

From M. Stevens CAA. RE: Re. Air Traffic Safety & Fol request F0002371. 25.04.16.

Dear Mrs Metcalfe,

Further to our previous correspondence, we can now provide a response to the questions raised in your e-mail originally submitted under the Freedom of Information Act 2000 (FOIA) in 2015 concerning wind turbine/ATC radar technology. Firstly, I apologise for the significant delay in responding to your concerns. This has been brought about by the need to involve several departments and subject matter experts across the CAA and research the history of the Whitelee development which dates back to 2005. In addition, there have been a number of regulatory activities that have, unavoidably, had to take precedence over your enquiry. Nevertheless, we regret the delay and appreciate your patience in this matter.

It is important to note that the FOIA provides a right of access to recorded information held by a public authority, rather than a requirement to respond to questions asked. As a result the majority of your enquiry does not fall under FOIA. We have, however, attempted to answer all of the questions that you have posed where possible. I have reproduced your queries in bold italic, with our response added beneath.

Further to the release of a Sunday Express article, which I'm sure you have seen concerning RAF reports (as attached) of a steep rise in near misses over wind farms

The CAA is aware of this issue; it has been discussed internally within the CAA and the issue it raises continues to be monitored. The CAA asks developers to provide information to the Defence Geographic Centre (which provides data to military crews for their planning purposes) of all windfarms above 70 feet to go into the Digital Vertical Obstruction File (DVOF) - the database that contains the consolidated source of obstacle data in the UK. From a civil aviation perspective, the majority of flights are subject to the UK Rules of the Air/Standardised European Rules of the Air (SERA) that essentially prohibits aircraft from flying within 500 feet of any person, building, vessel or other structure. Obstacles above 300 feet Above Ground Level (AGL) are notified to pilots and operators through the UK Aeronautical Information Publication and shown on pilot maps (e.g. Visual Flight Rules charts). In terms of Met mast Conspicuity, the CAA / General Aviation Awareness Council (GAAC) and Renewables UK have been working closely together to improve the visibility of anemometer masts – this work has resulted in changes to the text provided to planning authorities by the CAA concerning Met masts and revised text in CAP 764 Issue 6 which was published in February 2016.

In terms of onshore wind turbines, there is no mandated lighting for obstacles under 150m AGL. That said, the military employ a dedicated safeguarding team who assess wind farm applications and make requests for lighting for obstacles under 150m if they consider them to be significant from an aviation point of view. We

consider this to be a Ministry of Defence (MoD) matter; the CAA, as the UK's civil aviation regulator, would not normally offer comment unless our opinion has been specifically requested by the MoD.

It becomes apparent that the Fol questions previously lodged are entirely justified. Obviously the subject has been coincidentally raised elsewhere and underlines that there are indeed real problems arising related to wind turbines for our pilots both overseas and in the UK. This includes the associated problems caused by the proliferation of anemometer masts linked to wind power developments.

See comments above. This is indeed a known issue. The CAA has worked closely with the renewables industry (Renewables UK) and the GAAC to provide revised guidance to planning authorities, aviation and developers concerning Met Mast conspicuity.

It is why bringing these issues into the public domain whilst continuing our discussions will be an important part of the kind of transparency the public both deserve and expect. I have every confidence that the CAA will agree, as the current willingness to engage over these matters is entirely to their credit. This has apparently not been the case with air safety authorities outwith the U.K.

Having been alerted to a submission to the Australian Senate Inquiry involving the same issues as we are discussing, contact has been made with the pilot concerned. He has kindly shared with me all his documents and submissions including private communications where relevant. They make highly disturbing reading. Just one example being that of the important issue of turbulence. Although the subjects of cumulative effects & turbulence are covered in Chapter 2 pages 6 –8 of the CAA's CAP 764 Policy & Guidelines on Wind Turbines, it is becoming clear that in the light of emerging evidence and events, this guidance is seriously out of date.

The fully updated CAP 764 Issue 6 (www.caa.co.uk/CAP764) was published in February 2016 following an intensive consultation with industry and aviation stakeholders.

