

## Airspace Infringements – A BMAA Guide

### The UK Civil Aviation Authority's (CAA) definition of an airspace infringement is:

“The unauthorised entry into controlled or temporarily restricted airspace, or active Danger Area, by an aircraft is known as an infringement.”

### Numbers

In 2018 there were 1358 reported incidents in the UK. The majority involved general aviation pilots. The relative number in 2019 is higher than for the same period in 2018.

The continuing increase in reported incidences is partly due to a change in reporting culture, where Air Traffic Service Units (ATSUs) are now encouraged to report, rather than ignore, non-risk bearing infringements. - Occurrence reporting in the UK and the rest of Europe is governed by European Regulation 376/2014. Commission Implementing Regulation (EU) 2015/1018 lays down a list classifying occurrences in civil aviation to be mandatorily reported; Annex III1.10.b states “airspace infringement including unauthorised penetration of airspace”

### Causes

There are almost as many different reasons for an infringement as there are reported incidents. Each event has its own story, although there are some common causes.

**Distraction and Overload** Flying an aircraft demands constant attention, and although with experience the task becomes less demanding each pilot only has a certain level of task focus before becoming saturated. Adding to the task by internal or external distraction can lead to the point of overload and a result can be that in that instance the pilot effectively loses control of the aircraft and vertical or horizontal navigation can suffer.

Flight instructors recognise that student pilots have a limited capacity to absorb information and perform complex tasks. Flight training is based upon development of skills, rather than trying to teach everything at once. Recreational pilots, in particular low-hour pilots, can reach saturation point very quickly and additional tasks such as making an unexpected frequency change, or routing around weather, or dealing with a sick passenger can lead to overload and the potential to lose control of the aircraft causing a deviation in vertical or horizontal navigation, perhaps leading to an infringement.

**Poor planning** There continues to be infringements of NOTAMed activity, such as RA(T)s (Restricted Area (Temporary)) set up to protect a particular activity such as a Red Arrows display. Flying a route that has often been flown before, so that finding your way is not difficult, but failing to properly read and understand the NOTAMs is a common cause of RA(T) infringement. Some pilots just don't plan at all, although they are in the minority.

Planning tools such as SkyDemon are a great help when used correctly. The NOTAMs for your route will be displayed and in flight there is a warning if it calculates that you are possibly going to infringe. A recent review of infringements found that 85% could have been avoided if a GPS enabled planning

and flight tool, such as SkyDemon, had been properly used. In some cases a tool was in the aircraft but not properly used. For example, it was not turned on; it had some warnings turned off; the NOTAM information had been updated a day or so before and the tool had not had access to the internet since, so the NOTAMs were not current. Any tool is only as good as the user and the way that it is used.

**Altimetry** Many of the airspace infringements are vertical. It is important that pilots understand how the base of airspace is defined so they avoid -inadvertent vertical infringements.

Where the base of a block of airspace is defined as a Flight Level the altimeter should be set to the standard pressure of 1013.25 hectopascals (hPa). Flying on a local QNH which is often not 1013.25 means that you have to calculate where your altitude is in relation to the Flight Levels. For example, if the local QNH is 1003, FL50 will actually be at 4,700 feet amsl (or put another way, flying at 5000 feet on 1003 hPa will put the aircraft at an equivalent of 5,300 on 1013 hPa – remember “wind on hPa, wind on altitude”. So in this instance, even flying 200 feet below 5,000 feet on the local QNH will lead to an infringement.

Another common gotcha is flying below the base of airspace with a level expressed as an altitude on the wrong pressure setting. The correct pressure setting to use is the QNH of the airfield within the controlled airspace part of which is the area that you intend to fly below. Some pilots will be flying on a Regional Pressure Setting (RPS), sometimes incorrectly referred to as a Regional QNH, given by an ATSU. This must not be used to fly under airspace with a base of an altitude as, unless that position coincides with the lowest forecast pressure for the region, the aircraft will always be higher than the altimeter indicates.

Another altimeter error is flying outside the airfield circuit with the altimeter pressure set to QFE. Unless the airfield is at sea level or below you will always be at a greater altitude than the height shown. This has also led to vertical infringements. The best practice is to set the altimeter to the local QNH away from the circuit, unless flying close to airspace whose base is a Flight Level, and update the pressure setting as you journey on by calling a local ATSU for an update.

