Gateway documentation:
Stage 3 CONSULT

Draft Options Appraisal (Full)

ACP-2023-022

Roles

Action	Role	Date
Produce	Airspace Change Team UAS CDC	15 May 2024
Review	DAATM	16 May 2024
Approve	Change Sponsor RAF AIR Cap	17 May 2024

Drafting and Publication History

Issue	Change Summary	Date
1.0	Draft Submitted to CAA	17 May 2024
1.1	Para 1.2 - resubmitted to CAA	23 May 2024
1.2	Para 3.5.1 – rewording for clarity. Dates for consultation period adjusted throughout.	31 May 2024
1.3	Further amendment to wording in para 3.5.1	6 Jun 2024
1.4	Start date of consultation period changed to 11 June 2024	11 June 2024

Contents

Introduction

The main operating base (MOB) for the large Remotely Piloted Air System (RPAS), Protector RG Mk1 is RAF Waddington, where permanent segregated airspace in the form of a Danger Area (DA) has already been established. This is EGD324 and was implemented at the end of Nov 2023. Under current timescales, routine Protector operation is likely to commence from RAF Waddington in Summer 2024 when the MOD will conduct test and evaluation activities prior to Protector formally entering into service. During this, and for future activity in the UK, Protector will require a nominated permanent diversion airfield to be made available in the event that, for any unforeseen reason, RAF Waddington becomes unavailable. Following investigation into several military airfields, RAF Marham has been identified as the most suitable and preferred diversion airfield. Access to RAF Marham as a nominated diversion airfield as early as June 2024 has been managed under an airspace trial[1]. The ACP has been recently approved by the Civil Aviation Authority (CAA) and will enable an airspace trial to take place within a Temporary Danger Area (TDA) to test the procedures at RAF Marham as the diversion airfield.

This airspace change proposal (ACP) seeks to establish suitable airspace to enable Protector RG Mk1 safe and efficient access to RAF Marham as a nominated diversion airfield. The Ministry of Defence (MOD), and specifically Air Capability, is the Change Sponsor for this proposal (identification number ACP-2023-022).

The aim of this document is to provide evidence to the Civil Aviation Authority (CAA) that the Change Sponsor has adhered to the process laid out in CAP1616 for Stage 3 prior to the Consult Gateway. It builds upon the work undertaken during the Initial Options Appraisal in Stage 2 and forms part of the overall requirements for Stage 3, Consult.

This document uses the most up-to-date and credible data available. For instance, all charts have been produced using up-to-date CAA digital aeronautical 1:250 000 or 1:500 000 charts.

Statement of Need (SON)

Version 2.0 of the SON can be viewed via the CAA ACP Portal[2] and states that the objective of the proposed change is to establish suitable airspace enabling safe and efficient access to a nominated diversion airfield for the Beyond Visual Line Of Sight (BVLOS[3]) RPAS, Protector.

Summary of Stage 2 Initial Options Appraisal

The Change Sponsor presented two airspace design options upon which it invited feedback and comment from a range of stakeholders. Baseline scenarios were also developed as required in CAP1616; feedback on the suitability of these scenarios was also invited.

During the design principle evaluation in Stage 2 (Design Options and Design Principles Evaluation), Option 1 was evaluated as only partially meeting Design Principle (DP) 3, which is "*The airspace design should endeavour to maximise accessibility for other airspace users*". Since Option 2 met DP3 (via the addition of a vertical division in the airspace design) and all other DPs, the Change Sponsor decided to discount Option 1 and took only Option 2 through to the Initial Options Appraisal at Stage 2 of the process**.**

[1] See ACP-2023-047 on the CAA ACP Portal) here: Airspace change proposal public view (caa.co.uk)

[2]The SON can be found on the CAA ACP Portal here: Airspace change proposal public view (caa.co.uk)

[3] The MAA Master Glossary defines BVLOS as the operation of a Remotely Piloted Aircraft beyond a distance where the Remote Pilot is able to respond to or avoid other airspace users by visual means.

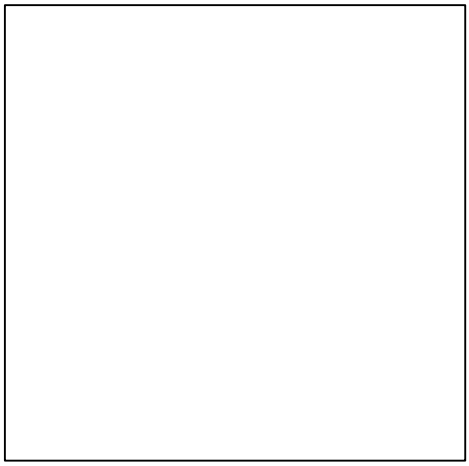
In accordance with CAP1616F, where there is a single design option only (other than the baseline scenarios), initial options appraisal and full options appraisal requirements can be consolidated. Therefore, the full options appraisal will be a consolidation with the initial options appraisal, consisting of an evaluation of Option 2, as described in Section 1, together with a comparison of its impacts against the baseline scenarios.

1 Context

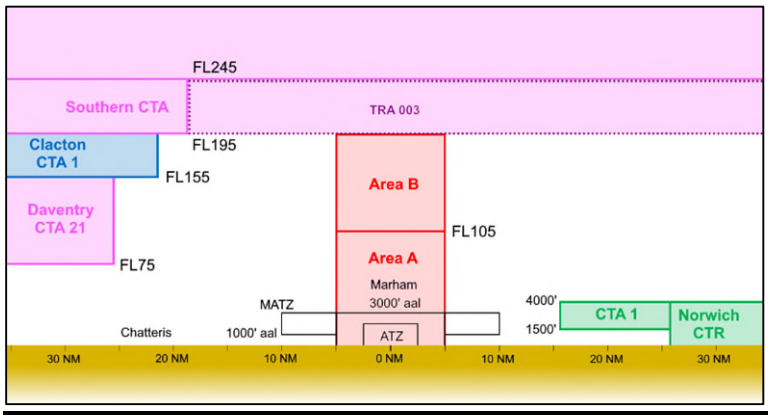
Proposed design option

1.1.1 As shown in Figure 1, Airspace Design Option 2 consists of one design and comprises two volumes of airspace, both of5NM radius centred on RAF Marham's aerodrome reference point (ARP)[4]. Area A is from surface to FL105[5]; Area B is FL105 – FL195.

Proposed Airspace Design (Option 2)



Source data: CAA VFR Aeronautical Chart 1:500K



SW/NE Cross-section (Areas A & B)

Lateral Dimension: 5NM radius circle centred on RAF Marham's ARP	**Vertical Dimension**: Area A: Surface to FL105 Area B: FL105 - FL195

Figure 1 – Proposed Airspace Design (Option 2)

1.1.2 The design of Airspace Design Option 2 aims to facilitate a more expeditious air traffic management. When Protector is not within an area, it would be considered 'active, but with no Protector activity within', and aircraft may be permitted to enter the airspace. Apart from reasons of routine air traffic safety and co-ordination, aircraft would only be prevented from accessing either area when Protector is in (or about to enter) either section.

1.1.3 The addition of the split aims to reduce holding times for aircraft wishing to cross the proposed airspace and those which operate to/from airfields situated within the airspace, thus promoting Flexible Use of Airspace (FUA). The proposed level of the division has been selected as FL105[6];

[4] RAF Marham airfield reference point is the midpoint of RW05/23 (52 38 54.26N 000 33 02.42E)

[5] A Flight Level (FL) is used to ensure that all aircraft are flying to a common datum to ensure height separation is maintained (1 Flight Level = approximately 100ft, e.g. FL 195 = approximately 19,500ft).

[6] FL105 was selected as the same level at which division is made in EGD324 at RAF Waddington.

