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ACP-2023-047

Trial Plan for
Airspace Trial to support Protector T&E Flying in the vicinity of RAF Marham

Submission – Version 1.1

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Roles

Action	Role	Date
Produce	Airspace Change Team UAS CDC	10 Jan 2024
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Drafting and Publication History

Issue	Date	Change Summary
1.0	12 Jan 2024	Initial issue
1.1	29 Jan 2024	Change to title of submission to reflect airspace trial; at para 2.2 addition of dates for trial; at para 6 and Table 2 addition of 4 th trial objective; amendment to para 9 and Appendix A paras 3.3.6-7 to add clarity and avoid potential confusion; addition of Table 3 at para 9.3 detailing occurrences of Runway BLACK at RAF Waddington and rationale for anticipated live diversion usage; Appendix A para 2.7 clarification added to use of Sculthorpe; Appendix A paras 5 – 8 data sources added as footnotes; Appendix B amendments to MOD draft documents 1 and 2; Appendix C updated Figure 2 to show proposed vertical split.

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References

- A. SARG - Policy Statement - Special Use Airspace – safety buffer policy for airspace design purposes dated 22 August 2014
- B. DRAFT Policy Statement - Policy for the establishment and operation of Special Use Airspace (Annex I) dated 25 November 2023

1. Introduction

1.1 The large Remotely Piloted Air System (RPAS), Protector RG Mk1 operates out of RAF Waddington where permanent segregated airspace is in place to support access through Class G airspace to its UK operating and training areas. Routine Protector operations at RAF Waddington is not scheduled to commence until late spring 2024 when test and evaluation activities will be conducted prior to Protector entering formally into service.

1.2 This airspace change (ACP-2023-047) is being managed under the airspace trial process as outlined in CAP1616. The purpose of the proposed change is to establish and trial airspace in the form of a Temporary Danger Area (TDA) centred on RAF Marham. The trial seeks to confirm that RAF Marham is a suitable diversion airfield for Protector and will be conducted in accordance with a trial / test plan with specified and measurable objectives. It will also inform the development of ACP-2023-022¹, which is at Stage 1 of the CAP1616 process and seeks to establish permanent segregated airspace in the vicinity of RAF Marham to facilitate continued and enduring access to a diversion airfield for Protector.

1.3 The trial objective has been split into 4 sub-objectives, details of which are at para 6.

2. Timing

2.1 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.

2.2 The airspace trial will commence on 1 Jun 2024 with a duration of up to 6 months. Two planned diversions to RAF Marham will be conducted in the period 1 Jun – 30 Nov 2024. Each diversion profile will involve an arrival and departure from RAF Marham. It is important to note that the TDA will need to be active for all Protector flying, including sorties from RAF Waddington when a planned diversion is not expected (i.e. the TDA may be active but not necessarily used). Therefore, regardless of whether Protector is expected to access the proposed TDA it will be activated by NOTAM whenever **any** Protector flying is taking place. This is to enable Protector to access RAF Marham as a diversion airfield in the event that, for any unforeseen reason, RAF Waddington becomes unavailable. Records of activation and usage will be kept in accordance with the trial objectives at para 6.

2.3 Times of TDA activation will be promulgated by Notice to Aviation (NOTAM) by D-1 at the latest.

3. Baseline Airspace Scenario. In accordance with the airspace trials process the Change Sponsor has prepared a baseline airspace scenario which reflects the current-day scenario. This can be found at Appendix A.

4. Feedback from Stakeholder Engagement

4.1 Engagement material was sent by email to 63 identified local airspace users, as well as NATMAC stakeholders, The Change Sponsor received responses from 9 stakeholders. The 3 main areas for concern were as follows:

- **Letters of Agreement (LOA).** Several LOAs would need amendment.

¹ ACP-2023-022 is at Step 1b of the CAP1616 process, details of which can be found on the CAA ACP Portal here: [Airspace change proposal public view \(caa.co.uk\)](https://caa.co.uk/airspace-change-proposal-public-view)

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- **Airspace classification.** A number of stakeholders suggested the airspace be designated Class C. This had previously been considered but had been ruled out in order to maintain flexible use of airspace (FUA) particularly during the many hours/days that Protector is not scheduled to fly. It would also avoid the additional air traffic resource required to manage Class C, as well as avoiding placing restrictions on other airspace users in terms of having to carry radio etc.
- **Impact on access to/from airfields located within the TDA.** Several airspace users that regularly access airstrips/airfields within the lateral footprint of the TDA expressed concern that they could be subject to unacceptable delays in arriving/departing when Protector was actually operating within the airspace. Through internal MOD discussion (including representatives from Marham ATC), it was agreed that the trial airspace would incorporate a vertical internal division (thereby splitting the airspace into 2) which would facilitate more expeditious air traffic management. This was thought to reduce holding times and promote FUA for all local airspace users (civil and military). The level of the vertical division would be gauged for suitability during the trial.

4.2 Therefore, the overall volume of airspace proposed within the engagement material remains unchanged but a vertical internal division has been incorporated following stakeholder feedback. No comments were received requiring a change to the notification procedures or airspace management that had been presented in the engagement letter.

5. TDA Dimensions

5.1 The dimensions of the TDA proposed over RAF Marham are in Table 1 below. Figures 1 and 2 on the following pages depict the proposed TDA in plan and cross-section views.

Identification and Lateral Limits	Vertical Limits	Remarks
EG DXXXA A circle, radius 5 NM, centred on 523854N 0003302W	Upper Limit: FL105 Lower Limit: Surface	Activity: UAS Beyond Visual Line of Sight (BVLOS) Hours: Activated by NOTAM DACS: RAF Marham Frequency: Marham Zone on 124.150MHz and 378.700MHz Tel: Marham ATC Switchboard on : 01760 444949 Sponsor: MOD
EG DXXXB A circle, radius 5 NM, centred on 523854N 0003302W	Upper Limit: FL195 Lower Limit: FL 105	Activity: UAS Beyond Visual Line of Sight (BVLOS) Hours: Activated by NOTAM DACS: RAF Marham Marham Zone on 124.150MHz and 378.700MHz Tel: Marham ATC Switchboard on : 01760 444949 Sponsor: MOD

Table 1- Dimensions for TDA at RAF Marham



Figure 1 - RAF Marham TDA Design

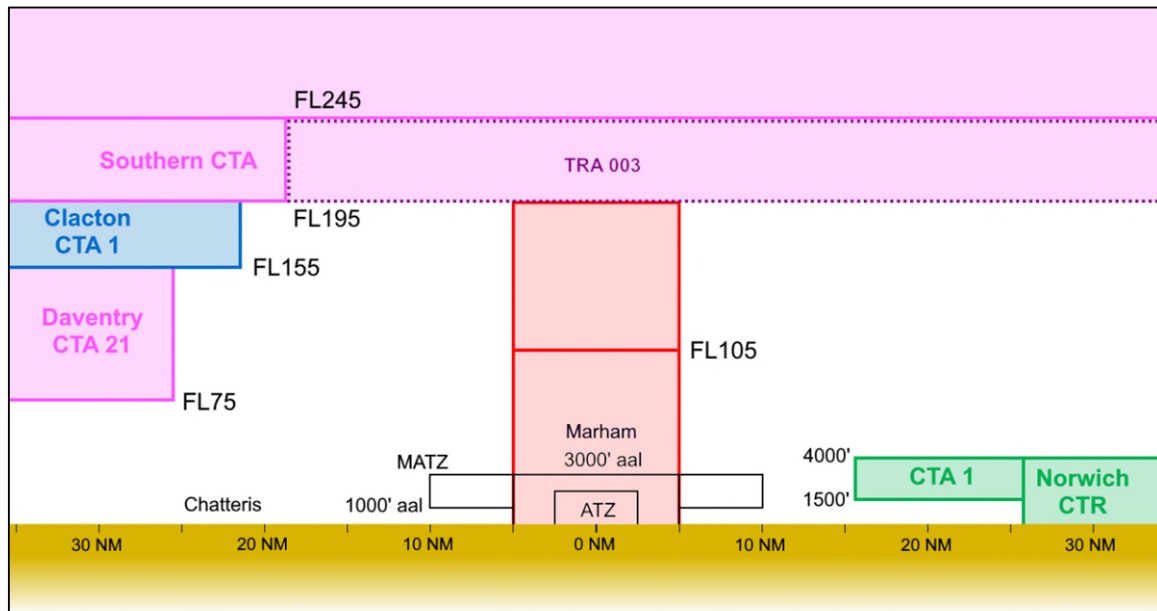


Figure 2 - RAF Marham SWN/E² TDA Cross-section

² The cross-section shows the controlled airspace associated with Norwich Airport. Whilst the airport does not lie directly in line with the SW/NW orientation it is represented here to show that Norwich Airport's controlled airspace is not coincident with the MATZ and any associated airspace at RAF Marham.

