

All NATMAC Representatives

26 April 2010

CAA DECISION LETTER

*Dear Stakeholders,*

**MINISTRY OF DEFENCE AIRSPACE CHANGE PROPOSAL FOR UNMANNED AIRCRAFT SYSTEMS**

**INTRODUCTION**

- 1.1 In November 2009, the Directorate of Airspace Policy received a formal proposal from the Ministry of Defence (MoD) to establish additional segregated airspace, in the area of Boscombe Down Aerodrome and to the south of the existing Salisbury Plain Training Area complex. 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.

**PROPOSAL OVERVIEW**

- 2.1 This proposal has been developed in order to accommodate the UK training requirements associated with the Watchkeeper (WK) Unmanned Aircraft System (UAS), which is shortly to enter service with 32 Regt Royal Artillery. Unless flown within the visual line of sight of the pilot, or fitted with an approved Detect/Sense and Avoid system<sup>1</sup> requires Unmanned Aircraft (UA) flights to be contained within segregated airspace<sup>2</sup>. 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 The training requirements for WK are not limited to the pilot training aspects, but are geared towards the tactical development and training in the use of the entire capability provided by the system, which involves operating with a much larger network of ground assets. Salisbury Plain is considered by MoD to be the main, if not the only, suitable location within the UK for such collective training to take place. WK is planned to be flown from Upavon and Boscombe Down airfields. Whilst a proportion of WK flights can be accommodated

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<sup>1</sup> 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.

<sup>2</sup> CAP 722 Unmanned Aircraft System Operations in UK Airspace - Guidance

within the existing Salisbury Plain DA complex, the segregated airspace available is insufficient to exploit the full capabilities of the WK system and thus, additional segregated airspace is required.

2.3 There are three airspace elements to the proposal:

- A 'floating' DA extending south from the existing Salisbury Plain DA complex, as depicted at Enclosure 2. This element is divided geographically into 3 sections from west to east, and extends vertically from FL80 to FL160, with a further level split at FL120, thereby creating 6 sub-areas in total. This airspace will be activated by NOTAM.
- An increase of the upper level to which DA EGD126 (Bulford) can be activated by NOTAM to FL90 (currently 2500ft amsl); this provides an opportunity for the aircraft to climb to height prior to entering the 'floating' DA if the western portion of the Salisbury Plain DAs (EGD 123/4/5) are active with artillery firings.
- A DA that is wholly contained within the Boscombe Down ATZ and extends from the surface up to 2000ft AAL (2407 AMSL). The Danger Area will be activated by NOTAM in order to segregate the departure and recovery phases of UAS flights at Boscombe Down aerodrome. The lateral dimensions take the general form of the current Boscombe Down ATZ but the boundary is modified where other DAs 'penetrate' the ATZ; the Old Sarum ATZ is not included.

## STATUTORY DUTIES

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

### 3.1 Safety

3.1.1 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.<sup>1</sup> In this respect I am content that the proposed airspace design is appropriate for the intended use; due to the fact that it is proposed as being 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; in particular, WK is not able to replicate the Detect/Sense and Avoid requirements. A DA Crossing Service (DACS) will be made available to pilots wishing to cross the new airspace and my staff, together with colleagues from the Safety Regulation Group of the CAA and the sponsor for the new DAs, have established specific principles regarding the conditions required for crossing civilian aircraft through DAs within which UAS are operating. These conditions include the provision of a Deconfliction Service<sup>2</sup> (DS) and a requirement for pilots to comply with ATC instructions, particularly with regard to level and track allocations. Pilots who are unable to comply with ATC instructions will not be given clearance to cross the areas. In addition, the UAS pilots will also be provided with a DS, with the additional stipulation that all ATC instructions are mandatory. The design is also compliant with the CAA's Safety Buffer Policy, with regard to proximity with adjacent IFR routes.

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<sup>1</sup> Transport Act 2000, Section 70(1).

