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**ACP-2019-18**

**Enabling RPAS and RAF Aerobatic Team Operations Out of RAF Waddington**

**Stage 4B**

**AIRSPACE CHANGE PROPOSAL**

**FINAL SUBMISSION Issue 1.0**

**Roles**

<b>Action</b>	<b>Role</b>	<b>Date</b>
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# 1 References

## Reference Material

The table below details all documents that will be referenced throughout this document. This includes previous material submitted as part of this Airspace Change Proposal as well as external publications.

Ref	Document	Publication
A	DAP1916 Statement of Need v2	13 Nov 21
B	Stage 1B Design Principles and Stakeholder Engagement	13 Jan 20
C	Stage 2A Design Options Development	14 Apr 22
D	Stage 2B Initial Options Appraisal	14 Apr 22
E	Stage 3B Consultation Document	7 Sep 22
F	Stage 3B Full Options Appraisal	7 Sep 22
G	RAFAT Requirements and Planning Document	24 Feb 23
H	Stage 4A Consultation Review	11 Apr 23
I	Stage 4A Final Options Appraisal	11 Apr 23
J	SARG - Policy Statement - SPECIAL USE AIRSPACE - SAFETY BUFFER POLICY FOR AIRSPACE DESIGN PURPOSES	22 Aug 14

**List of Abbreviations**

AAL	Above Aerodrome Level
ADS-B	Automatic Dependent Surveillance - Broadcast
ACP	Airspace Change Proposal
AGL	Above Ground Level
AIP	Aeronautical Information Publication
AMSL	Above Mean Sea Level
ATC	Air Traffic Control
ATS	Air Traffic Service
ATSU	Air Traffic Service Unit
BVLOS	Beyond Visual Line Of Sight
CAA	Civil Aviation Authority
CADS	Centralised Aviation Data Service
CAP	Civil Aviation Publication
CAS	Controlled Airspace
DA	Danger Area
DACS	Danger Area Crossing Service
DAAIS	Danger Area Activity Information Service
DAM	Defence Aerodrome Manual
DP	Design Principle
FL	Flight Level
GA	General Aviation (gliders, light aircraft, private helicopters, balloons)
LARS	Lower Airspace Radar Service
NOTAM	Notice to Aviation
MAA	Military Aviation Authority
MAC	Mid-Air Collision
MOD	Ministry of Defence
RA	Regulatory Article
RAFAT	Royal Air Force Aerobatic Team
RPA	Remotely Piloted Aircraft
RPAS	Remotely Piloted Air System
RTS	Release to Service
SoN	Statement of Need
SSR	Secondary Surveillance Radar
TDA	Temporary Danger Area
UAS	Unmanned/ uncrewed Aircraft System
UAV	Unmanned/ uncrewed Air Vehicle
VLOS	Visual Line of Sight

## 2 Introduction

2.1 This document forms part of Stage 4B of the Airspace Change Proposal ACP-2019-18 and has been prepared in accordance with Civil Aviation Publication (CAP) 1616. This proposal began in March 2019 and has developed in line with the process at Figure 1 below within the timeline agreed with the Civil Aviation Authority (CAA).



Figure 1 - Overview of the airspace change process (CAP1616 p.19)

2.2 This proposal addresses the need to enable the operation of a large Remotely Piloted Air System (RPAS), Protector RG Mk1, from its main operating base when it comes into service at Royal Air Force (RAF) Waddington from the early-2020s. The Change Sponsor for this ACP is the Ministry of Defence (MOD). An additional requirement emerged in 2021 for the RAF Aerobatic Team (RAFAT) to be able to access airspace over RAF Waddington to conduct flying display activity from 2023. The MOD felt that the best way to manage this new requirement was to combine both the Protector and RAFAT requirements within one airspace change. The CAA and the MOD agreed a means by which to do so and both requirements have been incorporated since Stage 2 for this ACP.

2.3 This proposal was deemed by the CAA to be a Level M1 ACP under CAP 1616 as an anticipated consequence of the change proposed is an alteration of civil aviation traffic patterns below 7,000 feet over an inhabited area. The proposal has been developed in line with the timeline agreed with the CAA below:

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<b>Stage</b>	<b>Date</b>
DEFINE Gateway	31 Jan 20
DEVELOP AND ASSESS Gateway	29 Apr 22
CONSULT Gateway	6 Sep 22
UPDATE AND SUBMIT	20 Mar 23 <sup>1</sup>
DECIDE Gateway	31 Jul 23
IMPLEMENT (Target AIRAC)	30 Nov 23

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<sup>1</sup> Delayed until 11 Apr 2023 with agreement of CAA