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however, to ensure all airspace user requirements are considered, the internal division of the airspace construct will be subject to further engagement at this stage of the ACP.

Supplementary Evidence

1.2.1 After completing the Initial Options Appraisal, the Change Sponsor identified the following additional information to be obtained or firmed up to inform the next stage of the Options Appraisal:

> 'A more definitive indication of Protector's forecast flying tempo is required from the Programme Delivery Team, in particular an estimate of projected live flying hours, which will inform the likely frequency of segregated airspace activation associated with RAF Marham'.

1.2.2 The estimate for utilisation of the proposed airspace provided in the Initial Options Appraisal remains unchanged: *"The Change Sponsor anticipates that during the first 6 months of Protector's service in the RAF, the flying tempo will be restricted to one air vehicle at a time during core flying hours Monday – Friday. This is likely to occur up to 3 times per week. It is difficult to predict when the flying tempo will significantly increase, but potentially within the first 24 months of service, there may be up to 2 air vehicles in the air simultaneously. Some night-flying is expected."*

1.2.3 In addition to the estimate above, the Change Sponsor has recently obtained an approximation of live flying training requirements for Protector when it comes into service; an allowance for live practice diversions (PD[7]) has been declared for RAF Marham (pending the availability of the synthetic trainer) as follows:

- All flying instructors will be required to conduct a live PD at RAF Marham. To facilitate this, up to 10 live PDs could be completed at RAF Marham soon after ISD is declared.

- Each trainee pilot must also undertake one live PD at RAF Marham. The current training schedule indicates an enduring requirement for up to 25 live PDs per financial year.

1.2.4 Special Use Airspace Crossing Service (SUACS) requests will be denied whilst Protector is actually operating within Area A during the performance of a practice diversion. The impact of this is estimated to be a worst case delay of 20 minutes to aircraft requesting access. This is the time estimated to complete one arrival profile on entering Area A at FL105, execute a go around[8] of the runway followed by a departure profile climbing to FL105 to clear Area A[9]. 20 minutes represents 3.4% of a 10 hr flying window. Therefore, based on up to 20 civil airspace users requesting crossings within 5 nm of RAF Marham spread throughout that window[10], an actual or PD inbound or outbound could result in less than 1 aircraft per event being impacted[11].

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[7] A PD will comprise of one arrival and one departure profile only.

[8] The aircraft will not touch down on the runway but complete a low approach to commence a climb away from the airfield

[9] An actual diversion will not occupy Area A for as long as 20 minutes as it will not continue to go around and depart.

[10] See para 3.4 of document entitled ACP-2023-022 Stage 2B Submission V1.0 at Airspace change proposal public view (caa.co.uk)

[11] (20 aircraft x 3.4% = 0.68 aircraft).

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2 Safety assessment

Overview

2.1.1 A safety assessment was presented with the Stage 2 Initial Options Appraisal and key elements are repeated here since it has not been necessary to develop the assessment further.

2.1.2 UK military aviation is regulated by the Military Aviation Authority (MAA). Accordingly, the Protector programme is subject to the MAA Regulatory Publications (MRP). Of particular relevance to the operation of Protector in UK airspace is MAA Regulatory Article (RA) 2320 – MAA regulation for operation of military RPAS. The RA states the criteria for beyond visual line of sight (BVLOS[12]) RPAS operation such that within UK airspace, BVLOS operations should only be conducted if:

- An appropriately approved Detect and Avoid (DAA) capability enables compliance with Rules of the Air appropriate to the class of airspace, or;

- They are flown using a Layered Safety Approach that specifically requires flight in Segregated Airspace, or in Controlled Airspace (Classes A-D) with the informed consent of the Air Navigation Services Provider (ANSP).

2.1.3 When Protector initially comes into service it will be fitted with a limited DAA capability only and, since RAF Marham is located entirely within Class G airspace, flight in segregated or controlled airspace is required. This will allow Protector (in the event of an actual or planned (PD) to access RAF Marham in a safe environment, maintain regulatory compliance, and provide protection of other airspace users of any associated and identified hazardous activities.

2.1.4 The MOD is producing an Airspace Integration Safety Argument (AISA) for the introduction of Protector into UK airspace. This work aims to develop an evidenced argument for the safe operation of Protector under Instrument Flight Rules (IFR) and under an air traffic service within transponder-mandatory airspace, as well as in suitable segregated airspace.

2.1.5 Assessment of potential funnelling. Reference to open-source flight data and to Marham ATC indicates that some very minor funnelling takes place between the RAF Marham MATZ and EGD208 (Stanford) at levels up to FL100. Since the proposed airspace has the same lateral footprint as the MATZ, it is appropriate to conclude that some pilots might still choose to avoid the DA rather than call for a SUACS which could add to the existing funnelling. Taking into account the low numbers of MATZ and overhead crossers even on the busiest flying days[13], the Change Sponsor assesses that even if a small percentage of pilots chose to avoid the DA, there would be a negligible increase to the funnelling of traffic. The Change Sponsor considered whether there was any means of gathering further data to support this assessment during the trial, but after discussion with Marham ATC it was concluded that verifiable data would be difficult to evidence and the workload to obtain it would be disproportionate to achieving a meaningful outcome.

2.1.6 Application of the CAA Safety Buffer Policy. The Change Sponsor has considered the proposed airspace's status with regard to the CAA's safety buffer policy[14] and proposes that it complies with the policy. The airspace is vertically adjacent to Class C airspace but a buffer is not

[12] The MAA Master Glossary defines BVLOS as the operation of a Remotely Piloted Aircraft beyond a distance where the Remote Pilot is able to respond to or avoid other airspace users by visual means.

[13] See para 3.4 of document entitled ACP-2023-022 Stage 2B Submission V1.0 at Airspace change proposal public view (caa.co.uk)

[14] SARG Policy Statement - Policy for the establishment and operation of Special Use Airspace dated 12 February 2024

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required. For EGD324 (RAF Waddington) and for the airspace trial scheduled for summer 2024 (RAF Marham), the MOD has agreed procedures in place with National Air Traffic Services (NATS), which the CAA has approved. The Change Sponsor will manage a similar process with NATS for this airspace change and present an agreement between MOD and NATS to confirm that no additional buffer is required. This will be presented to the CAA for approval with the formal submission at Stage 4 of the ACP.

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3 Full Options Appraisal

Operating Principles

3.1.1 The following operating principles and means of managing the airspace are anticipated to be implemented for the airspace:

- Operating authority will be RAF Marham ATC;
- A Special Use Airspace Crossing Service (SUACS) will be available during hours of activation from RAF Marham ATC;
- A (Special Use Airspace Activation Information Service (SUAAIS) will be available via appropriate military ATC agencies. London Information will be approached prior to submission to request provision of SUAAIS on 124.6MHz.

Type of airspace

3.2.1 The Change Sponsor intends to implement the required segregation in the form of a DA, which will provide the most efficient and tactical use of airspace. The MOD will activate the airspace structures only as and when necessary. In other words, only when activity by Protector is planned from either RAF Waddington or RAF Marham itself.

Notification

3.3.1 The DA will be activated via (Notice to Aviation (NOTAM) at the latest by D-1[15]. Activation and de-activation of the DA will be requested by RAF Waddington.

Activation periods

3.4.1 The proposed airspace will not be permanently active; it will only be activated when Protector flying is due to take place. Procedures will be adopted to ensure that the airspace is activated and notified as and when required. This will involve appropriate NOTAM action being taken by D-1 at the latest. The DA airspace would be kept active for the duration of Protector sorties and is likely to mirror the activation periods of the airspace implemented at RAF Waddington (EGD324) for Protector; this is required in order to facilitate an early recovery to Waddington and to cater for any unplanned emergency situations. It is important to stress that whilst this airspace is required to be active for the entirety of any Protector flying (whether or not Protector makes use of the DA), the DA may not be used as a mechanism by which MOD may exclude other airspace users, other than when Protector is within the airspace or for reasons of routine air traffic safety and co-ordination.