<sup>2</sup> iaw CAP 774

## **3.2 Airspace Efficiency**

- 3.2.1 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.<sup>1</sup> 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, as only the elements required for each specific mission will be utilised. The provision of a DACS, as detailed at 3.1.1 above, will also enable the management of other aircraft wishing to cross the segregated airspace.

## **3.3 Airspace Users**

- 3.3.1 I am required to satisfy the requirements of operators and owners of all classes of aircraft.<sup>2</sup> The Sponsor conducted extensive consultation with all affected stakeholder aviation groups as part of the design process and made amendments accordingly. The lower vertical limit of the 'floating' element of the new airspace has been selected at a level that is well above the most popular GA operating levels (FL80) and a further adjustment was made to accommodate operations in the vicinity of Compton Abbas aerodrome. 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. The more complex requirements of the local gliding communities have been accommodated through the Sponsor's stated intent to form a local management committee, which will be tasked with addressing any potential conflicts during occasions where particular (but infrequent) weather features/systems would influence the need for concurrent use of the same area by glider pilots. I am therefore satisfied that the revised structures will not be detrimental to airspace users as a whole.

## **3.4 Interests of Other Parties**

- 3.4.1 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.<sup>3</sup> The Change Sponsor has consulted widely with local government authorities and non-governmental organisations whose areas of responsibility or interest lie beneath the new airspace. With regard to the safety of those on the ground beneath the new airspace, the MoD has provided the CAA with a comprehensive summary of the WK safety strategy as part of the assurance process; this includes details of the airworthiness requirements (which are identical to manned aviation) and how the aircraft will be operated so as to always be within the gliding range of either Boscombe Down aerodrome, or a pre-planned Emergency Recovery Point within the existing Salisbury Plain DA complex, should its power unit fail. In addition, I have also stipulated that suitable operating procedures must be put in place for every flight to cater for Engine Failure After Take-off (EFATO) scenarios. I am therefore content that the interests of affected non-aviation parties have been satisfied.

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<sup>1</sup> Transport Act 2000, Section 70(2)(a).

<sup>2</sup> Transport Act 2000, Section 70(2)(b).

<sup>3</sup> Transport Act 2000, Section 70(2)(c).

### **3.5 Environmental Objectives**

3.5.1 In performing my statutory duties, I am obliged to take account of the Guidance provided by the Secretary of State<sup>1</sup>. My detailed considerations of the environmental aspects of this proposal are covered later in this letter.

### **3.6 Integrated Operation of ATS**

3.6.1 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.<sup>2</sup> When the airspace is active, MoD will be providing air traffic services within the segregated and surrounding airspace. Activities with other ATS providers will be accommodated in the same fashion as at present, via extant ATC liaison procedures. Arrangements to cater for the claw-back of the airspace associated with Airway R41, to the east of the new DAs, are in place and satisfactory to meet airspace policy requirements.

### **3.7 National Security**

3.7.1 I am required to take into account the impact any airspace change may have upon matters of national security.<sup>3</sup> This is an MoD sponsored Proposal and there are no national security issues identified; I am therefore satisfied that national security requirements will not be jeopardised by its implementation.

### **3.8 International Obligations**

3.8.1 I am required to take into account any international obligations entered into by the UK and notified by the Secretary of State.<sup>4</sup> 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.

## **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 WK is unlikely to cause a significant disturbance.
- Night transits to and from Boscombe Down are unlikely to cause additional sleep awakenings. In particular, it should be noted that other aircraft will continue to operate at lower altitudes than WK and that the majority of other aircraft types that currently utilise Boscombe Down generate greater noise levels than WK.
- Considering the WK's frequency of use and its engine size, the effect on the local air quality as a result of this airspace change is considered to be negligible. There is a possibility that additional CO<sub>2</sub> emissions may occur as a result of other aircraft being required to route around the new DAs. However, with the exception of the area surrounding Boscombe Down aerodrome and the raised portion of D126, the selected operating levels are well above the altitudes occupied by the majority of aircraft that currently transit through the area; in addition, a DACS will be available to those pilots that are able to comply with the requirements of the service.