### 3 Executive Summary

- 3.1 As outlined in the Statement of Need at Ref A and in Section 5 the Ministry of Defence (the Change Sponsor) is seeking to establish a Danger Area (DA) to facilitate Beyond Visual Line of Sight flying of Protector, a Remotely Piloted Air System, between RAF Waddington and its operating and training areas in the UK as well as aiming to provide a volume of airspace over RAF Waddington within which the RAF Aerobatic Team can safely conduct flying display training.
- 3.2 This airspace change is an essential element to fulfil the UK live training requirement for the new platform, Protector. Failure, to achieve approval for the proposed ACP, would have a direct impact upon this training requirement of front line crews and have a subsequent effect upon operational delivery and output for the MOD. There is currently no alternative option for live flying, therefore, without the proposed airspace solution MOD would be unable to generate any UK Protector capability. Alternative locations have been assessed and discounted due to existing operations, airspace structure or runway limitations.
- 3.3 The scenario is similar for RAFAT in that if the opportunity to train overhead RAF Scampton in EG R313 is withdrawn and the proposed airspace over RAF Waddington was not available, the options to provide training for a key element of UK 'soft power' (and promoting UK interests worldwide) would be extremely limited.
- 3.4 In accordance with CAP 1616 the Change Sponsor sought feedback from stakeholders on draft design principles (Refs B and C) which would be used to assess various options to be developed in Stage 2. Feedback at this stage was useful but not all relevant as feedback often involved comment on the entire ACP rather than just the Design Principles.
- 3.5 Stage 2A saw Design Options developed against the design principles (Ref C), feeding the Initial Options Appraisal (Ref D) in which the Sponsor first discounted some options (RMZ, TMZ, controlled airspace) and evaluated various airspace Design Options against the 'do nothing' baseline. This also involved a period of stakeholder engagement.
- 3.6 Stage 3 saw the development of consultation material (Ref E and F) as well as a consultation strategy. On passing the CONSULT gateway the Sponsor began a 12-week public consultation which included 2 face-to-face consultation events.
- 3.7 This generated 106 responses via CitizenSpace which were analysed and categorised accordingly into responses that either have the potential to affect the proposal or not. This was summarised in the Consultation Review (Ref H)
- 3.8 Following the Consultation Review and the Final Options Appraisal (Ref I) it was determined that no significant changes were required to the final proposal. Therefore, as a result of all the submissions discussed above the Change Sponsor developed the final proposal outlined in this document.

## 4 Current Airspace Description

### 4.1 Structures and routes

- 4.1.1 RAF Waddington sits entirely within class G airspace, which ordinarily does not provide adequate protection or segregation respectively for RAFAT and Protector at initial operating capability (IOC). A map of the local area is at Figure 2.



Figure 2– Local Area Airspace

- 4.1.2 RAF Waddington has an Aerodrome Traffic Zone (ATZ) and a Military Aerodrome Traffic Zone (MATZ). RAF Scampton is located to the north and RAF Cranwell and RAF Barkston Heath to the south. RAF Scampton, formerly home to the RAF Aerobatic Team (RAFAT), has closed but at the time of writing remains the focal point for RAFAT training using EG R313 throughout the year for aerobatic display practices<sup>2</sup>. The ATZ and MATZ at RAF Scampton have been withdrawn, but are still shown in Figure 2 since the updated edition of the background map would not be available until 27 Mar 23 and this submission would be out for review at that time. Cranwell and Barkston Heath form part of the Waddington Combined MATZ since Cranwell's airspace abuts Waddington's. RAF Coningsby is located to the east of RAF Waddington and possesses both ATZ and MATZ. To the south west of RAF Waddington is RAF Syerston which has an ATZ.

<sup>2</sup> RAFAT has relocated to RAF Waddington following the closure of RAF Scampton (this was further explained in this ACP submission documentation).

4.1.3 The Lincolnshire CTA is located above and to the north of RAF Waddington; the base level of Class A airspace laterally overlaps Waddington's MATZ at FL125, lowering to FL85 to the west and rising to FL155 to the east. To the south of the CTA, the airspace is Class G up to FL195; Class C extends from FL195 upwards south of the CTA. However, during specified hours<sup>3</sup> much of the airspace over Lincolnshire is activated as a Temporary Reserved Area (TRA), namely TRA003.

## 4.2 Airspace usage and proposed effect

4.2.1 RAF Waddington in Lincolnshire is the hub of UK Intelligence, Surveillance, Target Acquisition and Reconnaissance (ISTAR) and the main operating base for airborne intelligence aircraft and systems. Its current flying assets include:

- a. RC-135W Rivet Joint (51 & 54 Sqns) - a dedicated electronic surveillance aircraft;
- b. Shadow R1 (14 & 54 Sqns) which contributes to the comprehensive intelligence gathering of the RAF's ISTAR Force;
- c. RAFAT;
- d. Waddington Flying Club - a civilian flying club which operates PA28 and Tecnam P2008JC for flying training throughout the week and weekends.