**Aircraft Handling** In a few cases an infringement has happened because the pilot’s handling of the aircraft is inadequate. Several events have been the result of an aircraft in the climb outperforming the pilot’s expectations leading to flight through the base of controlled airspace. Knowing your aircraft and staying on top of it is a critical part of good flying skills.

Many pilots comment that they “just clipped” the airspace laterally due perhaps to a stronger crosswind than anticipated or even thermal activity. Others, that thermal activity lifted the aircraft and they were slow to respond. There is a simple answer to these events where just a small change in direction or level may cause an infringement. The answer is to not fly so close to the boundary that just the slightest change in direction or level will put you into airspace. The [“Take 2”](#) initiative suggests that pilots should not plan to route within 200 feet vertically and 2 miles horizontally of an airspace boundary where possible. Hugging an airspace boundary is legal, but rather unnecessary,

and like standing on a ledge on a tall building one step in the wrong direction is going to lead to a significant problem.

### **Effect of an infringement**

Regulated airspace is established to protect the aircraft within the airspace from mid-air collision. It provides a known environment in which standard separation procedures are used to control aircraft movement to achieve safe flight.

An infringement puts an uncoordinated aircraft into the otherwise coordinated traffic flow. Regulation requires controllers to reroute aircraft to maintain standard separation which increases controller workload and with it risk. Imagine that you are trying to juggle three balls and then someone throws in an extra ball. Now you have an additional ball to handle the work load increases and there is a chance that you might drop one.

There is no such thing as a minor infringement. As soon as the infringer enters airspace it creates an obstruction that must be avoided by 5 miles horizontally or 5,000 feet vertically. This can have a significant effect on the traffic flow within the airspace.

In the event that you do infringe airspace it is vital that you communicate with the airspace authorities immediately so they are aware of your position and intentions. Never turn off the transponder, it's what is keeping you and others safe; being electronically conspicuous to ATC and other aircraft reduces the risk of a mid-air collision. If you do turn off your transponder, expect a significant penalty as you will be in breach of SERA 13001<sup>1</sup>.

### **Transponders**

There is some confusion with regard to the accuracy of transponders. Transponders emit a vertical level signal based upon the standard pressure of 1013.25 hPa. The signal will be interpreted by the receiver equipment as a Flight Level or Altitude depending upon how the level of the particular volume of airspace is defined.

Regulation requires that the transponder must be accurate to within 150 feet. Most are accurate to within 25 feet, it is very unusual to be as far out as 150 feet. It is the pilot's responsibility to ensure that transponders are emitting accurate data. Where the base of airspace is defined as an altitude radar equipment will automatically calculate the conversion from the emitted signal, which is a Flight Level, to an altitude based upon the local QNH. Where the base of the airspace is defined as a Flight Level the radar will display the signal as a Flight Level.

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<sup>1</sup> (a) When an aircraft carries a serviceable SSR transponder, the pilot shall operate the transponder at all times during flight, regardless of whether the aircraft is within or outside airspace where SSR is used for ATS purposes.

There have been arguments that there is a tolerance of 200 feet either way, and that as such an infringement of less than 200 feet vertically may not have happened and a margin for error is allowed. This is incorrect. The ATSU does not allow a margin for error when initially registering an infringement. If the radar display shows an aircraft that is transmitting that it has entered airspace vertically without permission it is an infringement. It is the aircraft's transponder that is telling the controller its level through its Mode C (ALT). The controller is not using the radar to derive the level.

There have been cases where a subsequent engineering report has confirmed that the transponder is emitting an inaccurate signal and that no infringement has taken place. In the table below (Table 1) there are two examples of this, and no further action is warranted or has been taken.

### **Prevention**

Referring back to the **Causes** it is clear to see that there are several steps that can be taken to prevent an infringement.

**Know Your Limits and Fly within them** Plan ahead so that it is less likely that you will be surprised and task saturated. Consider potential problems with passengers and think how you will handle them. Prepare for event such as needing to reroute due to being unable to gain access to airspace, or weather changes.

**Plan the flight** with a mind-set of "This is the first time I have flown this flight. What do I need to ensure that I have done?" Use all the available tools to help you plan and complete the flight safely and make sure that you know how to use the tools both on the ground and in the air. Remember "Take 2".

