

Directorate of Airspace Policy

All NATMAC Representatives

14 July 2011

CAA DECISION LETTER

Dear Stakeholders,

WELSH GOVERNMENT AIRSPACE CHANGE PROPOSAL FOR UNMANNED AIRCRAFT SYSTEMS

1. INTRODUCTION

- 1.1 In July 2009, the Directorate of Airspace Policy received a formal proposal from the Welsh Government to establish additional segregated airspace, in the area to the east of, and surrounding, West Wales Airport (WWA). Upon receipt of the proposal, my staff undertook a detailed analysis of the operational requirements, the environmental assessments and the consultation process. The purpose of this letter is to provide you with an overview of the proposal and my subsequent decision on it.

2. PROPOSAL OVERVIEW

- 2.1 This proposal has been developed in order to support the development of ParcAberporth as a site for Unmanned Aircraft Systems (UAS) operations. Unless flown within the visual line of sight of the pilot, or fitted with an approved Detect/Sense and Avoid system¹, UK airspace policy requires Unmanned Aircraft (UA) flights to be contained within segregated airspace². For UK airspace operations, it has also been determined that the Danger Area (DA) is the most appropriate airspace construct to afford this segregation.
- 2.2 Currently, UAS operations from WWA take place within EGD201 (Aberporth) and within a Restricted Area (Temporary) [RA(T)] which consists of a 6nm radius circle centred on the airport, extending up to 5000ft amsl. A RA(T) for the purposes of UAS operations has been in place around WWA since Apr 06. This RA(T) has been reviewed and renewed at regular intervals, however at the time of the first renewal, WWA was informed that RA(T) airspace was not appropriate for long-term activities and, as a result, was advised to submit an Airspace Change Proposal (ACP) to support the establishment of permanent airspace structures. The proposed airspace, which is a significant expansion on the airspace volume encompassed by the present RA(T), has been developed as a result of feedback from industry and is not designed for one specific UAS type; it is intended to produce suitable volumes of segregated airspace which can be made available to support a variety of UAS activities. Initial airworthiness/certification flights will continue to be conducted over water within EGD201, but the new airspace provides opportunities for the development of

¹ Detect/Sense and Avoid is a generic term used to describe a system involving one or more sensors, which has the capability to see, sense or detect conflicting traffic or other hazards and so enable the pilot to take the appropriate action to comply with the applicable rules; in this way, the system acts as a substitute for 'See and Avoid' in a manned aircraft.

² CAP 722 Unmanned Aircraft System Operations in UK Airspace - Guidance

operating procedures and sensor payloads over a wide variety of terrain features and types of land, which cannot be conducted effectively over water.

2.3 There are four airspace elements to the proposal:

- A trapezoid-shaped DA, identified as EGD202, surrounding WWA that extends from Crymych in the south to New Quay in the north, activated by NOTAM from the surface to a maximum FL125. This airspace will segregate the departure and recovery phases of UAS flights at WWA and provide airspace for the routine operation of small/medium UAS; in effect, it replaces the existing WWA RA(T).
- A 'floating' DA, identified as EGD202A, to the east of WWA and activated by NOTAM between FL60 and FL100. This area is designed for UAS that need greater airspace in which to operate, or to over-fly varied terrain (rivers, lakes, forests etc) in which to prove/develop the operation of sensors.
- A 'floating' DA, identified as EGD202B, to the east of WWA and activated by NOTAM between FL100 and FL225; the level blocks used within this band will be specific for each UAS flight. This area permits the operation of fast, or higher flying, UA.
- A 'floating' DA, identified as EGD202C, to the east of EGD202B and activated by NOTAM between FL100 and FL225 and is intended for UAS flights where the use of EGD202B alone is insufficient for the planned activity. Again, the level blocks used within this band will be specific for each UAS flight. This element also provides connectivity to the existing Sennybridge DA (EGD203).

2.4 In addition, a small portion of the EGD201 complex, namely the 'semi circular' overland portion in the vicinity of WWA, has been further subdivided to form a separate DA (EGD201E). Normally only activated up to FL125, this will allow UAS flying to take place during periods when the remainder of the EGD201 complex has been handed back under FUA arrangements.