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<sup>1</sup> Transport Act 2000, Section 70(2)(d)

<sup>2</sup> Transport Act 2000, Section 70(2)(e).

<sup>3</sup> Transport Act 2000, Section 70(2)(f).

<sup>4</sup> Transport Act 2000, Section 70(2)(g).

- Aircraft overflying the Cranborne Chase & West Wiltshire AONB may be audible but less likely to cause a disturbance at the altitudes that the MoD plans to operate WK. Based upon the current guidance available, and having regard to the small size of WK, it would appear that operations at the heights associated with this Airspace Change Proposal are unlikely to have a significant impact upon tranquillity or visual impact.
- This ACP will not result in an overall environmental benefit, primarily because it is introducing an additional aircraft type into the airspace; once all of the factors are considered, 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.

## CONSULTATION

5.1 The Sponsor undertook consultation in accordance with the requirements of CAPs 724 and 725. Throughout the initial development of the proposal, it was MoD's intention to operate the aircraft solely from Upavon utilising a newly built tarmac runway; it was on this premise that the first round of public consultation was conducted during the summer of 2008. The runway development at Upavon has since been placed on a long term deferral by MoD and hence, whilst some WK flights will still be possible from the grass runway, operations from a paved runway are preferred; as a result, the intention is now to operate the aircraft from both Boscombe Down and Upavon; the precise usage of each airfield is still being determined by MoD, but latest estimates anticipate 50%-70% of flights originating from Boscombe Down. Therefore, the proposal was amended to incorporate additional segregated airspace around Boscombe Down airfield, which essentially consists of that portion of the existing ATZ that lies outside of any other DA. A second period of formal public consultation was conducted during the summer of 2009; this consultation covered these changes to the requirement and also included additional noise data for WK that was not previously available.

5.2 The assessment of the proposal by DAP Business Management noted the following points:

- The Sponsor identified 68 organisations as primary stakeholders together with 117 parish councils. These stakeholders were notified of the consultation in writing utilising recorded delivery. The consultation material was clear and easily understandable and very early on made the point that although the views of stakeholders were being sought, the views of others would also be considered.
- During the first consultation period, of the primary stakeholders 74% did not respond, 10% were in favour and 6% were against the proposal. For the second period, the response figures were 77% did not respond, 1% in favour, 3% against and 18% neutral (+ 1% admin, change of contact etc.). In addition, a further 55 responses were received from members of the public; 16% in favour, 40% against and 44% making no comment on the proposal but raising concerns over the overall consultation process or issues of UAS basing policy.
- Respondents raised a number of themes, which were correctly and clearly identified in the Stakeholder Consultation Feedback Reports published on 12 May 2009 (for the summer 2008 consultation) and 17 Nov 2009 (for the summer 2009 consultation). These key themes were adequately addressed in both documents and responses were provided to the issues raised.
- A number of issues required significant engagement to resolve, most notably in mitigating the effect of the proposal on gliding operations and addressing the concerns

of the Cranborne Chase & West Wiltshire AONB representatives, but the sponsor was equal to the task.

- The consultation process met the CAA's regulatory requirements and guidance in CAP 725.

5.3 The apparent lack of response from primary stakeholders is disappointing, although I recognise that a great deal of the airspace issues highlighted by local operators were addressed in the initial stages prior to formal consultation. I am also satisfied that reasonable steps were taken to ensure that consultees actually received the information. Hastening letters were sent 4 weeks prior to the close of consultation and, where communication issues arose, the sponsor was quick to try and resolve any problems.

## **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 presented represent the most reasonable and pragmatic solution whilst still supporting the MoD's key requirements.