Application of CAS(T) at RAF Marham

3.5.1 Ad-hoc implementation of CAS-T (temporary Class D airspace) occurs at RAF Marham to accommodate arrival/departure of fixed wing Royal Flights. Whilst it is possible for the DA and CAS-T structures to be active at the same time, concurrent use of airspace by civil registered crewed and military uncrewed aircraft is not permitted. The MOD is considering

[15] The NOTAM must be requested the day before the airspace is to be activated.

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the implications of this overlapping requirement, which may necessitate a letter of agreement (LOA) between departments to agree procedures for prioritisation, actions in the event of emergency and operational arrangements for holding Protector or Royal Flight aircraft. The Change Sponsor will alert the CAA to any development regarding this subject. In the interim, RAF Marham ATC will manage the airspace in accordance with current limitations on airspace access for Protector.

3.5.2 Stage 3 requires the Initial Options Appraisal that was carried out in Stage 2 to be developed further for each shortlisted option. As set out in the environmental assessment, quantitative assessments are considered to be disproportionate to the potential impact of the proposed airspace and have been agreed by the CAA to be out of scope. However, the Change Sponsor has continued to develop the Options Appraisal though Stage 3 using qualitative assessment only. Table 1 details the appraisal of Option 2 and the baseline scenarios against the high-level objectives and assessment criteria laid out in CAP1616f. Over and above the requirement in CAP1616f, an additional row has been added to the table outlining initial safety considerations in brief.

ACP-2023-047 Trial Data.

3.6.1 Via an airspace trial scheduled for Summer 2024, the Change Sponsor had intended to collect accurate climb and descent rates for Protector to determine potential utilisation periods, together with any other information that could inform the development of this ACP. This trial is scheduled to start mid-July 2024. Should any data become available during the consultation period that may impact the airspace design or operating principles, stakeholders will be notified and a re-evaluation of the options will be conducted.

The Baseline Option

3.7.1 CAP1616 requires the Change Sponsor to identify baseline scenarios; future scenarios without the airspace change that are developed for the following timescales:

- Year of implementation without the airspace change proposal (year 1); and
- 10 years after implementation without the airspace change proposal (year 10).

3.7.2 The baseline scenarios were presented to stakeholders for feedback at Stage 2 of the ACP process. Following CAA feedback at Stage 2 (see para 4.7.2) and information received from West Norfolk District Council, the baseline scenarios document has been updated to V3.0 and is available at Appendix A[16].

[16] The Baseline also includes new data received from West Norfolk District Council regarding planning for dwellings. This did not affect the options appraisal.

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Table 1 – Summary of options appraisal: Option 2 (at years 1 and 10) and baseline scenarios					
Group	Impact	Option 2: Year 1	Option 2: Year 10	Baseline + 1 Year	Baseline + 10 years
Communities	Noise	**Civil aircraft:** The mechanism for crossing the airspace associated with this option (SUACS) would be very similar to that of crossing the MATZ. Option 2 has the same lateral footprint as the extant MATZ at RAF Marham. Vertically, Option 2 provides flexibility in facilitating transit within 5NM of RAF Marham through the split of the proposed airspace into 2 areas, thus reducing changes to noise levels as a result of re-routing/holding outside the proposed airspace. Therefore, noise levels are expected to remain unchanged and it is considered that Any consequential impact on noise from this option is negligible compared to the impact of baseline scenarios.	**Civil aircraft:** The mechanism for crossing the airspace associated with this option (SUACS) would be very similar to that of crossing the MATZ. Option 2 has the same lateral footprint as the extant MATZ at RAF Marham. Vertically, Option 2 provides flexibility in facilitating transit within 5NM of RAF Marham through the split of the proposed airspace into 2 areas, thus reducing changes to noise levels as a result of re-routing/holding outside the proposed airspace. Therefore, noise levels are expected to change in line with forecast civilian and military traffic levels only. Any consequential impact on noise from this option is negligible compared to the impact of baseline scenarios due to infrequent utilisation of the airspace by Protector. There is intention for Protector to be equipped with a fully certified DAA within this timeframe.	No impact on noise within communities since: Protector would be unable to operate without Option 2. Therefore, airspace and associated activity would remain unchanged. Most civil and military pilots would carry on as they do now – ATZ and MATZ would still be in existence. There is the likelihood that some rerouting already occurs below 3000FT AAL, which is unlikely to change under this scenario. There is no anticipated change in the number of civil aircraft operating in the local area, nor will the aircraft types be altered.	Protector would be unable to operate without Option 2. Therefore, any change to noise levels is expected to be in line with forecast civilian and military traffic levels only. Most civil and military pilots would carry on as they do now. Whilst there may be a change to airspace in the vicinity of military aerodromes in the future it is best to assume that ATZ and MATZ would still be in existence. There is the likelihood that some rerouting already occurs below 3000FT AAL, which is unlikely to change under this scenario.

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Table 1 – Summary of options appraisal: Option 2 (at years 1 and 10) and baseline scenarios					
Group	Impact	Option 2: Year 1	Option 2: Year 10	Baseline + 1 Year	Baseline + 10 years
			Therefore, it is likely that there will be a reduction to volume of proposed airspace. Whilst it is difficult to offer any precise metrics, this could result in reducing the impact on other airspace users and therefore reducing any noise impact.		
Communities	Local Air Quality	The Change Sponsor has assessed that other than Protector, Option 2 will not result in an increase in the number of aircraft operating in the local area, nor will the aircraft types be altered. Minimal reduction in overall air quality thought to be possible as establishment of segregated airspace should lead to minimal reroute of General Aviation (GA) aircraft.	The Change Sponsor has assessed that, other than Protector, Option 2 will not result in an increase in the number of aircraft operating in the local area, Changes to overall air quality are expected to be in line with forecast civilian and military traffic levels only. Any consequential impact on local air quality from this option is negligible compared to the impact of baseline scenarios due to infrequent utilisation of the airspace by Protector. There is intention for Protector to be equipped with a fully certified DAA within this timeframe.	Protector would be unable to operate without Option 2. Therefore, airspace and associated activity would remain unchanged No reduction in air quality from existing aviation, since civil and military pilots would carry on as they do now – ATZ and MATZ would still be in existence. There is the likelihood that some rerouting already occurs below 3000FT AAL under this scenario which would already impact air quality.	Protector would be unable to operate without Option 2. Therefore, changes to overall air quality are expected to be in line with forecast civilian and military traffic levels only. Whilst there may be a change to airspace in the vicinity of military aerodromes in the future, it is best to assume that ATZ and MATZ would still be in existence.

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Table 1 – Summary of options appraisal: Option 2 (at years 1 and 10) and baseline scenarios					
Group	Impact	Option 2: Year 1	Option 2: Year 10	Baseline + 1 Year	Baseline + 10 years
			Therefore, it is likely that there will be a reduction to volume of proposed airspace. Whilst it is difficult to offer any precise metrics, this could result in reducing the impact on other airspace users and therefore reducing any impact on local air quality.	As there is no anticipated increase in the number of civil aircraft operating in the local area, nor will the aircraft types be altered, the local air quality is likely to remain unchanged.	There is the likelihood that some rerouting already occurs below 3000FT AAL under this scenario which would already impact air quality.
Wider society	Greenhouse gas emissions	The Change Sponsor has assessed that, other than Protector, Option 2 will not result in an increase in the number of aircraft operating in the local area, nor will the aircraft types be altered. There may be a very small increase in greenhouse gas if GA do not / cannot take advantage of a crossing service (e.g. SUACS) to achieve a direct routing	The Change Sponsor has assessed that, other than Protector, Option 2 will not result in an increase in the number of aircraft operating in the local area. Changes to greenhouse gas emissions are expected to be in line with forecast civilian and military traffic levels only. Any consequential impact on greenhouse gas emissions from this option is negligible compared to the impact of baseline scenarios due to infrequent utilisation of the airspace by Protector. There is intention for Protector to be equipped with a fully certified DAA	Protector would be unable to operate without Option 2. Therefore, as the Change Sponsor has assessed that there is no anticipated increase in the number of aircraft operating in the local area, nor will the aircraft types be altered, the greenhouse gas emissions are likely to remain unchanged.	Protector would be unable to operate without Option 2. Changes to greenhouse gas emissions are expected to be in line with forecast civilian and military traffic levels only.