3. STATUTORY DUTIES

3.1 My statutory duties are set out in Section 70 of the Transport Act 2000 (the Act), the CAA (Air Navigation) Directions 2001, as varied in 2004 (the Directions), and Guidance to the CAA on Environmental Objectives relating to the exercise of its air navigation functions.³

3.2 Safety

3.2.1 My primary duty is to maintain a high standard of safety in the provision of air traffic services and this takes primacy over all other duties.⁴ In this respect, I am content that the proposed airspace design is appropriate for the intended use; due to the fact that it is a Danger Area, for segregation purposes, I am satisfied that there will be no detriment to existing safety. Whilst the UAS flights that will be conducted within this airspace are not in themselves considered to be inherently dangerous, the activity demands an enhanced level of protection both from, and to, other airspace users through airspace segregation; most notably, the current generation of UAS are not able to replicate the Detect/Sense and Avoid requirements that would normally permit safe operation in a Class G environment. A DA Crossing Service (DACS) will be made available to pilots wishing to cross the new

³ Issued in 2002 by the DfT (then called the Department of Transport, Local Government and the Regions) (the Guidance).

⁴ Transport Act 2000, Section 70(1).

airspace. The design is also compliant with the CAA's Safety Buffer Policy, with regard to proximity with adjacent IFR routes.

3.3 Airspace Efficiency

3.3.1 I am required to secure the most efficient use of the airspace consistent with the safe operation of aircraft and the expeditious flow of air traffic.⁵ The proposed dimensions recognised the need for efficient use of airspace and the design sought to establish the minimum segregated airspace required to contain the activity. The airspace will be activated by NOTAM, rather than being a permanent feature, and the sub-division of the floating DA provides further flexibility to the design; only the elements required for each specific flight, and the necessary level blocks within each element, will be utilised. The provision of a DACS, as detailed at 3.1.1 above, will also enable the safe and efficient management of other aircraft wishing to cross the segregated airspace.

3.4 Airspace Users

3.4.1 I am required to satisfy the requirements of operators and owners of all classes of aircraft.⁶ The Sponsor conducted extensive consultation with all affected stakeholder aviation groups as part of the design process and made amendments accordingly. The original design involved a much larger volume of airspace, aligned on an E-W axis either side of WWA and with significantly lower base and upper levels. A further 4 iterations to the design were discussed with key stakeholder groups over an 18 month period, each of which took account of the emerging viewpoints and progressively reduced the volume of airspace, raised the base levels and removed the majority of the airspace to the west of WWA. Three final options, themselves a further refinement of the final iteration, were presented for public consultation; the option finally selected received the most favourable support from stakeholders, was considered the most practical option from an ATM perspective and was also expected to be the most useful to the UAS industry.

3.4.2 The lower vertical limits of the 'floating' elements (FL60 and FL100) of the new airspace have been selected at levels that are well above the most frequently used GA operating levels. Although the basic design takes in a large vertical block of airspace, it provides a significant element of flexibility in the selection of the level blocks that are specifically activated within each element for a particular flight; while it is clearly evident that EGD202 will usually require to be activated upwards from the surface, it has been stressed that only the airspace that is actually required should be activated, and thus the choice of its upper level of activation should be proportionate to the operations that are being conducted. Along with the provision of a DACS, I am satisfied with the Sponsor's commitment to provide access to the revised airspace when it is safe and appropriate to do so; records of DACS transits, including refusals and the occasions where the plans for UAS flights have been modified to accommodate the requirements of other airspace users will be maintained and subjected to scrutiny by my staff at periodic intervals. I am therefore satisfied that the revised structures will not be detrimental to airspace users as a whole.

3.5 Interests of Other Parties

3.5.1 I am required to take account of the interests of any person (other than an owner or operator of an aircraft) in relation to the use of any particular airspace or the use of airspace generally.⁷ The Change Sponsor consulted widely with local government authorities and non-governmental organisations whose areas of responsibility or interest lie beneath the

⁵ Transport Act 2000, Section 70(2)(a).

⁶ Transport Act 2000, Section 70(2)(b).

⁷ Transport Act 2000, Section 70(2)(c).

new airspace. With regard to the safety of those on the ground beneath the new airspace, the certification/airworthiness requirements are equivalent to those for manned aviation; in particular, for UAS which have a Maximum Take-Off Mass exceeding 20kg, flight within the new DAs is restricted to aircraft that are either:

- (i) under an approval, either company or aircraft, issued by the relevant Authority where its development has achieved an appropriate level of maturity, or
- (ii) the subject of an exemption.

In all cases the intention is that the aircraft and aircraft systems can maintain full compliance with the relevant aspects of the Air Navigation Order, Rules of the Air Regulations, or the equivalent military regulations. I am therefore content that the interests of affected non-aviation parties have been satisfied.