4.2.2 RAF Cranwell is the home No 3 & No 6 Flying Training School (FTS) operating the Embraer Phenom 100 (Multi Engine Pilot Training (MEPT)) aircraft and the 120TP Prefect aircraft respectively. It also has a thriving gliding club. RAF Coningsby is home to two frontline, combat-ready squadrons and is the training station for Typhoon pilots. It is also a RAF Quick Reaction Alert (QRA) station, protecting UK airspace. RAF Syerston is home to 2 FTS, the RAF Central Gliding School and operates the Viking T Mk 1 glider and Robin DR400 aerotow aircraft. It has occasionally been subject to aerobatic displays by RAFAT during the spring of 2023 via means of a Temporary Danger Area to test the location for routine flying display training pending the potential change to the availability of EG R313 following the sale of RAF Scampton.

4.2.3 Although the background classification of TRA003 between FL195 and FL245 is Class C, to avoid operational restrictions, military aircraft may operate autonomously or in receipt of an air traffic service. MOD and USAFE aircraft are the predominant users but use of the TRA is not restricted to military users.

4.2.4 The local area is also populated by numerous civil airfields and airstrips supporting some significant leisure flying (general aviation, gliding, paragliding and parachute activity). Busy airfields at Temple Bruer and Wickenby are adjacent to the proposed airspace and a very healthy level of general aviation and sporting/leisure flying activity takes place within the local area.

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<sup>3</sup> 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.

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- 4.2.5 Over the past 5 years RAF Waddington's annual airfield movements have seen a reduction from 12431 in 2017 to around 9000 in each of the following 4 years. In 2021 the E3D was retired from service (although it is continuing to operate at RAF Waddington in an out-of-service training role); the Sentinel was retired in Feb 2022. Following this, early indications indicate a potential reduction in airfield movements for 2022 in the region of 20% compared with figures for 2018 – 2021.
- 4.2.6 About 18% of total movements last year were made up by practice diversions (PDs), the majority by aircraft from RAF Cranwell.
- 4.2.7 The aerodrome operating hours are notified as follows, although it should be noted that RAF Waddington currently operates a flexible flying window and times may differ from them at short notice:
- 0800 – 2359 Mon – Thu
  - 0800 – 1800 Fri
- 4.2.8 At Stage 3 of the ACP the Change Sponsor proposed just one airspace design option for consultation. The airspace design consisted of one design from each of the following two categories:
- One airspace design for the airspace in the vicinity of RAF Waddington Surface up to FL105 (known as the low airspace design (Stage 2 Option 1));
  - One airspace design for the airspace in the vicinity of RAF Waddington FL105 - FL195 (known as the medium airspace design (refined Stage 2 Option 8)).
- 4.2.9 The following paragraphs broadly describe the current military and civil aviation activity in both pieces of airspace.

### **Military aviation activity in current airspace construct.**

4.2.10 Whilst military aviation is not wholly predictable, a typical day at RAF Waddington might be as follows. Rivet Joint aircraft are likely to depart early to their respective operating areas and recover later often carrying out an instrument approach to land. They do not routinely spend large amounts of time in the local area. Shadow may have up to 4 sorties per day, each typically departing to the northeast of Waddington for general handling activity before returning to base, crew change and repeat. Shadow may conduct a couple of radar circuits or visual circuits before landing. Waddington hosts numerous PDs throughout the day, mainly by RAF Cranwell aircraft and averaging 4 – 9 PDs per day. Waddington's Flying Club operates PA28 and Tecnam P2008JC which conduct sorties throughout the week and weekend, predominantly over the aerodrome and in the local area. The airspace directly overhead Waddington is used by aircraft from Cranwell and Coningsby to route outbound to the northwest and to position for instrument approaches to their respective aerodromes. These are all co-ordinated through routine ATC means.

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4.2.11 The medium airspace design (FL105 – FL195) encompasses airspace that is used by Tutor and Prefect aircraft from RAF Cranwell up to 10,000ft. Cranwell's Phenom aircraft operate in the same airspace FL80 – FL120 and preferably above FL100 to separate from Tutor and Prefect traffic. Phenom operate 12 – 16 sorties per day with night flying on up to 3 nights per week. Phenom training syllabus includes airways joins at Trent and the aircraft make regular use of the Gamston and Lichfield Radar Corridors.

