



Ministry
of Defence

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4 March 2024

ACP-2023-022 AIRSPACE DESIGN OPTIONS – STAKEHOLDER ENGAGEMENT v1.0

1. Introduction

1.1. This document forms part of the airspace change process as defined in Civil Airspace Publication (CAP)1616. ACP-2023-022¹ was commenced to enable the operation of a large Remotely Piloted Air System (RPAS), Protector RG Mk1, to and from a nominated diversion airfield at Royal Air Force (RAF) Marham. The Change Sponsor for this Airspace Change Proposal (ACP) is the Ministry of Defence (MOD).

1.2. The main operating base (MOB) for Protector is RAF Waddington, where permanent segregated airspace in the form of a danger area has been established to support Protector's operation. The danger area is EG D324A/B which was implemented at the end of November 2023. The current timescale is for routine Protector operations to commence from RAF Waddington in early June 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. Whilst Protector's MOB remains RAF Waddington there may be occasions when access to RAF Marham is required for operational reasons.

1.3. Access to RAF Marham as early as June 2024 is being managed under a separate MOD ACP (identification number ACP-2023-047²) and all key aviation stakeholders were approached late last year to provide feedback. The ACP has been recently approved by the CAA and will enable an airspace trial to take place to test the procedures at RAF Marham as the diversion airfield. The airspace trial will be conducted in accordance with a trial / test plan with specified and measurable objectives.

1.4. In terms of airspace construct, there is no expectation for the outer limits of the airspace design for this permanent ACP to differ from that of the trial, as they have already been demonstrated at RAF Waddington as sufficient to meet training and operational objectives.

1.5. This letter is part of the second stage of ACP-2023-022 to provide the permanent solution at RAF Marham.

1.6. Due to the position, construct and frequency of use of the proposed airspace, it is anticipated there will be no impact on non-aviation stakeholders.

¹ Each airspace change proposal (ACP) has a unique identifier allocated by the CAA. ACP-2023-022 is the airspace change identification of the ACP which is entitled "RPAS operations to/from a nominated diversion airfield".

² Details of the temporary change can be found on the CAA ACP Portal [here](#).

2. Layout of this Letter

The regulatory requirement is explained before the extant Design Principles (DPs) selected at Stage 1 of this ACP are re-iterated. The document then outlines the various airspace design options considered to meet the Statement of Need.

3. Regulatory Requirement



Protector has a 79ft wingspan and is 38ft long. It is powered by a single TPE 331-10 turbo-prop engine and will be operated by fully qualified RAF pilots.

3.1. 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 (BVLOS³) 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).

3.2. 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 permit Protector 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.

4. Design Principles (DPs)

4.1. In January this year the MOD undertook engagement activity with a comprehensive list of aviation and non-aviation stakeholders to develop a set of Design Principles (DPs) for this ACP. This engagement and the rationale for the final selection of DPs can be found on the CAA ACP Portal⁴

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.

⁴ See document entitled ACP-2023-022 Stage 1 DEFINE – Design Principles V1.0 at [Airspace change proposal public view \(caa.co.uk\)](https://www.caa.co.uk/air-space-change-proposal-public-view)

4.2. Table 1 shows the final set of DPs for ACP-2023-022. The DPs will be used during Stage 2 of this ACP to inform the development of the design options and against which the options can be qualitatively evaluated.

Priority	Ref	Design Principle
1	DP1	The airspace change proposal must maintain a high standard of safety and should seek to enhance levels of safety, wherever possible.
2	DP2	The airspace provides access to a sufficient area to meet operational and training objectives.
3	DP5	The airspace change proposal should not be inconsistent with relevant legislation, the CAA's airspace modernisation strategy or Secretary of State and CAA's policy and guidance.
4	DP3	The airspace design should endeavour to maximise accessibility for other airspace users.
	DP4	The airspace change proposal should consider the impacts on all airspace users.