3.6 Environmental Objectives

3.6.1 In performing my statutory duties, I am obliged to take account of the Guidance provided by the Secretary of State⁸. My detailed considerations of the environmental aspects of this proposal are covered later in this letter.

3.7 Integrated Operation of ATS

3.7.1 I am required to facilitate the integrated operation of air traffic services provided by or on behalf of the armed forces of the Crown and other air traffic services.⁹ When the airspace is active, interaction with other ATS providers will be accommodated in the same fashion as at present, via extant ATC liaison procedures and/or specific arrangements between ATS Units.

3.8 National Security

3.8.1 I am required to take into account the impact any airspace change may have upon matters of national security.¹⁰ There are no national security issues identified; I am therefore satisfied that national security requirements will not be jeopardised by implementation of the change.

3.9 International Obligations

3.9.1 I am required to take into account any international obligations entered into by the UK and notified by the Secretary of State.¹¹ No new international obligations arise as a result of the airspace change proposal. The new airspace has been designed in accordance with national regulatory requirements.

4. ENVIRONMENTAL CONSIDERATIONS

4.1 The Environmental Research and Consultancy Department has delivered a comprehensive assessment of the environmental impact of this change. This concludes that:

- The noise impact from an increase in UAS activity at the airport is unlikely to cause a significant disturbance.

⁸ Transport Act 2000, Section 70(2)(d)

⁹ Transport Act 2000, Section 70(2)(e).

¹⁰ Transport Act 2000, Section 70(2)(f).

¹¹ Transport Act 2000, Section 70(2)(g).

- The impact on the local air quality as a result of this airspace change is unlikely to be significant.
- Based upon expected UAS traffic volumes, the total additional CO₂ emitted as a result of this proposal is unlikely to be significant.
- In general terms, no significant impact upon either tranquillity or visual intrusion is anticipated from the implementation of this airspace. The new airspace does not sit above any AONBs or National Parks. UAS are typically smaller and generate less noise than manned aircraft, and so for these reasons they are less likely to be observed and/or heard, particularly given the higher altitudes associated with this Airspace Change Proposal away from the immediate vicinity of WWA. There is, however, the potential for an increase in UAS flights in the area; we cannot therefore, rule out the possibility that some observers might consider there to be an impact, simply because they have become more aware of the UAS operations.
- This ACP will not result in an overall environmental benefit, primarily because it is introducing additional aircraft into the area, over and above any expected increase in manned traffic; once all of the factors are considered however, the overall environmental impact is likely to be minimal.

4.2 Consequently, the environmental impact of the implementation of this change proposal is considered to be negligible and there is no requirement to refer this proposal to the Secretary of State. A copy of the ERCD summary report is attached.

5. CONSULTATION

5.1 The Sponsor undertook a public consultation between 5 May and 25 September 2009 in accordance with the requirements of CAPs 724 and 725. The consultation document, also translated into the Welsh language, was distributed to 114 organisations/individuals including aeronautical stakeholders, community and Town Councils, politicians, the UAS industry and local libraries. The consultation was conducted in the same way as any other Welsh Government consultation process and also included use of the Welsh Government 'Business and Economy' web pages, drop-in events, local newspaper advertisements and local radio announcements. A total of 218 responses were received as a result.

5.2 The assessment of the proposal by DAP's Airspace Policy Coordination & Consultation section noted the following points:

- The consultation received a relatively high level of response from operational consultees (16 respondees/36%). A number of aviation stakeholders not identified by the sponsor also provided contributions. These additional stakeholders tended to originate from outside the area of the proposal and so would not necessarily have been identified during the initial stakeholder analysis. Of the operational stakeholders, 15 were supportive of the proposal to varying degrees dependent on the option decided upon. One aviation stakeholder was strongly against the proposal on grounds of the loss of Class G airspace.
- The level of response from environmental stakeholders was roughly on a par with other ACP consultations of a similar nature. Beyond the identified stakeholders, a large number of private individuals/organisations contributed to the consultation, but many of the responses dealt with matters which were outside the scope of the consultation. The

majority of private individuals were against the proposal, although a large number of repeat objections (ie. identical comments but from different individuals) were received.