6. Trial Objective.

6.1 The overarching trial objective is to confirm that RAF Marham is a suitable diversion airfield for Protector and to inform the development of ACP-2023-022 (see para 1.2). The trial will be conducted in accordance with a MOD-produced trial / test plan with its own specified and measurable objectives. Whilst the MOD will be assessing a wide range of facilities, infrastructure and procedures to determine RAF Marham's suitability, the airspace trial will be measuring 4 sub-objectives specific to the size and shape of the proposed airspace, impact on other airspace users and associated operational procedures. The sub-objectives and metrics specific to this airspace trial are shown in Table 2 below.

To confirm that RAF Marham is a suitable diversion airfield for Protector		
Sub-objectives	Test item	Measured how
1	Volume of TDA	Is the airspace adequate in size and shape to enable Protector to complete a diversion inbound to RAF Marham? (YES/NO) Is the airspace adequate in size and shape to enable Protector to complete a departure from RAF Marham and climb to continue en route following a diversion inbound? (YES/NO)
2	Internal vertical division of TDA	Does the vertical internal division at FL105 provide benefit to other airspace users (Yes/No): a. How long does it take Protector to descend from FL195 to FL110 (to be measured in minutes)? b. How long does it take Protector to descend from FL105 to touchdown at RAF Marham (to be measured in minutes)? c. How long does it take Protector to climb from take-off to FL105 (to be measured in minutes)? d. Do the Protector ATLC times meet that in the System Performance Specification (Yes/No)
3	Procedures	Procedures, rules and limitations for safe operation of Protector in the local airspace of nominated UK diversion airfield have been documented and agreed. (YES/NO)
4	Informing of ACP-2023-022	Measurement of the impact on other airspace users throughout trial period: a. Instances of airspace activation (measured in number of days); b. Instances when airspace is activated but not used by Protector (measured in number of days); c. Duration that airspace is active and occupied by Protector (measures in hours/minutes per instance); d. DACS requests (total number); e. DACS refusals (total number and associated reasons); f. Delay to DACS approval for airspace users operating from airfields within proposed TDA, either outbound or inbound (to be measured in minutes); g. Any additional procedures identified to reduce identified impact (textual description).

Table 2 – Sub-objectives and test metrics for airspace trial

7. Safety Assessment

7.1 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).

7.2 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 and will permit Protector, in the event of an actual or planned (practise) diversion, 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.

7.3 The following operating principles and means of managing the airspace will be implemented for the airspace trial:

a. **Operating authority.** The Operating Authority for the TDA is as follows, together with details for the provision of a Danger Area Crossing Service (DACS) and a Danger Area Activity Information Service (DAAIS):

- Operating Authority - Marham ATC;
- A DACS will be available during TDA hours of activation from Marham ATC;
- A DAAIS will be available from Marham ATC during TDA hours of activation and ATC opening hours. London Information⁴ will also provide a DAAIS on 124.6MHz.

b. **Type of airspace.** The Change Sponsor intends to implement the required segregation in the form of a danger area, 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.

c. **Notification.** The TDA will be activated via NOTAM at the latest by D-1. Activation and de-activation of the TDA will be requested by RAF Waddington.

d. **Activation periods.** 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 danger area

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 NATS record of Engagement Summary V1.0 Appendix C for email on agreement to provide service

airspace would be kept active for the duration of Protector sorties; this is required in order to facilitate early recovery or emergency situations.

e. **Access to airspace.** To ensure minimum disruption to other airspace users a DACS will be offered within the 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. Procedures for managing this are being drawn up by the MOD and are set out in the draft LOAs at Appendix B. That said, the operation of Protector is likely to require segregation from other civil airspace users and, therefore, at this stage, requests to cross the airspace whilst Protector is within it will not be approved.

f. **Air Traffic Control.** RAF Marham ATC will be staffed at all times during Protector operations. Confirmation on the current status of the airspace will be available from other appropriate military ATC units, such as 78 Sqn (Swanwick Military) and London Information, when Marham ATC is closed.

g. **LOAs.** Relevant LOAs are presented with this submission in draft form, along with draft MOD orders and procedures. The Change Sponsor proposes that they will be finalised prior to activation of the TDA and will arrange for the CAA to have sight of the documents on completion, if required. The draft documents are included in this submission at Appendix B.

8. Application for dispensation from CAA Safety Buffer Policy

8.1 The Change Sponsor has considered the proposed airspace's status with regard to the safety buffer criteria laid down in Refs A and B. The MOD presented its proposal for an application for dispensation from the current CAA Safety Buffer Policy during a meeting with NATS in Dec 2023, notes from which have been included in the submission's summary of engagement. NATS confirmed that it has accepted the mitigations presented by MOD and had no further comment or concerns. The application for dispensation is at Appendix C.

9. Noise Impact Statement

9.1 CAP1616 requires trial sponsors to consider the noise impacts of a trial and as this is a military ACP, only consequential impacts on civil traffic need to be considered. 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 Military Aerodrome Traffic Zone⁵ (MATZ)). On an average day, Marham ATC estimate that they will receive around 20 requests for MATZ and overhead crossings from general aviation (GA) (both leisure and sporting) passing within 5 nm overhead and operating below 7000 ft above aerodrome level (AAL). Of that 20, up to 10 are estimated to cross above the MATZ. The total number of overhead crossings (inside and outside the MATZ) may peak to the high 20s on the busiest flying days, but is estimated to be less than 30 on any given day.

9.2 Supporting quantitative evidence has also been obtained from Marham ATC in the form of a monthly breakdown of MATZ crossing requests for the 12 months Oct 2022 – Sep 2023 (inclusive). 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. The figures provided are included in the baseline scenario at Appendix A Table 1. The figures support the qualitative estimate at para 9.1. During the busiest month of Jun 2023 the total number of

⁵ See Appendix A para 2.1 for description of Marham's MATZ

MATZ crossing requests was 83 under the current airspace construct. This equates to a weekly total of just over 19 requests. Assuming there were 2 or 3 busy flying days in any given week, the figures suggest an average of 6 – 10 MATZ crossing requests per day. Add to this the estimate of up to 10 crossing requests above the MATZ and below 7000 ft AAL, this would align with the qualitative estimate of around 20 crossings of the Marham MATZ and overhead.

9.3 A point worth noting is that even though the TDA may be activated, it will only be accessed by Protector on an infrequent basis. During the trial period it is estimated that it will be used on 2 occasions for planned diversion purposes, which in practice means 4 events (2 x inbound and 2 x outbound). Aside from these 2 planned diversions, the use of RAF Marham for other routine training of aircrew during the trial period will not be required. The only other occasion(s) when Protector is likely to require access to RAF Marham during the trial duration will be in the event of an actual diversion as a result of the main runway at RAF Waddington being declared BLACK⁶. Waddington ATC has provided the number of occasions when the runway at RAF Waddington has been unavailable to aircraft operations due to the runway status being declared BLACK over the last 5 years. The figures are shown in Table 3 below.