### **Civilian aviation activity in current airspace construct**

4.2.12 Whilst the MATZ is not a mandatory avoid for civil pilots, the majority of civil pilots call Waddington ATC when flying in proximity to RAF Waddington and when requiring to transit within 5 nm of RAF Waddington. On an average day, ATC will receive around 15 requests for MATZ and overhead crossings from General Aviation (GA) aircraft (both leisure and sporting). This may peak to the high 20s on the busiest flying days, but is estimated to be less than 30 on any given day. Gliding activity is generally limited to the west and south of Waddington and largely 2000 – 5000 ft. 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 Waddington 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. The airspace FL105 – FL195 is used by gliders on a relatively infrequent basis and by the occasional aircraft leaving the national route structure to position for the Midlands airports. The British Parachute School aircraft at Langar make regular use of the area over the Vale of Belvoir up to FL150 as depicted in green on Figure 3 below.



Figure 3 – Langar Skydive Operating Area

## Proposed Effect

4.2.13 The Change Sponsor has considered the effect that this airspace change will have on other airspace users. Whilst there will certainly be some impact on various local military and civil airspace users, the Change Sponsor has made efforts to minimise this. There may be a small impact on ease of access to the low airspace design by general aviation. The estimated initial Protector flying tempo will require activation of segregated airspace up to 3 days per week. Protector will spend minimal time (approximately 10 minutes during departure or recovery phase) in the low airspace design. Access by general aviation will be maximised by the ability to obtain a danger area crossing service (DACS). Access to the low airspace design is also likely to be impacted during RAFAT display practices. RAFAT is currently in the process of determining which of its display / training activities can be safely conducted at Waddington, which in turn will inform the estimate of usage, and therefore it is difficult to assess the precise impact on access to the airspace by general aviation. The worst case scenario is likely to be 6 x 30-minute daily training slots (Monday-Friday).

4.2.14 The estimated Protector flying tempo will require activation of the medium airspace design up to 3 days per week but it is estimated that Protector will spend very little time in the medium airspace design. Whilst feedback from stakeholders revealed that few operated within the medium airspace design, access by general aviation will be maximised by the ability to request a DACS. The Change Sponsor was able to avoid disruption to Skydive Langar by a refinement of this option at Stage 3.

4.2.15 There may be some impact on access for MOD/RAF aviation conducting training sorties up to FL120 and accessing Gamston Corridor at FL190/ joining controlled airspace, although the Change Sponsor made some refinement of medium airspace design at Stage 3 to mitigate this. The impact should be minimal unless there is some reason why military pilots are unable to obtain DACS / crossing clearance

4.2.16 The Change Sponsor will need to keep general aviation fully informed of the changes to airspace and, the availability of a DACS. This will maximise awareness, thereby reducing the likelihood of infringement of active segregated airspace. Media engagement, local airspace group briefings and other informing activities including a formal update to the UK Aeronautical Information Publication (AIP) will be put in place prior to first use of the airspace.

### **4.3 Operational efficiency, complexity, delays and choke points**

4.3.1 The airspace surrounding RAF Waddington benefits from air traffic services provided by several military and civilian units in general and more specifically with the recent co-location of all military terminal radar services within the Lincolnshire TATCC at RAF Coningsby. The airspace also benefits from good coverage under the Lower Airspace Radar Services (LARS) network. Aircraft operating in the vicinity of Waddington who wish to obtain an air traffic service typically receive a LARS from either Waddington or Humberside. Whilst the landscape surrounding RAF Waddington is occupied by numerous military and civilian aerodromes, the majority of the airspace immediately surrounding RAF Waddington is class G. Of course the airspace above FL100 to the north of Waddington encompasses the controlled airspace of the Lincs CTA. Airspace users must familiarise themselves with a variety of airspace restrictions (e.g. ATZ, MATZ, the current Restricted Area overhead Scampton, para-dropping sites, controlled airspace). The airspace to the south and west of Waddington is heavily used by gliders; the Change Sponsor is not aware of any particular issues regarding operational delays or choke points which should be considered.

### **4.4 Safety issues**

4.4.1 There are no specific safety issues within the current airspace structure that the Change Sponsor has been made aware of.

### **4.5 Environmental issues**

4.5.1 There are no specific environmental issues within the current airspace structure that the Change Sponsor has been made aware of.

