satisfies customs, immigration and police (when applicable) requirements.

Full details of the requirements, GAR form submission and associated guidance can be found at www.gov.uk/government/publications/general-aviation-operators-and-pilots-notification-of-flights.

FOREIGN REQUIREMENTS

When arriving into a foreign state, you will normally have to use an aerodrome that is designated for customs and/or immigration purposes. Details of this can be found in the AIP entry for the relevant foreign aerodrome. At smaller aerodromes customs and immigration may be available with prior notification.

When travelling within the Schengen Area of Europe, there is normally no requirement to land at designated aerodromes, however participating states do have the right to implement border controls in response to specific events or threats, so check the current situation before planning a flight.

It is also a requirement when leaving most states, including the Schengen area, to depart from a designated aerodrome and give any prior notice of your departure that may be required at that aerodrome.

Non-ICAO compliant aircraft or pilot licences

If you are flying an aircraft that does not have an ICAO-compliant certificate of airworthiness, you may need to seek the permission of the relevant states before flying outside the UK. This normally includes microlights (sometimes known as ultralights in other states), amateur constructed aircraft or aircraft that formerly held an ICAO certificate but now fly on a national permit to fly. In the UK these are often collectively known as 'permit aircraft'.

Many amateur built aircraft may be flown internationally within Europe under the relevant European Civil Aviation Conference (ECAC) agreement. However, implementation of this is not consistent throughout Europe and some states still require individual permissions. You must check the requirements of the relevant state before flight.

The following GA associations compile information on flying permit aircraft internationally, although it cannot be guaranteed that the information is completely accurate or up to date:

- European Microlight Federation – www.emf.aero;
- British Microlight Aeroplane Association – www.bmaa.org; and
- Light Aircraft Association – www.lightaircraftassociation.co.uk.

If flying on a non-ICAO compliant pilot's licence or medical declaration, you will also likely need the permission of the relevant state before flying outside the UK. For example, an ICAO medical certificate is required to fly most powered aircraft outside the UK.

Many states have a validation process for ICAO compliant pilot licensing when operating aircraft registered within an EU member state.

If required by the state being overflown or visited, you must carry the permission with you at all times.

FINDING OUT MORE

Including:

11.

INFORMATION

Finding out more

The CAA is also increasingly moving towards the use of electronic communication and publications. For the latest news and regulatory updates, subscribe to SkyWise notifications (skywise.caa.co.uk); this provides notifications of things like airspace restrictions, new regulations or publications and can be tailored to your particular type of flying.

AIRSPACE

Airspace & Safety Initiative (ASI) – airspacesafety.com

The Airspace & Safety Initiative (ASI) is a joint CAA, NATS, Airport Operators Association (AOA), GA and MoD project to investigate and tackle the major safety risks in UK airspace.

The initiative aims to encourage good practice for all pilots, to help reduce airspace incidents such as infringements of controlled airspace.

Radiotelephony Manual – www.caa.co.uk/cap413

The UK Radiotelephony Manual (CAP 413) aims to provide pilots, Air Traffic Services personnel and aerodrome drivers with a compendium of clear, concise, standard phraseology and associated guidance for radiotelephony communication in United Kingdom airspace.

UK Flight Information Services – www.caa.co.uk/cap774

The UK Flight Information Services (CAP 774) details the suite of air traffic services (ATS) which (excluding aerodrome services) are the only services provided in Class G airspace within the UK Flight Information Region (where notified, elements of the UK FIS are also provided to aircraft operating in Class E airspace). Therefore, this document is equally applicable to civilian and military pilots, air traffic controllers, and Flight Information Service Officers. There is a supplementary leaflet – www.caa.co.uk/cap1434.

Airspace infringements: Review and remedial actions process – www.caa.co.uk/cap1404.

If you do end up infringing airspace, the approach for the CAA dealing with this is set out in CAP 1404. The process is designed to focus on lessons learnt and apply proportionate and appropriate remedial action.

