

The



VFR Club

**AIR TRAFFIC
CONTROL
MANUAL**

for

VFR PILOTS

NOT TO BE USED FOR REAL WORLD AVIATION

Version 1.1

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1 GENERAL INFORMATION

The manual is designed to reflect the real world Air Traffic Control Rules and Procedures, with highlighted notes where the VATSIM procedure differs. This to help Virtual Pilots become as real as possible, which is one of the things which makes the hobby so enjoyable.

There are many terms which will be unfamiliar to non-pilots in this manual. Please refer to the Acronyms and Abbreviations at section 2.5.3 and the Abbreviations Section at section 6 for an explanation.

On first reading, it may seem that ATC is hugely complex. However, it basically has a simple structure, but many different scenarios within that structure, as you would expect. If you are having problems, ask for help, and you will invariably get it, as happened to me at least once.

Humberside Tower, Golf Alpha Victor, I am positioned on the downwind heading for 21, but I cannot see the runway.

Golf Alpha Victor, can you see three smoking chimneys in your two o'clock?

Affirm, Golf Alpha Victor

Golf Alpha Victor; turn right onto base leg abeam these chimneys. Just before you reach them, if you turn onto the runway heading, the runway will be straight in front of you"

Roger Golf Alpha Victor

Later

Golf Alpha Victor runway identified, turning final.

Roger Alpha Victor, Cleared land two one, you are No. 1

None of that dialogue would be found in the official publications, but it follows the Request – instruction/information structure (see section 1.5 below). The problem was that the runway was very pale in colour surrounded by freshly mown grass which had been allowed to turn into hay.

1.1 Air Traffic Controllers

Air Traffic Controllers are nice people. They only want to help you, so be nice to them, help *them*, and in particular don't be frightened of them. Many of them hold pilot's licences, and they probably wish they were up there with you rather than stuck on the ground anyway!

If they growl at you, it is as much as they will ever do. You probably deserved it for bad airmanship, but it was equally probable that they are tired. It is a VERY demanding job, which is why they only ever do 2 hours on duty at a time. VATSIM Controllers are even nicer because they are doing it for FUN. It isn't a job.

In particular, don't go to pieces if a controller tells you to put right a wrong. Accept it and keep flying. The golden rule of flying, above all else is

AVIATE : NAVIGATE : COMMUNICATE

1.2 We were All sailors Once

Although many older aircraft have their airspeed indicators calibrated in miles per hour, the internationally recognized units are knots for speed, and nautical miles for horizontal distance. Altitude is in feet in the UK and USA, and in metres in much of the rest of the world.

A nautical mile is one minute (1/60th of a degree) of longitude (or latitude if and only if measured at the equator). It is equivalent to 6072 feet or 1.15 statute miles (1.85 kilometres)

One knot is one nautical mile per hour.

(In our sailing heritage, when the "lead" was swung overboard, the speed was measured by the number of knots in the rope attached to it, which passed through the sailor's hands in a given time.)

1.3 Visual Flight Rules

Pilots flying under Visual Flight Rules (VFR) must fly at all times within sight of the surface, clear of cloud and with a horizontal visibility of 5 kilometres or more. If the aircraft speed is greater than 140 knots, then the clearance from cloud must be 1500 metres horizontally and 1000 feet vertically. Slower aircraft must simply remain clear of cloud.

1.4 Light and Heavy

Aircraft are classified into 2 groups – light and heavy. A light aircraft is defined as one which weighs less than 7600 kilogrammes maximum all-up weight (MAUW). MAUW includes aircraft, fuel, passengers and baggage. All the rest are heavy. The class of aircraft determines, in some situations, how it is handled by ATC. For example, a light aircraft landing behind a heavy, has to remain behind the heavy by, typically (it varies) 6 nautical miles) to avoid being affected by wake turbulence – the turbulence generated by the wings of large aircraft. It has been known for light aircraft to be turned over completely on late final approach by the swirling vortices produced by big wings. ATC will normally give a wake turbulence warning in this situation.

1.5 Types of Air Traffic Control

There are four basic types of Air Traffic Control.

- a) Air/Ground radio (A/G)
- b) Aerodrome Flight Information Service (AFIS)
- c) Air Traffic Control (ATC)
- d) Radar Vectoring

The difference between a, b, and c is one of level of instruction given to pilots, A/G is used at most small general aviation (GA) airfields and provides **information** only to pilots who must make their own decisions based on the information given. Under an AFIS service, used at slightly busier aerodromes, pilots are given information and **advice**. With certain exceptions, Air Traffic Control provides pilots with **instructions**. Radar vectoring is mostly applicable to Instrument Flying. For the moment, Cix Virtual Flying Club members need only concern themselves with Air Traffic Control.

1.6 Controlled Airspace

There are seven classes of airspace in international air law, but for the VFR pilot in the UK, they boil down to three effectively.

Class A VFR flight is not permitted in Class A airspace under any circumstances, with the sole exception of the Channel Islands CTA and CTR, where a VFR flight, known as a **Special** VFR flight (SVFR) may be permitted in certain conditions (see section 3.10 for details of Special VFR Flight). Heathrow Airport Control Zone is Class A airspace.

Class D This is airspace around the larger aerodromes and airports in which VFR traffic is not permitted without specific clearance from ATC. A VFR clearance may be granted within Class D airspace, if the VFR minima can be met.

The VFR minima for Class D airspace are an in flight visibility is 5km or more and 1000 feet vertically and 1500 metres horizontally clear of cloud. However, in respect of the latter, for aircraft below 3000 feet and at 140 knots or less, to be simply clear of cloud is sufficient.

If VFR conditions cannot be met, a Special VFR clearance may be granted. See section 3.10 for details of Special VFR Flight.

Because many airports such as Manchester, Birmingham and Liverpool have Class D airspace around them, and also have active General Aviation activity, including flight training, VFR and SVFR clearances in class D airspace are commonly provided. Aircraft without radios are not normally permitted.