Table 1 - ACP-2023-022 DPs following stakeholder engagement

5. Baseline Scenarios

5.1. The Change Sponsor must undertake an assessment of the impacts of the future scenario without any airspace change⁵, by comparison against the impacts of any proposed design options. To achieve this the MOD has prepared two baseline scenarios⁶ in accordance with CAP1616 as follows:

- A scenario based on the year of implementation without the airspace change proposed (year 1)
- A scenario based on 10 years after implementation without the airspace change proposed (year 10)

5.2. Both scenarios are provided at Annex A and the Change Sponsor is interested in your feedback as to their suitability. Changes to the use of the airspace, independent of the proposed airspace change (such as traffic growth and fleet changes) will be evaluated along with the design options and then measured against each of the design principles. An initial options appraisal on the impacts of each design option (including the baseline) will be conducted.

6. Design Options

6.1. Through continued collaboration with the air vehicle manufacturer, General Atomics – Aeronautical Systems Incorporated (GA-ASI) and RAF subject matter experts the MOD has

⁵ CAP 1616f – Stage 2 - Develop and Assess

⁶ In accordance with CAP 1616 v4.0, it was not a requirement to present the current day scenario (baseline) to stakeholders until Stage 2 of the ACP; however, CAP 1616 v5.0 (effective January 2024) mandates this is a requirement at Stage 1, with additional Year 1 'no change' and Year 10 'no change' baseline scenarios at Stage 2. The current day scenario was provided for the trial airspace (ACP-2023-047) and does not differ from the year 1 scenario for this ACP, which is provided at Annex A.

focussed on minimising the impact of EG D324 at RAF Waddington on other airspace users, whilst maintaining military operational objectives and operating in accordance with current regulation. Similar considerations have been employed in developing the airspace design for the airspace trial at RAF Marham. The Change Sponsor sees no merit in revisiting design options that were rejected during the original ACP for RAF Waddington⁷ and is proposing the same airspace design(s) for the permanent airspace change as the design that will be trialled this summer.

6.2. In accordance with the CAP1616 process, the MOD engaged with aviation stakeholders last year in the run up to the establishment of a Temporary Danger Area (TDA) at RAF Marham (ACP-2023-047). The TDA will support a trial of RAF Marham as the diversion airfield and as stated in para 1.3 is expected to commence in the summer of 2024 with a duration of up to 6 months. Feedback on the option of an internal division within the trial airspace construct, together with any assessment of test plan objectives obtained during the early phase of the trial, will be key in the finalisation of the airspace design for ACP-2023-022.

6.3. The MOD is presenting 2 airspace design options both in the form of a cylinder of 5 nm radius centred on RAF Marham's Aerodrome Reference Point⁸ (ARP). Both options are located directly beneath Class C airspace, which during notified hours⁹ is activated as a Temporary Reserved Area (TRA). The overall vertical dimensions of both airspace design options are from surface to Flight Level (FL)195¹⁰

6.4. Responses from stakeholders on how they perceive the suitability of these options and their preferences are invited, as this will help determine the airspace design option(s) to take through to Stage 3.

6.5. Both airspace design options are intended for use by Protector as follows:

- Planned use of RAF Marham for anything other than operational necessity is not envisaged.
- When required to access RAF Marham. Protector will enter the cylinder at FL195 from the adjoining Class C airspace above. It will then perform a spiral descent and execute its automatic landing profile to the main runway¹¹;
- On departure from RAF Marham. Protector will execute its automatic take-off profile and perform a spiral climb to FL195 when it will enter Class C airspace;
- On occasion crews may be required to conduct practise diversions into RAF Marham for currency reasons.

6.6. Note that operations in both runway directions are being supported in each airspace design. Protector has a long endurance (20 hrs+) and the designs need to cater for the event of a runway change.

6.7. As discussed at para 3.1, Protector is subject to the MAA RA 2320: Protector will initially come into service with a limited DAA capability, and as RAF Marham is located entirely within Class G airspace, flight in segregated or controlled airspace is required. Thus, the 'do nothing' scenario would mean that Protector operations cannot take place at RAF Marham (or outside of

⁷ ACP-2019-18 can be found on the CAA ACP Portal [here](#)

⁸ RAF Marham airfield reference point is the midpoint of RW05/23 (52 38 54.26N 000 33 02.42E)

⁹ Mon-Fri 0830 to 1700 UTC Winter; Mon-Fri 0730 to 1700 UTC Summer; Excluding English Public Holidays. TRA may be activated at other times by NOTAM.