A list of questions follow:

1. Does the CAA share CASA concerns about the turbulence coming from the Wind Turbines and effects on air traffic?

We cannot comment on CASA but the CAA has been actively researching the turbulence effect of wind turbines and has published the results of the study conducted with Liverpool University as Information Notice [IN 2015/038](#).

2. Does the CAA agree that such turbulence, which can travel up to 30-40 Kilometres, should be taken into consideration in respect of turbines erected nearer to airports than these distances?

At all times, responsibility for the provision of safe services lies with the Air Traffic Service provider or Air Navigation Service Provider (ANSP) and the pilot (and potentially operator) is responsible for the safe conduct of the flight, taking into account a variety of factors. The current CAA recommendations in CAP 764 quote a figure of 16 Rotor Diameters for wind turbines over 30m. Given the largest UK onshore turbines typically have a rotor diameter of 126m (example taken is a Vestas V126 3.45MW Turbine) that would equate to 16 rotor diameters being in the region of just over 2km. Furthermore, the Liverpool University research (for a smaller turbine) indicated 5 rotor diameters or 0.63km. The next steps for the CAA Wind Turbine Turbulence research is to carry out trials on larger turbines in order to ascertain if the model used for the smaller turbines in the Liverpool University Study could be extrapolated to larger turbines. If so, the 16 rotor diameter advice could be revisited. Revised advice on turbulence is contained within the new version of CAP 764.

3. It is assumed that the CAA agrees that a British court would find that where an Authority advises that there should be notification of turbines being built within 30-40 kilometres of airports in the UK, it establishes that there is an implication of a safety issues. Should this not be the case, please will the CAA provide reasons for disagreement.

Safeguarding procedures apply in accordance with the [ODPM circular 2003/1](#). It is the responsibility of individual airports to take measures to safeguard their own operations and agree procedures with their local planning authorities to be notified of developments and to make representation accordingly. At all times, responsibility for the provision of safe services lies with the ATS provider or Air Navigation Service Provider (ANSP). It should be noted that the CAA does not have regulatory powers to approve or reject planning applications. Further information is available within CAP 764.

4. Will the CAA confirm that the turbulence has been demonstrated to be severe to light aircraft and light twin engine aircraft up to a considerable distance?

The most recent guidance on turbulence published by the CAA is in [IN 2015/038](#).

5. In Chapter 2 page 7. 8.4 of CAP 764 is this somewhat amazing admission/statement (my emphasis). 'There are currently no Mandatory Occurrence Reports (MOR) or aircraft accident reports related to wind turbines in the UK.

The version of CAP 764 referred to was published in 2012; the statement still held true in August 2015.

However, the CAA has received anecdotal reports of aircraft encounters with wind turbine wakes representing a wide variety of views as to the significance of the turbulence. Although research on wind turbine wakes has been carried out, the effects of these wakes on aircraft are not yet known. Furthermore, the CAA is not aware of any formal flight trials to investigate wake effects behind operating wind turbines. In the UK wind

turbines are being proposed and built close to aerodromes licensed and unlicensed), including some developments on aerodrome sites, indicating an urgent need to assess the potential impact of turbulence on aircraft and in particular, to light aircraft and helicopters.’ As this document is dated Jan.2012 – will the CAA explain why this ‘urgent need’ has not yet been addressed?

The need is being addressed – please see the Information Notice above. CAP 764 has been updated to that effect. The issue of turbulence is also a work-strand of the DECC Chaired Aviation Management Board, the minutes for which should be published by DECC.

6. Will the CAA please confirm that the advice relating to both cumulative effects and turbulence issues was given to the Scottish Government either before or during discussions leading to the granting of planning permission for the Whitelee wind farm development? May I also have dates of any meetings held with Ministers or Government departments & minutes provided of the discussions undertaken? It is important to know whether the Directorate of Airspace Policy (DAP) or NATS were involved in these meetings if held, as it is stated that the DAP hold ‘responsibility for the planning and regulation of all UK airspace, including the communications, navigation and surveillance (CNS) infrastructure, to support safe and efficient operations by the appropriate aviation stakeholders and also has the lead responsibility within the CAA for all wind turbine related issues.’ NATS’ say that their first priority is the safety of aircraft in the airspace they are licensed to operate. They are also ‘legally obliged to provide safeguarding services’ for the airports they are contracted to, as part of the wind farm planning process. There is an admission that the radar manufacturer’s (Terma) SCANTER system is not yet available. Even if proved to be as successful as hoped, this will take time to integrate and install and will not help in the event of emergency landing episodes.