Year	Number of occurrences
2019	3
2020	2
2021	9
2022	3
2023	5

Table 3- Occurrences of Runway BLACK at RAF Waddington 2018-23

9.4 Over the 5 year period 2018 – 2023 the runway at RAF Waddington was not available due to runway BLACK on 22 occasions, an average of 4.4 occasions per year. Whilst the actual figures have not been made available for this submission, a proportion of these occurrences would be due to snow/snowclearing operations, during which Protector would not have been likely to have flown. Nevertheless a reasonable estimate for runway BLACK occurrences during the summer months would therefore be 2 (the Change Sponsor has halved and rounded down the annual estimate since the trial is running for only 6 summer months). DACS requests will be denied whilst Protector is actually operating within the TDA, the impact of which is estimated to be a worst case delay of 10 - 15 minutes per event. Furthermore, using the estimate of no more than 2 unplanned diversions it can be seen that potential worst case delays of 15 minutes may occur on up to 4 occasions (2 x inbound and 2 x outbound). 15 minutes represents 2.5% 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, a live diversion inbound or outbound could result in less than 1 aircraft being impacted ($20 \times 2.5\% = 0.5$ aircraft). It is clear that the impact would be minimal overall.

9.5 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 or altered by new airspace and hence the production of operational diagrams would be difficult and of no benefit. The Change Sponsor has also 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. Since the change is likely to impact only 1 or 2 civil airspace users on the busiest flying day and

⁶ Runway BLACK indicates that a runway is unusable for a reason other than cloudbase or visibility

considering the mitigations put in place (e.g. NOTAM, DACS), the overall impact of the proposed change on noise is thought to be negligible.

9.6 In conclusion, considering the very low impact on noise, the MOD assesses any further analysis with regard to the metrics outlined in CAP1616, Appendix B, para B88, as disproportionate and requests that it is scoped out.

10. Informing of any affected communities prior to airspace change decision

10.1 The Change Sponsor has a responsibility to determine if there are there any communities that may be affected by the airspace trial, or by consequential impact of the TDA, that have not been engaged with as part of the ACP process and if so, to detail how these communities will be advised of any such impact. In addition, the mechanism for crossing the airspace associated with the TDA (via a DACS) would be very similar to that of crossing the MATZ, and coupled with the fact that the TDA has the same lateral footprint as the extant MATZ at RAF Marham, any changes to traffic patterns should a DACS not be available is likely to be very similar to those experienced today. Therefore, the Change Sponsor assesses that there is no requirement to formally inform any additional communities before a decision is taken by the CAA about its implementation.

11. MOD Action during TDA Activation

11.1 The MOD will collate, monitor and report to the CAA on stakeholder feedback received during the periods of the TDA activation. This will be managed throughout the duration of the TDA. The means by which to provide feedback will be communicated in 2 ways:

- The Change Sponsor will provide contact details via the CAA ACP Portal for all stakeholders and will provide a link to all identified stakeholders via direct email;
- Details will also be provided in the AIC notifying the TDA.

11.2 Once the TDA has ended any feedback collected during the period of activation shall be compiled into a summary report and presented to the CAA for review.

12. Enquiries about the TDA

12.1 Enquiries relating to the subject TDA should be directed to AR Ops 01293 768202 in the first instance.

Appendix A

ACP-2023-047 Baseline Scenario

1. Context.

1.1. RAF Marham sits within class G airspace, which does not provide adequate protection or segregation for the equipment configuration of Protector. Civil⁷ and military⁸ 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.

2. Current structures routes, procedures and behaviours.

2.1. The RAF Marham Air Traffic Zone (ATZ) is a circle 2.5 nm radius centred on Marham's aerodrome reference point (ARP), N 52 38 54.26, E 000 33 02.42 and is 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 requiring transit of either the Marham ATZ / MATZ can call Marham Zone on frequency. 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).

2.2. 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 or in be receipt of an air traffic service autonomously (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.

2.3. 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 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.

⁷ CAP 722 - Unmanned Aircraft System Operations in UK Airspace - Guidance (caa.co.uk)

⁸ RA 2320 – Flight Procedures: Role Specific S2 and Certified Remotely Piloted Air Systems (publishing.service.gov.uk)

2.4. 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.

2.5. 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 7500ft and controlled by Lakenheath zone on 128.900 MHz.

2.6. 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.

2.7. 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 124.150⁹.

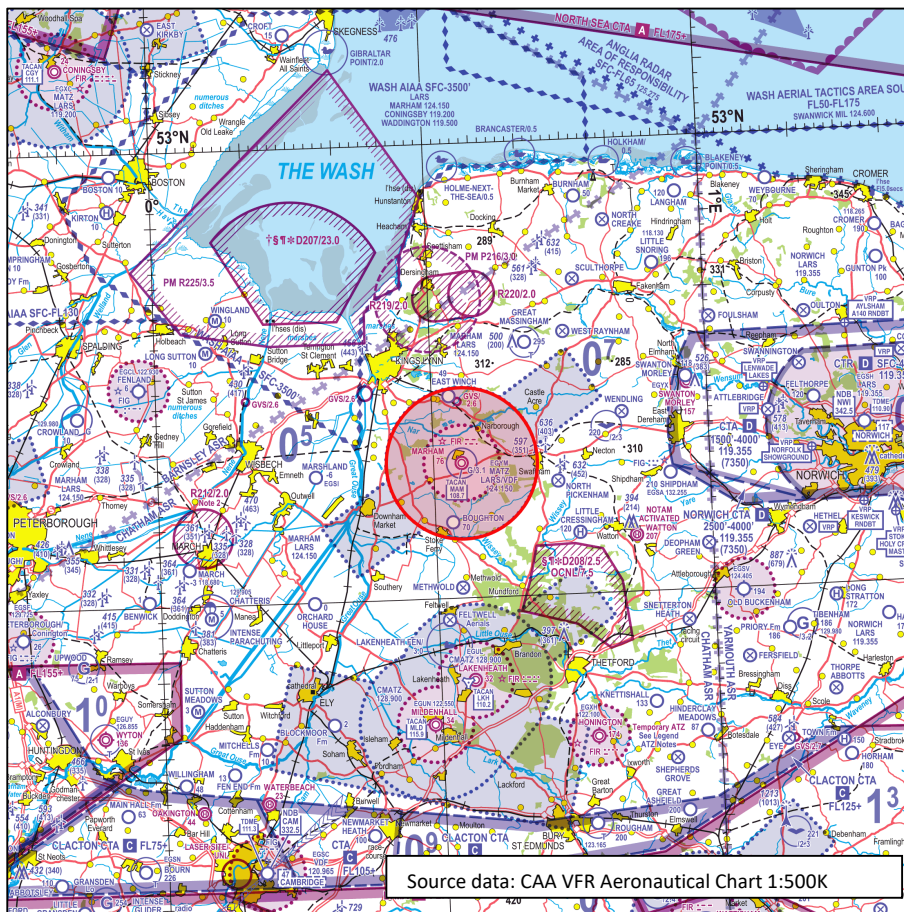


Figure 1 - RAF Marham Local Area.