## 5 Statement of Need

### 5.1 Statement of Need

5.1.1 The SoN was submitted to the CAA at Stage 1 of the CAP 1616 process. It reads as follows:

*There is a requirement for a large Remotely Piloted Air System (RPAS) to operate from RAF Waddington from the mid-2020s. Pursuit of an ACP optimises an approach, in terms of efficiency and safety, for RPAS to operate from and to RAF Waddington. Furthermore, this approach will support the safe integration of the RPAS into the national airspace structures, given the anticipated performance of on-board systems and the surrounding airspace classification. Access to existing training areas around the UK will also be considered as part of the integration into the national airspace structures. There is an emerging requirement for the RAF Aerobatic Team to conduct display flying activity over RAF Waddington from early 2023 following the Team's relocation from RAF Scampton in late 2022. Integration of this requirement within the Protector ACP is considered the safest operating model.*

5.1.2 This airspace change is an essential element to fulfil the UK live training requirement for the new platform, Protector. Failure, to achieve approval for the proposed ACP, would have a direct impact upon this training requirement of front line crews and have a subsequent effect upon operational delivery and output for the MOD. There is currently no alternative option for live flying, therefore, without the proposed airspace solution MOD would be unable to generate any UK Protector capability. Alternative locations have been assessed and discounted due to existing operations, airspace structure or runway limitations.

5.1.3 The scenario is similar for RAFAT in that if the opportunity to train overhead RAF Scampton in EG R313 is withdrawn and the proposed airspace over RAF Waddington was not available, the options to provide training for a key element of UK 'soft power' (and promoting UK interests worldwide) would be extremely limited.

### 5.2 Airspace Modernisation Strategy

5.2.1 This proposal does not form part of the Airspace Modernisation Strategy. This ACP does not aim to solve the strategic issue of RPAS integration within UK airspace, nor does it seek to 'invent' anything novel.

5.2.2 In order to comply with current policy a Danger Area is the most recognised method of achieving segregated airspace for operating RPAS in the UK. Future airspace modernisation may negate the requirement for segregated airspace or introduce alternative methods of segregating RPAS in future at which point this airspace structure will no longer be required for the Protector activity.



## 6 Proposed airspace description

### 6.1 Objectives/requirements for proposed design

6.1.1 This proposal addresses the need to enable the operation of a large RPAS, Protector RG Mk1, from its main operating base when it comes into service at RAF Waddington. An additional requirement is for the RAFAT to be able to access airspace over RAF Waddington to conduct flying display activity from 2023.

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

- Either employ an appropriately approved Detect and Avoid (DAA) capability to enable compliance with the Rules of the Air appropriate to the class of airspace,
- or be flown using a Layered Safety Approach that specifically requires flight in segregated airspace.

6.1.3 When Protector comes into service it will be fitted with a limited DAA capability only, which is not likely to meet the requirements to fly in all classes of airspace. The working assumption is that Protector will be able to fly within classes A and C airspace<sup>4</sup>. Since RAF Waddington is located within class G airspace, some form of airspace segregation is required for its transit through current class G airspace in order to be able to achieve onward transit using classes A and C airspace.

6.1.4 **RAFAT.** Better known as the Red Arrows, RAFAT has represented the RAF and the UK since 1965. Widely acknowledged as one of the world's premier display teams, they represent the speed, agility and precision of the RAF, assist in Armed Forces recruitment and promote the best of British. The Team fly the BAE SYSTEMS Hawk TMk1 fast jet trainer.

6.1.5 Having some form of protected airspace is essential for the safety of RAFAT pilots and other airspace users. When display flying, the Team generally fly at 360kts, from 100ft above ground level (AGL) up to approximately 8000 ft AGL if the weather allows a vertical routine. This makes reaction times slow, and it can be cumbersome to reactively manoeuvre the formation. As all pilots take references from the Team leader, there are very few pairs of eyes looking out for other traffic and the Team relies on a radar service for early warning of intruders.

6.1.6 Following the RAF's decision to sell RAF Scampton, RAFAT relocated to RAF Waddington (in late 2022). There is considerable uncertainty about what will happen to RAF Scampton after it is sold by the MoD. Whatever the land area is used for in the future (and who owns it) will determine whether EG R313 remains useable by RAFAT for their display training. Therefore the RAF has had to examine alternative locations and airspace volumes for RAFAT practice flying.

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<sup>4</sup> Para 10.2 contains information on how this working assumption is being tested by the Change Sponsor.

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6.1.7 RAFAT has provided a statement (dated 24 Feb 23) on current airspace requirements, intent and plans. It is at Annex C.

6.1.8 The proposal seeks to secure airspace for:

- the integration of Protector RG Mk1 into UK airspace in the early 2020s;
- RAFAT to conduct training over RAF Waddington.

## 6.2 Proposed new airspace/route definition and usage

6.2.1 The proposal is to introduce a Danger Area, activated by NOTAM by RAF Waddington Operations through the Military Airspace Management Cell (MAMC). It comprises 2 volumes of airspace as follows:

- One volume of airspace in the vicinity of RAF Waddington from surface up to FL105 (known as the **low airspace design** (Stage 2 Option 1));
- One volume of airspace in the vicinity of RAF Waddington FL105 - FL195 (known as the **medium airspace design** (refined Stage 2 Option 8)).