Note: Pilots flying under VFR MUST NOT ENTER Class D airspace without permission and a specific clearance from the ATC unit, and must obey instructions from ATC.

Class F & G This effectively means, in the UK, “everywhere else”. It is also known as “the open Flight Information Region (FIR). Pilots may fly VFR in the open FIR (learn your acronyms!) under the terms described in 2 above.

1.7 Other Controlled Airspace

The large airports have a significant area of country embraced by controlled airspace which falls into four categories. These three-dimensional blocks of the atmosphere, several cubic miles in size and with, of course, entirely invisible boundaries become so engrained in the pilot's thinking that they might as well have brick walls, floors and ceilings!

1.7.1 Terminal Manoeuvring Areas

Terminal Manoeuvring Areas (TMAs) are large areas of controlled airspace, covering one or two counties or more, and with the exception of the Scottish TMA, are Class A airspace. They are used for arriving and departing commercial traffic flying entirely under Instrument Flight Rules (IFR). VFR traffic is prohibited from the Class A TMAs, but fortunately they extend from a base level of a few thousand feet so that General Aviation traffic does not have to go round them, but can go underneath them. There are three in the UK

- London TMA – Base level 2500 feet
- Manchester TMA – Base level 3500 feet
- Scottish TMA – Base level 25000 - 4000 feet (varies)

The Scottish TMA is Class E Airspace, which for the VFR pilot is effectively the same as Class D. In other words, VFR pilots may request a Special VFR clearance to fly through the Scottish TMA. This is just as well, because Scottish extends from west of Glasgow to east of Edinburgh, which would otherwise be quite a barrier to north-south travelling GA traffic.

1.7.2 Control Areas

Control Areas (CTAs) are smaller than TMAs and they cover the arrival and departure routes of the smaller airports such as Luton, East Midlands and Birmingham. Heathrow CTA alone is Class A and the rest are Class D. The base level of a CTA is some thousands of feet above the ground as they are protecting inbound and outbound traffic which is already airborne. VFR pilots may of course transit Class D CTAs with ATC permission.

1.7.3 Control Zones

Control Zones (CTRs) are smaller again than CTAs – perhaps 20 miles across north to south and east to west. They are used to protect landing and departing IFR traffic and, with the exception of Heathrow, which is Class A airspace, as mentioned above in section 1.6, are all Class D airspace, and obviously extend from the surface. The top of a CTR usually if not invariably coincides with the bottom of that airport's CTA, again for obvious reasons. VFR traffic wishing to land at one of these airports may request an SVFR clearance in order to do so.

Once again, the one exception to this rule is London CTR which is Class A airspace. As one of the busiest airports in the world, with an arriving aircraft every 2 minutes and similar departing, one's Cessna 152 is very definitely not welcome. Consequently, any aircraft flying under VFR is not permitted to land at Heathrow.

1.7.4 Aerodrome Traffic Zones

Aerodrome Traffic Zones (ATZs) are a special little area of controlled airspace which surround all **Licensed** Airfields other than those controlled by CTRs etc. Unlike the other types of Airfield protection airspace, which may be any shape, depending on traffic requirements, ATZs are circular with a radius of 2 nautical miles (nm), unless the runway is 1850 metres in length or more, in which case the ATZ is 2.5nm in radius.

(Note: One of the strange things about aviation is that every number which defines a limit of some sort is different. There is absolutely no pattern, which is what makes learning Aviation Law so hard for students.)

An aircraft may enter an ATZ only with the permission of the Air Traffic Controller, and of course, in the case of small aerodromes, this means the Air/Ground radio operator or the Aerodrome Flight information Service Officer (AFISO). It is the only command that these grades of Air Traffic Control Officer can give, as in all other respects they may only impart information, as outline in section 1.5 above.

Where an aerodrome has "Prior Permission Required" (PPR) included in its particulars as printed in the Air Pilot (the aviation law "Bible") it means that pilots must not land without express permission. This may be by telephone or over the radio whilst in flight, and a particular aerodrome's requirements in this respect are included in the information given in the Air Pilot. Permission is deemed to be granted when the controller acknowledges the pilot's initial request for "joining instructions" and passes back the information required for landing. Permission to land may be refused for any reason. A pilot does not require a SVFR clearance in an ATZ.

1.7.5 Military Aerodrome Traffic Zones

The final type of aerodrome protective airspace is the Military Aerodrome Traffic Zone, or MATZ (pronounced "mats"). Surprisingly perhaps, it is not mandatory to request permission from the ATCO at the military aerodrome to transit a MATZ, but it is ALWAYS good airmanship to do so. There is a standard radio procedure for this outlined in section 2 below.

1.7.6 Exceptions

There are always exceptions. The Channel Islands are surrounded by Class A airspace extending across much of the Channel from the coast of France to the line of latitude 50° North. However, Channel islands Control, based on Jersey will give a SVFR clearance to an aircraft flying under VFR provided it is radio and transponder equipped.

2 AIR TRAFFIC CONTROL PROCEDURES

2.1 General

At an aerodrome with ATC, there are normally Tower and Approach Controllers, and very occasionally Ground Controllers. Ground controls taxiing and vehicle movements, Tower controls final approach, landing and take off. Both these controllers are in the part of the Control Tower with windows, and use their eyes. Approach monitors approach and departure from the CTR, handing over to Tower once the aircraft has the runway in sight for landing, and for departure, once the aircraft has reached a commonly used and defined visual reference point (VRP).

In this manual, the Air Traffic Controller's instruction is printed in red, and the pilot's response in blue. Text within square brackets is optional.