The CAA does not hold any information that indicates that the CAA provided advice to the Scottish Government on the subjects of turbulence and cumulative effects. Our records indicate that CAA officials met with the Secretary of State for Transport on 23 March 2005 to discuss the Whitelee development and its impact on aviation activity at Glasgow Airport. The CAA does not hold any minutes or notes of that meeting. We have, however, attached copies of correspondence that we hold between the Scottish Government and the CAA concerning the Whitelee project and the subsequent application to expand the windfarm. We have redacted some personal data from this correspondence.

The following is a list of current operational wind farm mitigation technologies:

- [Aveillant](#) – Recently approved for operational use at East Midlands Airport
- [Raytheon](#) – Approved for use at Great Dun Fell radar station last September, soon to be introduced at Lowther Hill.

- [Terma SCANTER 4002](#) radar is now in use at Chester Hawarden and Liverpool John Lennon airports to mitigate [Frodsham](#) wind farm and at Edinburgh airport to mitigate [Tormywheel](#) Wind Farm.
- [PagerPower](#) – Has a comprehensive list of available wind farm mitigation technologies.

7. At the Senate Inquiry, CASA stated they did not carry out a study into the effects of turbulence due to the absence of funds, despite a recent funding boost. Due to its importance for public safety, can the CAA confirm that such a question of funding will not enter into the equation should further work be needed into any existing study, or commencement of the required work?

We cannot confirm whether we will attain funding for the next stage of this project as that is beyond our control. However, we can confirm that we are doing all in our power to attain the relevant funds to initiate the next step in the wind turbine turbulence research project.

8. An Australian flying operations inspector has been reported to have said that this study was both needed and required - but that it had been denied due to political interference. Can the CAA confirm that in the absence of a UK study such interference will not be permitted should this work commence?

The turbulence study is a work-strand that sits under the Aviation Management Board (AMB) which is chaired by DECC. As such, DECC, DfT and the MoD are fully updated on the progress at the AMB. We are unaware of any such interference. See [IN 2015/038](#).

9. Are plans in hand to conduct this study as a matter of urgency if it does not yet exist?

See above.

10. It would be of interest to know please, in respect of Glasgow & Prestwick airports, exactly which protective and other services are also run from them. Those I have in mind would be Aerial Fire Fighting services and crop spraying activities, Search & Rescue helicopter services and areas covered. If these services are run from elsewhere to cover the area adjacent to and within the Whitelee wind farm catchment area, where are they based? Likewise Air Ambulance and Police cover services and areas covered. Also to what extent are either airports used for Air Training activities e.g. by Air Training schools?

This would be a matter for the airport. The Scottish Police Aviation Unit operates from Glasgow City Heliport and the Scottish Air Ambulance operates one helicopter from Glasgow. Our understanding is that Prestwick will be a new Maritime and Coastguard Agency SAR base in 2016.

As has been observed, as far as Aerial Fire fighting and crop spraying are concerned, to be remembered is the insistence that some companies have that these important areas of activity will be unaffected. This is clearly untrue. There is also a tendency to downplay the impact of the power lines which are needed to transfer the electricity to the Grid. Where farmers requiring crop spraying are concerned, turning off turbines is offered as a solution. They remain a formidable obstacle. Furthermore, this only eliminates the potential for pilot vertigo and reduces the turbulence caused by turning blades – but there remains the misconception that turning off turbines pertains only to those in the field being treated. It is reported that companies balk when realisation dawns that ALL turbines for a mile around each field need to be shut down. The IAAA resolution regarding this is on record to be found at www.agaviation.com/ It is interesting in that although there is not a refusal to work within a wind farm, support will be given to any pilot who does. It is notable that in Australia, agricultural companies working in and around wind farms charge extra for doing so. They recognise the obviously raised danger levels and some companies, understandably, refuse to undertake this work. The level of dereliction of a duty of care for those involved is shown by those wind power companies who apparently have gone as far as offering to pay these raised charges - if they are given planning permission. Where aerial fire fighting is concerned, time will not always be available when needed for contacting those responsible for turning turbines off. The RFS's conclusion that there is in fact an Aviation Hazard due to the Turbines located around the Crookwell Aerodrome is important. This is because it was based upon International experience from Aviation Fire Fighting incidents, and Agricultural Pilots, with regards to operating Aircraft near Wind Turbines.

