# CAA Environmental Assessment

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| **Title of airspace change proposal (ACP)** | Enabling Remotely Piloted Aircraft Operations at RAF Fairford - HALE |
| **Change sponsor** | Ministry of Defence (MoD) |
| **Project reference** | ACP-2021-078 |
| **Account Manager** | [redacted] |
| ***Case study commencement date*** | 8 January 2024 |
| ***Case study report as at*** | 05 February 2024 |

*Instructions*

In providing a response for each question, please ensure that the 'status' column is completed using the following options:

YES • NO • PARTIALLY • N/A

To aid the SARG Lead it may be useful that each question is also highlighted accordingly to illustrate what is:

resolved YES not resolved PARTIALLY not compliant NO

## 1. Introduction

*Insert a brief summary of the proposed change, covering aspects such as key elements of the airspace design, sponsor, CAA* scalability *Level, any key documents used for this report, any links (contingent or otherwise) to other proposals etc.*

The proposed airspace change is to establish a segmented Danger Area (DA) to facilitate Beyond Visual Line of Sight (BVLOS), High Altitude Long Endurance (HALE) Remotely Piloted Aircraft (RPA) to transit from Royal Air Force Fairford to the required transit altitude. The proposed permanent DA complex was originally from SFC to FL500 centred on RAF Fairford to allow US HALE RPA to arrive and depart the aerodrome and climb to FL500 before transiting to its operational location. A technical amendment was submitted on 05 February 2024 to increase the upper limits of segments C and D to FL660 to comply with CAP722, which states that BVLOS activities must be segregated in the absence of a CAA-approved DAA capability. US HALE RPAS do not have that capability. There are no other

amendments being sought to the altitudes of other segments and no change to the proposed activation times, frequency, or duration of activation.

The ACP sponsor is the Ministry of Defence. The proposed ACP is to support NATO's Agile Combat Employment concept and in particular, US Air Force operations at RAF Fairford. The CAA has scaled the proposal as a Level M2 ACP (under CAP1616 v.4) on the basis that there is anticipated to be minimal impact on civil aviation traffic patterns below 7,000 ft. The key documents used for this report are 20231208-ACP-201-078 RPAS Ops from RAF Fairford HALE Stage 4B Final Submission.pdf in particular, section 15 Environmental Assessment and Annex A – Environmental Impact Analysis and 20231208-ACP-2021-078 RPAS Ops from RAF Fairford HALE Stage 4A Consultation Review.pdf

| 2. Nature of the Proposed Change | | Status |
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| 2.1 | Is it clear how the proposed change will operate, and therefore what the likely environmental impacts will be? | Yes |
| | The proposed DA comprises 4 volumes of airspace as follows:<br>• RAF Fairford from surface to FL75 (segment A)<br>• FL50 – FL240 (segment B)<br>• FL160 – FL660 (segment C)<br>• FL200 – FL660 (segment D) | |

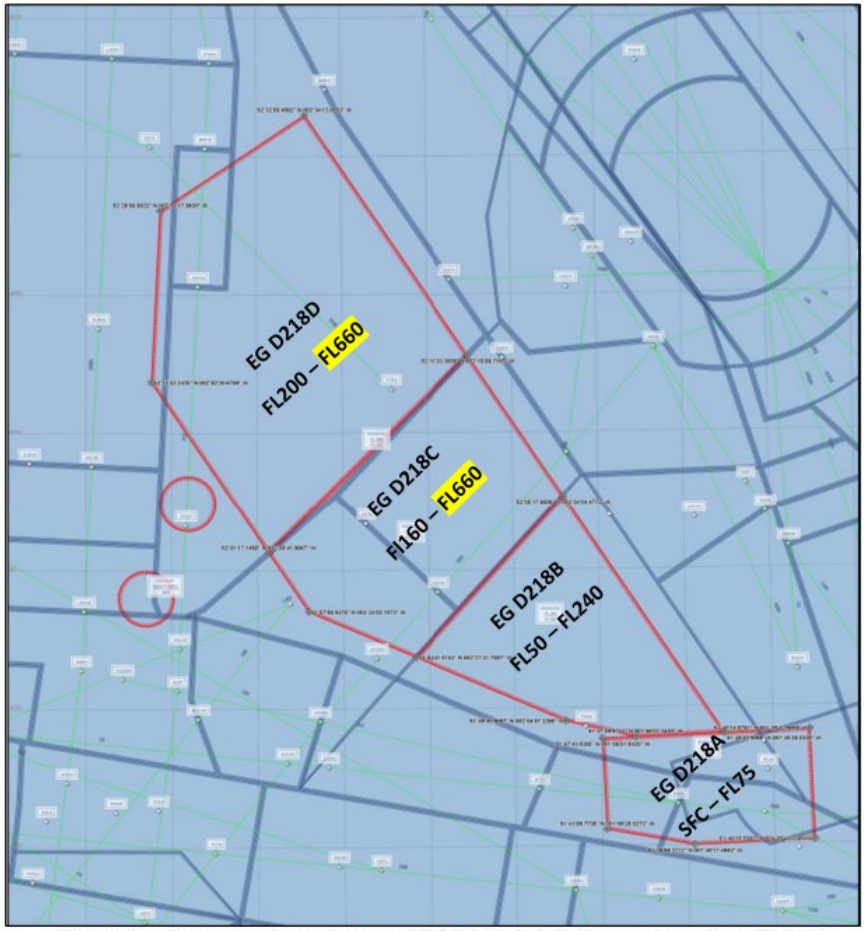


Figure 3 – Proposed Amendment of EGD218 C & D (Upper Altitude to FL660)

The four segments are joined laterally to allow for the safe climb and descent of HALE RPA between RAF Fairford and the transit altitude of FL600+. The proposed airspace is adjacent to several controlled airspace structures and ATS routes and consequential impacts on other airspace users has been identified and evaluated.