⁹ Source: UK MIL AIP AD 2 – EGYM

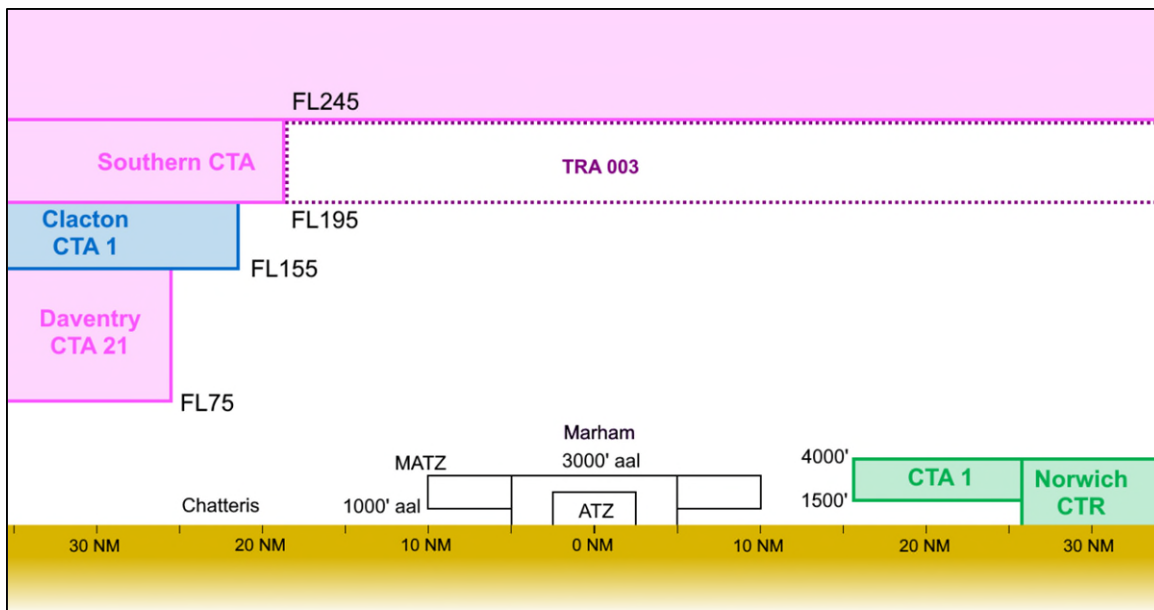


Figure 2: Cross-section Diagram of RAF Marham Local Airspace

3. Airspace usage.

3.1. RAF Marham.

3.1.1. RAF Marham's current 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 way).
- A small Model Flying Club, active mainly during weekend hours or outside flying operations.

3.1.2. 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

3.1.3. It is not possible to quantify routine aviation activity at RAF Marham¹⁰ 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.

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

¹⁰ Source for all RAF Marham activity data: RAF Marham ATC

3.2. Other military activity.

3.2.1. 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. 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-10,000ft within 5nm of the airfield for overhead PFOs. 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. RAF Marham also accepts occasional Practice Diversions (PDs) from RAF Lakenheath; these are all co-ordinated through routine ATC means.

3.3. Civilian Aviation Activity.

3.3.1. NAL, serves circa 2700¹¹ 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.

3.3.2. 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 which are within the RAF Marham MATZ. LOAs have been implemented between these airfields, in addition to agreements with Rookery Farm, Great Massingham and Southery Airfields which are situated in the local vicinity.

3.3.3. 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 (EHMS) tasking.

3.3.4. The King's Helicopter Flight (KHF) operating in and out of Sandringham House utilise RAF Marham for refuelling purposes.

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

3.3.6. 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 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 (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 1¹² 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

¹¹ Source: [Table 03 Aircraft Movements PDF.rdl \(caa.co.uk\)](#)

¹² Source: RAF Marham ATC

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.

3.3.7. 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.

3.3.8. The airspace surrounding Marham benefits from air traffic services provided by several military and civilian 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 1: MATZ Crossers Oct 2022 to Sep 2023

4. Safety Risks.

4.1. There are no current safety risks that the Change Sponsor is currently aware of.

5. Local features below 7,000ft.

5.1. Within the RAF Marham MATZ there are no densely populated areas. Whilst there are no adjacent National Parks¹³ or Areas of Outstanding Natural Beauty (AONB)¹⁴, an Air Quality Management Area (AQMA)¹⁵ has been located on the edge of the MATZ boundary at Swaffham.

6. European sites overflown below 3000ft.

¹³ Source: <https://www.nationalparks.uk/>

¹⁴ Source: [Areas of outstanding natural beauty \(AONBs\): designation and management - GOV.UK \(www.gov.uk\)](#) and [Magic Map Application \(defra.gov.uk\)](#)

¹⁵ 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)

6.1. The Change Sponsor is aware of one current Special Area of Conservation (SAC) pertaining to the Norfolk Valley Fens¹⁶. There are no Special Protection Areas (SPA)¹⁷; Ramsar sites¹⁸ (wetlands of international importance) or Compensatory habitat (areas secured to compensate for damage to SACs, SPAs and Ramsar sites).

7. Environmental impacts.

7.1. There are no specific environmental issues within the current airspace structure that the Change Sponsor has been made aware of. Current noise is of that associated with military aircraft referenced above only and there are no tranquillity, biodiversity or air quality issues.

8. Local Context.

8.1. There are currently 9 planning applications in place within the Marham MATZ, none of which impact the airspace, and there are no planning agreements¹⁹²⁰.

8.2. RAF Marham has existing noise abatement procedures²¹ to avoid Fincham and Castle Acre. There are no noise action plans²² within the RAF Marham MATZ that the Change Sponsor is currently aware of.

9. Local Trade-offs and Priorities.

9.1. The current day scenario does not present any local trade-offs of priorities.

¹⁶ Source: [Norfolk Valley Fens - Special Areas of Conservation \(jncc.gov.uk\)](https://jncc.gov.uk/norfolk-valley-fens-special-areas-of-conservation). 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](#).

¹⁷ Source: [Natural England Access to Evidence - Special Protection Areas Map](#)

¹⁸ Source: [Ramsar \(England\) | Ramsar \(England\) | Natural England Open Data Geoportal \(arcgis.com\)](#)

¹⁹ Source: [View and track planning applications | View and track planning applications | Borough Council of King's Lynn & West Norfolk \(west-norfolk.gov.uk\)](#)

²⁰ Source: [MyNearest | Borough Council of King's Lynn & West Norfolk \(west-norfolk.gov.uk\)](#)

²¹ Source: UK MIL AIP AD 2 – EGYM

²² Source: [Noise Action Plan \(2019\): Agglomerations \(Urban Areas\) \(publishing.service.gov.uk\)](#)

Appendix B

Draft Procedures and Letters of Agreement (LOAs)

A.1 The following draft procedures and LOAs are included

1. Protector Operations (amended from V1.0)
2. LOA between Lincs TATCC, RAF Waddington, RAF Coningsby, RAF Cranwell, RAF Marham, 78 Sqn Swanwick and 56 Sqn for Protector Operations (amended from V1.0)
3. LOA between the owner of East Winch airfield and RAF Marham
4. LOA between the owner of Boughton (South) airfield and RAF Marham
5. LOA between the owner of Boughton (North) airfield and RAF Marham

*****PDFs to be inserted in final submission*****

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PROTECTOR OPERATIONS.

REFERENCES:

- A. [BM Policy EG D324 ATS Provision](#)

GENERAL

1. For PTR operations at RAF Marham EGD###, a cylinder with a 5nm radius centred around MRH, from surface up to FL195, will be activated. The DA is sub-divided with EGD###A from surface to FL105 and EGD###B from FL105 to FL195.

START PROCEDURE

2. PTR will be towed to the spectacles on Taxiway C for start by the Ground Crew. PTR Ground Crew will request start either on GRD frequency 118.325 / 360.40 or via SMRE, using the tail number. With start approval the ATIS information is to be passed by MRH GRD.
3. After engine start, PTR Aircrew will check in on GRD frequency 118.325 / 360.40 with the ATIS code and using the flight Callsign. If the ATIS code is incorrect MRH GRD shall pass the correct ATIS code and change.
4. When PTR Aircrew call for start, an information call is to be passed to MRH Radar at the earliest opportunity to allow them to establish EGD### 'HOT'.
5. When notified of EGD### 'HOT', the VCR ASOS shall annotate accordingly in the information box on the weather page of TopSky and inform Stn Ops.