The rules state that the full call sign of the aircraft is used unless or until the ATCO abbreviates it, which would be after the initial call. He may abbreviate Golf Bravo Oscar Zulu to Golf Oscar Zulu or just Oscar Zulu. In practice, after the initial call, pilots often abbreviate their call sign first. Where two aircraft have similar call signs, the Controller may request that each aircraft uses its full call sign in all transmissions.

The pilot reads most transmissions from ATC back in full. There are exceptions which are identified in the examples of correct R/T dialogue below. The aircraft is identified by the full phonetic spelling of its call sign where this is correct formal procedure, and by the abbreviated form when the formal procedure is not mandatory.

2.2 Who is in charge?

The pilot is totally responsible for the aircraft's safety at all times. For example, if ATC give a landing clearance, but there is an aircraft on the runway which doesn't seem, to the pilot, to be moving, then he must call "going around" and make a missed approach. ATC may have been confident that the aircraft ahead would clear in time, but if the pilot is unsure HE is in charge of his aircraft.

The usual flow of dialogue is a **request** from the pilot, and a **permission** from ATC, or an **instruction** from ATC and an **acknowledgment** of compliance by the pilot. The pilot NEVER tells ATC what to do, but may tell ATC what he is doing, in particular if he is unable to comply with an ATC instruction because of aircraft safety, or for air-legal reasons.

The pilot must NEVER take off without an express clearance to take off in the exact words "Cleared [for] take off". A frequently used phrase "Line up and wait" is not a take off clearance.

The pilot must NEVER land without the express clearance to land in the exact words "Cleared [to] land".

2.3 Chatter

Don't! ATC don't want to know your life history. "Good morning" and "Goodbye" and "Thank you" are acceptable, but the only non-standard patter you would use is to inform ATC of a potential problem. "Gloucester Approach, Golf Oscar Zulu, the Piper Cherokee ahead has not lowered his undercarriage".

2.4 Talking to other Aircraft

The rule is – you don't, except in an emergency.

Sometimes (not usually under ATC, but at smaller fields), you might want to inform another aircraft who is about to land, that you are not about to enter the runway beneath him. In that situation, you do not call the other pilot, you simply make **your** intentions known by saying

Golf Oscar Zulu holding short runway two seven for landing aircraft.

If you do talk to another pilot, you only ever state **your** intentions. You don't try and tell him what to do. That's his responsibility.

2.5 What to say and How to Say It

There are few rules. In many cases you just have to learn the correct way to say things.

2.5.1 The Introduction

Every ATC dialogue starts with: -

<The called station>, <The calling station>.

E.g.

Gloucester Approach, Golf Bravo November Oscar Zulu"

That is the ONLY correct introductory call.

Contrary to film folklore, you do not use the words "this is" in the middle as in "Gloucester Approach, this is Golf Bravo November Oscar Zulu"

NEVER use "Golf Bravo November Oscar Zulu calling Gloucester Approach" – another line beloved of film directors, the most famous of which I can recall is "Flying Doctor calling Walambula Base".

Once communication is established, the form becomes

For information or instructions: - <Called station> Message

e.g. "Golf Oscar Zulu, turn right two seven zero"

For acknowledgement: - Message <Calling station>

e.g. “Right two seven zero, Golf Oscar Zulu”

2.5.2 Numbers

Runway two seven, not twenty seven

Runway zero four, not four

Queue Enn Aitch one zero two fife (yes **fife**)

Heading one niner zero (yes **Niner**)

Runway zero nine (In this one situation, I have never heard anyone say “niner”)

One tousand fife hundred feet (Yes **tousand**, and NEVER “fifteen hundred”)

Tree tousand feet (You’re right – it’s tree! – and NEVER tree zero zero zero!)

“Surface wind two seven zero, fourteen knots”. The direction is expressed as separate digits and the speed as a normal number because compass bearings, for whatever purpose, are always spoken in this way.

Radio frequencies are spoken “one two six decimal three fife”, although you will hear (in the real world and on Vatsim) “one two six three fife”. A frequency of 123.00 should be spoken “one two three decimal zero zero”, but most commonly you will hear “one two three decimal zero”.

2.5.3 Acronyms and Abbreviations

PPL – Private Pilots Licence. All club members will have one of these. The term PPL is also in general use to describe a Private Pilot – e.g. “He’s a PPL with 300 hours on Tomahawks”.

IMC – Instrument Meteorological Conditions. These are weather conditions which are below the minima for VFR flight. The term also applies to a PPL who has obtained an “IMC Rating”. This is a 15 flying hours additional training course in instrument flight designed to allow experienced PPLs to fly in conditions below VFR minima. The CAA policy on the IMC rating is that it is assist a pilot to deal with inadvertent IMC, rather than being a licence to fly regularly in IMC.

Note: Vatsim PPL members are assumed to have an IMC rating.

VFR – Visual Flight Rules

IFR – Instrument Flight Rules

QNH – the altimeter barometric pressure setting for take off and en route flight – pronounced Queue Enn Aitch

QFE – the altimeter barometric pressure setting for landing – pronounced Queue Eff EE

MATZ – “Mats” not Mike Alpha Tango Sierra

G-WHIZ – Golf Whisky Hotel India Zulu not Gee Whiz!! (There is an aircraft with that registration!)

ATZ – ay tee zed

CTA – “Zone” e.g. “Request entry into the Liverpool zone at Chester”

TMA – you shouldn’t be there!! Descend immediately.

POB (Persons on Board) – Pee Oh Bee

VFR – Vee Eff Are, not Victor Foxtrot Alpha

IFR (you shouldn’t be) Eye Eff Are

IMC (Instrument Meteorological Conditions) Usually India Mike Charlie, just to confuse, but Eye Emm Cee is equally acceptable. (You shouldn’t be there either!)

If using radio navigation aids (navaids) – quite acceptable for VFR navigation, then:-

NDB – Enn Dee Bee

VOR – Vee Oh Are

But the identification letters of the navaid are spoken phonetically.