¹⁰ 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 100 ft, eg FL 195 = approximately 19,500 ft).

¹¹ The Protector air system is equipped with an Automatic Take-Off and Landing Capability (ATLC) which means that Protector will follow pre-determined flight profiles for the initial departure and final approach phases of flight.

EG D324 at RAF Waddington). The aspiration remains that, with developments in technology and a better understanding of RPAS operations within the UK, BVLOS activity can eventually be integrated into all classes of airspace.

Option 1



Source data: CAA VFR Aeronautical Chart 1:500K

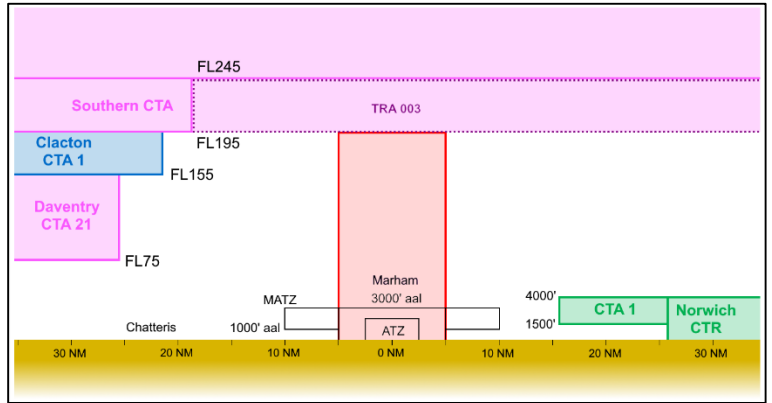


Figure 1- RAF Marham TDA SW/NE Cross-section

Lateral Dimension: 5 nm radius circle centred on RAF Marham's aerodrome reference point (ARP)

Vertical Dimension: Surface to FL195.

Option 2



Source data: CAA VFR Aeronautical Chart 1:500K

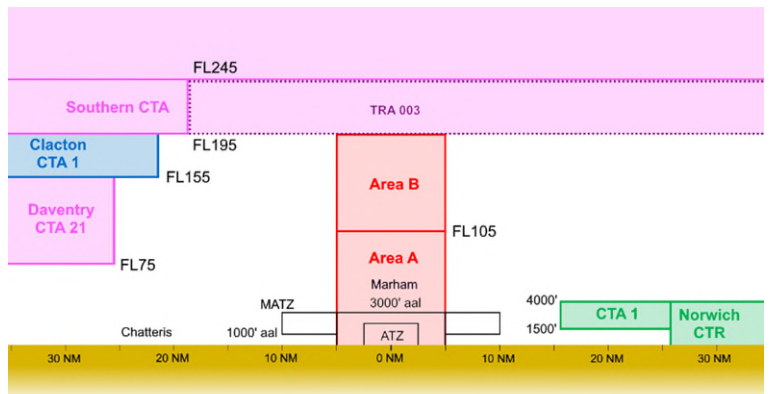


Figure 2- RAF Marham TDA SW/NE Cross-section with internal vertical division

Lateral Dimension: 5 nm radius circle centred on RAF Marham's aerodrome reference point (ARP)

Vertical Dimension:
Area A Surface to FL105
Area B FL105 - FL195.

6.8. An internal division is incorporated within the cylinder (thereby splitting the airspace into 2 vertical sections) to facilitate a more expeditious air traffic management. When Protector is not within a section, it would be considered inactive and aircraft may be permitted to enter the airspace. Aircraft would only be prevented from accessing either section of airspace when Protector is in (or about to enter) either section. It is thought that this will reduce holding times and thereby promote Flexible Use of Airspace (FUA) for all local airspace users (civil and military). The level of the division has been selected as FL105¹² for Option 2 and will be gauged for suitability by feedback from stakeholders and during the early stages of the airspace trial, which has been approved under ACP-2023-047.