While aerial spraying is not commonplace in the UK, some does exist, notably for moorland/heather management. We have not received any correspondence from anyone involved in this industry concerning wind turbine effects.

So once again, this information establishes justification for question 10 in addition to the original Fol enquiries.

In a bid to acquire accurate up to date information, the Department of Energy & Climate Change, of which the CAA is a member, has been asked the following questions and a response is awaited:

The CAA is not a member of DECC. It is represented on the DECC Chaired Aviation Management Board along with numerous other aviation stakeholders, the MoD, DfT, and the Renewables Industry.

1. How many studies have been funded or co-funded by DECC (or previously by the DTI) into the effects of wind turbines on radar?

2. May I please have copies of any such studies?

3. Have they produced any solutions?

4. How much have they cost?

This is a matter for DECC to respond to. The AMB minutes should contain most of this information.

5. How many of the solutions are now incorporated into radar at airports thereby allowing the safe operation with wind turbines nearby?

See above.

In conclusion, it becomes clear that the 'elephant in the room' is current Energy Policy in respect of renewable energy involving wind power. The Scottish Government's obsession with this technology has resulted in a complete absence of the precautionary principle needed when allowing the construction of ranks of wind turbines on hills overlooking/in close proximity to a Major International Airport.

At all times, responsibility for the provision of safe services lies with the ATS provider or Air Navigation Service Provider (ANSP). Glasgow and Prestwick are responsible for safeguarding their own operations and making representation accordingly.

In this sense both Glasgow and Prestwick Airports are implicated. Should any disaster feared by pilots having to run the current gauntlet ever actually happen, (an event fervently prayed for not to occur) this fact will not be lost on lawyers representing families involved. Should it be revealed that those in Government made the decision in favour of granting planning approval in the full knowledge of existing dangers for air traffic, they and their advisors, may well find that they are indeed culpable.

See above.

When facts are examined again, they appear to fall as below.

a. There is no failsafe method of radar system in existence which covers all known problems for air traffic – neither was there when permission for Whitelee wind farm to be built was granted.

b. RAF pilots are reporting near misses involving wind turbines.

c. Proliferation of low visibility met masts on hills in all areas, which can also cause a danger to low flying aircraft, turbine wake turbulence and radar clutter are all established as being unresolved and of real concern.

d. Proof that emergency landings into Glasgow and Prestwick Airports would not be impeded by the Whitelee wind farm does not exist.

Radar solutions are being developed. Met Mast proliferation is considered an issue and has been addressed through collaboration with RUK and the GAAC. Impacts of windfarms on the safe operation of airports are a matter for the airports concerned who can make representation accordingly to the planning authorities.

As advisors to the Government on such matters, it is sincerely hoped and trusted that in respect of the removal of turbines which pilots would now judge to be needed on the grounds of public safety, such advice will be given as a matter of urgency. Especially those nearest to the airport judged to capable of causing dangerous turbulence effects - which are in addition to the known radar inadequacies. Instances of such turbine removals having been ordered in other countries are now being reported. The problem of anemometer masts on high ground must also be addressed to avoid similar risks to public safety.

At all times, responsibility for the provision of safe services lies with the ATS provider or Air Navigation Service Provider (ANSP). It should again be noted that the CAA does not have regulatory powers to approve or reject planning applications. Permissions for siting of turbines are ultimately matters for the planning authorities. The CAA has no powers in this regard.

I trust that this response answers your questions.

Yours sincerely

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