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Table 1 – Summary of options appraisal: Option 2 (at years 1 and 10) and baseline scenarios					
Group	Impact	Option 2: Year 1	Option 2: Year 10	Baseline + 1 Year	Baseline + 10 years
			within this timeframe. Therefore, it is likely that there will be a reduction to volume of proposed airspace. Whilst it is difficult to offer any precise metrics, this could result in reducing the impact on other airspace users and therefore reducing any greenhouse gas emissions impact.		
Wider society	Tranquillity	The Change Sponsor has assessed that, other than Protector, Option 2 will not result in an increase in the number of aircraft operating in the local area, nor will the aircraft types be altered. Due to Infrequent utilisation of the airspace by Protector, the local tranquillity is likely to be unaffected.	The Change Sponsor has assessed that, other than Protector, Option 2 will not result in an increase in the number of aircraft operating in the local area. Changes to tranquillity are expected to be in line with forecast civilian and military traffic levels only. Any consequential impact on tranquillity from this option is negligible compared to the impact of baseline scenarios due to infrequent utilisation of the airspace by Protector.	Protector would be unable to operate without Option 2. Therefore, as the Change Sponsor has assessed that there is no anticipated increase in the number of aircraft operating in the local area, nor will the aircraft types be altered, the tranquillity is likely to be unaffected.	Protector would be unable to operate without Option 2. Changes to tranquillity are expected to be in line with forecast civilian and military traffic levels only.

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Table 1 – Summary of options appraisal: Option 2 (at years 1 and 10) and baseline scenarios					
Group	Impact	Option 2: Year 1	Option 2: Year 10	Baseline + 1 Year	Baseline + 10 years
Wider society	Biodiversity	The Change Sponsor has assessed that, other than Protector, Option 2 will not result in an increase in the number of aircraft operating in the local area, nor will the aircraft types be altered. Due to Infrequent utilisation of the airspace by Protector, the local biodiversity is likely to be unaffected.	The Change Sponsor has assessed that, other than Protector, Option 2 will not result in an increase in the number of aircraft operating in the local area. Changes to biodiversity are expected to be in line with forecast civilian and military traffic levels only. Any consequential impact on biodiversity from this option is negligible compared to the impact of baseline scenarios due to infrequent utilisation of the airspace by Protector. .	Protector would be unable to operate without Option 2. Therefore, as the Change Sponsor has assessed that there is no anticipated increase in the number of aircraft operating in the local area, nor will the aircraft types be altered, the biodiversity is likely to be unaffected.	Protector would be unable to operate without Option 2. Changes to biodiversity are expected to be in line with forecast civilian and military traffic levels only.
Wider society	Capacity/ resilience	N/A	N/A	Protector would be unable to operate without Option 2. Therefore, no change to the current situation.	Protector would be unable to operate without Option 2. Therefore, no change to the current situation.
General Aviation	Access	There may be a very small impact on ease of access to the airspace proposed by Option 2 by GA. Estimated initial Protector flying tempo will require activation of	There may be a small impact on ease of access to the Option 2 airspace design options, in line with forecast	Protector would be unable to operate without Option 2. Therefore, no change to the current situation.	Protector would be unable to operate without Option 2. There would be no consequential impact to access from this

Table 1 – Summary of options appraisal: Option 2 (at years 1 and 10) and baseline scenarios					
Group	Impact	Option 2: Year 1	Option 2: Year 10	Baseline + 1 Year	Baseline + 10 years
		segregated airspace up to 3 times per week. However, it is expected that Protector will need to access airspace infrequently and for a maximum of approximately 20 minutes during each departure or recovery phase. Access by GA will be maximised when the airspace is not occupied by Protector by provision of a crossing service (e.g. SUACS). Option 2 provides flexibility in facilitating transit within 5NM of RAF Marham through the split of the proposed airspace into 2 areas, thus reducing the requirement for GA to re-route or to hold outside the proposed airspace. Gliders without communication equipment are likely to be unable to enter the DA, as they would not be able to receive a SUACS.	civilian and military traffic levels only. Estimated initial Protector flying tempo will require activation of segregated airspace up to 3 times per week. However, it is expected that Protector will need to access airspace infrequently and for a maximum of approximately 20 minutes during each departure or recovery phase. Access will be maximised when the airspace is not occupied by Protector by provision of a crossing service (e.g. SUACS). Option 2 provides flexibility in facilitating transit within 5NM of RAF Marham through the split of the proposed airspace into 2 areas, thus reducing the requirement for aircraft to re-route or to hold outside the proposed airspace. Gliders without communication equipment are likely to be unable to enter the DA, as they would		option and changes to access are expected to be in line with forecast civilian and military traffic levels only.

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Table 1 – Summary of options appraisal: Option 2 (at years 1 and 10) and baseline scenarios					
Group	Impact	Option 2: Year 1	Option 2: Year 10	Baseline + 1 Year	Baseline + 10 years
			not be able to receive a SUACS. There is intention for Protector to be equipped with a fully certified DAA within this timeframe. Therefore, it is likely that there will be a reduction to volume of proposed airspace. Whilst it is difficult to offer any precise metrics, this could result in reducing the impact on other airspace users.		
General Aviation / commercial airlines	Economic impact from increased effective capacity	N/A	N/A	N/A	N/A
General Aviation / commercial airlines	Fuel burn	There may be a small increase in fuel burn if GA do not / cannot take advantage of a crossing service (e.g. SUACS) to achieve a direct routing.	There may be a small increase in fuel burn in line with forecast civilian and military traffic levels, if aircraft do not / cannot take advantage of a crossing service (e.g. SUACS) to achieve a direct routing.	Protector would be unable to operate without Option 2. Therefore, as the Change Sponsor has assessed that there is no anticipated increase in the number of aircraft operating in the local area, nor will the aircraft types be altered, the fuel	Protector would be unable to operate without Option 2. Therefore, Changes to fuel burn are expected to be in line with forecast civilian and military traffic levels only.

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Table 1 – Summary of options appraisal: Option 2 (at years 1 and 10) and baseline scenarios					
Group	Impact	Option 2: Year 1	Option 2: Year 10	Baseline + 1 Year	Baseline + 10 years
				burn is likely to remain unchanged	
Commercial airlines	Training costs	No perceived training costs.	No perceived training costs.	Not applicable	Not applicable
Commercial airlines	Other costs	No other costs anticipated.	No other costs anticipated.	Not applicable	Not applicable
Airport /ANSP	Infrastructure costs	No infrastructure costs will be imposed.	No infrastructure costs will be imposed.	Not applicable	Not applicable
Airport /ANSP	Operational costs	No operational costs anticipated.	No operational costs anticipated.	Not applicable	Not applicable
Airport /ANSP	Deployment costs	No costs anticipated for deployment.	No costs anticipated for deployment.	Not applicable	Not applicable

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Table 1 – Summary of options appraisal: Option 2 (at years 1 and 10) and baseline scenarios					
Group	Impact	Option 2: Year 1	Option 2: Year 10	Baseline + 1 Year	Baseline + 10 years
Airport /ANSP	Other costs	No other costs foreseen.	No other costs foreseen.	Not applicable	Not applicable
Safety Considerations (not an exhaustive list)		Pilots being unaware of new airspace. Re-route through unfamiliar areas. Funnelling as a result of need to re-route. Increased controller workload due to funnelling/SUACS requests.	Funnelling as a result of need to re-route. Increased controller workload due to funnelling/SUACS requests.	Protector would be unable to operate without Option 1 or 2. Therefore, as the Change Sponsor has assessed that there is no anticipated increase in the number of aircraft operating in the local area, nor will the aircraft types be altered, there are no safety considerations.	Protector would be unable to operate without Option 1 or 2. Therefore, safety considerations are expected to be in line with forecast civilian and military traffic levels only.