7. Type of Airspace to Accommodate Protector Activities

7.1. RAF Marham sits entirely within Class G airspace, which does not provide adequate segregation for Protector without a full DAA capability. Consideration has been given to the most appropriate type of airspace to accommodate Protector activities; a precis follows and is then further summarised in Table 2 below.

7.2. In broad terms civil and military regulations specify that without an appropriately approved DAA capability, Protector must be flown using a Layered Safety Approach that specifically requires flight in segregated airspace. Protector is fitted with TCAS II, which may be approved to provide a DAA capability in airspace where all traffic can be expected to be operating a transponder (i.e. transponder-mandatory airspace). 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.

Type of segregated airspace	Suitability for Protector	MOD Comment
Classes A & C Class D above FL100 or if below FL100 is also a TMZ ¹³	Yes	These classes of airspace are not justifiable by the Change Sponsor in terms of: <ul style="list-style-type: none"> ○ Restrictions placed on other airspace users; ○ Air traffic management resourcing; ○ Flexible use of airspace (notified hours of activation in UK AIP).
Class E	Unknown	Pending AISA for Protector, but thought unlikely to be suitable.
Class G Danger Area	Yes	Less impact on other airspace users since it can be tactically managed (does not have notified hours of activation in UK AIP)
TMZ/RMZ	Possibly	Not being considered for same reasons as noted above for Classes A, C and D,

Table 2- Proposed Airspace Types for Consideration with MOD Comment

¹² FL105 was selected as the same level at which division is made in EGD 324 at RAF Waddington.

¹³ TMZ = Transponder Mandatory Zone.

7.3. It is envisaged, therefore, that the most economical type of airspace to be implemented (in terms of hours of activation, access to airspace and manpower resource) would be segregated airspace in the form of a Danger area. However, the MOD is keen to understand other airspace users' views on the type of airspace to be implemented.

8. Measures to Minimise the Impact on other Airspace Users

8.1. The type of airspace implemented will drive the overall hours of airspace activation. As suggested above, the implementation of segregated airspace in the form of a danger area will provide the most efficient and tactical use of airspace, since the MOD will be able to activate the airspace structures only as and when necessary.

8.2. The proposed airspace will not be permanently active; it will only be activated when Protector flying is due to take place (either from RAF Waddington or on departure from RAF Marham). Procedures will be adopted to ensure that the airspace is activated and notified only as and when required. This will involve appropriate Notice To Aviation (NOTAM) action being taken at D-1¹⁴. To ensure minimum disruption to other airspace users a Special Use Airspace Crossing Service (SUACS) will be offered within all implemented airspace. This means that, even if the airspace has been notified as being active, it may be possible for both civil and military aircraft to transit through it under a clearance from either RAF Marham or Swanwick Military ATC.

8.3. Information on the current status of the airspace will be available, including a Special Use Airspace Activity Information Service (SUAAIS) via RAF Marham or other appropriate military ATC units.

9. Utilisation of Airspace

9.1. 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.

¹⁴ D-1 means that the NOTAM must be requested the day before the airspace is to be activated.

10. How to Provide Feedback

10.1. The MOD welcomes comments and feedback from all interested parties. All comments received regarding this proposal will be taken into consideration before taking the design(s) through to CAP1616 Stage 3. All the details of this airspace change proposal are available on the CAA ACP Portal. The ACP identification number is ACP-2023-022. Feedback on the proposed change and what is important to you should be sent to:

The Airspace Change Manager at UASCDC-ACP@qinetiq.com

10.2. A feedback form is provided at Enclosure 1 and a Word document is attached to the email containing this material for your use if you wish.

Responses must be received by 5 April 2024.