The proposed airspace is expected to be activated 2-3 times per week for up to 3 hours per activation. The 3-hour window is intended to not only accommodate arrivals and departures but also to ensure that the airspace is active for a sufficient time to allow for emergency or contingency scenarios. Activation will be by NOTAM at least 24 hours prior to operations. A Danger

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| | Area Crossing Service (DACS) is to be provided.<br><br>The proposed hours of activation will be between 1 hour after sunset and 1 hour prior to sunrise. The sponsor has acknowledged the impact that this activation period would have during the winter months and has stated that they will restrict activation to a shorter window, no earlier than 2000 UTC and no later than 0530 UTC, for normal operations. However, the sponsor wishes to retain the option to utilise the full extent of the activation window to allow for operational flexibility in the event of an unforeseen urgent defense requirement.<br><br>This ACP is scaled as a Level M2, a proposed change where the anticipated consequences are either (a) an alteration of civil aviation traffic patterns at 7,000 feet or above, or (b) no impact on civil traffic. In this case criterion (a) applies as the proposed ACP is not considered likely to alter civil aviation patterns below 7,000 ft. Environmental impacts that are a direct result of military aircraft or military operations (including civil aircraft carrying out military function under contract) are not required to be considered or assessed. However, consequential environmental impacts from other airspace users (i.e., civil aviation) that are a result of the proposed change must be assessed.<br><br>There are three airports adjacent to the proposed DAs, London Oxford Airport (Kidlington), Cotswold Airport (Kemble), and Gloucestershire Airport. There are also several smaller airfields utilised for GA flying and several gliding, hang-gliding, and microlight sites (see Figure 3 above). The sponsor has indicated that the airspace in the region can be busy during the daytime however, at night when the proposed DAs are to be activated, aviation activity outside of controlled airspace is stated to be 'close to zero'. The sponsor has supported this rationale by observation of ADS-B data, impact analysis simulation (presented in stage 3) and stakeholder feedback. In conclusion, the sponsor assessed that impacts to Class G airspace and General Aviation should be minimal with the provision of a Danger Area Crossing Service (DACS).<br><br>For Level M2 ACPs, the sponsor is only required to assess carbon dioxide ($CO_2$) emissions associated with the consequential changes on civil aviation patterns (CAP1616 v4 paragraph B12). A quantitative assessment of $CO_2$ emissions was undertaken by the sponsor at Stage 2 and subsequently amended in response to CAA feedback at that stage. The final details of the $CO_2$ assessment are provided in response to Q.8 below.<br><br>There is no requirement for sponsors to assess noise or other environmental impacts for Level M2 ACPs. |

| 3. Secretary of State Call-in Noise Criterion | | Status |
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| 3.1 | Is the proposal likely to meet the Secretary of State's criterion for call-in on noise impacts? If yes, has the additional assessment on that criterion been undertaken and what are the results? If no, what is the rationale for that conclusion?<br><br>The criterion, as set out in the DfT's Air Navigation Guidance (2017)1 is that the proposed airspace change could lead to a change in noise distribution resulting in a 10,000 net increase in the number of people subjected to a noise level of at least 54 dB2 as well as having an identified adverse impact on health and quality of life.3 | **No** |
| | The ACP does not meet the Secretary of State's criterion for call-in on noise impacts as the proposed ACP is not anticipated to change civil aviation patterns below 7,000 ft. | |

| 4. Statement of Need | | Status |
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| 4.1 | Does the Statement of Need include any environmental factors? | **No** |
| | The statement of need does not include any environmental factors. | |

| 5. Design Principles | | Status |
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| 5.1 | Does the final set of Design Principles include any environmental objectives? | **Yes** |
| | The Change Sponsor developed a set of seven Design Principles (DP). One DP has a specific environmental objective, DP *g) 'Minimise the environmental impact of non-participating aircraft'* and one non-specific environmental objective DP*(c) 'Minimise the impact to other airspace users*', which seeks to influence the nature and scale of consequential environmental impacts on other airspace users and is, therefore, considered to include an environmental objective. DP *(d) 'Adhere to FUA principles and Strategy'* also aims to minimise disruptions to civil air traffic and therefore impacts the consequential environmental impacts by efficient operational management of airspace. Further, it may also be considered that DP *(e) 'Where possible and practicable,* | |

[1] The DfT's call-in criteria are set out in The Civil Aviation Authority (Air Navigation) Directions 2017, Section 6, paragraph (5). These Directions are replicated in Annex D of the DfT's Air Navigation Guidance 2017,

[2] LAeq 16h noise exposure.

[3] The assessment of the numbers of people affected and the associated adverse impacts on health and quality of life of the airspace change proposal should be carried out by the sponsor in accordance with the requirements set out in the DfT's Guidance.

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| | *accommodate the Airspace Modernisation Strategy'* also indirectly refers to the Strategy's overarching Environmental Sustainability principle in terms of minimising impacts. It should be noted that not all the design principles include a SMART objective or are fully defined. | |
| 5.2 | Does the proposal explain how and to what extent the final airspace design achieves any environmental Design Principles? | **Yes** |
| | The sponsor developed the final airspace design from three design options, Option 0 (Do nothing) and two HALE options 1 and 2. The 'Do nothing' option was rejected at Stage 2 as the lack of segregated airspace would preclude HALE RPA operations. After Stage 2, NATS identified significant expected impacts from HALE Options 1 and 2. Specific concerns were raised by NATS regarding the impact of the upper limit altitude of Segment A for both options on flight planning for departures at adjacent airports. In addition, the southern portion of Segment A was identified as generating a major impact to civil traffic patterns.<br><br>Based on engagement with NATS and further analysis by the sponsor, it was determined that HALE Options 1 and 2 were not viable. The sponsor undertook further stakeholder engagement and produced an interim HALE option which reduced the upper level of Segment A to FL 80 and modified the shape of Segment A to allow it to be shifted ~5 NM to the north. After further safety analysis, Segment D was added to improve operational flexibility in the event of adverse weather conditions. This option also sought to reduce impacts to other airspace users by permitting a faster climb to operating altitude.<br><br>Following further engagement with NATS in respect of the interim design option, further modifications were made to minimise the impact on other airspace users. This process resulted in HALE Option 3 which allows for increased internal safety buffers and provides more operational flexibility for contingency situations. This Option is stated to reduce the possibility of excursion and is assessed to be the minimum viable airspace needed to fully meet DP a) 'Provide a safe environment for all airspace users' and DP b) 'Provide access to sufficient suitable airspace to enable efficient RPAS transition between the ground and high-level transit routes.'<br><br>Design Principle Evaluation of Design Option 3 was undertaken at Stage 3 as part of the Full Options Appraisal. The final design option (Option 3) was evaluated as **partially** meeting DP *g) 'Minimise the environmental impact of non-participating aircraft.'* This was on the basis that by selecting the minimum viable volume of airspace, limiting the activation window to times of lower traffic, limiting the frequency of activation to 2-3 times per week, and limiting the duration of activation no more than 3 hours, the option minimises the environmental impact of non-participating aircraft as much as possible while still permitting the required military activity. The DPE recognises that Design Option 3 still has some impact on non-participating aircraft. It was noted that the provision of a DACS should further limit this impact.<br><br>It is acknowledged by the sponsor that there would still be some impacts to civil flight planning but that the final design option minimises the consequential impacts to other airspace users and the subsequent increase in CO2 emissions. Considering the | |