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4 Environmental Assessment

Impact Assessments

4.1.1 CAP 1616F endorses that the MOD need only ever assess the anticipated environmental impacts of the consequential changes on civil aviation patterns. Environmental impacts that are a direct result of military aircraft or military operations are not required to be considered or assessed. Consequential environmental impacts from other airspace users (i.e., civil aviation) that are a result of the airspace change proposal must be assessed.

Linked Airspace Change Proposals

4.2.1 Under a separate airspace change proposal (identification number ACP-2023-047) [17], an airspace trial has been approved at RAF Marham in the form of a Temporary Danger Area (TDA). The trial seeks to confirm the suitability of RAF Marham as the permanent diversion airfield for Protector. Linked proposals must be environmentally assessed on a combined basis. The outer airspace construct, operating principles and utilisation for both solutions are the same and the combined environmental assessment is presented below.

Noise

4.3.1 In seeking some qualitative assessment of the impact of the proposed airspace on noise, the Change Sponsor has assessed that the proposed change will not result in an increase in the number of aircraft operating in the local area, nor will the aircraft types be altered. Therefore, the same amount and type of noise is likely to impact the local population as is currently the case. As described in the Initial Options Appraisal the change is likely to impact less than 30[18] aircraft on the busiest flying day. Taking that into account along with the mitigations put in place (e.g. NOTAM, SUACS), the overall impact of the proposed change on noise is thought to be negligible. For the entirety of the activation period of any segregated airspace, civil air traffic will be able to take advantage of a SUACS and it is thought that for the majority of the activation period such requests will be successful, with minimal requirements to reroute. In this case, the Change Sponsor proposes that since the surrounding airspace is Class G, where the majority of the civil air traffic is GA and engaged predominantly in leisure or sporting activity, it would be difficult to predict any definite traffic patterns created by any new segregated airspace.

4.3.2 CAP 1616F suggests that operational diagrams may be useful when it is difficult or impossible to measure aircraft noise accurately and reliably. The Change Sponsor also considered whether it would be possible or indeed useful to provide operational diagrams of civil traffic patterns to compare likely changes between the baseline scenario and the situation after the implementation of any proposed airspace over RAF Marham. The Change Sponsor feels that it would be difficult to produce accurate and useful operational diagrams for future traffic patterns and that there would be minimal benefit in doing so. Therefore, the Change Sponsor has scoped out the use of operational diagrams.

4.3.3 CAP 1616I proposes that Change Sponsors should consider noise contours and overflight as environmental metrics for noise measurement. The Change Sponsor proposes to scope out the requirement to conduct noise modelling as to do so is assessed as disproportionate to the impact created, since the proposed airspace design is expected to impact less than 30 civil aircraft per day.

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[17] Access to RAF Marham as a nominated diversion airfield as early as June 2024 has been managed under an airspace trial (see ACP-2023-047 on the CAA ACP Portal). For more details see: https://airspacechange.caa.co.uk/PublicProposalArea?pID=574

[18] See para 3.4 of document entitled ACP-2023-022 Stage 2B Submission V1.0 at Airspace change proposal public view (caa.co.uk)

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The Change Sponsor proposes that Leq contours or WebTAG noise modelling will not be conducted.

4.3.4 Finally, CAP1616 requires Change Sponsors to confirm the minimum noise modelling category that is required to be applied to the airspace change. A rationale to scope out this requirement was provided in Stage 2 of the ACP based on the low numbers of aircraft which might be affected. The CAA was in agreement and a noise modelling category was, therefore, not stipulated for this ACP.

Greenhouse Gas Emissions

4.4.1 The Change Sponsor has assessed that the proposed change will not result in an increase in the number of aircraft operating in the local area, nor will the aircraft types be altered. Therefore, the same amount of Greenhouse Gas Emissions is likely to impact the local population as is currently the case.

Local Air Quality

4.5.1 An Air Quality Management Area (AQMA)[19] has been located on the edge of the MATZ boundary at Swaffham. The Change Sponsor has assessed that the proposed change will not result in an increase in the number of aircraft operating in the local area, nor will the aircraft types be altered. Therefore, the local air quality is likely to remain the same as if the airspace were not in situ.

Tranquillity

4.6.1 There are no adjacent National Parks[20] or Areas of Outstanding Natural Beauty (AONB)[21] affected by this proposed airspace.

Biodiversity

4.7.1 Change Sponsors are advised to use operational diagrams or overflight contours to identify any biodiversity receptors overflown below 7,000 feet. Biodiversity receptors include locally identified biodiversity receptors and European sites such as: Special Areas of Conservation (SAC) and possible SACs; Special Protection Areas (SPA) and potential SPAs; Ramsar sites (wetlands of international importance) and proposed Ramsar sites; Compensatory habitats (areas secured to compensate for damage to SACs, SPAs and Ramsar sites).

4.7.2 On advice from the CAA at Stage 2, the Change Sponsor reassessed the presence of European sites and identified five[22][23] within the recommended 18KM radius of the runway at RAF Marham, shown at Figure 2. The map shows that only one European sits inside the SE edge of the 5NM radius of the airspace and thus, overflight by Protector would extremely infrequent.

4.7.3 The Change Sponsor assesses that the ACP will not result in an increase in the number of aircraft operating in the local area, nor will the aircraft types be altered and due to Infrequent utilisation of the airspace by Protector, even if a small percentage of pilots chose to avoid the DA,

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[19] Source: Defra, Air Information Resource Air Quality Management Areas (AQMAs) - Defra, UK. Breckland District Council Air Quality Management Area Number 2 Order 2017 is an area to the north and south of Swaffham town centre with declared Nitrogen dioxide NO2 pollutant (https://uk-air.defra.gov.uk/aqma/details?aqma_ref=1654#1259)

[20] Source: https://www.nationalparks.uk/

[21] Source: Areas of outstanding natural beauty (AONBs): designation and management - GOV.UK (www.gov.uk) and Magic Map Application (defra.gov.uk)

[22] Source: Magic Map Application (defra.gov.uk)

[23] The Baseline at Appendix A has also been updated to V3.0 to reflect the amendment.

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there would be a negligible increase to the overflight of European sites[24]. The Change Sponsor proposes the use of operational diagrams or overflight contours would be disproportionate to the potential impact.