6.2.2 The single design comprises two volumes of airspace, the lateral boundaries of which overlap and which are vertically joined. These combined volumes of airspace provide appropriate segregated airspace for the Protector and RAFAT activities.

6.2.3 The draft AIP entry is at Figure 4 below:

Identification and Name Lateral Limits	Upper Limit Lower	Remarks
EG Dxxx (for Low Airspace Design) A circle, 5 NM radius, centred on 530958N 0003126W	Upper limit: FL105 Lower limit: SFC	Activity: Unmanned Aircraft System (VLOS/BVLOS); Red Arrows conducting formation aerobatic and display training  Contact: Waddington ATC, Tel: 01522-727451/727452  Service: DACS & DAAIS: Waddington ATC on 119.500 MHz when open DAAIS via London Information on 124.600 MHz.  Danger Area Authority: HQ Air  Hours: Activated by NOTAM
EG Dxxx (for Medium Airspace Design)  531343.00N 0004324.00W- 530818.10N 0001452.17W- 525555.81N 0002123.30W- 530119.54N 0004950.28W- 531343.00N 0004324.00W	Upper limit: FL195 Lower limit: FL105	Activity: Unmanned Aircraft System (VLOS/BVLOS)  Contact: Waddington ATC, Tel: 01522-727451/727452  Service: DACS & DAAIS: Waddington ATC on 119.500 MHz DAAIS via London Information on 124.600 MHz.  Danger Area Authority: HQ Air  Hours: Activated by NOTAM.

Figure 4 - Draft AIP entry

6.2.4 The proposed airspace will appear on aeronautical charts as follows. Figure 5 depicts the combined low and medium volumes of airspace in plan and cross-section view


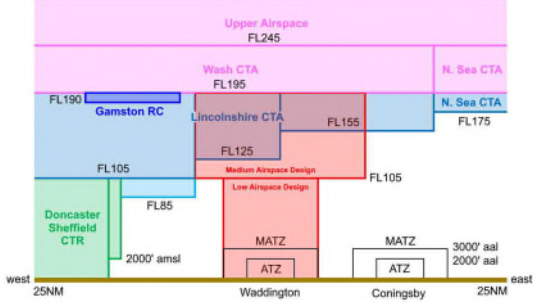
 <p style="text-align: center;">Source data – CAA VFR aeronautical chart</p>	<p><b><u>Final Combined Low and Medium Airspace Design Options</u></b></p> <p>Activation:  <b>Low</b> would be used for both RAFAT and Protector activities.  <b>Medium</b> would be activated for Protector activity only, to enable Protector to continue climb into Classes A and/or C airspace and vice versa.</p>  <p style="text-align: center;"><i>Combined airspace design cross-section WNW/ESE</i></p>
<p><b>Lateral Dimensions:</b>  <b>Low</b> - 5 nm radius circle centred on RAF Waddington’s aerodrome reference point<sup>5</sup> (ARP).  <b>Medium</b> - 18 x 13 nm rectangle aligned to and abutting the southern edge of the Lincs CTA.</p>	<p><b>Vertical Dimensions:</b>  <b>Low</b> – Surface – FL105  <b>Medium</b> – FL105 - FL195</p>

Figure 5- Combined Low and Medium airspace designs

6.2.5 **Usage.** The airspace will only be activated when required by NOTAM. When not activated the airspace will revert to the current structure. The low airspace design presented in Figure 6 will be used for both RAFAT and Protector activities. The airspace will be kept active for the duration of the RAFAT and/or Protector sorties. In the latter case this is required in order to facilitate early recovery or emergency situations. The airspace is a cylinder of 5 nm radius and has vertical dimensions of surface to FL105.

<sup>5</sup> RAF Waddington’s airfield reference point is the midpoint of RW02/20 (530958N 0003126W)

6.2.6 Whilst the RAFAT requirement for the low airspace design up to FL105 will endure, it is possible that when the full DAA capability is delivered to Protector its activity may only require segregated airspace up to a maximum of 3000 ft above aerodrome level (AAL). In accordance with the MOD's endeavour to minimise the impact on other airspace users, it may be possible to notify the low airspace design to a lower upper limit for Protector activity in the future. This would be managed through another CAP 1616 process and has no bearing on this ACP.