Lichfield NDB (LIC) would be Lima India Charlie. E.g.

East Midlands Approach, Golf OscarZulu. Estimate the Lima India Charlie in six minutes

Roger – beloved of all those Top Gun films. It means, “I have heard what you say and understand.” Use it sparingly.

Wilco – another chestnut, but from the Biggles era. It is probably used more commonly than “Roger”, and is a little more specific in its meaning. “I have heard your instruction and will comply.”

Affirm – means “Yes”

Affirmative – Not used in UK ATC terminology

Negative – means “No”

Negatory – Ugh! (CB Radio-speak – ten-one buddy!).

Over – at the end of a transmission. This is NEVER used in Aviation R/T.

Out – This may be used very occasionally if you are ending a transmission, but the Controller could be expecting more.

Gloucester Tower, Golf Bravo November Oscar Zulu, request radio check

Golf Bravo November Oscar Zulu, Gloucester, reading you strength 5

Roger. Golf Oscar Zulu out

ATC was probably expecting you to request taxi, but all you wanted to do was test your radio.

Note that ATC has abbreviated its callsign to just “Gloucester” in this example. It is **inadvisable** for you to do the same because you have a choice of two Gloucesters, Tower and Approach, so omitting that word could lead to confusion.

3 VFR FLIGHT UNDER AIR TRAFFIC CONTROL

Air Traffic Control (ATC) consists of a dialogue between pilot and controller in which the controller gives **instructions** to the pilot and the pilot carries out these instructions. For Visual Flight Rules (VFR) flight, full ATC is only given in certain controlled airspace. Outside controlled airspace, VFR flight receives only a basic Flight Information Service (FIS), but more of this later.

Note: The pilot remains responsible for complying with the Rules of the Air and for the safety of the aircraft at all times.

This means that in some circumstances, if he is unable to legally or safely carry out an ATC instruction (e.g. if asked to climb, but this would take him/her into cloud) he must inform ATC that he is unable to comply.

3.1 The Terrified Student

In his or her early student days, a pilot is invariably terrified of talking to ATC, because so much information is passed in one transmission, which has to be noted down, remembered and then (the desperate bit) read back as precisely as a tape recording without getting the numbers the wrong way round, and without hesitation or deviation. However, it really does become second nature after quite a short time. After 40 hours flight training the student is often better than the seasoned pilot who has become slipshod with time.

3.2 Movement on the Ground

At an ATC controlled aerodrome, no aircraft (or vehicle) must move anywhere without express permission from ATC. In some cases, ATC even require the light aircraft pilot to obtain permission to start his engine(s), a procedure which is mandatory for commercial aircraft.

3.3 Departure Clearances

At airports with a Class D Control Zone, all aircraft will be given a departure clearance whilst still on the ground. At large airports, this will be given before taxiing, but at the smaller regional airports and those local aerodromes with full ATC facilities, the clearance will be given during taxiing.

A clearance will contain the following information: -

- e) After take off turn left or right
- f) Leave the zone at a standard exit point
- g) Any altitude restriction
- h) The flight rules pertaining to the departure

A typical example would be: -

Golf Bravo November Oscar Zulu, you are cleared with a left turn out to leave the zone at Chester, not above one thousand five hundred feet Liverpool QNH, standard VFR.

And you have to read it back precisely as given (or as near as possible – note the slight difference in the reply below which is the result of familiarity rather than lack of it. It contains all the vital elements in the correct order, so is acceptable.

Cleared left turn out to Chester, not above one thousand five hundred feet, standard VFR, Golf Oscar Zulu.

3.4 Take-Off

After start up and before taxiing, the pilot should obtain the ATIS broadcast where provided, and note the designation letter. (See section 3.7 below). For FS and VATSIM, this procedure is slightly different. The ATIS is automatically displayed on the Squawkbox window once the ATC frequency has been selected. There is no separate ATIS frequency as there is in the real world.

Gloucester Tower: Golf Bravo November Oscar Zulu: Request radio check & taxi [instructions] with information Bravo

Golf Bravo November Oscar Zulu: Reading you strength 5: Taxi to holding point Charlie. QNH 1012.

Taxi Holding point, Charlie, QNH 1012: Golf Oscar Zulu.

Engine run up and vital actions may be completed at the holding point, or at busy airports where the taxi distance is short just before starting to move off the apron. When these checks are complete: -

Golf Oscar Zulu: Ready for Departure

Golf Oscar Zulu Cleared take off runway 22

Cleared take off runway 22 Oscar Zulu

3.5 Leaving The Circuit

Tower will “hand over” the aircraft to Approach

Golf Oscar Zulu Contact Gloucester Approach on 125.65

Gloucester Approach 125.65, Golf Oscar Zulu

If Tower is late calling, but is obviously not busy, then if the pilot thinks he has been forgotten, (it does happen), he may make a gentle prompt:

Gloucester Tower Golf Oscar Zulu, 2 miles north, crossing the Severn

Golf Oscar Zulu Contact Gloucester Approach on 125.65

Gloucester Approach 125.65, Golf Oscar Zulu

The pilot changes frequency, and then calls Approach:

Gloucester Approach Golf Bravo November Oscar Zulu

Golf Oscar Zulu QNH 1012. Report leaving the frequency

Wilco – Golf Oscar Zulu

Then, when clear of the ATZ or CTR: -

Gloucester Approach Golf Bravo November Oscar Zulu, 3 miles north of the field request change frequency to London Information, 124.75.

Roger: Golf Oscar Zulu, Frequency change approved, [Goodbye].