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| | changes that have been made to the final design option as a result of stakeholder engagement but acknowledging that the anticipated impacts have not been completely mitigated, the CAA agrees that the final airspace design partially achieves the specific environmental design principle (DP g) and non-specific DP *c) 'Minimise the impact to other airspace users.'*<br><br>In respect of DPs d) and e) the final option was evaluated as 'met' for both. For DP d) '*Adhere to FUA principles and strategy',* the sponsor states that the final design and proposed times of use minimise impacts to other airspace users and that, in accordance with CAP 740 Appendix A, the airspace will the airspace will be activated when needed and returned when no longer needed. Additionally, the expected availability of a DACS will permit use of this airspace by other civil and military airspace users, where possible. For DP e) '*Where possible and practicable, accommodate the Airspace Modernisation Strategy*' the sponsor has highlighted that the AMS aims to accommodate RPAS and is required to support the delivery of Defence and Security objectives. The final design option minimises the impact of other airspace users, addressing the Strategy's overarching Environmental Sustainability principle. This evaluation of the DPs is acceptable.<br><br>It should be noted that the sponsor has committed to reducing the activation period to a shorter window for normal operations, to no earlier than 2000 UTC and no later than 0530 UTC. This should further minimise impacts on other airspace users, during the winter months however, the sponsor wishes to retain the option to utilise the full extent of the activation window to facilitate urgent defense requirements.<br><br>Note the sponsor is seeking dispensations to the SARG SUA Safety Buffer Policy to minimise impacts to other users. Specifically, the sponsor is seeking dispensation from the established lateral buffer from edges of TMAs, CTRs, CTAs (excluding the Upper CTAs) and from ATS Routes above FL195 to 3nm in all cases. If approved, this is anticipated to further reduce impact on network route traffic. | |
| 5.3 | Were there any proposed environmental Design Principles that were rejected from the final set? If so, is the rationale for rejecting those Principles reasonable? | **No** |
| | No Design Principles were rejected from the final set. | |
| 5.4 | Were there any design options during the airspace change process that might have better met the environmental Design Principles than the final proposal as submitted to the CAA? If so, is the rationale for rejecting those options set out? | **No** |

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| | No other design options were presented during the airspace change process that would have better met the environmental DPs than the final proposal. Notwithstanding this, there are impacts on $CO_2$ emissions associated with the final design proposed.<br><br>The sponsor developed the final airspace design from three initial design options, Option 0 (Do nothing) and two HALE options 1 and 2. The 'Do nothing' option was rejected at Stage 2 as the lack of segregated airspace would preclude HALE RPA operations.<br><br>Following further analysis at Stage 2, it was determined by the sponsor that HALE Options 1 and 2 were not viable. The sponsor undertook further stakeholder engagement and produced an interim HALE option which was amended again after further safety analysis. Following engagement with NATS, further modifications were made to minimise the impact on other airspace users. This process resulted in HALE Option 3 which reduced the possibility of excursion and was assessed to be the minimum viable airspace needed to fully meet DP a) 'Provide a safe environment for all airspace users' and DP b) 'Provide access to sufficient suitable airspace to enable efficient RPAS transition between the ground and high-level transit routes.'<br><br>Design Option 3 was evaluated as partially meeting DP *g) 'Minimise the environmental impact of non-participating aircraft.'* This was on the basis that the final design option represents the minimum viable volume of airspace and limits the frequency and duration of activation to minimise the environmental impact of non-participating aircraft as much as possible. However, it is acknowledged that there would still be some impacts to civil flight planning and the consequential environmental impacts associated with the ACP have not been completely mitigated. |

| **6. Options Appraisal** | | **Status** |
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| 6.1 | Have environmental impacts been adequately reflected and assessed in the Options Appraisal? | **Yes** |
| | For Level M2 ACPs, the sponsor is only required to assess carbon dioxide (CO2) emissions associated with the consequential changes on civil aviation patterns (CAP1616 v4 paragraph B12). A quantitative assessment of CO2 emissions was undertaken by the sponsor at Stage 2 and subsequently amended in response to CAA feedback at that stage. The final details of the $CO_2$ assessment are provided in response to Q.8 below. | |
| 6.2 | Is the final proposal as submitted to the CAA the airspace design option that also produced the best environmental impacts as assessed by the Options Appraisal? If not, does the rationale for selecting the preferred option adequately explain this choice? | **Yes** |
| | The sponsor assessed that the final design option (Option 3) minimises the environmental impact of non-participating aircraft as much as possible while still permitting the required military activity. This has been achieved by utilising the minimum viable volume of airspace, limiting the activation window to times of lower traffic frequency, limiting the frequency of activation to 2-3 | |