TAXI PROCEDURE

6. PTR aircrew will call for taxi as standard. PTR is to be provided taxi instructions in the same manner as a standard aircraft although consideration should be given to the reduced visibility of PTR aircrew.

TAKE-OFF & LANDING PROCEDURE

7. PTR will operate on GPS ALG where the landing datum is adjusted for the threshold of the runway in use. As such they will be deconflicted on QFE from other visual circuit traffic.
8. PTR is equipped with retractable gear, therefore SOP for gear checks apply.
9. Wind limitations. The maximum crosswind speed for landing is 15 kts in all weight Configurations. The maximum crosswind speed for take-offs is as follows: 5 kts in Lightweight and mediumweight configuration (<10,500lbs All Up Take Off Weight (ATOW)), 15 kts in heavyweight configuration (10,500-12,500lbs ATOW).
10. PTR is not cleared to trample RHAGs, therefore a derigged cable is required for PTR to use the runway.
11. MRH RA will descend PTR to facilitate a standard join for the visual circuit. Once two-way with MRH ADC, the phraseology will be that of a standard join on QFE.
12. The phraseology for the ATLC would be same as expected from a standard circuit.

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13. The aircraft will still be expected to report final gear down. On reporting the gear is down the aircraft is given clearance to land/Low Approach.

14. Standard SOPs apply for the TRC Controller.

DA MANAGEMENT

15. Once PTR has vacated the DA and is safely en-route, EGD### 'COLD' is then updated on TopSky but remains 'active' iaw the NOTAM.

16. When Protector has completed the last sortie of the day, inform Stn Ops who will liaise with WAD Ops. When all activity is finished then a NOTAM will be submitted by WAD Ops to 'deactivate' the airspace. MRH ATC cannot close until the DA is confirmed inactive by way of the cancelled NOTAM, as a DACS must always be available when the DA is active.

EMERGENCY

17. In the event of an emergency, extant procedures are to be followed.

a Emergency ATC reference cards are in the VCR and TRC.

18. In the event of Lost Link, Protector will fly on its last cleared route before returning to land on a pre agreed route (tactically managed to minimise disruption) before landing at RAF Marham.

19. In the event of a Loss of R/T. PTR will orbit and maintain their altitude whilst direct landline calls are made between the CGCS (01522 727712) and MRH ATC (01760 444949).

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LETTER OF AGREEMENT BETWEEN THE LINCOLNSHIRE TERMINAL AIR TRAFFIC CONTROL CENTRE, RAF WADDINGTON, RAF CONINGSBY, RAF CRANWELL, **RAF MARHAM** 78 SQN SWANWICK AND 56 SQN FOR PROTECTOR OPERATIONS.

Review Date: 1 Nov 24

Note: Additions in red are the proposed amendments to include the Marham airspace (EGD###) into the original WAD airspace (EGD324) LoA.

REFERENCES:

- A. [BM Policy EG D324 ATS Provision](#)

PURPOSE

1. The purpose of this Letter of Agreement (LOA) is to define the procedures to be applied between the Lincolnshire Terminal Air Traffic Control Centre (Lincs TATCC), RAF Waddington, RAF Cranwell, **RAF Marham** and 78 Sqn to facilitate **support to Protector Operations**.

SIGNATORY UNITS

1. Units participating in this LOA:
 - a. Lincs TATCC (encompassing CON ATC, WAD Radar and CWL Radar)
 - b. RAF Waddington (WAD)
 - c. RAF Coningsby (CON)
 - d. RAF Cranwell (CWL)
 - e. **RAF Marham (MRH)**
 - f. 78 Sqn, Swanwick (78 Sqn)
 - g. 56 Sqn RAF Waddington (PTR).
 - h. Royal Air Force Aerobatics Team (RAFAT)

INTRODUCTION

2. WAD will facilitate the Operations of the General Atomics MQ9B PTR, Remotely Piloted Aircraft System (RPAS) by 56 Sqn from Nov 23. The Civil Aviation Authority have approved the establishment of Managed Danger Area (MDA) EGD324, overhead WAD and CWL which will be activated for PTR and certain RAFAT operations from Dec 23. The MDA is split into two parts: a 'cylinder' (EGD324A); a 5nm radius circle centred on WAD, active from surface to FL105, and a 'box' (EGD324B); which extends from the southern edge of the 'cylinder', active FL105 to FL195. These will allow PTR to climb and descend safely into a known air environment.

3. **MRH will provide PTR with a diversion airfield from May 24, with establishment of EGD### overhead MRH. The MDA is a cylinder of 5nm radius centred on MRH, active from surface to FL195. The MDA cylinder is subdivided into two parts: EGD###A from surface to FL105 and EGD from FL105 to FL195.**

HOURS OF OPERATION

4. The MDA activation, **for both the WAD and MRH airspace**, will be notified by means of NOTAM at least 24hrs in advance.
5. PTR activity will be coordinated at the weekly Operational Planning Group (OPG) held internally at WAD. The WAD Radar **and MRH Ops** presence in the OPG will ensure the activity is

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notified to **both** the Lincs TATCC **and MRH ATC**. All other signatories seeking planned PTR activity ahead of NOTAM activation are welcome to listen to the OPG recordings stored on MS Teams or attend the meetings themselves. **PTR activity requiring ATS support outside of routine operating hours of WAD and MRH will require advance notification and subsequent approval by WAD and/or MRH Ops.**

6. A Danger Area Crossing Service (DACS) will be available from Lincs TATCC **for EGD324 and from MRH ATC for EGD###** iaw **REF A** to aid flexible use of airspace (FUoA).

PTR FLIGHT PROFILE SUMMARY

7. PTR will depart WAD / **MRH** and climb in a spiral inside EGD324A / **EGD####A** to 3000ft WAD QFE / **MRH QFE**, changing to WAD / **MRH** Radar's frequency when established in the climb safely. WAD / **MRH** Radar will then continue to climb PTR to FL100 inside EGD324A / **EGD####A**. It will take approximately 10 minutes from departure to reach FL100. Once established at FL100, PTR will be given a further climb to FL190 and will re-position into EGD324B / **EGD####B**. As PTR passes FL160 it will be handed to 78 Sqn. The MDA airspace from FL160 to FL195 will then be delegated to 78 Sqn. Once PTR has vacated the MDA, responsibility for the airspace from FL160 to FL195 will revert to WAD / **MRH** Radar.

8. On recovery, PTR will enter EGD324B / **EGD####B** at FL190 and will be instructed to descend not below FL150. It will then be handed to WAD / **MRH** Radar on passing FL160. Once established at FL150, PTR will be given a further descent to FL100 and will re-position into EGD324A / **EGD####A**. Further descent will be conducted in a spiral on the WAD / **MRH** QFE and will be subject to other activity at WAD / **MRH** with the aim of achieving height 3500ft QFE before transfer to WAD / **MRH** Tower for final descent profile. The recovery from FL100 will take approximately 10 minutes.

9. There will also be occasions where PTR conducts local sorties and remains within EGD324. On these occasions, delegation of control over the airspace will be managed tactically between WAD Radar and 78 Sqn.

ATS AND COORDINATION

10. **ATS provision will be conducted iaw REF A, unless operating iaw the following specific LoAs**

- a EGD324: [LNAA Operations at RAF Waddington](#)
- b EGD###: [Broughton South](#)
- c EDG###: [Broughton North](#)
- d EDG###: [East Winch](#)

11. A DACS **for EGD324** will be available from WAD Radar for the duration of the NOTAM. Ac can contact WAD LARS on 119.5 / 232.70 and request a DACS, which will be subject to the position and intentions of PTR. Any ac unable to receive a positive clearance through onboard radios will be unable to receive a DACS.