Or, sometimes,

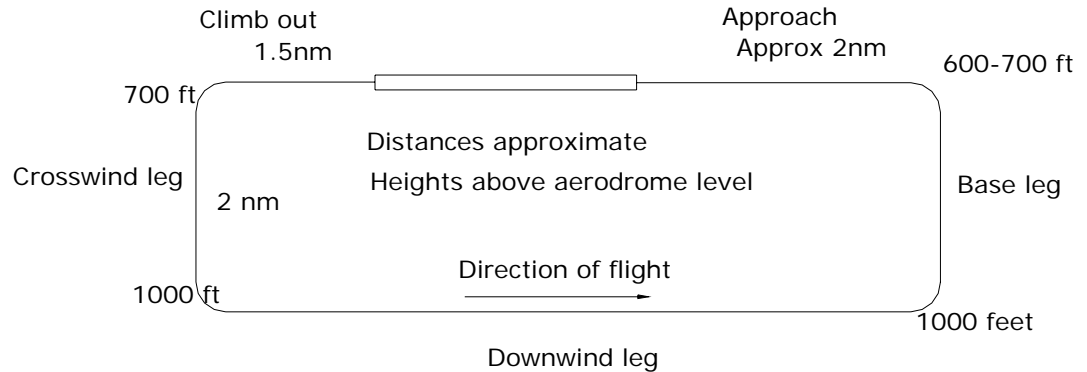
Gloucester Approach Golf Bravo November Oscar Zulu leaving the zone to the north en route Welshpool : Heading 320 passing 1500 feet for 2500 feet QNH 1008. Request Frequency Change to London Information, 124.75.

Roger: Golf Oscar Zulu, [Goodbye]

3.6 The Circuit

Believe it or not, trying to land an aircraft visually from a long straight in approach is quite difficult, due to lack of visual references. Also, how did you know it is the right field you are aiming for (in the days before tarmac runways)? So the overhead join and circuit was devised. The circuit itself is a long rectangular flight path with the runway forming the centre part of one leg.

Circuits may be left hand (anti-clockwise) or right hand (clockwise). Left hand circuits are preferred by the pilot, as he sits in the left hand seat (well it was the American Wright Brothers that got us into this!). This gives him a better view of the airfield.



The VFR Circuit

The diagram above shows a typical circuit which would be flown by a Cessna 172 or a light aircraft of similar performance. Larger and faster aircraft will require slightly bigger circuits. The “circuit height” is usually 1000 feet, though occasionally less – typically 800 feet, and rarely, more (Welshpool is the only one I know, and its circuit height is 1500 feet because of adjacent high ground.) Circuits for helicopters are often lower (commonly 600 feet) and opposite in direction to that for fixed wing aircraft.

The perfectly flown circuit should take 6 minutes from lift off to touch down. Some flying clubs have circuit flying competitions where the nearest circuit flown to 6 minutes duration is the winner.

3.7 ATIS Broadcasts

At least 10 minutes (i.e. about 20nm) before the Estimated Time of Arrival (ETA) over the aerodrome, obtain the ATIS broadcast and note the designation letter.

Note: On VATSIM, when you tune a new frequency, an ATIS is automatically displayed in text on the Squawkbox screen. It provides the following information as a minimum: -

Voice <Voice IP address>/EGCC_V_TWR

Manchester ATIS Information <Phonetic letter, e.g. Alpha>

Arriving 24R Departing 24L, 24R

Info at www.vatsim-uk.org

Some controllers add some of the information which is used in a real world ATIS.

A real world ATIS (Automated Terminal Information Service) gives the some or all of the following information: -

Airport, date and time, runway in use, runway surface condition, Surface wind direction and speed, Cloud information, Visibility, QNH, QFE,

Temperature, Dewpoint, and ends with “On first contact, report information <phonetic letter> received.”

(Aside: If you ever wondered why a pop group should call itself “Wet Wet Wet”, then it is one of the runway surface condition statements in an ATIS. I still wonder why a pop group should call itself that!)

3.8 Joining Procedure

So we have listened to the ATIS and noted down the runway in use, the QNH, the surface wind and the designated letter. The rest is important to note, but you don’t need to refer to it again, so there’s no need to write it down.

3.8.1 An Aerodrome with an ATZ only

At no less than 5 minutes (i.e. about 10nm) before the Estimated Time of Arrival (ETA) over the aerodrome, call the Approach controller.

Gloucester Approach Golf Bravo November Oscar Zulu

Golf Bravo November Oscar Zulu Gloucester Approach pass your message.

Gloucester Approach, Golf Bravo November Oscar Zulu Cessna 152 inbound from Welshpool: Overhead M50: Heading 140: 2500 feet QNH 1005: ETA Gloucester one fife: Information Golf.

When giving an altitude, give the QNH you are using as well, in the form “one zero zero fife”. The ETA (Gloucester 15) means I will be arriving overhead your airfield in 15 minutes time. If you want to give a time of arrival, then say “at time three five” meaning at 35 minutes past the current hour, the hour normally not being spoken. (Note M50 is said as “Emm Fifty”).

Golf Oscar Zulu report 2 miles to the north west of aerodrome.

Report 2 miles north west Golf Oscar Zulu

Then, when almost at the 2 mile point

Gloucester Approach Golf Oscar Zulu, 2 miles to run.

Golf Oscar Zulu contact tower on 118.25

Tower 118.25 Golf Oscar Zulu

Note: It is rare for you to actually get as far as the aerodrome overhead before being asked to position for the circuit, whereas at small airfields without full ATC, the “Overhead Join” is the standard joining procedure. Because Vatsim only operates full ATC procedures at present, the standard overhead join is omitted from this manual for the time being.

Once you are handed over to Tower, you change frequency quickly and simply call: -

Gloucester Tower Golf Bravo November Oscar Zulu*

Golf Bravo November Oscar Zulu, join right base for runway two two, you are No. 1.

Join right Base runway two two, No. 1, Golf Oscar Zulu

*There is no need to say any more. He knows where you are, because you have been handed over by Approach, and he can see you through the window of the Tower. **Note:** that because it is a first contact on this frequency, the pilot uses his full call sign.