**Include altimeter** setting in your planning so that you don't make an avoidable error.

**Be conspicuous.** Many aircraft are equipped with a transponder which can emit an identity code and through an encoder, the aircraft's altitude. If the aircraft has a transponder it is a legal requirement to have the transponder switched on in flight.

There is a UK code, 7000, that shows that the aircraft is there and not under any Air Traffic Service (ATS). This can be seen by ATC.

Many airports now have a unique code assigned to them called a Frequency Monitoring Code (sometimes known as a Listening Squawk). If this is set it means that the pilot is listening out on radio to the frequency allocated to the airport whose code is set. There is no need for the pilot to talk to the airport's ATC, but it allows the controller to contact the aircraft if they wish to. The ATSU may see that the aircraft appears to be on a course which will infringe regulated airspace and will be able to contact the aircraft and give information to prevent (if controlling capacity exists) or resolve the infringement. When operating a Frequency Monitoring Code, it is still the pilot's responsibility to remain outsider controlled airspace.

**Talk.** Although many pilots are happy with their own navigation and just enjoy the peace of flying for recreation and doing so as simply as possible, it makes sense when in more complex areas to communicate with an ATSU to alert them to your presence. They can then keep an eye on you and be ready to assist if at any time you call on them. Although radio services are not specifically offered to keep you out of controlled airspace help is at hand if you need. Many infringements could have been avoided if the pilot had just been in touch.

## **Enforcement**

When an aircraft has infringed a report will go to the UK CAA for consideration. The report is usually made by the agency responsible for air traffic movements in the airspace infringed.

Depending upon the circumstances of the event it may be passed to a weekly review meeting at which the evidence supplied is reviewed by a group within the CAA made up of experienced flight instructors, examiners, airspace managers and a member from the MOD Regulator, the MAA - There is no one person with the authority to review and decide any outcome.

Contrary to some views expressed the CAA does not go all out to prosecute each pilot however serious the consequences of the infringement; the aim is to ensure that the pilot is trained to a level where the risk of re-infringing is greatly reduced. There are a series of measures that the CAA can take which largely depend upon the attitude of the pilot of the aircraft both before and after the event.

The CAA publishes the process in CAP 1404 which can be accessed at this link.

<https://publicapps.caa.co.uk/docs/33/CAP%201404%20DEC2018%20E3.pdf>

Information is gathered from the pilot and the airspace authority.

The resulting action is tailored to the severity of the event, the causal factors and the pilot's attitude both at the time of the event and during the investigations. Action can be any of the following and is based on the occurrence and the pilot's previous infringement record over a 2 year period:

- No action
- A letter advising the pilot of their responsibility to navigate/operate so as not to infringe
- Read an on-line tutorial and complete an on-line test based upon the tutorial and core knowledge that a licensed pilot should have
- Attend an Airspace Awareness Infringement Course (AIAC)
- Undertake further flight training
- Provisional Suspension of licence pending interview and bespoke training.

The group publishes the results of each month's actions on the ASI website.

The example below is for September 2019.

Table 1

Course of action	Number	Summary
Closed with No Further Action	6	Transponder unserviceability confirmed by licenced engineer, no infringement occurred (2) Student (4)
Warning letter	56	includes (50) warning letters to close the occurrence – see note below (*)
On-line test	6	
Flight training	1	Poor standard of navigation requires practical training
Airspace Infringement Awareness Course (AIAC)	11	Loss of Separation (1) Safety Intervention measures applied (8) Multiple airspace infringements resulted in safety intervention measure (1) Failure of online-test (CAP1404 escalatory measure) (1)
Provisional suspensions	0	
Ongoing investigations	3	
Licence revocation	0	

64 of the closed events were closed with no action or a warning letter. A further 18 required further training either by flight or attendance at the AIAC.

More results can be found on the ASI website by following this link.

<https://airspacesafety.com/facts-stats-and-incidents/>

### Summary

All infringements carry a very real safety risk, not just to you in your aircraft but to those flying in other aircraft too.

There is no such thing as a minor infringement.

It is not good enough to treat infringements as an inevitable mistake that all pilots will eventually make.

It is every pilot's responsibility to conduct every flight responsibly, which includes actively planning how each flight **WILL NOT RESULT** in an infringement.