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| | times per week, and limiting the duration of activation to no more than 3 hours. The proposed provision of a DACS should further limit this impact. As the environmental impacts associated with the ACP are expected to be proportional to the consequential changes to civil aircraft patterns, the final design option submitted to the CAA is also likely to produce the best environmental impacts, as assessed by the Options Appraisal. |

| **7. Noise [for Level 1 and Level M1 airspace change proposals]** | | **Status** |
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| 7.1 | Has the noise impact been adequately assessed and presented in both the consultation material and the final submission to the CAA, taking account of scalability and proportionality? | **No** |
| | There is no requirement for noise to be assessed for Level M2 ACPs. | |
| 7.2 | If a noise assessment has not been undertaken by the sponsor, has this decision been adequately explained and evidenced in both the consultation material and the final submission to the CAA, and is the rationale reasonable? | **Yes** |
| | Yes, this ACP has been scaled as a Level M2 for which the sponsor is only required to assess carbon dioxide ($CO_2$) emissions associated with the consequential changes on civil aviation patterns (CAP1616 v4 paragraph B12). | |
| 7.3 | Summary of anticipated noise impacts from the final proposed airspace change. | |
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| **8. CO2 Emissions** | | **Status** |
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| 8.1 | Has the impact on $CO_2$ emissions been adequately assessed and presented in both the consultation material and the final submission to the CAA, taking account of scalability and proportionality? | Yes |
| | A detailed quantitative analysis of the anticipated $CO_2$ emissions due to civil traffic being re-routed as a consequence of this ACP has been provided in Section 15 and Annex A of the Stage 4 – Final Submission document (submitted 8 December 2023) and in the Stage 4A Annex C – Consultation Presentation.<br><br>At Stage 3 of the ACP process, the sponsor submitted an assessment of the impacts which included calculation of route length, fuel burn and carbon dioxide equivalent emissions on a per impacted flight per hour basis (for summer and winter periods), and a calculation of the annual minimum and maximum environmental impacts. The change sponsor used the most | |

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| | up to date and credible data and modelling in line with relevant best practice however, there were some gaps in the assumptions made for the modelling inputs and an error in the calculation of fuel burn and $CO_2$ emissions was identified with the model outputs being 10x higher than anticipated.<br><br>The sponsor subsequently provided revised calculations and further information on the model input assumptions which have been accurately incorporated into the final submission document. The final submission document includes data for the proposed revised activation period (20.00 – 05.30) which affords a shorter activation period than the previously modelled winter activation period (17.00 – 07.00) but longer than the previously modelled summer activation period (21.00 – 05.00).<br><br>The source of the data for the environmental assessment has been clearly referenced. Traffic sample data was taken from 2303 AIRAC for sampling period 23/03/23 to 19/04/2023 and simulated baseline air traffic models have been produced using NEST (v1.8). Emission figures have been produced using BADA 4.2 data. The model input assumptions and output calculations have been verified and accepted by the CAA.<br><br>The sponsor produced a Consultation Presentation at Stage 4A which incorporated diagrams of the simulated impact of the ACP on civil aircraft, calculations showing the best case and worst-case annual emissions including comparison of the summer and winter schedules, together with a simulation of additional fuel costs for civil aircraft as a result of the required re-routes. The Sponsor selected aviation stakeholders from an area within a radius of approximately 30 miles from RAF Fairford and used the National Air Traffic Management Advisory Committee (NATMAC) as a means of broader engagement plus local aviation, airline, local authority, other local and national organisations and individual stakeholders.<br><br>The environmental assessment and the representation of the assessment in stakeholder engagement materials has been appropriate in terms of scale and proportionality based on the requirements for a Level M2 ACP. | |
| 8.2 | If an assessment of the impact on $CO_2$ emissions has not been undertaken by the sponsor, has this decision been adequately explained and evidenced in both the consultation material and the final submission to the CAA, and is the rationale reasonable? | N/A |
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| 8.3 | Summary of anticipated impact on $CO_2$ emissions from the final proposed airspace change. | |

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| | The Environment Impact Assessment in respect of this ACP was undertaken by NATS Analytics in September 2023. The assessment was based on a number of key assumptions and modelled scenarios to evaluate impacts to civil traffic, using representative traffic samples provided by NATS Analytics.<br><br>Traffic sampling confirmed that no impacts are expected below 7,000 feet as a consequence of the proposed final design option. This conclusion has been confirmed through stakeholder engagement and the categorisation of this ACP as a Level M2 change can therefore be validated. While impacts to civil traffic patterns below 7,000 feet are evaluated as being highly unlikely, the Sponsor has incorporated impact mitigation measures including, NOTAMs when proposed airspace would be active, activation during periods of low traffic density, and the utilisation of a DACS.<br><br>The final Design Option was designed to avoid heavily used routes as far as possible and the worst-case scenario for fuel burn and CO2 emissions (where no DACS is utilised) is presented in Annex A of the Stage 4B – Final Submission document. The traffic sample used for the simulation was taken from the 2303 AIRAC (EUROCONTROL) covering the period 23/03/2023 to 19/04/2023. This AIRAC was chosen to give an up-to-date baseline set of traffic that was not significantly impacted by the Covid-19 pandemic and included the West Airspace Implementation. A total of 6 sample days were selected to represent the winter and summer schedules (3 days in the winter period and 3 in the summer period). The dates were selected to give a good overall representation of traffic, taking into account day of the week, traffic count and city pair flows. The traffic sample was defined as any flight whose simulated trajectory changed due to activation of the Danger Area.<br><br>Due to the proximity of the Danger Area to the southern edge of the UK FIR (London FIR), some flights need to change their UK entry/exit point between the Baseline and Scenario simulations in order to produce a valid flight plan. Therefore, a Simulation Region was created for the study, matching the UK FIR on the Atlantic boundary but expanding across European airspace. This fixed the Oceanic UK FIR entry/exit point for any transatlantic flights, ensuring that the North Atlantic Tracks were utilised in a realistic manner. See Figure A-2: Example Trajectory. |