3.8.2 An Aerodrome with a Control Zone (CTR)

At no less than 5 minutes (i.e. about 10nm) before the Estimated Time of Arrival (ETA) at the zone boundary, call the Approach controller.

Liverpool Approach Golf Bravo November Oscar Zulu

Golf Bravo November Oscar Zulu Liverpool [Approach], pass your message.

Liverpool Approach, Golf Bravo November Oscar Zulu Cessna 152 inbound to Liverpool from Welshpool: Overhead Wrexham: Heading 140: 2500 feet QNH 1005: ETA zone boundary one five: Information Golf, request entry into the zone at Chester.

Golf Oscar Zulu I am unable to clear you to enter the zone at Chester at this time. Do you wish to enter the zone at Oulton Park?

Affirm. Golf Oscar Zulu

All aircraft will be given an entry clearance after their initial call.

An entry clearance will contain the following information, similar to the departure clearance: -

- a) Enter the zone at a standard entry point
- b) Any altitude restriction
- c) The flight rules pertaining to the departure

You are now given your entry clearance.

Golf Oscar Zulu cleared to enter the zone at Oulton Park, Special VFR, not above one thousand five hundred feet. Report at Helsby.

And once again you have to read it back as precisely as possible as given.

Cleared [to] enter the zone at Oulton Park Special VFR not above one thousand five hundred feet. Report at Oulton Park. Golf Oscar Zulu.

Note: A pilot may request a non-standard entry point, which may be granted if traffic is light. In the example above, the request to join at Chester (Not a standard entry point, but a standard *exit* point))it was refused! The pilot was redirected to a standard entry point without any fuss or drama. *Oulton Park is a well known (and highly visible) Motor Racing Circuit, hence its use as a standard entry point.* Note also that the pilot was *offered* the alternative, not given it mandatorily, because he might wish to select a different standard entry point, and it is the pilot who has command of the aircraft.

If the pilot does not wish to enter at Oulton Park (there may be a huge thunderstorm sitting just overhead), he can request a different one.

Golf Oscar Zulu I am unable to clear you to enter the zone at Chester at this time. Do you wish to enter the zone at Oulton Park?

Negative. Request entry into the zone at Seaforth, Golf Oscar Zulu.

Note: You use the word “Affirm” for Yes” and Negative” for “No”. You do NOT use “Affirmative” – that is American.

In recent years, “Standard VFR” has replaced “Special VFR” for daytime flights into a CTR. The difference is that under a Standard VFR clearance, you can legally enter the zone when the in flight visibility is less than 10 kilometres.

Golden Rule: You **MUST** not enter the zone under any circumstances without express clearance. If you cannot get your message in, because of busy R/T, you must remain outside the zone and wait until you can get your message in. It is best to turn 180° and fly back the way you came for 5 minutes, then turn and try again.

Liverpool Approach Golf Oscar Zulu passing Oulton Park.

Golf Oscar Zulu, your clearance is to Helsby. Report at Helsby

Liverpool Approach Golf Oscar Zulu approaching Helsby.

(Give yourself time by calling a little early, rather than arriving and being told to orbit while waiting for other traffic to clear).

Report Helsby Golf Oscar Zulu

The circuit may be busy, and the controller wants to remain south of the M56 in this situation. In this case, Helsby has been given as the clearance

limit. The pilot must not proceed into the circuit area without further permission. Before you reach your clearance limit, the ATCO may call you and, if you have the airfield in sight (the vital element here) he will hand you over to Tower. If you do not have the field in sight, as can happen in poor but legal visibility (5 kilometres is not very good visibility at all!), he may give you a heading to steer to bring you onto a section of the circuit.

Golf Oscar Zulu Do you have the field in sight?

Affirm, Golf Oscar Zulu

Golf Oscar Zulu, Contact tower on one two six decimal three five

Tower one two six three five Golf Oscar Zulu

Note the word “decimal”. This is the correct official way to read out frequencies, but on **read back**, it is acceptable to omit it, although personally I rarely do.

Once you are handed over to Tower, you change frequency quickly and simply call: -

Liverpool Tower Golf Bravo November Oscar Zulu*

Golf Bravo November Oscar Zulu, join left base for runway 27, you are No. 2 to a Cherokee on a three mile final.

Join left Base runway 27 No. 2, Golf Oscar Zulu

*As in the previous example, this is sufficient to let Tower know that you are now on his frequency.

3.9 The Approach and Landing

You then report as you position onto left base. Note the brevity. An approach to land is no time for expounding your aircraft’s life history.

Golf Oscar Zulu, left base

Assuming the Cherokee has landed and cleared the runway, then you will get “No. 1” – it’s your turn.

Golf Oscar Zulu Cleared [to] land runway 27, Surface wind two seven zero fourteen knots. No. 1

Cleared [to] land runway 27. No. 1. Golf Oscar Zulu**

or

Golf Oscar Zulu Cleared [to] land runway 27, Surface wind two seven zero fourteen knots. You are No. 2 to a Bandeirante. Report when you have it in sight.

Cleared [to] land runway 27. No. 2. Traffic ahead in sight. Golf Oscar Zulu**

**You do not read back the surface wind, but you do read back the runway number and your position in the queue.

On VATSIM, the Tower controller of course doesn't have a window into your house. Unlike the real world, Vatsim Tower controllers use Radar. For this reason, the ground procedures on landing are slightly different to real life. When given taxi instructions to "exit at Foxtrot", you report back "cleared Foxtrot", as the Vatsim controller can't see you.

3.10 Special VFR

A Special VFR clearance may be given to a pilot who is unable to comply with IFR flight (because he is not qualified to do so, or the aircraft is not equipped with the necessary instruments) in a Control Zone.

SVFR clearances are given to VFR pilots

- For all VFR flights at night
- When the in-flight visibility is less than VFR minima for that class of airspace.

