

The CIX VFR Club	Flight Training Notes	Exercise 20
For Simulation Purposes only. Not to be used for real World flight	DEPARTING THE CIRCUIT	Issue 1.2 18/04/11

1 INTRODUCTION

This tutorial is specifically designed for Microsoft Flight Simulator pilots flying VFR flight in the UK. It is part of a series of tutorials being produced by the [Cix VFR Club](#).

If you are confused by any issue, Cix VFR Club members may post a message in the Cix Conference or Web Forum, or email the Club CFI (see web site), and we will try to clarify any points you are having difficulty with. Because you don't have the benefit of an instructor to bounce questions off, you are actively encouraged to discuss the material in this way.

Basic Navigation Theory for Flight Simulator pilots is covered in Exercise 16, and Practical VFR Navigation is dealt with in Exercise 17. This tutorial moves on one stage and describes how put this information into practice by setting off on a cross country navigation exercise.

2 PREPARATION

We have said several times that preparation is vital in all phases of flight. You may hear the phrase occasionally in the world flight simulator, "getting behind the aircraft". This means simply being insufficiently prepared for the next event in the flight. It is definitely not a good idea to start to taxi without knowing which runway you're going to take off from or what frequency you should be transmitting on.

2.1 Checklist

In Exercise 17, the subject of good preparation before flight was covered. We will assume that you have: -

- 1) A clear flight plan, with headings, winds, distances and estimated times to each waypoint
- 2) An aviation chart (preferably) or a road map with your intended route marked on it
- 3) Sufficient fuel for the flight
- 4) Paper and pencil
- 5) A watch
- 6) A note of all the radio frequencies you need if you are going to fly the flight on line with VATSIM. The radio calls you will make may be found in the Club's "ATC for Pilots" document available on the web site.
- 7) Checked Servinfo and obtained the weather at both your departure and arrival airfields, plus whether there is anyone manning either airfield's ATC, and

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The following is a list of checks about your **destination** that you should make before your departure.

- 1) Runway in use
- 2) Weather
- 3) ATIS frequency
- 4) Approach frequency
- 5) Tower frequency
- 6) Circuit height
- 7) The circuit direction
- 8) Reporting points
- 9) What type of join are you going to make
- 10) Are there any areas to avoid
- 11) Estimated time of arrival

2.2 Essential Information before Departure

In the real world, you would telephone your destination airfield for a briefing on the circuit information and weather, as a minimum, and possibly a briefing on special procedures such as noise abatement (avoiding certain population centres, wildlife sanctuaries etc.). On Vatsim, you can get this information by tuning into the frequency of your destination airfield if it has a controller on duty. By tuning in the destination frequency, the online clients Squawkbox and FSInn will display the current weather at that airfield as a banner of red text on a green background scrolling across the upper part of your computer screen.

For on-line flying, assuming that your destination is manned on Vatsim, you can get most of this information from Servinfo or VATSpy.

<http://www.avsim.com/hangar/utils/servinfo/> or

<http://www.metacraft.com/VATSpy/>

These two applications provide a huge amount of information about who is flying, and where; who is controlling and where, plus weather and airfield information and much more. You only need to install one of them. Which one is entirely down to user preference. Vatspy is the newer of the two and has a slightly more modern user interface, but otherwise they do precisely the same job. Whichever choice is made, it is a fairly vital addon programme for serious on-line flyers.

2.3 Servinfo Overview

Select the ATC overview screen, and click on the Union Flag symbol to select the UK. You will find the name of the controller and the position he is manning shown in the upper window. If you then click on the controller's

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name a pop-up window appears containing various pieces of information, including the airfield details, in a similar way to the Automated Terminal Information Service (ATIS) which is available in the real world by tuning the radio to a special frequency.

Some controllers will provide a voice ATIS on the same frequency that is used for ATIS in the real world. As a minimum the VATSIM ATIS will provide the surface winds and the runway in use. From this information you can either decide on the approach you will make if the field is a smaller one without ATC, or you can mentally prepare for the possible approaches that may be given you by ATC.

That is a brief overview only of how to find controllers on line in the UK. In between flights, it is advisable to spend some time browsing the options to find the many other information which Servinfo can provide.

2.4 Using Vatspy

Select the ATC overview screen, and click on the Union Flag symbol to select the UK. You will find the name of the controller and the position he is manning shown in the upper window. If you then click on the controller's name a pop-up window appears containing various pieces of information, including the airfield details, in a similar way to the Automated Terminal Information Service (ATIS) which is available in the real world by tuning the radio to a special frequency.

Some controllers will provide a voice ATIS on the same frequency that is used for ATIS in the real world. As a minimum the Vatsim ATIS will provide the surface winds and the runway in use. From this information we can either decide on the approach you will make the field is a smaller one, without ATC, or you can mentally prepare for the possible approaches that will be given you by ATC.

3 WHERE TO START FROM

When you drew your flight plan, you almost certainly drew it from directly on your departure airfield to directly on your destination airfield. That was fine, but after take off, if you stay on the runway extended centreline, by the time you are at 1000 feet you will be 3 miles or so away from the airfield. So if you now turn onto your planned heading and fly it accurately, you will of course miss your destination airfield by 3 miles or so. So you would need to change your planned heading slightly before you have even really got going.