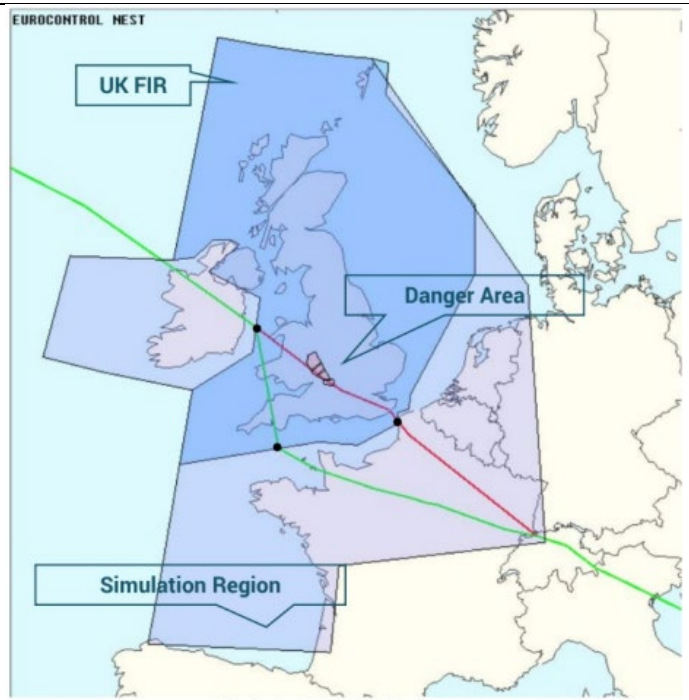


Fig A-2 – Example Trajectory

Baseline (red)
Scenario (green)

In this scenario the flight route length was calculated to increase by 77 nm with resultant increase in fuel burn and $CO_2e$ emissions.

To assess the environmental impact of the ACP, the track distance flown within the UK FIR (NM) was taken from the Baseline and Scenario models and used to calculate the change in distance flown. The fuel burn at cruise by aircraft type was then taken from the BADA 4.2 PTF tables and used to calculate the fuel burn change based on the change in distance flown. The figures (A-3 and A-4) below show baseline trajectories compared to the simulated trajectories of traffic routed around the activated Danger Areas.


Fig A-3 – Baseline Trajectories


Fig A-4 – Re-routed Trajectories when Danger Areas are active

The flights modelled were used to represent a typical 3-hour long activation segment of the Danger Area. Based on a maximum of 9 hours of activation per week, this was scaled up to represent a maximum annual impact of 468 activation hours per year. The average route length, fuel burn and carbon dioxide equivalent (CO2e) emissions per impacted flight per hour were calculated for the winter schedule (between 17:00 and 07:00 UTC) and summer schedule (between 21:00 and 05:00 UTC) and the results used to calculate the annualised minimum impact (best case scenario) and annualised maximum impact (worst case scenario) in terms of fuel burn and CO2e emissions for years 2024 – 2033. Overall, an average of 15 flights are impacted per typical 3-hour long activation segment. **Based on a minimum of 2 activations per week, this equates to a minimum of 1,560 flights impacted per year, and for the maximum of 3 activations per week, an estimated maximum of 2,340 flights impacted per year (based on 2023 traffic data).** The weighted average fuel burn per flight of 32,999 kg in the baseline and 33,299 kg in the simulated scenario for the whole flight trajectory was applied to the annual impacted traffic to obtain the total fuel burn (in tonnes) for each scenario.

The traffic forecasts were calculated using the NATS (March 2023) Base Case Forecast to estimate the maximum annual impacts from 2024 to 2033 (10 years post implementation) and assuming a steady growth rate of 0.7% for 2029 onwards.

The cumulative fuel burn and $CO_2$ emissions were determined for the aircraft that were simulated to be impacted along their

normal route and the delta value calculated by reference to the baseline fuel burn and $CO_2$ emission values for the 10-year forecast period. The table below provides the delta from the baseline fuel burn (Tonnes) and the predicted increase in fuel cost, based on the worst-case scenario.

| Year | Delta from baseline (fuel in tonnes) | Increased Fuel Cost |
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| 2024 | 743 | £ 438,704 |
| 2025 | 757 | £ 446,971 |
| 2026 | 767 | £ 452,875 |
| 2027 | 776 | £ 458,189 |
| 2028 | 785 | £ 463,503 |
| 2029 | 790 | £ 466,456 |
| 2030 | 796 | £ 469,998 |
| 2031 | 802 | £ 473,541 |
| 2032 | 807 | £ 476,493 |
| 2033 | 813 | £ 480,036 |

**According to the calculations, the estimated increase in cumulative annual fuel cost in a worst-case scenario equates to an average of ~ £178 in fuel cost per impacted flight, this amounts to an increase in fuel costs for civil aviation of £4.63m over the 10-year forecast period (2024-2033).**

The jet fuel price used to derive these costs was derived from the IATA jet fuel price of £590.45/tonne as updated on 17/07/2023.

Using the Defra TAG Greenhouse Gas Workbook, the sponsor has calculated that the **Net Present Value of carbon dioxide equivalent emissions of proposal is calculated as - £2,339,003.** The negative value reflects a net cost, i.e., an increase in $CO_2$e emissions.

The simulation, modelling and calculation methodologies used to conduct the environmental impact assessment are considered robust and representative of the worst-case scenario.

**UPDATE 05/02/2024:** The late change to the upper limit of segments C and D from FL500 to FL660 has the potential to change the outputs to the environmental impact assessment, specifically if the change in volume of segregated airspace impacted more civil traffic movements. The sponsor formally requested feedback from NATS on whether the assumptions that were made in the environmental impact assessment at Stage 3 would be the same based on the amended airspace. NATS confirmed that the NATS Analytical model was built using the dimensions of the TDA to FL500 with an additional 2,000 ft buffer above and below to account for the CAA SUA buffer policy. NATS confirmed that there were no aircraft identified above FL500 in the traffic sample used to inform the model outputs. Regarding the duration of activation, the change sponsor states that the flight profile of the platform is not anticipated to change, and there would be no change to the duration of activation prior to releasing the airspace.

