Corporate Communications
External Information Services

Mrs Veronica Metcalfe
Avich & Kilchrenan Community Council
luanam@btinternet.com

7 July 2015
Reference: F0002371

Dear Mrs Metcalfe

I am writing in respect of your recent request of 8 June 2015 made under the Freedom of Information Act 2000 (FOIA).

Your request is for answers to a series of questions repeated below:

Question 1. As wind turbines near airports are a risk to multiple lives, please provide examples of any radar mitigation software which has been proven to work.

Question 2. Should there be any currently in existence and use, does the vendor of the software involved guarantee that no lives will be at risk by the reliance placed upon it?

Question 3. Should the answer to both questions be that no such technology exists, may I have a written undertaking that when it comes to risk to multiple lives, decisions will be precautionary in that should such a technology be adopted, the software will have to be guaranteed by the vendor that no lives will be put at risk?

Our response:

Firstly, it would be useful to explain the way in which aircraft operate both in a radar environment and outside of it, how wind turbines are dealt with in aviation, how they affect radar performance and how safe operations are undertaken.

When a planning application for a wind turbine is presented, aviation operators/airfields have the opportunity to comment on the application. Larger airports are formally 'safeguarded' in that government guidance requires local planning authorities to establish formal notification agreements with those airports to ensure that planning applications can be considered. Smaller aerodromes are encouraged to arrange informal agreements with their local planning authorities to that same end. Where a wind turbine is established, it is depicted on aviation charts and any local aerodrome procedures take into account the obstacle clearance required to ensure safe operations.

Aircraft operate under one of two sets of rules depending on in-flight meteorological conditions. In good conditions, aircraft can fly under Visual Flight Rules (VFR) where the pilot is responsible for seeing and avoiding other aircraft and ground obstacles. There is a requirement for pilots to conduct pre-flight planning to ensure that they have planned for any navigation hazards along the planned route. In poorer weather, or when aircraft are involved in passenger/air transport activities, Instrument Flight Rules (IFR) will apply. This means that aircraft are procedurally separated from other aircraft and ground obstacles such as wind turbines; in effect, aircraft will not fly below an altitude that guarantees obstacle clearance, even if the aircraft is not being assisted by a radar service. With a radar service, under IFR an air traffic controller is not permitted to give an aircraft a descent instruction that takes the aircraft below a safe altitude. Aircraft arriving and departing aerodromes under IFR use instrument approach and departure procedures designed to ensure that ground obstacle clearance is maintained, irrespective of whether a radar service is available.

There are 2 types of radar in common use, and most radar-equipped aerodromes use both together. Primary Surveillance Radar (PSR) works by 'bouncing' a radio beam off an aircraft that produces a radar return ('blip') on the controller's screen. Secondary Surveillance Radar (SSR) sends out an interrogation signal to the aircraft; if the aircraft is equipped with a SSR transponder, it will respond by identifying itself and providing position and altitude information. The 2 radar returns are superimposed on the same display. An aircraft without a SSR transponder will just show as a primary blip. Unfortunately, moving wind turbine blades can also cause radar primary blips to appear on radar. Whilst a controller will know that a wind turbine or wind farm is at that location, he/she cannot assume that it is a turbine blade causing the blip and must assume that it is an aircraft without a SSR transponder and will offer avoiding action or a re-route to the aircraft under control. Such re-routeing is efficient and increases fuel burn. There are a number of ways of removing the need to re-route aircraft in this way.

Firstly, it is possible to turn off the primary radar in the vicinity of the wind farm, so the primary returns are not seen on radar. The disadvantage of using this method alone is that the controller cannot see an aircraft without a SSR transponder in that area either. To mitigate that risk, there will often be a Transponder Mandatory Zone established around the wind farm; to enter the Zone, aircraft must either be SSR transponder equipped or be in radio contact with the radar unit whose radar is affected (that way non-transponding aircraft can be safely coordinated by the controller). An additional method is to adjust the processing of the radar data in such a way as to allow the radar to differentiate between wind turbine blades and non-transponding aircraft and remove the former. Alternatively, an ANSP can use what is known as an 'in-fill' radar – this is a radar that is located in a separate location where it cannot see the wind turbine because its radar beam does not operate low enough, but still has adequate coverage with which to provide a safe service to aircraft.

I should point out that these solutions are not aimed at preventing aircraft from hitting wind turbines – that is achieved by the way flight operations are conducted, as explained above. The aim of these mitigation methods is to ensure that the controller can give a safe and expeditious radar service without the need to avoid extraneous radar clutter.

The CAA does not claim that industrial wind turbines are not a risk to aviation safety. However, as an independent aviation safety regulator we can only point out the risks that wind turbines can cause to aviation safety and which can directly or indirectly impose a contributory risk to the overall safety of a radar service provided to aircraft. To this effect, the CAA has published Civil Aviation Publication (CAP) 670 – *Air Traffic Service Safety Requirements* and CAP764 – *Policy and Guidelines on Wind Turbines* that point out the risks that wind turbines can present to aviation and also the potential mitigation measures that can be implemented. These publications can be found on the CAA web site.