12. **A DACS for EGD### will be available from MRH Radar for the duration of the NOTAM. Ac can contact MRH LARS on 124.150 / 378.70 and request a DACS, which will be subject to the position and intentions of PTR. Any ac unable to receive a positive clearance through onboard radios will be unable to receive a DACS.**

AGREED FACILITATING PROCEDURES

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13. **law REF A**, the MDA will be described as 'active / inactive' when referencing its published NOTAM activity. The MDA will be described as 'hot/ cold' when it is / is not actively being used by PTR. **Equally when RAFAT is actively using EGD324 the MDA will be described at 'hot'**. The local TopSky overlay is to be selected by the WAD / **MRH** Radar Sup/ATCO IC when the MDA is 'hot' and de-selected once 'cold'.
14. PTR should remain within the MDA when below FL195, only leaving in extremis to meet deconfliction minima or for safety of flight.
15. **WAD / MRH ATC / Radar actions for PTR departure.** When PTR is on engine start:
 - a. WAD / **MRH** ATC will prenote WAD / **MRH** Radar who will declare EGD324A / **EGD####A** 'hot'.
 - b. WAD / **MRH** Radar will assign PTR a squawk; **3634 specifically for WAD Radar to aid identification and situational awareness of PTR to surrounding ATC units.**
 - c. WAD / **MRH** Radar will then prenote 78 Sqn, who will co-ordinate the planned routing for PTR from EGD324B / **EGD####B** if required, which should also be promulgated via an ACN.
 - d. The handover to 78 Sqn should begin once PTR has passed FL160.
16. **WAD / MRH ATC / Radar action for PTR recovery.** Upon receiving a prenote from 78 Sqn that PTR is recovering WAD / **MRH** Radar will:
 - a. Provide a squawk (**3634 for WAD recoveries**) and a frequency to 78 Sqn, delegate FL150 – FL195 of EGD324B / **EGD####B** to 78 Sqn and select the relevant TopSky overlays.
 - b. Once observed entering EGD324B / **EGD####B**, prenote WAD / **MRH** ATC (who will prepare circuit sterilisation) and declare EGD324A / **EGD####A** 'hot'. For EGD324, if there is concurrent RAFAT display activity at WAD, PTR will maintain not below FL110 in the EGD324B until RAFAT call complete. PTR can re-position into EGD324A at FL100 while RAFAT recover to Waddington.
 - c. Once established in EGD324A / **EGD####A**, provide a stepped descent to ensure IFR separation against any remaining circuit traffic is maintained. At 3500ft WAD / **MRH** QFE, PTR is to be transferred to WAD / **MRH** ATC.
17. Once PTR is in two-way comms with WAD / **MRH** ATC:
 - a. ADC will provide further descent join to the Visual Circuit.
 - b. When PTR has landed, Lincs TATCC / **MRH Radar** will deselect the airspace on TopSky and inform local units if required so they are able to use the airspace. WAD / **MRH** ATC will inform **WAD Ops who in turn will inform CAA** AR Ops, so the NOTAM notifying the MDA as 'active' can be cancelled for the remainder of the day, informing the general aviation community.
18. **78 Sqn Swanwick.** 78 Sqn will adhere to the following:
 - a. 78 Sqn shall contact WAD / **MRH** Radar for a clearance to cross the MDA or advise their ac to contact WAD / **MRH** Radar for a DACS.

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- b. On receipt of a PTR prenote, 78 Sqn are to provide a sqk and frequency. The handover should begin once PTR has passed FL160. Once PTR has vacated the confines of the EGD324B / EGD###B, 78 Sqn will notify WAD / MRH Radar that PTR is safely en route.
- c. On recovery to WAD / MRH, 78 Sqn shall prenote WAD / MRH Radar. The prenote will allow WAD / MRH Radar to delegate the airspace from FL150 to FL195 to 78 Sqn, provide them with a squawk and a frequency. 78 Sqn shall not descend PTR below FL150 and will endeavour to initiate the handover no later than FL160. Once the handover is complete, responsibility for the airspace from FL150 to FL195 will revert to WAD / MRH Radar.

SPECIFIC EGD324 AGREED FACILITATING PROCEDURES

19. **CWL.** CWL Radar, ATC, Flying Club and Gliding Club are to adhere to the following:

- a. Once notified that either MDA is 'hot', if any ac under the control of CWL Radar/ ATC requires a DACS, CWL Radar /ATC will request permission from WAD Radar.
- b. Some instrument procedures are affected and prior planning should prevent these being used, alternatively a DACS may be sought, or the traffic held off ac until the MDAs are 'cold'. Affected CWL instrument procedures are:
 - (1). NDB3 to ILS Rwy 26.
 - (2). TAC ILS Rwy 26.
 - (3). TAC Rwy 26.
 - (4). TAC Rwy 08 (Cat C,D,E) Instrument approaches affected.
 - (5). MID 1C
- c. Due to the close proximity of the MDA to Temple Bruer (unlicensed airfield to north of CWL), CWL ATC shall advise these arrivals / departures to contact CWL frequency 124.450 before departing/recovery to facilitate an early DACS from WAD Radar.
- d. Before commencing flying, CWL Gliding Club and Flying Club shall confirm the MDA status for the period of their flying activity. If the MDAs are planned to be active and CWL ATC are closed, the Flying / Gliding Club supervisor shall call WAD ATC on 01522 727451/2 to facilitate deconfliction and coordination.

20. **CON ATC.** CON ATC are to adhere to the following:

- a. Once notified that either MDA is 'hot', if any ac under the control of CON ATC requires a DACS, CON ATC will request permission from WAD Radar.
- b. All CON departures will be restricted to FL95 until laterally clear of the MDAs. Performance departures can be approved with the caveat of 'remaining outside of EG324'.
- c. Due the complexity of the airspace once the MDA is active, CON ATC will encourage visual recoveries when on Rwy07. However, should GCAs be required for Rwy07, CON ATC is to request Sterile Area C from CWL Radar and vector the ac around the MDA. TI on these ac will also be passed to WAD Radar.
- d. TACAN approach profiles to Rwy 07RH conflict with EGD324A. Prior planning should prevent CON attempting this type of approach when the MDAs are 'hot'. Ac/ controllers may seek a DACS to facilitate them or hold off ac until the MDAs are 'cold'.

SPECIFIC EGD324 PROCEDURES FOR RAFAT

21. EGD324A is also utilised for RAFAT to conduct display practices at WAD. Activation and publication procedures will be conducted iaw paras 4 & 5. Activity will mostly occur Mon to Fri 0800L-1730 local but can also take place on weekends.

22. Restrictions on other local airspace users during RAFAT activity will remain iaw paras 10-20. RAFAT will be passed traffic information on instrument and visual recoveries to CON 07RH and CWL 19RH. Upon receipt of this, RAFAT will endeavour to honour the boundary of the MDA until the traffic is no longer relevant (as confirmed by Wad Radar).

SPECIFIC EGD### AGREED FACILITATING PROCEDURES

23. To facilitate flexible use of airspace; where the DA is 'Active/Cold' 78 Sqn will be authorised to cross / utilise the airspace without obtaining a DACS approval iaw below:

a MRH Radar will notify 78 Sqn (and LKH RAPCON¹) when the DA is 'Active - Cold' and provide EGD### entry approval. Until this notification has been received, 78 Sqn (and LKH RAPCON) must request individual DACS crossing approvals.

b MRH Radar will notify 78 Sqn (and LKH RAPCON) when the DA is 'Active – Hot' and confirm with both ATS agencies that all aircraft have vacated EGD###. When notified 'Active – Hot' 78 Sqn (and LKH RAPCON) must request individual DACS crossing approvals.