NATS cautioned that while current usage indicates that there would no impacts associated with raising the upper level of the airspace, this did not take account of future “new entrant” civilian traffic which may operate from FL500 to FL660. The definition of “new entrant “was not specified. Whilst this may have an impact on the number of flights consequentially impacted by the proposed (amended) ACP over the 10-year forecast period, it would be difficult for the change sponsor to predict the type and frequency of those flights at this stage. Pragmatically, the number of ‘new entrant traffic’ is likely to be comparatively small with

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| | limited relative impact on fuel burn and $CO_2$ emissions. Therefore, based on current use patterns the environmental impact assessment is considered to remain relevant.<br><br>The sponsor has proposed the following mitigation measures to reduce the impact of the ACP:<br><br>**Danger Area Crossing Service** - The sponsor has stated that an activation window of up to 3 hours is required to provide flexibility in case the planned departure or arrival time is impacted by adverse weather or minor maintenance delays. This duration also ensures that the airspace is active in the event the aircraft needs to land shortly after take-off in an emergency or contingency scenario. In normal operations, the airspace is only expected to be in use for 45-55 minutes per activation. When possible, the sponsor proposes that the airspace will be made available to ATS providers, via a DACS, to minimize required re-routing of civil aircraft around the Danger Area.<br><br>**Reduced Activation Window** - The Sponsor agreed to a NATS request to reduce the original activation window (1 hour after sunset to 1 hour before sunrise) to 20:00 - 05:30 UTC to avoid peak traffic periods. This equates to a 4.5-hour reduction in the activation window during the winter months. Using the traffic samples from the winter hours scenario, the sponsor has calculated that this would reduce the average number of aircraft impacted from 6 to 3.6 per hour. This reduction is due to an average of ~10 aircraft per hour no longer being impacted between17:00 - 20:00 and 05:30 - 07:00. Whilst the Sponsor intends to operate only during the reduced window, they also wish to retain the option to utilise the full extent of the activation window to allow for operational flexibility in the event of an unforeseen urgent defence requirement. This is expected to be a rare occurrence but cannot be accurately estimated at this time. Consequently, the change in fuel burn and $CO_2$ emissions associated with this proposal has not been provided. |

| **9. Local Air Quality [for Level 1 and Level M1 airspace change proposals]** | | **Status** |
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| 9.1 | Has the impact on Local Air Quality been adequately assessed and presented in both the consultation material and the final submission to the CAA, taking account of scalability and proportionality? | **No** |
| | There is no requirement for local air quality to be assessed for Level M2 ACPs. | |
| 9.2 | If an assessment of the impact on Local Air Quality has not been undertaken by the sponsor, has this decision been adequately explained and evidenced in both the consultation material and the final submission to the CAA, and is the rationale reasonable? | **Yes** |
| | Yes, this ACP has been scaled as a Level M2 for which the sponsor is only required to assess carbon dioxide (CO2) | |

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| | emissions associated with the consequential changes on civil aviation patterns (CAP1616 v4 paragraph B12). |
| 9.3 | Summary of anticipated impact on Local Air Quality from the final proposed airspace change. |
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| 10. Tranquillity [for Level 1 and Level M1 airspace change proposals] | | Status |
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| 10.1 | With specific reference to Areas of Outstanding Natural Beauty and National Parks - Has the impact on tranquillity been adequately considered and presented in both the consultation material and the final submission to the CAA, taking account of scalability and proportionality? | **No** |
| | There is no requirement for tranquillity to be assessed for Level M2 ACPs. | |
| 10.2 | If consideration of the impact on tranquillity has not been undertaken by the sponsor, has this decision been adequately explained and evidenced in both the consultation material and the final submission to the CAA, and is the rationale reasonable? | **Yes** |
| | Yes, this ACP has been scaled as a Level M2 for which the sponsor is only required to assess carbon dioxide ($CO_2$) emissions associated with the consequential changes on civil aviation patterns (CAP1616 v4 paragraph B12). | |
| 10.3 | Summary of anticipated impact on tranquillity from the final proposed airspace change. | |
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| 11. Biodiversity [for Level 1 and Level M1 airspace change proposals] | | Status |
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| 11.1 | Has the impact on biodiversity been adequately assessed and presented in both the consultation material and the final submission to the CAA, taking account of scalability and proportionality? | **No** |

| | | |
|---|---|---|
| | There is no requirement for biodiversity to be assessed for Level M2 ACPs under CAP1616 v4. | |
| 11.2 | If assessment of the impact on biodiversity has not been undertaken by the sponsor, has this decision been adequately explained and evidenced in both the consultation material and the final submission to the CAA, and is the rationale reasonable? | **Yes** |
| | Yes, this ACP has been scaled as a Level M2 for which the sponsor is only required to assess carbon dioxide ($CO_2$) emissions associated with the consequential changes on civil aviation patterns (CAP1616 v4 paragraph B12). | |
| 11.3 | Summary of anticipated impact on biodiversity from the final proposed airspace change. | |
| | | |

| **12. Traffic Forecasts** | | **Status** |
|---|---|---|
| 12.1 | Have traffic forecasts been provided, are they reasonable, and have these been used to reflect the anticipated environmental impacts of the proposal?<br>*If the proposal has an aim of increasing traffic numbers over and above what would be achieved without the proposal, then the sponsor should provide two sets of forecasts for determining impacts – one set that assumes no implementation and therefore normal growth and a second set that assumes implementation and therefore "enhanced" growth.* | Yes |
| | The sponsor has established that this ACP neither results in an increase in the number of aircraft operating in the local area nor alters the aircraft types.<br>The sponsor has undertaken a quantitative assessment of $CO_2$ emissions associated with the proposed airspace change in line with the requirements of CAP1616 v4. This included the evaluation of the impacts over the 10-year period from year of implementation (2024 – 2033). The assessment was completed in September 2023 with the traffic forecasts calculated using the NATS (March 2023) Base Case Forecast to estimate the maximum annual impacts from 2024 to 2033 and assuming a steady growth rate of 0.7% for 2029 onwards. The forecast assumptions are reasonable, and the sponsor has used the most up to date traffic forecast sources given the date of the assessment. | |