That doesn't seem too good an idea, so we deal with it in one of two ways.

3.1 Departing from the Overhead

When learning how to climb away from the runway and turn into the circuit (Exercise 12, section 6 you learned that if you maintain the runway heading

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until you reach 700ft, then perform a climbing 90° rate one turn (maximum angle of bank 17°) to the crosswind leg, you will reach the normal circuit height of 1000 feet at roughly the point where you want turn downwind.

In this situation, you intend to leave the circuit, so continue the climb, and continue the turn at rate one, until you see the airfield straight ahead once more. Roll-out of the turn but continue the climb until you have reached 2000 feet on the airfield's QNH, turning as necessary to ensure that you stay overhead the airfield. Note that it is important that all your turns are in the same direction as the circuit direction.

Whilst doing this manoeuvre, make sure that you keep a good lookout and the listening watch on the radio for any other traffic which might be joining the airfield at a similar height and in roughly the same position that you are. It is also important whilst looking out for the field which is going to be somewhere on your nose, that you don't become distracted and allow the airspeed to decay. Also, in a prolonged climb, lower the nose occasionally to make sure there is no other aircraft ahead of you which you cannot see in the nose-high climb attitude.

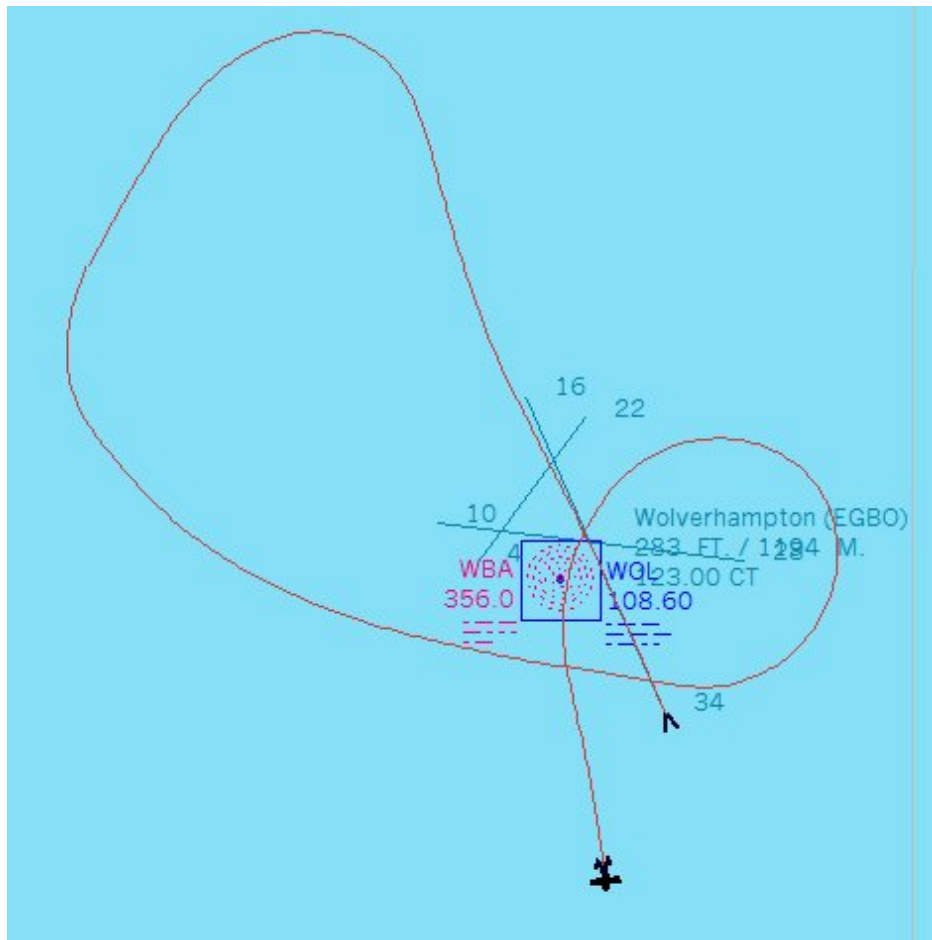
Now by coincidence, it often happens that you arrive back overhead the airfield at almost the same time that you reach 2000 feet. There's no particular mathematical reason for this, except that from the position where you would turn downwind if you were staying in the circuit you're probably almost 2 miles from the airfield and to fly that 2 miles, still climbing, brings you to 2000 feet.

Once you are level at 2000 feet you have three choices depending on the direction in which you wish to go. Let us assume that the circuit direction is left-hand, and that all your turns have been left-hand.

- 1) If your planned heading is ahead of you and to your left then you simply continue the turn and roll wings level as you reach your planned heading. Remember to roll out of turns 10° before the heading you wish to fly.
- 2) If your planned heading is ahead of you and to your right, then if you are sure there are no other aircraft in the vicinity, you can turn right up to about 45°. Otherwise you should continue your left-hand turn right around until you come back to your planned heading.
- 3) If your planned heading is behind you as you arrive overhead the field, then continue your left turn until you come onto your planned heading.