6.2 I am well aware that this ACP breaks new ground in a number of areas and is 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. Whilst to date these have all either been resolved, or are the subject of an appropriate mitigation strategy, I have taken a measured approach in my decision and have added a number of conditions to the approval; these include:

- Use of the new DAs is initially restricted to the WK UAS, or other similar UAS types that possess an equivalent airworthiness status and environmental characteristics; the use of any other type of UAS shall be subject to an additional safety and environmental assessment.
- Radar monitoring of the new DAs must be available throughout the time that UAS operations are taking place within them.
- Unmanned Aircraft operating within the new airspace must always remain within gliding range of either Boscombe Down aerodrome, or a nominated Emergency Recovery Point within the Salisbury Plain Danger areas; additionally, suitable operating procedures are to be in place for every flight to cater for Engine Failure After Take-off (EFATO) scenarios.
- Operational statistics are to be maintained covering details of DACS transits (including those refused) and occasions where plans for UAS flights have been adjusted/rearranged to accommodate the operations of other airspace users.
- For environmental reasons, planned overflight of the town of Amesbury should be avoided to the greatest extent possible, commensurate with the safe operation of aircraft, whilst in transit to and from Boscombe Down within the DA encompassed by the Boscombe Down ATZ.

6.3 The revised airspace will become effective from 1 July 2010 (AIRAC 7/2010) and the new DAs will be identified as EG D120 and EG D122A/B/C. 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*

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M Swan  
Director

Enclosures:

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

# Summary Environmental Report for the Salisbury Plain Training Area UAV Airspace Change Proposal

This is a summary of the Annex E report prepared by ERCD titled “Salisbury Plain Training Area UAV” for DAP (dated 12 March 2010). The report described the environmental considerations relevant to the proposed creation of new Danger Areas at Salisbury Plain for the purpose of introducing flights by Watchkeeper (WK), an Unmanned Aerial Vehicle (UAV), from both Upavon and Boscombe Down airfields.

## Noise

The sponsor used a number of metrics to portray the anticipated noise impact of WK.

WK will not be flying any lower than FL90 in areas A-C, but will be lower as it departs and arrives at Boscombe Down airfield (typically 1,500ft). With all of the noise metrics used to illustrate the impact of WK, it should be borne in mind that other, noisier aircraft are likely to continue operating in the airspace below areas A-C during the day and at weekends.

The aggregation of noise measurements undertaken by the sponsor produced an  $L_{max}^1$  figure of 82 dBA for a fly-past at 200ft. Based on these measurements, noise modelling for WK produced a peak sound level ( $L_{max}$ ) of 68 dBA at 950ft, and at 9,000ft, the  $L_{max}$  is expected to be 41 dBA. Furthermore, based upon the modelling and the expected heights at which WK will be flown, the sponsor believes that the  $L_{max}$  values for WK will typically be 40 dBA and below. This assertion seems reasonable based upon the sponsor’s assessment.

The sponsor advised that WK will not fly below 1,500ft beyond the boundary of the Boscombe Down airfield, and that this is the height it will typically transit from the new Danger Area around the airfield to the existing Danger Areas over Salisbury Plain. This could mean that WK flies over Amesbury as it transits to and from Boscombe Down. At 1,500ft, WK is expected to produce a Sound Exposure Level (SEL) of 75 dBA. “Typical” transit heights were used to model a selection of representative aircraft that operate at Boscombe Down and of the four aircraft used as a comparison, only one has a lower SEL than WK.

With regards to night flights, previous research has shown that residents tend to be awoken by the noise levels in a single noise event. One of the key findings of this research is that for outdoor aircraft noise events below 90 dBA SEL, the average person’s sleep is unlikely to be disturbed. Therefore, at 75 dBA SEL, it is reasonable to conclude that there are unlikely to be additional awakenings from sleep caused by WK transiting to and from Boscombe Down at night.

The  $L_{eq\ 16\ hours}$  metric was used to illustrate the anticipated noise impact of WK flying in a fixed location for a sustained period. Using this metric, and assuming that WK flies for a 16-hour operation at 7,000ft above the ground, the anticipated noise impact is 45 dBA. This is well below the 57 dBA  $L_{eq}$  threshold for the onset of significant community annoyance.