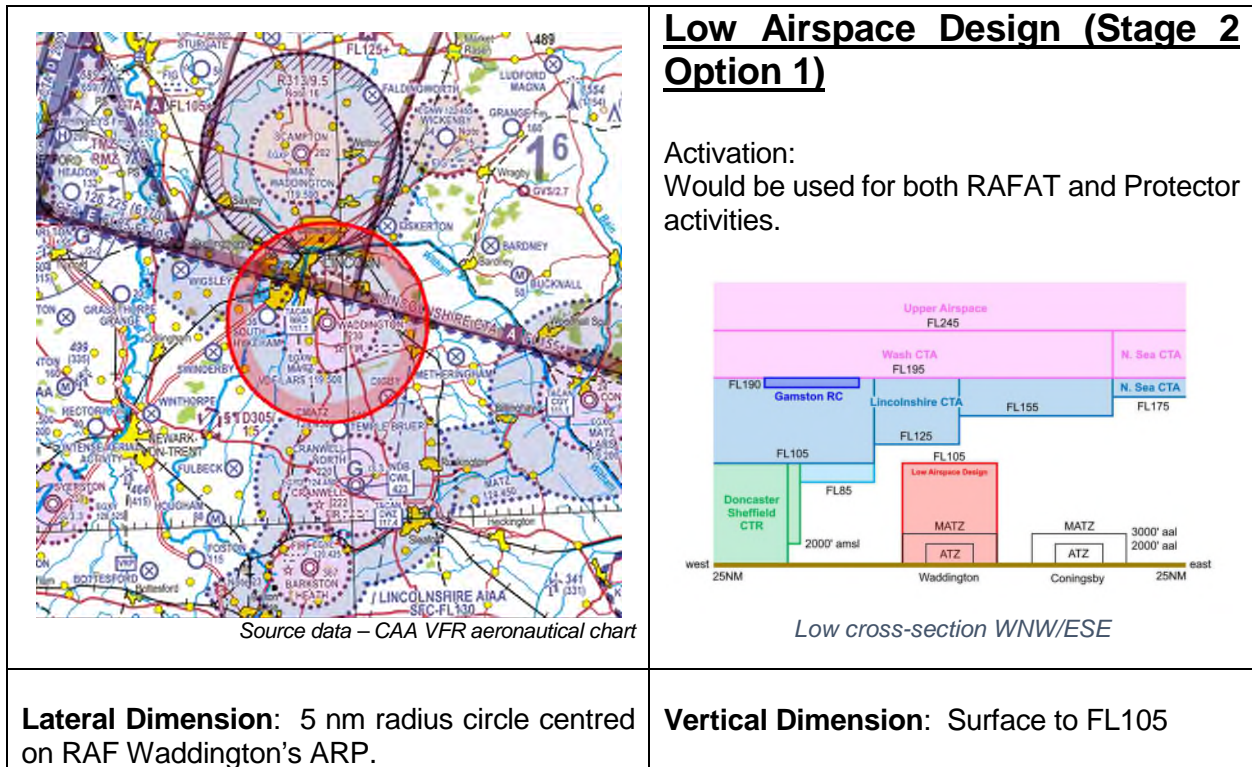


Figure 6 – Low Airspace Design

6.2.7 The medium airspace design presented in Figure 7 will be used by Protector as it climbs into or descends from Classes A and C airspace. RAFAT will not use this airspace. It measures 18 x 13 nm and its vertical dimensions are FL105 - FL195.

6.2.8 The low and medium designs may be activated separately as follows:

- The **low airspace design** will always be activated for Protector and RAFAT activity;
- The **medium airspace design** will be activated for Protector activity only; when activated for Protector the low airspace design will be simultaneously activated.