| 13. Consultation | | Status |
|---|---|---|
| 13.1 | Has the sponsor taken account of any environmental factors (noise, $CO_2$ emissions, Local Air Quality, tranquillity or biodiversity) raised by consultees or has evidence been provided to indicate why this has not been possible? | Yes |
| | A stakeholder observation was made that introducing a further DA would cause increases in fuel burn, and increased $CO_2$ emissions, as a result of aircraft having to re-route around the airspace. The sponsor was asked to consider utilising an existing DA. The sponsor responded that existing DAs were not sufficient to contain HALE RPA operations from RAF Fairford. The impact of the proposal has been evaluated and the worst-case scenario used to quantify the change in track miles and fuel burn. The sponsor has worked to minimise impacts associated with the proposal while still maintaining the required military capability, this has included changing the dimensions of the DA through the options appraisal process and restricting operations to night-time periods.<br><br>The sponsor has proposed further mitigation through provision of a DACS and a reduced activation window whereby the sponsor has proposed reducing the activation window (1 hour after sunset to 1 hour before sunrise) to 20:00 - 05:30 UTC for day-to-day operations in order to avoid peak traffic periods, during the winter period. Sponsor to retain option to utilise original activation window for unforeseen operational requirements. | |
| 13.2 | Has the sponsor taken account of any consultation response submitted by ICCAN? If so, what are the outcomes? | N/A |
| | ICCAN was wound down at the end of September 2021 by the Secretary of State for Transport. No consultation response has therefore been forthcoming. | |

| 14. Public Evidence Session (if held) | | Status |
|---|---|---|
| 14.1 | If a Public Evidence Session has been held, was any new evidence on potential environmental impacts presented? | **N/A** |
| | This Level 2 Airspace Change Proposal is sponsored by the MoD and, as such, no public evidence session was required. | |
| 14.2 | If so, was the new evidence relevant and material to the CAA's consideration of the environmental impacts of the submitted airspace change proposal? | **N/A** |
| | This Level 2 Airspace Change Proposal is sponsored by the MoD and, as such, no public evidence session was required. | |

| 15. Compliance with policy and guidance from Government, ICCAN or the CAA | | Status |
|---|---|---|
| 15.1 | Has the sponsor satisfied all relevant policy and/or guidance from either the Government, ICCAN or the CAA, with regards to environmental impacts of the proposed airspace change? | Partial |
| | The CAA is required to take into account the Air Navigation Guidance 2017. In the Air Navigation Guidance 2017, the Government has set environmental objectives with respect to air navigation. These environmental objectives are 'designed to minimise the environmental impact of aviation within the context of supporting a strong and sustainable aviation sector. The objectives are, to:<br>• limit and, where possible, reduce the number of people in the UK significantly affected by adverse impacts from aircraft noise;<br>• ensure that the aviation sector makes a significant and cost-effective contribution towards reducing global emissions; and<br>• minimise local air quality emissions and in particular ensure that the UK complies with its international obligations on air quality.<br>The objectives of the Air Navigation Guidance 2017 are met for this ACP in respect of noise and local air quality emissions by virtue of having no consequential impacts on civil aviation traffic patterns below 7,000 ft but does not contribute towards the objective 'to ensure that the aviation sector makes a significant and cost-effective contribution towards reducing global emissions.'<br><br>The Airspace Modernisation Strategy recognises that the military has requirements to all types of airspace, to secure the UK's borders and operate within the confines of segregated DAs. RPAs will want to make use of lower levels, both inside and outside controlled airspace, with an increasing number looking to use higher levels for longer-distance, BVLOS operations. The AMS also identifies that there will be an ongoing requirement to provide areas of restriction in the airspace for safety reasons when certain activities are underway, such as military or emergency services operations and training.<br><br>However, the AMS environmental sustainability strategic objective states that: "environmental sustainability will be an overarching principle applied through all airspace modernisation activities. Airspace modernisation should deliver the Government's key environmental objectives with respect to air navigation as set out in the Air Navigation Guidance."<br><br>Any best practice guidance that has been issued by ICCAN specifically on the topic of consultation process/practice will be considered in the CAA's Consultation Assessment report rather than within this Environmental Assessment report. | |
| 15.2 | Has the sponsor adequately considered the DfT's Altitude-Based Priorities[4]? | Yes |

[4] Paragraph 3.3, DfT's Air Navigation Guidance 2017

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| | The sponsor has adequately considered the DfT's Altitude-Based Priorities and assessed all the required impacts for a Level M2 change. For Level M, the Ministry of Defence need only ever assess the anticipated environmental impacts of the consequential changes on civil aviation patterns. Where anticipated changes are in the airspace at or above 7,000 feet, the impact of $CO_2$ emissions is prioritised over noise. |

| **16. Other aspects** | | **Status** |
|---|---|---|
| 16.1 | Are there any other aspects of the airspace change proposal that have not already been addressed in this report but that may have a bearing on the environmental impact?<br><br>*For example:*<br>• *Is the proposal linked to any related Airspace Change Proposals, possibly as an enabler or part of a wider programme of changes?*<br>• *Have coincidental environmental impacts been adequately considered and portrayed, notably secondary impacts due to changes in General Aviation activity?* | No |
| | The sponsor has adequately assessed and quantified coincidental environmental impacts, specifically the secondary impacts on fuel burn and $CO_2$ emissions as a result of civil aircraft re-routing around the DA. | |

| **17. Recommendations/Conditions/PIR Data Requirements** | | Status |
|---|---|---|
| 17.1 | Are there any Recommendations which the change sponsor **should try** to address either before or after implementation (if approved)? If yes, please list them below. | No |
| | ***GUIDANCE NOTE:*** *Recommendations are something that the change sponsor* ***should try*** *to address either before or after implementation, if indeed the airspace change proposal is approved. They may relate to an area in which the change sponsor is reliant upon a third party to actually come to an agreement and consequently they do not carry the same 'weight' as a Condition.* | |
| 17.2 | Are there any Condition(s) which the change sponsor **must fulfil** either before or after implementation (if approved)? If yes, please list them below. | No |

| | | |
|---|---|---|
| | ***GUIDANCE NOTE:*** *Conditions are something that the change sponsor* ***must fulfil*** *either before or after implementation, if indeed the airspace change proposal is approved. If their proposal is approved, change sponsors* ***must*** *observe any condition(s) contained within the regulatory decision; failure to do so* ***will usually*** *result in the approval being revoked. Conditions should specify the consequence of failing to meet that condition, whether that be revoking the ACP or some alternative.* | |
| 17.3 | Are there any specific requirements in terms of the data to be collected by the change sponsor for the Post Implementation Review (if approved)? If yes, please list them below. | No |
| | ***GUIDANCE NOTE:*** *PIR data requirements concerns any specific data which the change sponsor should be instructed to collate post-implementation, if indeed the airspace change proposal is approved. Please use this section to list any such requirements so that they can be captured in the regulatory decision accordingly.* | |