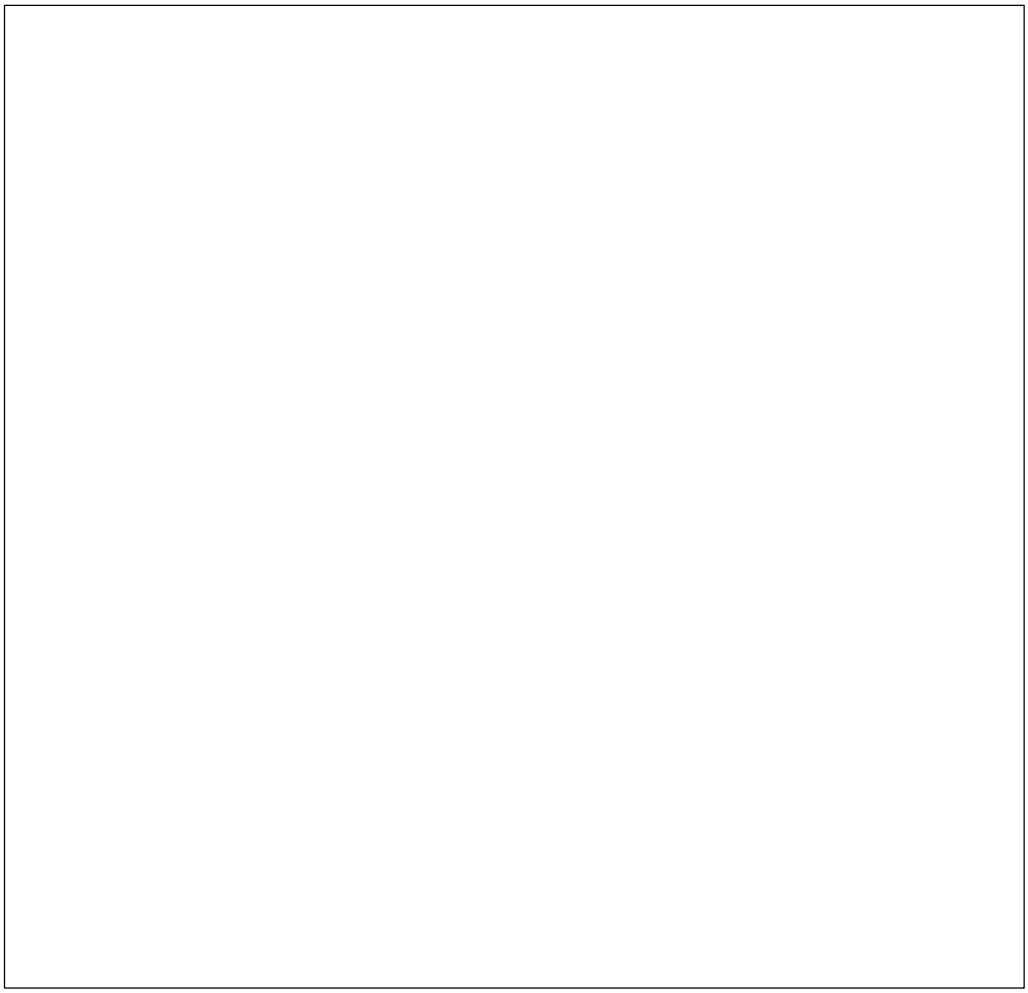

Figure 2: Map of local European Sites (Red line=18KM; Blue line=5NM)

Source: Magic Map Application (defra.gov.uk)

Habitats Assessment

4.8.1 The Change Sponsor screened out the requirement for a Habitats Assessment at Stage 2 of the ACP.

5 Summary

Summary and preferred option

[24] Para 1.3.5 and Table 1 (Biodiversity) refer.

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5.1.1 The single airspace design option remains unchanged following the Initial Options Appraisal at Stage 2. Therefore, the preferred design option is Option 2 and is the proposed option at Stage 3.

5.1.2 The baseline scenario does not meet the SON or DP2 (*The airspace provides access to a sufficient area to meet operational and training objectives*) and therefore would severely limit Protector's UK training and operational activity.

5.1.3 The Change Sponsor proposes that since the impact on other airspace users and the environment is considered to be negligible, further attempts to provide quantified or monetised analysis would be disproportionate and provide little if any additional clarity for stakeholders.

5.1.4 A high level assessment of costs and benefits was provided for all design options at Stage 2, including the Baseline options. As above there would seem little benefit in repeating this analysis at this stage

Next Steps

5.2.1 This document will be submitted to the CAA as evidence to support the ACP-2023-022 Stage 3.

5.2.2 It is part of the documentary evidence for the Stage 3 Assessment Gateway (document deadline 17 May 2024), for the CAA's Assessment Gateway scheduled for 31 May 2024).

5.2.3 Upon receipt of approval from the CAA, the Change Sponsor will commence formal consultation on the proposed design from 11 June 2024.

5.2.4 The following CAP616 timeline is anticipated:

Table 3 - Post-Consultation steps for ACP-2023-022

Date	Activity	Detail
2 August 2024	Stage 3 Consultation Ends	No further feedback will be considered after this date
5 September 2024	Stage 3 Collate & Review	Feedback document uploaded to the CAA ACP Portal
20 September 2024	Stage 4 - Update and Submit	Upload ACP final submission to the CAA ACP Portal
13 January 2025	Stage 5 - Decide	CAA decision
17 April 2025	Stage 6 - Implement	Airspace implemented
12 months post-implementation	Stage 7 – Post Implementation Review	Assessment of the effectiveness and usage of any implemented airspace

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Appendix A: ACP-2023-022 - Baseline Scenarios V3.0

1. Context.

1.1. Year of implementation

1.1.1. RAF Marham sits within class G airspace, which does not provide adequate protection or segregation for the equipment configuration of Protector. Civil[25] and military[26] regulations specify that without an appropriately approved Detect And Avoid (DAA) capability to enable compliance with the Rules of the Air appropriate to the class of airspace, Protector must be flown using a Layered Safety Approach that specifically requires flight in segregated airspace. Protector does not currently have an appropriately approved DAA appropriate to Class G airspace and therefore, is unable to access the airspace above and around RAF Marham. A map of the local area is at Figure 1.

1.2. Year 10

1.2.1. As the Protector programme progresses, it is anticipated that there would be advances in technology permitting the development and instalment of an appropriate DAA system on the airframe within the next 10 years. Should this be the case, then the required airspace would either be significantly reduced or negated.

2. Structures routes, procedures and behaviours.

2.1. Year of implementation

2.1.1. RAF Marham Air Traffic Zone (ATZ) is a circle 2·5NM radius centred on Marham's aerodrome reference point (ARP), notified from surface to 2000FT Above Aerodrome Level (AAL). The Military Air Traffic Zone (MATZ) is a circle 5NM radius centred on Marham's ARP and is notified from surface to 3000FT AAL. Pilots must call Marham Zone on frequency to obtain permission to enter the ATZ. No reply on the Zone frequency will indicate that Marham MATZ can be crossed but pilots must continue to avoid the ATZ unless operating in accordance with previously agreed procedures. Marham Zone is activated in order to protect operational flying and so aligns with its military flying requirements; all opening hours are routinely promulgated via a Notice To Aviation (NOTAM).

2.1.2. Directly above and surrounding RAF Marham the airspace is Class G up to Flight Level FL195; Class C extends from FL195 upwards. During specified hours, the airspace is activated as a Temporary Reserved Area (TRA 003). Although the background classification between FL195 and FL245 is Class C, to avoid operational restrictions, military aircraft may operate autonomously or in be receipt of an air traffic service (when not occupied by Unmanned Air Vehicles (UAV)). MOD and United States Air Force (USAF) aircraft are the predominant users but use of the TRA is not restricted to military users. Above the TRA is the East Anglia Military Training Area (EAMTA), FL 245 to FL 660. A cross-section diagram of the local airspace is at Figure 2.

2.1.3. RAF Lakenheath and RAF Mildenhall are situated adjacent to one another approximately 15NM to the South of RAF Marham. The airfields each have an ATZ (2.5NM radius, up to 2000ft) and have a Combined MATZ (CMATZ) with a 5NM radius centred on each RP with a vertical limit of 3000ft. RAF Lakenheath provides the radar ATC services for both airfields. A Letter of Agreement (LOA) is in force between RAF Lakenheath and RAF Marham to mitigate the risk of collision of departing and arriving Air Systems (AS) at both airfields. RAF Lakenheath is home to the U.S. Air

[25] CAP 722:Unmanned Aircraft System Operations in UK Airspace - Guidance

[26] RA 2320 – Flight Procedures: Role Specific S2 and Certified Remotely Piloted Air Systems (publishing.service.gov.uk)

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Forces in Europe (USAFE) Fighter Wing operating F-35 and F-15 aircraft. RAF Mildenhall serves heavy air transport aircraft including the KC-135 aerial refuelling capability, RC-135V/W Rivet Joint reconnaissance aircraft plus the MC-130J and CV-22 Osprey transport aircraft.