There is also the potential for the creation of additional noise over some areas as a result of other noise-generating aircraft (such as General Aviation) being required to route

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<sup>1</sup> All of the noise measurement metrics used in this report are explained in more detail in CAP 725, Appendix B, Sections 4 & 5.

around the new segregated airspace. The extent of this potential impact will be minimised for a number of reasons however:

- The new Danger Areas will only be activated when WK is operating. At other times, the current airspace arrangements will prevail.
- The majority of the new segregated airspace (Areas A-C) will only be active between FL90 and FL160, which will allow any aircraft that operate below FL90 to continue to do so.
- The level of current activity between FL80 and FL160 is infrequent, which would suggest that few noise-generating aircraft will be affected.
- A Danger Area Crossing Service will be introduced, enabling some aircraft to cross the new segregated airspace even when it is activated.

## **Emissions**

There are no emissions data for WK so the sponsor illustrated the potential impact by modelling the expected CO<sub>2</sub> emissions caused by a close equivalent aircraft, and then comparing this with another aircraft.

Based upon the assumptions about the usage of WK, an estimate was calculated for the total additional CO<sub>2</sub> that the introduction of WK flights may generate. Using this information, it is estimated that total CO<sub>2</sub> emitted in one year would be in the region of 79 tonnes. By comparison, a Britten-Norman Defender BN12 would be expected to emit a total of almost 2,000 tonnes over a year. As the introduction of WK would represent additional activity over and above all existing activity at Upavon and Boscombe Down, it was concluded that WK would have a negative impact in terms of CO<sub>2</sub> emissions. However, the extent of that negative impact is likely to be insignificant on the basis of the expected fuel burn rate and level of activity of WK.

## **Local Air Quality**

The introduction of WK will have a negligible impact upon local air quality. Neither airfield (Upavon or Boscombe Down) is within Air Quality Management Areas, and the likely volume of emissions from WK (considering its frequency of use and its engine size) are not likely to show an impact upon air quality.

## **Tranquillity and Visual Intrusion**

Based on the noise modelling results, "typical" L<sub>max</sub> noise levels caused by WK overflying the Cranborne Chase and West Wiltshire AONB are anticipated to be <55 dBA. The worst-case noise level within the AONB is Hart Hill near Shaftesbury which was modelled as having an L<sub>max</sub> value of 46 dBA. When WK overflies the AONB it may be audible in some circumstances but whether or not this impacts upon tranquillity is a subjective and individual perception. This will be less likely if WK operates at the heights that the MoD expects to be typical (more likely) than at worst-case heights (unlikely).

The issue of visual intrusion was adequately considered by the sponsor, bearing in mind the minimum height that WK will be flying, the size of WK, the fact that it will not be creating contrails, and its anticipated noise levels. Additionally, other aircraft are likely to continue flying at heights below WK.

Whilst accepting that there may be an impact on the Cranborne Chase & West Wiltshire AONB, it was felt that the likely impact will be negligible for a number of reasons, namely:

- The new airspace is not entirely above an area of the Cranborne Chase & West Wiltshire AONB. (Specifically, Areas A & B of the new airspace.)
- The base level of this airspace is FL80.
- Currently, this airspace is Class G and therefore could be (and is) used by any aircraft today.
- The size and characteristics of WK will make its noise and visual impact less than most other manned aircraft.

## **Conclusion**

As the introduction of WK represents the operation of a new aircraft type in addition to existing traffic levels, this Airspace Change Proposal will not result in an overall environmental benefit. However, the overall environmental impact is likely to be minimal once all of the factors are considered.

Andrew Green

Environmental Research and Consultancy Department

25 March 2010

# MOD UAS ACP

Areas A to C - EG D122A/B/C - FL 80 to FL160

Area D - EG D120 - surface to 2000ft AAL (2407 ft AMSL)

EG D126 - Upper limit increased to FL90 by NOTAM