- Respondents raised a number of themes, which were correctly and clearly identified in the Stakeholder Consultation Feedback Report published on 15 April 2010. These key themes were adequately addressed in the document. While the majority of the issues were resolved by the sponsor, the lack of data concerning noise impact and the eventual pattern of operations were difficult to close off, however the sponsor responded honestly over the lack of clarity.

6. REGULATORY DECISIONS

- 6.1 I am content that the proposed airspace design is safe, which satisfies my primary statutory duty. Thereafter, when considering the competing demands of my remaining duties, together with the Directions and Guidance, I am satisfied that the final option and the operational arrangements that have been proposed represent the most reasonable and pragmatic solution whilst still supporting the further development of unmanned aviation within the UK.
- 6.2 This is only the second DA complex to be established specifically for UAS use, although due to some subsequent delays in the requirement to activate the first complex (EGD120/122) it will be the first one to actually be used. As such, I am well aware that this airspace change represents a significant step forward with regard to the operation of Unmanned Aircraft within UK airspace. The subject has naturally raised some objections, and may continue to do so, but I have taken a measured and balanced approach in reaching my decision.
- 6.3 The revised airspace will become effective from 28 July 2011 (AIRAC 8/2011) and the new DAs will identified as EG D202, EG D202A/B/C and EG D201E. My staff will review the effectiveness of the arrangements 12 months after introduction and the results of this review will be published.

Yours sincerely,

Mark Swan

M Swan
Director

Enclosures:

1. Airspace Change Proposal - Environmental Summary Report.
2. Map of Proposed Airspace.

Enclosure 1

Summary Environmental Report for the West Wales UAS Airspace Change Proposal

This is a summary of the Annex E report prepared for DAP by ERCD titled “West Wales UAS Environment” (dated 20 October 2010). The report described the environmental considerations relevant to the proposed creation of new Danger Areas for the purpose of increasing the number of flights by Unmanned Aircraft Systems (UAS) from Parc Aberporth airfield.

As the new airspace will be used for UAS research, there were a number of factors that meant it was difficult to precisely gauge the extent of the environmental impacts:

- There is no requirement for unmanned aircraft to follow defined routes or procedures in the new airspace. For this reason, assessing and quantifying the impact of introducing these new Danger Areas was not possible with any degree of accuracy.
- This is further complicated by the potential number and range of UAS that could subsequently operate at the airport, and the uncertainty of the length of each flight and how each UAS might be operated. The sponsor was unable to provide any information about typical operating heights.

Noise

Two noise metrics were used to illustrate the possible noise impact. Assessing the impact in this instance was complicated by the fact that few UAS have certified noise data, and it was difficult to foresee which UAS types will ultimately operate at West Wales. With those two limitations, the sponsor selected the approaches set out below.

L_{max} Values

There is a lack of certified noise data for UAS, and therefore noise levels for types of unmanned aircraft that may operate at West Wales were measured by the sponsor, for comparison with manned aircraft that currently using the airport.

The UAS types modelled by the sponsor range from 23dBA to 68dBA. This compares with the manned aircraft used for comparison which had a range of 76dBA to 91dBA.

However, the L_{max} values that were calculated did not illustrate the expected/likely noise levels for the UAVs at typical operational heights. At best, they illustrated that UAS typically generate less noise than manned aircraft at a standard height of 950ft, and that therefore they should also be quieter than manned aircraft at greater heights. The sponsor did confirm that the lowest heights at which they would operate would be 1,000ft above the base of the airspace block in use.

L_{eq} Contours

The CAA provided advice to the sponsor at various stages that L_{eq} contours were probably not appropriate for this proposal due to the volume of aircraft (not very many) and the type of aircraft (UAS), but also advised that if contours were going to be produced, then they should reflect the specification in CAP725 (i.e. starting at 57dBA, and then increasing at 3dBA intervals). Instead, the L_{eq} contours produced were 50 dBA and 55 dBA - and they illustrated a “worst-case” scenario that assumed the maximum permitted annual movements and therefore did not reflect the current noise impact at the airport.

Using the contours provided by the sponsor, the CAA concluded that:

- A 57dBA contour (i.e. the metric normally required under CAP725) would be within the 55dBA contour illustrated in the proposal.
- If contours were to be produced using the current traffic volumes and a more realistic traffic mix, it is likely they would be much smaller than those used to illustrate the worst-case. This is because the current traffic volumes are much less and the traffic mix is likely to include a variety of aircraft (some of which will generate less noise than the two examples used for the worst-case illustration).