LOST LINK

24. In the event of a Lost Link, PTR will squawk 7400 and will follow the existing clearance to a point where they will hold for a prescribed amount of time before following a pre-established recovery profile back to WAD / MRH. In event that this occurs, all standing agreements are suspended. Tactical coordination is to avoid crossing below a descending PTR or above a climbing PTR. Wherever possible, the MDA should be avoided until contact is made with the pilot via landline to confirm intentions and aid recovery to WAD / MRH.

APPLICATION OF LOA

25. The contents of this LOA should not prevent any pilot, air traffic controller or controlling authority from using discretion in the case of an emergency or to exercise a duty of care iaw CAP 774. The relevant unit shall be informed of any departure from the agreed procedure as soon as possible.

26. Permanent amendment to this LOA will only be affected with the written consent of all signatories.

27. The agreed procedures will be detailed where necessary in signatories' unit order books and LOAs.

28. This LOA is effective once signed by all signatories.

¹ iaw Marham ATC – Lakenheath RAPCON LoA.

SIGNATORIES

Position	Rank/ Name	Signature	Date
OC OSW, RAF Waddington			19 Oct 23
OC Ops Wg, RAF Coningsby			6 Nov 23
OC Ops Wg, RAF Cranwell			19 Oct 23
OC Ops Wg, RAF Marham			
OC RAFAT			30 Oct 23
OC 56 Sqn			20 Oct 23
OC 78 Sqn			20 Oct 23

5 Dec 23

**LETTER OF AGREEMENT BETWEEN THE OWNER OF EAST WINCH AIRFIELD AND
ROYAL AIR FORCE MARHAM**

1. The following Air Traffic Control procedures are agreed between Ms/Mrs/Miss Burman and Royal Air Force Marham, covering the operation of aircraft into and out of private landing strip of East Winch, situated 5 miles north of RAF Marham:
 - a. Royal Air Force Marham is published as an extended hours aerodrome. When open and within its capacity, RAF Marham, when requested will provide an Air Traffic Service to aircraft both into and out of East Winch Airfield.
 - b. Airspace users are to be aware that RAF Marham now operates from all 4 runways, Rwy01, Rwy05RH, Rwy19RH, Rwy23. Airspace users are to remain vigilant for fast jet traffic operating in the vicinity of RAF Marham MATZ.
 - c. Pilots of radio equipped aircraft inbound to East Winch Airfield are to attempt to contact Marham Zone on VHF 124.150 MHz as early as possible for their transit towards the Airfield, to enable early coordination of a MATZ transit with ATC. Likewise, aircraft departing East Winch are requested to make every effort to contact Marham ATC via telephone prior to departure.
 - i. When EGD### is NOTAM'd as active, pilots must not depart without a positive clearance from Marham ATC. Likewise, when recovering to East Winch, pilots must not enter EGD### without a positive clearance from Marham ATC. Clearances can be obtained via the contact details on the NOTAM.
 - d. Pilots of transponder equipped aircraft are requested to ensure that their mode 3A and C are switched on prior to departure from or recovery to the airfield. Non-transponder equipped aircraft are requested to telephone RAF Marham ATC prior to departure with a brief overview of their route or general handling requirements.
 - e. Pilots of non-radio equipped aircraft requiring MATZ penetration are to clear their arrival and departure by telephone and on each occasion with RAF Marham ATC Supervisor on Narborough (01760) 444949.
 - f. Should the airstrip accept visiting aircraft, the airfield owner will endeavour to ensure the visiting pilot is fully briefed on the agreement contained herein.
2. Signed on behalf of RAF Marham and by the owner of East Winch Airfield.

Wing Commander
Officer Commanding

Owner
East Winch Airfield

Operations Support Wing
RAF Marham

5 Dec 23

**LETTER OF AGREEMENT BETWEEN THE OWNER OF BOUGHTON (SOUTH)
AIRFIELD AND ROYAL AIR FORCE MARHAM**

1. The following Air Traffic Control procedures are agreed between Mr Warner and Royal Air Force Marham, covering the operation of aircraft into and out of private landing strip of Boughton (South), situated 4 miles south of RAF Marham:
 - a. Royal Air Force Marham is published as an extended hours aerodrome. When open and within its capacity, RAF Marham, when requested will provide an Air Traffic Service to aircraft both into and out of Boughton (South) Airfield.
 - b. Airspace users are to be aware that RAF Marham now operates from all 4 runways, Rwy01, Rwy05RH, Rwy19RH, Rwy23. Airspace users are to remain vigilant for fast jet traffic operating in the vicinity of RAF Marham MATZ.
 - c. Pilots of radio equipped aircraft inbound to Boughton South Airfield are to attempt to contact Marham Zone on VHF 124.150 MHz as early as possible for their transit towards the Airfield, to enable early coordination of a MATZ transit with ATC. Likewise, aircraft departing Boughton South are requested to make every effort to contact Marham ATC via telephone prior to departure.
 - i. When EGD### is NOTAM'd as active, pilots must not depart without a positive clearance from Marham ATC. Likewise, when recovering to Boughton South, pilots must not enter EGD### without a positive clearance from Marham ATC. Clearances can be obtained via the contact details on the NOTAM.
 - d. Pilots of transponder equipped aircraft are requested to ensure that their mode 3A and C are switched on prior to departure from or recovery to the airfield. Non-transponder equipped aircraft are requested to telephone RAF Marham ATC prior to departure with a brief overview of their route or general handling requirements.
 - e. Pilots of non-radio equipped aircraft requiring MATZ penetration are to clear their arrival and departure by telephone and on each occasion with RAF Marham ATC Supervisor on Narborough (01760) 444949.
 - f. Should the airstrip accept visiting aircraft, the airfield owner will endeavour to ensure the visiting pilot is fully briefed on the agreement contained herein.
2. Signed on behalf of RAF Marham and by the owner of Boughton (South) Airfield.

████████████████████
Wing Commander
Officer Commanding

████████████████
Owner
Boughton (South) Airfield

Operations Support Wing
RAF Marham

5 Dec 23

**LETTER OF AGREEMENT BETWEEN THE OWNER OF BOUGHTON (NORTH)
AIRFIELD AND ROYAL AIR FORCE MARHAM**

1. The following Air Traffic Control procedures are agreed between Mr Coulten and Royal Air Force Marham, covering the operation of aircraft into and out of private landing strip of Boughton (North), situated 4 miles south of RAF Marham:
 - a. Royal Air Force Marham is published as an extended hours aerodrome. When open and within its capacity, RAF Marham, when requested will provide an Air Traffic Service to aircraft both into and out of Boughton (North) Airfield.
 - b. Airspace users are to be aware that RAF Marham now operates from all 4 runways, Rwy01, Rwy05RH, Rwy19RH, Rwy23. Airspace users are to remain vigilant for fast jet traffic operating in the vicinity of RAF Marham MATZ.
 - c. Pilots of radio equipped aircraft inbound to Boughton North Airfield are to attempt to contact Marham Zone on VHF 124.150 MHz as early as possible for their transit towards the Airfield, to enable early coordination of a MATZ transit with ATC. Likewise, aircraft departing Boughton North are requested to make every effort to contact Marham ATC via telephone prior to departure.
 - i. When EGD### is NOTAM'd as active, pilots must not depart without a positive clearance from Marham ATC. Likewise, when recovering to Boughton North, pilots must not enter EGD### without a positive clearance from Marham ATC. Clearances can be obtained via the contact details on the NOTAM.
 - d. Pilots of transponder equipped aircraft are requested to ensure that their mode 3A and C are switched on prior to departure from or recovery to the airfield. Non-transponder equipped aircraft are requested to telephone RAF Marham ATC prior to departure with a brief overview of their route or general handling requirements.
 - e. Pilots of non-radio equipped aircraft requiring MATZ penetration are to clear their arrival and departure by telephone and on each occasion with RAF Marham ATC Supervisor on Narborough (01760) 444949.
 - f. Should the airstrip accept visiting aircraft, the airfield owner will endeavour to ensure the visiting pilot is fully briefed on the agreement contained herein.
2. Signed on behalf of RAF Marham and by the owner of Boughton (North) Airfield.