When operating on a Special VFR clearance the pilot must

- Obtain an ATC clearance and comply with ATC instructions
- Fly within the limitations of the pilot's licence>(* see below)
- Remain clear of cloud, in sight of the surface and clear of obstructions
- Comply with the low-flying regulations except the height restrictions of Rule 5 of the Rules of the Air**.
 - a) fly at sufficient height to be able to land clear of the area and without danger to people or property if an engine fails
 - b) NOT fly closer than 500 ft to any person, vessel, vehicle or structure, unless landing or taking off
- Avoid aerodrome traffic zones unless prior permission has been obtained from ATC

Although almost all Control Zones are Class D airspace, the Channel Islands Control Zone is Class A airspace, and SVFR flight is permitted in this zone, provided a formal flight plan is filed and the aircraft is equipped with a transponder.

* For a PLL the privileges of the licence require that under an SVFR, the in flight visibility must be 10km or more, and this overrides the airspace condition. For a PPL with IMC or IR, the in flight visibility must be 3km or more.

** Rule 5 of the Rules of the Air states that an aircraft may not fly within 1500 feet vertically of any congested area, and fly at sufficient height to be able to land clear of the area and without danger to people or property if an

engine fails. The 1500 feet rule is waived for SVFR flight, but NOT the “land clear” provision.

4 ATC EN ROUTE

There are three types of en route radio service applicable to VFR pilots, and two others which I will mention briefly.

4.1 Flight Information Service

This a base level service which provides the pilot with limited information, (usually just the QNH) and the ATC unit with a position and intentions report.

4.2 Radar Information Service

This is a level higher than a FIS, but is only available from certain ATC units – those which have radar (they don't all have). Here the ATC unit will monitor your position on radar and provide information on possible conflicting traffic within 5 miles radius of you and 1000 feet vertically (if the ATCO has height information, and they often don't have).

4.3 Radar Advisory Service

A recent rule change means that a RAS will not be given to VFR flights, so suffice it to say that under a RAS, the pilot flying IFR will be told where to fly in order to avoid conflicting traffic. Don't ask for a RAS under VFR, as refusal often offends!

4.4 Who do I Talk to En Route?

In general, any airfield which may be affected by your flight. However, there are three main services you should use.

4.4.1 London Information

London (or Scottish) Information is a base level service to allow pilots to know who is around them, without tying up the time of a busy airport controller. The Information services do not have Radar and simply act as a clearinghouse for messages. They will provide the Regional QNH and information on any other known traffic with about 10 miles radius. The Information Services cannot provide a radar service.

4.4.2 Lower Airspace Radar Service

LARS is a service operated mainly by military aerodromes plus some of the regional airports, e.g. Luton. A LARS unit has radar (of course) and can provide all three of the available in flight services. Although you may request a FIS, they will often provide you with a RIS unasked.

On Vatsim, Thames Radar, although not technically a LARS does provide the same service to aircraft under VFR, and is frequently manned by our member Ruth McTighe. On Vatsim also, a LARS will be provided by Approach or Radar Controllers, not the aerodrome controllers. Look for frequencies followed by Thames_APP or EGNR_APP in the Squawkbox ATC Directory.

4.4.3 Regional Airports

If you are passing near the controlled airspace of regional airports, it is a good idea to get your FIS from them, rather than London Information. They can pick you up on radar and may give you an advisory service if they are quiet.

4.4.4 Local Aerodromes

If you plan to overfly an aerodrome which has an ATZ, not a CTR, then provided you are above 2000 feet on their QNH, you don't need to call them. However, if you are close to 2000 feet, then it is a good idea (good airmanship) to call them and tell them your intentions.

4.5 VATSIM Procedures

In VATSIM, most airports and aerodromes do not have ATC. On any evening, there may be perhaps half a dozen manned stations, mostly the major airports. Using the programme SERVINFO (a free download from one of the many Vatsim download sites), you can find out who these are. With the exception of Heathrow, the Club will try and plan trips which maximise our exposure to manned stations.

If there is no ATC at a specific airport, it is worth trying the local Approach controller. For example, Thames Radar will give a Tower service for London City and Biggin Hill. We have the advantage of cyber-mobility like that!

4.6 The Airborne Flight Plan

When first contacting an en route service, you make a call which is effectively an airborne flight plan. The dialogue has certain required statements, given in a particular order – Flying Instructors use a mnemonic – CEPHACER.

Callsign & Type

En Route From/To

Position

Heading

Altitude

Conditions (VFR)

ETA at next turning point

Request

It goes like this: -

London Information Golf Bravo November Oscar Zulu:

Golf Bravo November Oscar Zulu Pass your message:

London Information Golf Bravo November Oscar Zulu : Cessna 152
: En route Gloucester to Welshpool : 10 miles north west of
Gloucester : heading 320 : 2500 feet QNH 1008 : VFR : Two POB
: Request flight information Service.

There may be slight variations from this, but mostly by including or omitting the less vital items. Sometimes heading, POB or ETA or any two or all three may be omitted, but the others are essential.

Golf Bravo November Oscar Zulu Flight Information Service.
Regional QNH 1007

The pilot acknowledges:

London [Information] Golf Bravo November Oscar Zulu Flight
Information Service. Regional QNH 1007

The first time you try this you invariably end up tongue tied and garbled, so it is particularly disappointing to get the terse reply giving just the regional QNH! I used to practice all the time – when driving, in the bath etc.

5 MAYDAY MAYDAY

It happened to me during an on-line flight with a live ATC service (Not Vatsim). I was flying a twin, when due to a quirk in the software, the right hand throttle refused to move, so I effectively lost one engine. I declared an emergency, cut short the circuit and landed safely, although I couldn't turn right once on the ground!