## Summary of Assessment of Environmental Impacts & Conclusions

This Airspace Change Proposal (ACP) is sponsored by the Ministry of Defence (MoD) ('the sponsor') and seeks to establish a segmented Danger Area (DA) to facilitate Beyond Visual Line of Sight (BVLOS), High Altitude Long Endurance (HALE) Remotely Piloted Aircraft (RPA) to transit from Royal Air Force Fairford to FL660. The proposed permanent DA complex is from SFC to FL660 centred on RAF Fairford to allow US HALE RPA to arrive and depart the aerodrome and climb to FL600 before transiting to its operational location.

The proposed airspace is expected to be activated 2-3 times per week for up to 3 hours per activation. The 3-hour window is intended to accommodate arrivals and departures but also to ensure that the airspace is active for a sufficient time to allow for emergency or contingency scenarios. Activation will be by NOTAM at least 24 hours prior to operations. A Danger Area Crossing Service (DACS) is to be provided. The proposed hours of activation will be between 1 hour after sunset and 1 hour prior to sunrise.

The CAA has scaled the proposal as a Level M2 ACP (under CAP1616 v4) on the basis that the sponsor has demonstrated that there will be minimal impact on civil aviation traffic patterns below 7,000 ft. For Level M2 ACPs, the CAA is directed to disregard the environmental impacts that are a direct result of military aircraft or military operations (including civil aircraft carrying out military function under contract). However, consequential environmental impacts from other airspace users (i.e., civil aviation) that are a result of the proposed change must be assessed in accordance with Level 2 requirements. For Level 2 ACPs, where anticipated changes are in the airspace at or above 7,000 feet, the impact of $CO_2$ emissions is prioritised over noise, in accordance with the Government's altitude-based priorities.

The sponsor submitted an Environment Impact Assessment in respect of this ACP in September 2023. The assessment was based on modelled scenarios to evaluate impacts to civil traffic using representative traffic samples provided by NATS Analytics. Traffic sampling confirmed that no impacts are expected below 7,000 feet as a consequence of the proposed final design option. For impacts to civil aviation above 7,000 ft, the sponsor generated a 'simulated region' to take account of the proximity of the Danger Area to the southern edge of the UK FIR (London FIR), this identified that some flights would need to change their UK entry/exit point between the Baseline and Scenario simulations in order to produce a valid flight plan.

Based on the simulations and sample traffic data for both summer and winter periods, the sponsor calculated that an average of 15 flights would be impacted per typical 3-hour long activation segment. Based on a minimum of 2 activations per week, this would equate to a minimum of 1,560 flights impacted per year, and for the maximum of 3 activations per week, an estimated maximum of 2,340 flights impacted per year (based on 2023 traffic data). The track distance flown within the UK FIR (NM) was taken from the Baseline and Scenario models and used to calculate the change in distance flown. The cumulative fuel burn and $CO_2$ emissions were then determined for the 10-year forecast period (2024 – 2033).

The estimated increase in cumulative annual fuel cost in a worst-case scenario associated with the proposed DA equates to an average of approximately £178 in fuel cost per impacted flight, this amounts to an increase in fuel costs for civil aviation of £4.63m over the 10-year forecast period (2024-2033). Using the Defra TAG Greenhouse Gas Workbook, the Net Present Value of carbon dioxide equivalent emissions of the proposal is calculated as - £2,339,003. The negative value reflects a net cost, i.e., an increase in CO2e emissions.

The sponsor has endeavoured to minimise impacts associated with the proposal while still maintaining the required military capability, this has included changing the dimensions of the DA through the options appraisal process and restricting operations to night-time periods.

The sponsor has proposed further mitigation through provision of a DACS and has proposed a reduced activation window of 20:00 - 05:30 UTC for day-to-day operations to avoid peak traffic periods. However, the sponsor intends to retain the original activation window to allow for operational flexibility in the event of an unforeseen urgent defence requirement.

The CAA accepts the sponsors assessment methodology and calculation of additional fuel burn and $CO_2$ emissions associated with the proposed DA. It is noted that there is a significant net cost in CO2e emissions as a result of the proposed military airspace change.

| **Outstanding issues?** | | |
|---|---|---|
| Serial | Issue | Action required |

| | | |
|---|---|---|
| 1 | Change to upper flight level of proposed DA | Confirmation of upper flight level of DA segments C and D and any resultant changes to impacted civil traffic and $CO_2$ emissions. |

**Instructions for sign-off completion [Please delete this box prior to publication]**

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Level 2 ACP - Airspace Regulator (Environment) signature
Airspace Regulator (Environment) review signature
Principal Airspace Regulator assessment approval signature.

***Seek guidance from Airspace Regulator (Environment) if there is uncertainty as to whether CTNA sign-off is required.***

**Level 2 ACP**

| Environmental assessment sign-off | Name | Signature | Date |
|---|---|---|---|
| Environmental assessment completed by Airspace Regulator (Environment) | [redacted] | [redacted] | 29/01/2024 |
| Environmental assessment reviewed by Airspace Regulator (Environment) | [redacted] | [redacted] | 31/01/2024 |
| Environmental assessment conclusions approved by Manager Airspace Regulation | [redacted] | [redacted] | 16/02/2024 |