The CAA requires ANSPs to conduct a risk assessment to establish whether they can provide a safe service and submit a safety case to the CAA for our approval. It is not the CAA that will judge that risks exist at a particular turbine site or not. Mere presence of wind turbine near an airport does not mean there is a risk to aviation operations as this is dependent on a number of factors.

Turning to your specific questions:

Question 1.
As wind turbines near airports are a risk to multiple lives, please provide examples of any radar mitigation software which has been proven to work.

In respect of wind turbines affecting aviation surveillance radars, there are many different solutions that have recently emerged from the industry. Many are being still trialled and some are already developed and implemented. However, it is important to point out the fact that there is no gold plated single solution that works for all sites and all situations.

Depending on the types of effects that impact a particular site, the type of solution that is required can be different. For example there are in-fill radar solutions that have been developed by several manufacturers which can work for some sites. There are also other solutions which are designed targeting only the display effects, but not the overall effects on the radar. Also the CAA, as an independent safety regulator, is not in a position to declare or recommend any one solution by a specific manufacturer. However, so far we have seen solutions that work for specific circumstances at several airport sites.

Question 2.
Should there be any currently in existence and use, does the vendor of the software involved guarantee that no lives will be at risk by the reliance placed upon it?

No. There are solutions that are already in place at several UK airports. The vendors of these various solutions are only required to provide "declarations for suitability of use" under the Single European Sky Interoperability Regulations. This means they are only required to provide evidence that their system "does what it says on the tin" and is suitable for its purpose. It is the provider of the aviation services (the Air Navigation Service Provider (ANSP)) who needs to claim and make arguments that the service they are providing is safe. This claim is based on the number of occurrences of different severity levels that can occur if the mitigation fails to work.

Question 3.
Should the answer to both questions be that no such technology exists, may I have a written undertaking that when it comes to risk to multiple lives, decisions will be precautionary in that should such a technology be adopted, the software will have to be guaranteed by the vendor that no lives will be put at risk?

We recommend you read CAP 670 SUR 13 in response to this question. Technology does exist that works depending on the type of effects experienced and the severity of those effects impacting at a particular site. It is the ANSP that has to take ownership of the safety argument that they present to the CAA, and this is to ensure that the risk is mitigated to an acceptable level and it is no guarantee that no occurrences will happen as a direct result of wind turbine interference on radar systems. Both ANSPs and vendors of such solutions are only required to comply with European law which is governed by the European Commission Implementing Rules and are not required to provide specific guarantees. If an ANSP in the UK wants to implement any such solution, be it software or other type of mitigations, they are required to submit a safety case to the CAA Northern Regional Office and we will only approve such solution after satisfying ourselves that the risk has been mitigated to an acceptable level and that all arguments and associated evidence are robust.

Finally, I understand that you have been contacted by Mr Jim Walker of the CAA's Airspace Regulation section to discuss the issues that you have raised. Should you require additional information or clarification following this response, Mr Walker will be happy to discuss the matter further; his contact details are james.walker@caa.co.uk or telephone 0207 453 6523.

If you are not satisfied with how we have dealt with your request in the first instance you should approach the CAA in writing at:-

Caroline Chalk
Head of External Information Services
Civil Aviation Authority
Aviation House
Gatwick Airport South
Gatwick
RH6 0YR

caroline.chalk@caa.co.uk

The CAA has a formal internal review process for dealing with appeals or complaints in connection with Freedom of Information requests. The key steps in this process are set in the attachment.

Should you remain dissatisfied with the outcome you have a right under Section 50 of the FOIA to appeal against the decision by contacting the Information Commissioner at:-

Information Commissioner's Office
FOI/EIR Complaints Resolution
Wycliffe House
Water Lane
Wilmslow
SK9 5AF
www.ico.gov.uk/complaints.aspx

If you wish to request further information from the CAA, please use the form on the CAA website at http://www.caa.co.uk/application.aspx?catid=286&pagetype=65&appid=24.

Yours sincerely

Rick Chatfield
General Enquiries and Case Management

- The original case to which the appeal or complaint relates is identified and the case file is made available;
- The appeal or complaint is allocated to an Appeal Manager, the appeal is acknowledged and the details of the Appeal Manager are provided to the applicant;
- The Appeal Manager reviews the case to understand the nature of the appeal or complaint, reviews the actions and decisions taken in connection with the original case and takes account of any new information that may have been received. This will typically require contact with those persons involved in the original case and consultation with the CAA Legal Department;
- The Appeal Manager concludes the review and, after consultation with those involved with the case, and with the CAA Legal Department, agrees on the course of action to be taken;
- The Appeal Manager prepares the necessary response and collates any information to be provided to the applicant;
- The response and any necessary information is sent to the applicant, together with information about further rights of appeal to the Information Commissioners Office, including full contact details.