2.1.4. To the East of RAF Marham by approximately 20NM is Norwich Airport (NAL), surrounded by a Control Zone (CTR) and a Control Area (CTA), both up to 4000FT. An LOA is in place to facilitate safe ATC service to traffic to and from NAL and aircraft operating under the control of RAF Marham.

2.1.5. EGD208 Stanta is a Danger Area (DA) located 10NM South East of RAF Marham. Utilised for ordinance, para dropping and Unmanned Air Systems (UAS) it is active from surface to 2500FT ALT (Occasionally (OCNL) up to 7500FT by NOTAM) and controlled by Lakenheath zone on 128.900MHz.

2.1.6. RAF Marham is 10NM to the South of Sandringham House, which is subject to Restricted Area (RA) EG R219, with 1.5M radius centred on 524948N 0003049E from surface up to altitude 2000FT.

2.1.7. Sculthorpe MOD Training Area is located around 15NM North East of RAF Marham for Close Air Support (CAS), Joint Force Air Component (JFAC) or Para/Air-dropping activity. All UK Military AS's operating in the vicinity of Sculthorpe are to contact RAF Marham on VHF 124·150[27].

Figure 1: RAF Marham Local Area.

Source data: CAA VFR Aeronautical Chart 1:500K

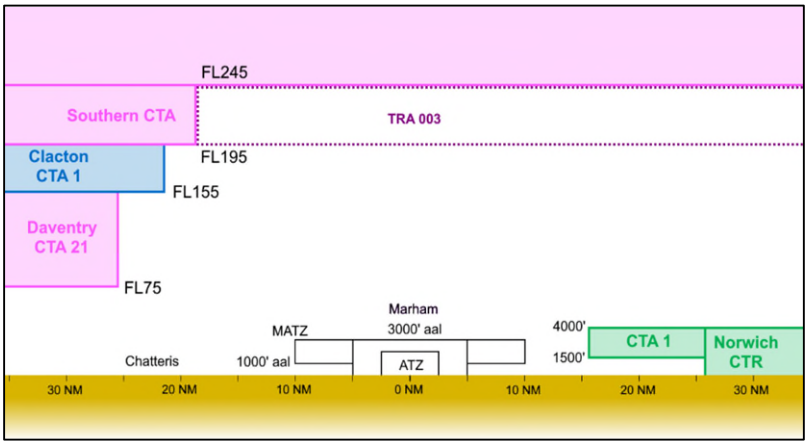

Figure 2: Cross-section Diagram of RAF Marham Local Airspace

2.2. Year 10

2.2.1. No anticipated changes.

3. Airspace usage.

3.1. Year of implementation

3.1.1. RAF Marham.

[27] Source: UK MIL AIP AD 2 – EGYM

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i. RAF Marham's assets are:

- The F-35 Lightning (617 & 207 Sqns), a 5th Generation, multi-role, stealth fighter.

- Two Slingsby Aviation Firefly aircraft for the provision of flying training through the RAF Aero Club, which is active both during the week and at weekends in the local vicinity (up to 15NM away).

- A small Model Flying Club, active mainly during weekend hours or outside flying operations.

- Marham also has 809 Naval Air Squadron, with further force growth planned[28].

ii. The aerodrome operating hours are notified as follows, although it should be noted that RAF Marham currently operates a flexible flying window and times may differ from them at short notice:

- 0800 – 2359 Mon – Thu

- 0800 – 1800 Fri

iii. It is not possible to quantify routine aviation activity at RAF Marham[29] as there is no typical day. F-35s may operate as single AS or in formation, conducting anything from four to seven sorties in a 24-hour period. These may consist of; visual and instrument circuits at the aerodrome; departure to operate within 30NM for general handling; departure to operate in EGD323 over the North Sea.

iv. RAF Marham hosts numerous practice diversions (PD) throughout the day, mainly from RAF Lakenheath and RAF Cranwell, averaging 4 – 5 PDs per day.

3.1.2. Other military activity.

i. The airspace directly surrounding and overhead RAF Marham is used by fast jets for training up to FL245 by RAF Coningsby, RAF Lakenheath and RAF Marham airspace users, who conduct general-handling and air combat training, as well as simulated surface attack in vicinity of RAF Marham.

ii. The local Stanta range is also host to many close air support and forward air control exercises, supported by fast jets. The F-35B Practice Flame Out (PFO) approach demands surface--10,5000ft within 5NM of the airfield for overhead PFOs.

iii. On a daily basis Lakenheath departures and arrivals route through the Marham overhead to/from the D323 complex; departures from Lakenheath over fly the edge of the RAF Marham western MATZ stub and aircraft returning under VFR over fly the central MATZ. The vast majority of Mildenhall departures transit in the vicinity of Marham due to the TACAN provision.

iv. RAF Marham also accepts occasional Practice Diversions (PDs) from RAF Lakenheath; these are all co-ordinated through routine ATC means. RAF Cranwell and RAF Barkston Heath on occasion make use of Marham as their booked Diversion. Any such diversion

[28] Growth rate of 809 Naval Air Sn was not provided by the stakeholder

[29] Source for all RAF Marham activity data: RAF Marham ATC

commitment would be for up to 19 aircraft (Prefect) potentially plus four aircraft (Phenom).

Year 10

3.1.3. Forecasting out to 10 years is a challenging task from a MOD perspective. Over the past 4 years, RAF Marham's annual airfield movements have seen an increase from 5002 in 2020, to 8582 in 2023, shown at Table 1[30]; almost 60% in traffic growth. This is a result of the RAF receiving 37 F35s to date, less than half of the total expected number.

Year	Total No. of Airfield Movements
2019	6534
2020	5002
2021	5422
2022	7727
2023	8582

Table 1: RAF Marham Annual Airfield Movements

3.1.4. RAF Marham expects to host a total of 87 F35s, divided into 4 Sqns (three operational and 1 trg). This will represent a significant increase in sortie rate within the proposed airspace. Increased force growth at Lakenheath and cooperation with USAFE F35s means it is likely that RAF Marham air traffic levels will continue to grow the rate seen over the last 5 years for at least the next five.

4. Civilian Aviation Activity.

4.1. Year of implementation

4.1.1. NAL, serves circa 2700[31] aircraft movements annually, including scheduled and charter aircraft as well as offshore oil/gas/wind farm transportation. The CTA and CTR do not impact the RAF Marham MATZ.

4.1.2. The local area is populated by numerous civil airfields and airstrips supporting leisure flying (general aviation, gliding, paragliding and parachute activity). Of note are East Winch and Broughton (North and South) private landing strips, all of which are within the RAF Marham MATZ. LOAs have been implemented with these airfields, in addition to agreements with Rookery Farm, Great Massingham and Southery Airfields which are situated in the local vicinity.

4.1.3. The East Anglia Air Ambulance (EAAA) from both Cambridge and Norwich operate in the local area and require occasional access to cross the RAF Marham ATZ/MATZ at short notice in response to Helicopter Emergency Medical Service (HEMS) tasking.

4.1.4. RAF Marham is frequently used for both FW and RW VVIP movements, military and private. VVIP FW movements require the establishment of CAS-T.