Electronic conspicuity devices – www.caa.co.uk/cap1391

CAP 1391 explains the benefits of EC in terms of reducing the risk of airborne conflict between aircraft in UK uncontrolled airspace. It sets out the required minimum technical specification and explains the regulatory approach manufacturers need to follow for portable EC devices to be legally used on board aircraft in uncontrolled UK airspace.

INFORMATION

Finding out more

SAFETY

General Aviation Safety Council (GASCo) – www.gasco.org.uk

GASCo was originally formed in 1965 and aims to:

- Collect, collate and disseminate flight safety information among users of UK registered general aviation aircraft; and
- Study all matters affecting, or which might affect, flight safety in UK general aviation and to make recommendations to interested parties, as necessary.

Some of GASCo's activities involve the conduct of Safety Evenings on behalf of the CAA, the publication of safety information and a quarterly magazine devoted to GA flight safety issues.

Air Accidents Investigation Branch – www.aaib.gov.uk

The Air Accidents Investigation Branch (AAIB) investigates civil aircraft accidents and serious incidents within the UK, its overseas territories and crown dependencies. The results of investigations are published and available on the AAIB's website.

CHIRP – www.chirp.co.uk

Confidential Human Factors Incident Reporting Programme (CHIRP) is an independent flight safety reporting programme, the aim of which is to contribute to the enhancement of flight safety in the UK's commercial and general aviation industries.

CHIRP publish 'GA Feedback' on their website which contains reports submitted by personnel involved in aviation that highlight safety issues encountered during operations.

Clued Up – www.caa.co.uk/ga

Clued Up magazine is produced on behalf of the CAA and brings you the latest news in aviation safety, topical issues, advice and contribution from pilots, air traffic controllers and safety experts from the across the UK's General Aviation community. From the CAA's GA homepage, click on 'Safety guidance and resources'.

CAA Safety Sense – www.caa.co.uk/safetysense

CAA Safety Sense Leaflets cover a wide variety of safety and operational topics relevant to GA flying.

GetMet – www.metoffice.gov.uk/aviation/ga

Produced in association between the Met Office and the CAA, this free booklet provides essential information on where to get your met data to safely enjoy low-level flying, both in the UK and near Europe.

INFORMATION

Finding out more

REGULATORY

CAA useful links

- GA Unit – www.caa.co.uk/ga – contains a wealth of regulatory information, including current 'hot topics' of interest.
- CAA consultations – www.caa.co.uk/consultations
- CAA publications – www.caa.co.uk/publications
- Civil Air Publications (CAPS) can be found by entering the URL as www.caa.co.uk, forward slash the number of the CAP you are looking for. For example: www.caa.co.uk/capXXXX
- Regulations made under the Civil Aviation Act 1982 and Air Navigation Order 2016 (CAA consolidation) – CAP 393 – www.caa.co.uk/cap393
- Assimilated law applicable to aviation – https://www.caa.co.uk/uk-regulations/
- Official Record Series 4 – www.caa.co.uk/ors4 – ORS4 contains all general (not individual) permissions and exemptions that are made either against or pursuant to the ANO or European regulations. An example of this are the 'SERA permissions', which set out areas in which the UK has exercised national discretion under SERA.

EASA regulations and documents

- EASA regulations – www.easa.europa.eu/regulations – EASA organise regulations by functional area, such as airworthiness or flight crew licensing. Look for the 'Easy Access' consolidations that include amendments, Acceptable Means of Compliance (AMC) and Guidance Material (GM).
- EASA rulemaking documents – www.easa.europa.eu/document-library – EASA places rulemaking documents such as 'notices of proposed amendments' (NPAs – essentially consultation documents) and 'Opinions' (draft regulations post consultation but prior to enactment) under the 'document library' section of their website.

Aeronautical Information Service – www.nats.aero/do-it-online/ais/

AIS is the main source of information relevant to air navigation in the UK, containing the Aeronautical Information Publication (AIP), Aeronautical Information Circulars (AIC) and NOTAMs. Airspace details and procedures can be found in the ENR section, with aerodromes in the AD section.

European AIS Database – www.ead.eurocontrol.int

Contains online versions of European AIPs. Requires a login to be created.