In any situation you must resist the temptation to turn right more than 45° from this position. In option 2 above it would be better airmanship to reduce the rate of turn as you approach the overhead so that you end up either roughly in the direction in which you wish to go, all broadly in a direction such that your intended route is behind you. It is much safer to make a long left turn than a short right one.

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Part of The Map View In FSX Showing An Overhead Departure

Note the time as you roll wings level, and hey presto, you have departed your starting airfield exactly on the line you drew on your map. All you need to do now is to maintain that heading to your destination or next waypoint.

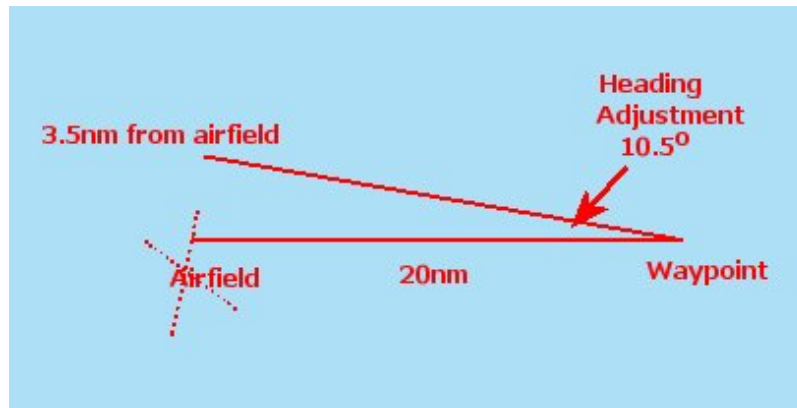
4 DEPARTING FROM OTHER POSITIONS

The manoeuvre above is time-consuming, and once pilots gain some experience, they quite often adopt a different procedure. Whilst preparing a flight plan, the pilot makes allowance for the fact that as he climbs out on the extended runway centreline, he will end up two or three miles away from the airfield.

If you are climbing at a rate of 600 feet per minute at 70 knots then at 1800 feet you have flown for approximately 3 minutes and approximately 3 nautical miles, perhaps 3.5. Applying the one in 60 rule, (see exercise 17 section 6.2 for an explanation of the one in 60 rule) if your next waypoint is

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20 miles away and you are 3.5 miles away from the airfield then you need to make a correction to a heading of 10.5° (three times 3.5) because 20 miles is one third of 60.



Track Error on Departure

A more practical example would be where the pilot climbed to 600 feet at 70 knots and then turned left, (assuming left-hand circuits again), on to his planned heading. At 600 feet he would only be approximately 1 mile from the airfield, so again applying the one in 60 rule, he would have to make a 1° correction if his next waypoint was 60 miles away, or 3° if his next waypoint was 20 miles away.

You may have realised already that there could be a problem with this solution. If the pilot wants to fly in a direction which would require a right turn out, but the circuit is left-hand, is he permitted to make a right turn out? The short answer is yes he may. So in other words, this technique can be adopted for any direction in which a pilot wishes to go.

If the direction in which pilot wishes to go is more or less on the runway heading, then he simply continues his climb straight ahead or makes any small heading adjustment necessary, once he is 500 feet above the aerodrome or higher. The sooner he makes the adjustment, the more accurate will be his track as he will not be introducing a significant position error.

If the direction in which the pilot wishes to go is the reciprocal of the runway heading from which he has just taken off, again the answer is straightforward. The aircraft is climbed into the circuit, and from the downwind position the climb is continued. The pilot turns the aircraft slightly, looking behind him, so that he arrives at 2000 feet on the downwind track with the runway more or less straight behind him.

The only circumstance in which the departing aircraft cannot adopt any of the above techniques is when the aircraft is departing from an airfield which has a Class D control zone. In this situation the pilot must obey air traffic

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control instructions, period! Almost always, airfields with class D Control zones have standard departure routes for VFR aircraft via recognized reporting points. These reporting points are usually positioned to permit traffic to depart the airfield in any direction, simply being instructed to report overhead the appropriate one for the direction in which they are travelling.

To give an example of this situation, we can look at Liverpool. If runway 27 is in use, aircraft departing to the North will be instructed to report at Seaforth docks. Aircraft departing to the South will be instructed to report at Chester. If runway 09 is in use, aircraft departing to the North will be instructed to report at Kirkby, whilst aircraft departing to the South will be instructed to report at Oulton Park racing circuit.

These locations are known as Visual Reporting Points, (VRPs) and are marked on the aviation charts. Aircraft wishing to go West or East will still be required to exit the zone at one of these visual reporting points. Similar procedures exist for other airfields of similar size to Liverpool.

Some small airfields have standard departure procedures, designed to avoid overflying sensitive locations such as villages, wildlife sanctuaries or hospitals. An example of such a procedure is at Popham, runway 26, where aircraft are requested to turn right 30° immediately after takeoff. Note the word requested. Popham does not have air-traffic control which issues mandatory instructions, but an air ground radio station, which can only provide information. However, in the real world, The Civil Aviation Authority would take a dim view of pilot deliberately ignoring this "information".