In an emergency, it is even more important to

AVIATE : NAVIGATE : COMMUNICATE

If time permits, change to the emergency frequency 121.50. The standard Mayday call is as follows: -

Mayday, Mayday, Mayday

London Centre Golf Bravo November Oscar Zulu: Cessna 152:
Engine failure: Intend immediate forced landing 5 miles south

east of Welshpool. : Passing 1500 feet heading 350: Student pilot: One POB.

Or if not time to change frequency, transmit on present working frequency: If you can't get it all in, your callsign, your position and intentions are all that is required. Don't make your will over the R/T, it's not British! Anyway, most single engine prangs are survived.

In Vatsim, there is no emergency frequency, so you would make your Mayday call on the frequency you are working at the time.

It is actually good fun doing engine – out landings on Flight Simulator, and very good training. Switch your engine off mid-downwind in the circuit and try and land on the runway.

6 ABBREVIATIONS USED IN AVIATION

Rather than try and select the important ones, I have completed almost the complete list, because they appear on charts and aerodrome plans, in Flight Guides etc., and most of them are commonly used.

AAL	Above Aerodrome Level
ABn	Aerodrome Beacon
ACC	Area Control Centre
A/C	Aircraft
A/D	Aerodrome
AFIS	Aerodrome Flight Information Service
AGL	Above Ground Level
A/G	Air/Ground communication station
AIAA	Area of Intense Aerial Activity
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
Ap	Approach (Lighting)
APAPI	Abbreviated Precision Approach Path Indicators
APP	Approach Control
ATC	Air Traffic Control
ATIS	Automatic Terminal Information Service
ATSU	Air Traffic Service Unit
AVGAS	Aviation Gasoline
AVTUR	Aviation Turbine Fuel
Awy	Airway
BAA	British Airports Authority
CAA	Civil Aviation Authority

CAS	Controlled Airspace
c/s	Call-sign
CTA	Control Area
Ctl	Control
CTR	Control Zone
DME	Distance Measuring Equipment
E	East
EET	Estimated Elapsed Time
Elev.	Elevation
ETA	Estimated Time of Arrival
ETD	Estimated Time of Departure
FAT	Final Approach Track
FBU	Flight Briefing Unit
FIC	Flight Information Centre
FIR	Flight Information Region
FIS	Flight Information Service
FL	Flight Level
Freq.	Frequency
ft.	Feet
GA	General Aviation
GCA	Ground Controlled Approach System
GMC	Ground Movement Control
GMP	Ground Movement Planning
GMT	Greenwich Mean Time (UTC)
Gn	Green
H+	minutes past the hour
H24	Continuous operation
HF	: High frequency
HJ	Sunrise to Sunset
Hmr.	Homer
HN	Sunset to Sunrise
HO	Hours of operational requirement
Hold	Holding Point
HP	Holding Point
hr/s	Hour/s
IAP	Instrument Approach Procedure
IAS	Indicated Air Speed
IBn	Identification Beacon
ICAO	International Civil Aviation Organisation

IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
Info.	Information
kHz	Kilohertz
kt	knots
lbs	Pounds (weight)
Lctr.	Locator Beacon (NDB)
LDA	Landing Distance Available
LFA	Local Flying Area
LITAS	Low Intensity Two Colour Approach Slope System
LLZ	Localizer
m	metres
M or Mag	Magnetic
MATZ	Military Aerodrome Traffic Zone
MDH	Minimum Descent Height
MEDA	Military Emergency Diversion Aerodrome
Met	Meteorological Office
METAR	Aviation Routine Weather Report (in aeronautical meteorological code)
MHz	Megahertz
Mil.	Military
MKR.	Marker Beacon
MM	Middle Marker
MTWA	Maximum Total Weight Authorised
MAUW	Maximum All Up Weight
(N)	Night
N	North
NATS	National Air Traffic Services
NDB	Non-directional Radio Beacon
NAVAIDS	Radio Navigation Aids
NM, nm	Nautical Miles
NOTAM	Notice to Airmen. A notice containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations
OCH	Obstacle Clearance Height
Op hrs	Operation Hours
OPMET	Operational Meteorological (Information)
OM	Outer Marker

O/R	On Request
O/T	Other Times
P	Primary Frequency
PAPI	Precision Approach Path Indicators
POB	Persons on Board
PPL	Private Pilot's License
PAR	Precision Approach Radar
PN	Prior Notice
PNR	Prior Notice Required
PPR	Prior Permission Required
QFE	Altimeter sub-scale setting to obtain elevation above aerodrome level
QFU	Runway orientation (in degrees Magnetic)
QNH	Altimeter sub-scale setting to obtain elevation above sea level
R	Red or Radial
RAD	Radar
RCL	Runway Centre Line
REIL	Runway End Identifier Lights
R/T or RTF	Radio Telephone
RVR	Runway Visual Range
Rwy	Runway
S	South
S	Secondary Frequency
SAL	Supplementary Approach Lighting
Sctr.	Sector
SAR	Search and Rescue
SFC	Surface
SR	Sunrise
SRA	Surveillance Radar Approach
SS	Sunset
SSR	Secondary Surveillance Radar
SVFR	Special Visual Flight Rules
TACAN	Tactical Air Navigation Aid (UHF)
TAF	Aerodrome Weather Forecast
Tel	Telephone
Thr/Thld.	Threshold
TMA	Terminal Maneuvering Area
TORA	Take-off Run Available
TVOR	Terminal VOR
TWR	Tower

UFN	Until Further Notice
UTC	Co-ordinated Universal Time
VAD	Visual Approach and Departure
VASIS	Visual Approach Slope Indicator System
VDF	VHF Direction Finding
VFR	Visual Flight Rules
VHF	Very High Frequency
VMC	Visual Meteorological Conditions
VOLMET	Meteorological Information for aircraft in flight
VOR	VHF Omnidirectional Radio Range
VORTAC	Very High Frequency Omni Range and Tactical Air Navigation
VRP	Visual Reference Point
W-	West
Wh	White