[30] Source: RAF Marham ATC (unable to provide 2019 data)

[31] Source: Table_03_Aircraft_Movements_PDF.rdl (caa.co.uk)

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4.1.5. Gliding activity generally takes place to the west and south of RAF Marham and is predominantly up to 4000FT. When the weather conditions are suitable, gliders also frequently cross to the north and east of Marham.

4.1.6. Whilst the MATZ is not a mandatory avoid for civil pilots, the majority of civil pilots call RAF Marham ATC when flying in proximity to the aerodrome and when requiring to transit within 5 M of RAF Marham. A qualitative assessment was obtained from Marham ATC regarding the number of requests from civil airspace users to cross overhead RAF Marham (both inside and outside the MATZ). On an average day, RAF Marham ATC estimates that it will receive around 20 requests for MATZ and overhead crossings from general aviation (GA) aircraft (both leisure and sporting) passing within 5 M overhead and operating below 7000 FT AAL. This may peak to the high 20s on the busiest flying days, but is estimated to be less than 30 on any given day. Supporting quantitative evidence has also been obtained from RAF Marham ATC in the form of a monthly breakdown of MATZ crossing requests for the 12 months Oct 2022 – Sep 2023 (inclusive). The figures are provided in Table 1[32] below. Since Marham ATC does not routinely operate at weekends the figures apply to requests for Monday to Friday only and no further granularity is available. Most requests for MATZ crossings are approved with minimum restrictions to the requested route and altitude. An occasional route alteration may be proposed by ATC to sequence crossers with RAF Marham traffic patterns either by lateral or vertical means. Outside the ATZ pilots are not duty-bound to accept the re-route and do not always do so, choosing to follow their stated route and keep a good lookout.

4.1.7. Approximately 10 civilian aircraft per day transit the RAF Marham overhead, above the MATZ. In addition, it is estimated that 50-60 military aircraft also pass overhead. Predominantly from RAF Lakenheath, the aircraft depart heading 240° for 3NM, then turn to the NE to pass over RAF Marham above FL 70.

4.1.8. The airspace surrounding Marham benefits from air traffic services provided by several military and civilian ATC units with good coverage under the Lower Airspace Radar Services (LARS) network. Aircraft operating in the vicinity RAF Marham who wish to obtain an air traffic service typically receive a LARS from either RAF Marham or NAL. The Change Sponsor is not aware of any particular issues regarding operational delays or choke points which should be considered.

Month	Number of MATZ Xers
October 22	48
November 22	41
December 22	14
January 23	32
February 23	33
March 23	71
April 23	73
May 23	36
June 23	83
July 23	46
August 23	57

[32] Source: RAF Marham ATC

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September 23	54

Table 2: MATZ Crossers Oct 2022 to Sep 2023

4.2. Year 10

4.2.1. Estimated Class G airspace traffic growth in this area is likely to be generated by USAFE operations[33] together with GA traffic and will be dependent on various economic and social factors that are impossible to predict (e.g. fuel costs, GDP etc.). Therefore, although the data provided below at Table 3[34] indicates an overall increase in both LARS traffic and MATZ crossers at RAF Marham, no further granularity is available on which to evaluate a reliable 10 year forecast.

4.2.2. The MOD is not aware of any significant forecast increase in civil traffic in the vicinity of RAF Marham, from both the commercial and GA perspective. However, the Eurocontrol forecasting 'Base Scenario' percentages have been used to forecast traffic levels in the vicinity of RAF Marham for the next 10 years.

Year	LARS	MATZ Crossers	Expected increase from 2019 Traffic level
2019	*5848*	*648*	-
2020	4043	599	-
2021	4952	907	-
2022	5815	615	83%
2023	5556	616	95%
2024	*5731*	*635*	98%
2025[35]	*5848*	*648*	100%
2026	*5941*	*658*	101.6%
2027	*6036*	*669*	103.2%
2028	*6133*	*679*	104.8%
2029	*6231*	*690*	106.4%
2030	*6331*	*701*	108%
2031	*6432*	*712*	109.6%
2032	*6535*	*724*	111.2%
2033	*6640*	*735*	112.8%
2034	*6746*	*747*	114.4%

[33] Anticipated growth figures were unavailable from RAF Lakenheath

[34] Source: RAF Marham ATC

[35] "After 2025, flight growth is expected to average 1.6% per year" Eurocontrol Forecast 2023-2029

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2035	*6854*	*759*	116.0%

Table 3: RAF Marham Annual Statistics and forecast levels

5. Safety Risks.

5.1. Year of implementation

5.1.1. There are no anticipated safety risks.

5.2. Year 10

5.2.1. Safety considerations are expected to be in line with forecast civilian and military traffic levels only, with no anticipated changes to safety risks.

6. Local features below 7,000FT.

6.1. Year of implementation

6.1.1. Within the RAF Marham MATZ there are no densely populated areas. Whilst there are no adjacent National Parks[36] or Areas of Outstanding Natural Beauty (AONB)[37], an Air Quality Management Area (AQMA)[38] has been located on the edge of the MATZ boundary at Swaffham.

6.2. Year 10

6.2.1. There are no anticipated changes to local features below 7,000FT.

7. European sites overflown below 3000FT.

7.1. Year of implementation

7.1.1. The Change Sponsor is aware of five European sites[39] within 18 KM of RF Marham runways: Special Area of Conservation (SAC) pertaining to the Norfolk Valley Fens, Breackland, Ouse Washes and Roydon Common Bog; Special Protection Area (SPA) Breckland.

7.2. Year 10

7.2.1. There are no anticipated changes to European sites overflown below 3000FT.

8. Environmental impacts.

8.1. Year of implementation

[36] Source: https://www.nationalparks.uk/

[37] Source: Areas of outstanding natural beauty (AONBs): designation and management - GOV.UK (www.gov.uk) and Magic Map Application (defra.gov.uk)

[38] Source: Defra, Air Information Resource Air Quality Management Areas (AQMAs) - Defra, UK. Breckland District Council Air Quality Management Area Number 2 Order 2017 is an area to the north and south of Swaffham town centre with declared Nitrogen dioxide NO2 pollutant (https://uk-air.defra.gov.uk/aqma/details?aqma_ref=1654#1259)

Magic Map Application (defra.gov.uk)

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8.1.1. There are no anticipated environmental issues (including tranquillity, biodiversity or air quality) within the structure.

8.2. Year 10

8.2.1. Environmental impacts (including tranquillity, biodiversity or air quality) are expected to be in line with forecast civilian and military traffic levels only.

9. Local Context.

9.1. Year of implementation

9.1.1. There are currently nine planning applications in place within the Marham MATZ (7 minor, two major), none of which impact the airspace; there are no planning agreements[4041].

9.1.2. RAF Marham has existing noise abatement procedures[42] to avoid Fincham and Castle Acre. There are no noise action plans[43] within the RAF Marham MATZ that the Change Sponsor is currently aware of.

9.2. Year 10

9.2.1. There is planning permission for 3 sites with a total of 90 dwellings within the 5NM radius of RAF Marham, as laid out in the West Norfolk District Council Local Plan[44].

10. Local Trade-offs and Priorities

10.1. Year of implementation

10.1.1. There are no anticipated local trade-offs of priorities.

10.2. Year 10

10.2.1. There are no anticipated local trade-offs of priorities.

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[40] Source: View and track planning applications | View and track planning applications | Borough Council of King's Lynn & West Norfolk (west-norfolk.gov.uk)

[41] Source: MyNearest | Borough Council of King's Lynn & West Norfolk (west-norfolk.gov.uk)

[42] Source: UK MIL AIP AD 2 – EGYM

[43] Source: Noise Action Plan (2019): Agglomerations (Urban Areas) (publishing.service.gov.uk)

[44] Source: https://www.west-norfolk.gov.uk/download/downloads/id/2491/sadmp_plan_adopted_2016.pdf

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