P J DOWNER
Change Sponsor

Annexes:

A. ACP-2023-022 Baseline Scenario

Enclosure:

1. ACP-2023-022 – Stage 2 Engagement Feedback Response Form

ANNEX A: ACP-2023-022 - Baseline Scenarios

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. Civil¹ and military² 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 2.5 nm 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 5 nm 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. The Zone frequency is normally available 0800-2359 (local) Mon-Thu, Fri 0800-1800 (local) subject to station-based operational 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 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 (2.5 NM radius, up to 2000ft) and have a

¹ [CAP 722 - Unmanned Aircraft System Operations in UK Airspace - Guidance \(caa.co.uk\)](https://www.caa.co.uk/Information-For-Industry/Operational-Information/CAP-722-UK-Airspace-Guidance)

² [RA 2320 – Flight Procedures: Role Specific S2 and Certified Remotely Piloted Air Systems \(publishing.service.gov.uk\)](https://www.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/100000/ra-2320-flight-procedures-role-specific-s2-and-certified-remotely-piloted-air-systems.pdf)

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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 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 20 NM 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. EG D208 Stanta is a Danger Area located 10 NM 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 128.900 MHz.

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 15 NM 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 124.150³.



Figure 1: RAF Marham Local Area.
Source data: CAA VFR Aeronautical Chart 1:500K

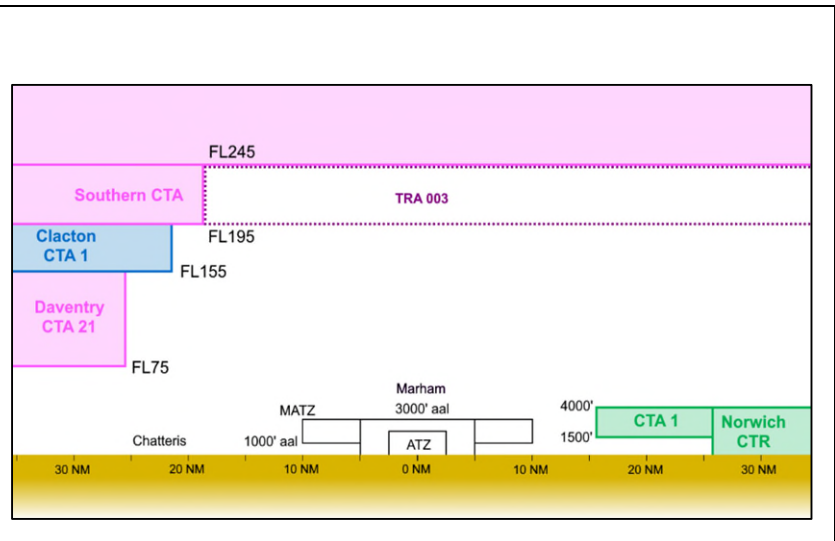


Figure 2: Cross-section Diagram of RAF Marham Local Airspace

2.2. Year 10

2.2.1. No anticipated changes.

³ Source: UK MIL AIP AD 2 – EGYM

3. Airspace usage.

3.1. Year of implementation

3.1.1. RAF Marham.

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.

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 Marham¹⁸ as there is no typical day. F-35s may operate as single AS or in formation, conducting anything from 4 to 7 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 EG D323 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--7,5000ft 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, with the vast majority of Mildenhall departures routing 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.

¹⁸ Source for all RAF Marham activity data: RAF Marham ATC

3.2. Year 10

3.2.1. Forecasting out to 10 years is a challenging task from a MOD perspective. A third front-line F-35 squadron may be in situ at RAF Marham, generating a slight increase to potential traffic operating within the proposed airspace. 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 1¹⁹. Whilst this is almost 60% in traffic growth, there is no reason to conclude that this rate will continue year on year as the figures are likely to have been impacted by the COVID pandemic and movements at the airfield may be subject to vast variations as a consequence of operational demands.

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

Table 1: RAF Marham Annual Airfield Movements

3.2.2. There are no other anticipated changes to military aircraft activity.

4. Civilian Aviation Activity.

4.1. Year of implementation

4.1.1. NAL, serves circa 2700²⁰ aircraft movements annually, including scheduled and charter aircraft as well as off-shore 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. The King’s Helicopter Flight (KHF) operating in and out of Sandringham House utilise RAF Marham for refuelling purposes.