Based upon the contours for the Cessna 172R (which do not stretch beyond the airport's boundary) and the indication that UAS will generally produce less noise than manned aircraft, it seemed unlikely that the addition of UAS at the airport would significantly increase the current L_{eq} contours.

Accepting the key limitations in this proposal – lack of certified noise data for unmanned aircraft, lack of knowledge as to which UAS will operate at the airport, and lack of knowledge about likely flight patterns – then the impact has been presented adequately.

Emissions

Given the lack of information that was available to the sponsor in terms of the emission rates and potential use of the airspace by UAS, a broad but reasonable assessment of the impact on CO₂ emissions was made.

In assessing the impact of CO₂ emissions, a worst-case assumption was made by the sponsor that all of the carbon in the fuel is converted to CO₂ by the UAS engines. This would not be the case in reality, but it helps to portray a conservative estimate of the impact.

The estimate of total CO₂ in the proposal is based upon the sponsor's medium traffic forecasts. It shows approximately 23 tonnes of CO₂ from UAS in 2010, increasing to approximately 26 tonnes in 2015. This is not a significant impact, but still represents an increase in CO₂ emissions. This estimate makes the following assumptions:

- A UAS produces approximately 18kg of CO₂ per hour.
- Each UAS flight is for two hours.

The consultation did not include an estimate of the total CO₂ that would be produced by new types at West Wales. This was on the grounds that it was not possible to forecast either the type of UAS that would be operating or their level of activity (e.g. numbers of flights and duration). Instead, the consultation included a table that compared fuel burn rates (and therefore CO₂ emission rates) for a range of unmanned and manned aircraft. The comparison table in the consultation showed that UAS typically have a much lower emissions rate than manned aircraft, and if powered by an electric motor, have no emissions.

Local Air Quality (LAQ)

The new UAS flights at the airport will not create any LAQ issues, taking account of the likely volume of emissions and numbers of aircraft.

Tranquillity and Visual Intrusion

Based upon tranquillity studies to date it appears that UAS flying at the likely heights associated with this Airspace Change Proposal are unlikely to have a significant impact upon tranquillity.

The airspace does not sit above any AONBs or National Parks. All of the options presented in the consultation avoided overflight of the Pembrokeshire Coast National Park.

In particular, the sponsor's Consultation Report, submitted as part of the proposal, confirms that SACs and SSSIs will be identified as "noise sensitive" sites and therefore overflight of these sites will be avoided whenever possible. This should reduce any impact upon tranquillity and visual intrusion at these sites.

Conclusions

The proposal did not result in an overall environmental benefit because introducing UAS at the airport is an increase in traffic, over and above any expected increase in manned aircraft; and because the airport is not operating at its maximum capacity, the UAS do not replace any existing manned aircraft and therefore enabling greater numbers of aircraft to fly from West Wales airport will result in a negative environmental impact. This negative impact will be in the form of additional noise and CO₂ emissions.

Noise

The sponsor shows that UAS typically generate less noise than manned aircraft at a standard height of 950ft, and therefore they should also be quieter than manned aircraft at greater heights. Typical operating heights were not provided by the sponsor but it is likely that for most of the time the UAS will be operating at heights greater than 950ft.

Based on "worst-case" L_{eq} contours provided by the sponsor, the expected increase in aircraft operating from the airport is unlikely to have an impact on the existing noise contours at the airport. This means that the increase in UAS is unlikely to increase the numbers of residents significantly annoyed by aircraft noise near the airport.

CO₂ Emissions

Based upon expected traffic volumes for UAS, the total additional CO₂ emitted as a result of this proposal is unlikely to be significant.

LAQ

The impact upon LAQ of the proposal is likely to be insignificant.

Tranquillity and Visual Intrusion

The new airspace does not sit above any AONBs or National Parks. Additionally, unmanned aircraft are typically smaller and generate less noise than manned aircraft, and for these reasons are likely to be more difficult to observe and/or hear. There is, however, the potential for an increase in UAS flights in the area; we cannot therefore, rule out the possibility that some observers might consider there to be an impact, simply because they have become more aware of the UAS operations. So in general terms, it is expected that the implementation of this airspace is unlikely to have a significant impact upon either tranquillity or visual intrusion, but because both are subjective, it is not possible to rule out that some observers may be aware of UAVs operating and may consider there to be an impact.

Biodiversity

The impact upon biodiversity of the proposal is likely to be insignificant.

Andrew Green

Environmental Research and Consultancy Department

1 June 2011