████████████████████
Wing Commander
Officer Commanding

████████████████
Owner
Boughton (North) Airfield

Operations Support Wing
RAF Marham

Appendix C

Application for Dispensation from the CAA Safety Buffer Policy wrt ACP-2023-047 (Protect or diversion airfield at Marham)

References:

- A. Policy Statement – Special Use Airspace – safety buffer policy for airspace design purposes dated 22 August 2014
- B. DRAFT Policy Statement - Policy for the establishment and operation of Special Use Airspace (Annex I) dated 25 November 2023

1 ACP-2023-047 Requirement and Airspace Design

1.1 The proposed airspace associated with ACP-2023-047 comprises a volume of airspace in the form of a temporary danger area (TDA). It is in the shape of a cylinder of 5 nm radius, centred on RAF Marham's Aerodrome Reference Point²³ (ARP) from surface to FL195. It incorporates a vertical internal division at FL105 (thereby splitting the airspace into 2) in order to facilitate more expeditious air traffic management. Figure 1 illustrates the lateral dimensions of the proposed TDA and Figure 2 illustrates a cross-section of the proposed TDA from a southwest/northeast perspective²⁴.

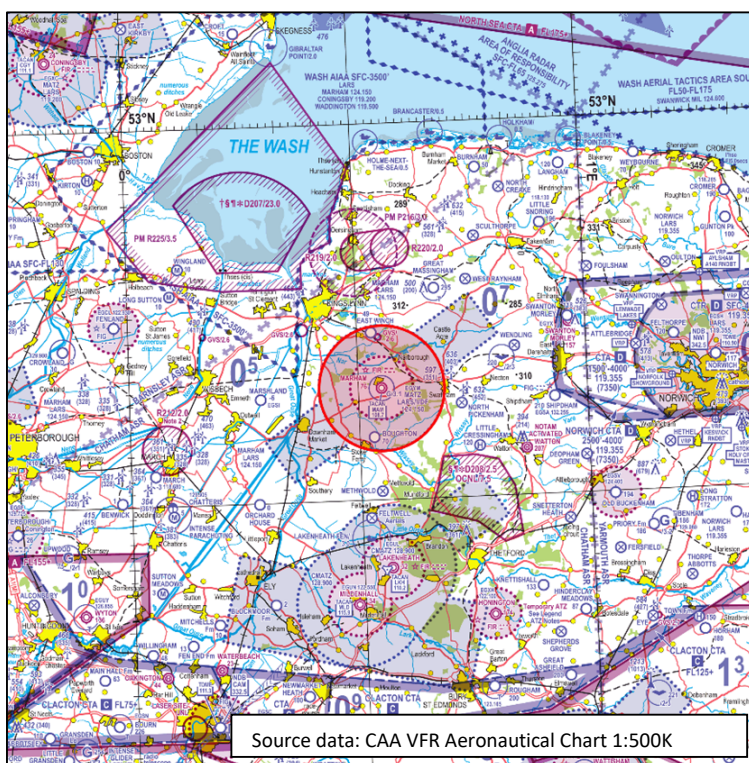


Figure 1 - RAF Marham TDA Lateral Dimensions

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

²⁴ Norwich Airport is not directly aligned with RAF Marham's extended centreline, but it is shown here to provide an idea of the proximity of its controlled airspace in relation to RAF Marham's Military Aerodrome Traffic Zone (MATZ)

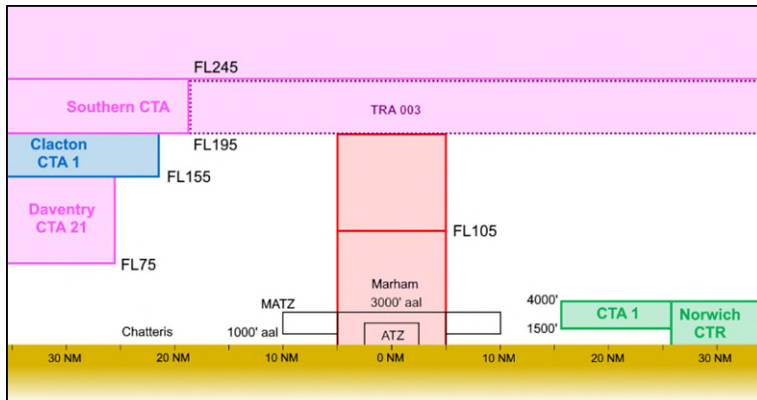


Figure 2 - RAF Marham TDA SW/NE Cross-section (with internal vertical division)

2 Use of the Proposed TDA

2.1 In the event of an aircraft diversion, the design above provides Protector with a means to access RAF Marham from the Class C airspace directly above Marham and to do the reverse when repositioning post-diversion.

3 Safety Buffer Policy

3.1 Ref A is the current Safety Buffer Policy, but is likely to be superseded by Ref B; Ref B is out for comment at the moment, so it would be appropriate to consider the content of both documents.

3.2 Ref A: Para 2.5 of the current Safety Buffer Policy document lays out the types of activity which require a buffer to be applied. Of note for ACP-2023-047 it states:

2.5 The following descriptors as listed in the UK AIP ENR 5.1 will require the application of a lateral and/or vertical buffer:

- Air Combat or High Energy Manoeuvres; Military Exercise; Supersonic Flight; Pilotless Target Aircraft; UAS (BVLOS)

2.6 The following buffer criteria shall be applied to the activities described in paragraph 2.5:

a. Lateral Buffer Requirement - A lateral safety buffer will normally be established and promulgated in order that the minimum separation between structures will be:

(1) 5nm from the edge of an airway, TMA, CTA or CTR.

(2) 10nm from the centreline of Advisory or Upper ATS Routes.

b. Vertical Buffer Requirement - SUA will normally be established and promulgated in order that a minimum separation of 2000ft above or below structures will be maintained.

c. The above criteria may be achieved through airspace design or ATM procedures. Similarly, where a new controlled airspace structure or air traffic route is proposed, it may not be established where the above criteria would be infringed.

3.2.1 Following assessment of the separation requirements iaw Ref A the Change Sponsor presents the following application with appropriate mitigations:

- Lateral dispensation is not required since there is no CAS within 5nm of the proposed TDA;
- Vertical dispensation is requested as the upper limit of the proposed TDA directly abuts the lower limit of Class C airspace. The MOD presents mitigations in the form of positive ATC management provision and the development of ATM procedures for consideration. Similar procedures have already been developed by the MOD in collaboration with NATS within work on ACP-2019-18 (see note below). Specifically, procedures to ensure that Protector remains at or below FL175 within the proposed TDA unless a clearance to climb above FL195 has been received from ATC. This will constitute approval to enter Class C airspace (regardless of whether TRA003 is active or not)

Note: Whilst the airspace proposed by ACP-2019-18 has recently been approved and implemented, NATS still has to complete some outstanding safety work before Protector test and evaluation flights will commence. However, it is anticipated that such work will be able to be transferred across to support this ACP and subsequently to ACP-2023-022, which will propose a permanent structure around RAF Marham for in-service diversion purposes.

3.3 **Ref B:** The draft policy states that the purpose of a safety buffer is to ensure that SUA structures are adequately separated from flight planned aircraft operating in adjacent CAS. The stipulation for a 5nm lateral or 2000ft vertical buffer for RPAS BVLOS activity is not presented. After a request for clarification from the CAA, it is understood that the proposed draft policy signals Change Sponsors to engage with other ATC units / ANSPs to agree an appropriate buffer against flight planned aircraft (pre-tactical phase); such agreement must be submitted to the CAA at an appropriate stage of the ACP process.

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