4.1.5. Gliding activity generally takes place to the west and south of RAF Marham and is predominantly up to 4000ft.

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 nm 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

¹⁹ Source: RAF Marham ATC

²⁰ Source: [Table 03 Aircraft Movements PDF.rdl \(caa.co.uk\)](#)

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(GA) aircraft (both leisure and sporting) passing within 5 nm 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 1²¹ 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.

4.1.6. 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.

4.1.7. 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
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 primarily by 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 3²² 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.

²¹ Source: RAF Marham ATC

²² Source: RAF Marham ATC

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.

4.2.3.

Year	LARS	MATZ Crossers
2020	4043	599
2021	4952	907
2022	5815	615
2023	5556	616

Table 3: RAF Marham Annual Statistics

5. Safety Risks.

5.1. Year of implementation

5.1.1. There are no anticipated safety risks.

5.2. Year 10

5.2.1. There are 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 Parks²³ or Areas of Outstanding Natural Beauty (AONB)²⁴, an Air Quality Management Area (AQMA)²⁵ 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 one current Special Area of Conservation (SAC) pertaining to the Norfolk Valley Fens²⁶. There are no Special Protection Areas (SPA)²⁷; Ramsar sites²⁸ (wetlands of

²³ Source: <https://www.nationalparks.uk/>

²⁴ Source: [Areas of outstanding natural beauty \(AONBs\): designation and management - GOV.UK \(www.gov.uk\)](#) and [Magic Map Application \(defra.gov.uk\)](#)

²⁵ Source: [Defra, Air Information Resource Air Quality Management Areas \(AQMA\) - 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 \(https://uk-air.defra.gov.uk/aqma/details?aqma_ref=1654#1259\)](#)

²⁶ Source: [Norfolk Valley Fens - Special Areas of Conservation \(jncc.gov.uk\)](#). The Norfolk Valley Fens is where main concentration of lowland Alkaline fens occurs, plus species of [Narrow-mouthed whorl snail](#) and [Desmoulin's whorl snail](#).

²⁷ Source: [Natural England Access to Evidence - Special Protection Areas Map](#)

²⁸ Source: [Ramsar \(England\) | Ramsar \(England\) | Natural England Open Data Geoportal \(arcgis.com\)](#)

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international importance) or Compensatory habitat (areas secured to compensate for damage to SACs, SPAs and Ramsar sites).

7.2. Year 10

7.2.1. There are no anticipated changes to European sites overflowed below 3000ft.

8. Environmental impacts.

8.1. Year of implementation

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

9. Local Context.

9.1. Year of implementation

9.1.1. There are currently 9 planning applications in place within the Marham MATZ (7 minor, two major), none of which impact the airspace; there are no planning agreements²⁹³⁰.

9.1.2. RAF Marham has existing noise abatement procedures³¹ to avoid Fincham and Castle Acre. There are no noise action plans³² within the RAF Marham MATZ that the Change Sponsor is currently aware of.

9.2. Year 10

9.2.1. There are no anticipated changes to the local context.

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.

²⁹ Source: [View and track planning applications | View and track planning applications | Borough Council of King's Lynn & West Norfolk \(west-norfolk.gov.uk\)](#)

³⁰ Source: [MyNearest | Borough Council of King's Lynn & West Norfolk \(west-norfolk.gov.uk\)](#)

³¹ Source: UK MIL AIP AD 2 – EGYM

³² Source: [Noise Action Plan \(2019\): Agglomerations \(Urban Areas\) \(publishing.service.gov.uk\)](#)

Enclosure 1 - ACP-2023-022: Stage 2 Engagement Feedback Response Form

ACP-2023-022 - Stage 2 Engagement Feedback Response Form	
Name	
Representing	
Address	
Email Address	
Please refer to the design options indicated at Section 6. Which design option (1 or 2) is preferable to you? Please give your reasoning.	
Would you suggest any changes to either design option?	
What thoughts do you have regarding the type of airspace being considered (Class G Danger Area)?	
Please give your feedback on the suitability of the Baseline Assessment.	
Do you have any other suggestions, concerns or comments?	