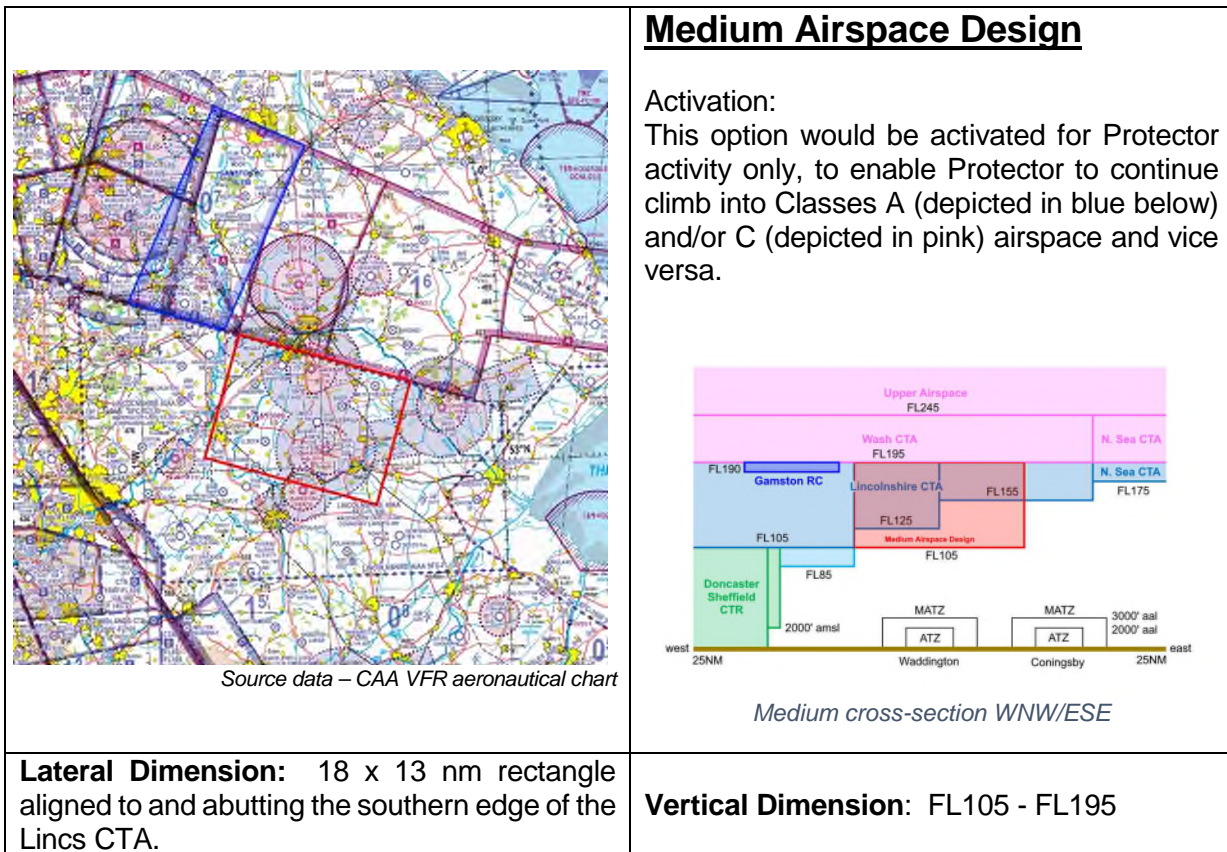


Figure 7 – Medium Airspace Design

6.2.9 The estimated initial Protector flying tempo will require activation of segregated airspace up to 3 days per week. Protector will spend minimal time (approximately 10 minutes during departure or recovery phase) in the low airspace design. Planning estimates for Protector training sortie durations indicate up to 12 hr sortie lengths; any tasking for UK-based operations would be on a case-by-case basis. RAFAT is currently in the process of determining which of its display / training activities can be safely conducted at Waddington, which in turn will inform the estimate of usage. The worst case scenario is likely to be 6 x 30-minute daily training slots between late September and the end of March. These usually take place Monday-Friday during daylight hours. Occasional weekend use is expected during summer (mid May – late September) for In Season Practice. The estimated Protector flying tempo will require activation of the medium airspace design up to 3 days per week but it is estimated that Protector will spend very little time in the medium airspace design.

6.2.10 When the proposed airspace is active, a DACS and a DAAIS will be provided by Waddington ATC. In addition a DAAIS will also be available from London Information.

### 6.3 Application for dispensation from CAA Safety Buffer Policy

6.3.1 The Change Sponsor has considered the proposed airspace's status with regard to the safety buffer criteria laid down in Ref J. Work has been undertaken within the MOD and with NATS with regards to the CAA safety buffer policy due to the proximity of the Lincs CTA to both the low and medium airspace designs. Mitigations to obtain dispensation from the policy have been identified; an application for dispensation is at Annex A along with confirmation that NATS has accepted the mitigations presented by MOD at this stage and has no further comment or concerns.

### 6.4 Mitigations.

6.4.1 The following mitigations will reduce the impact of the proposed airspace when active:

- Provision of a DACS will reduce the impact on the vast majority of air traffic operating in the area.
- Specific Letters of Agreement will reduce the impact on other airspace users e.g. British Model Flyers Association clubs and members.
- Letter of Agreement between NATS and 78 Sqn for the management of Protector activity within the medium airspace design - (see Annex B Ref C).
- Application of an internal buffer to the low and medium airspace design and associated request for dispensation from the CAA Safety Buffer Policy will reduce impact on network route traffic within the Lincs CTA.
- The proposed airspace will only be activated when Protector and RAFAT activity is planned and for the least duration possible.
- NOTAMs will be promulgated as early as possible in order to assist in flight planning.
- Should Protector or RAFAT activity be cancelled or concluded early, the airspace will be deactivated as soon as practicable.
- Should the provision of a DACS not be available due to workforce or equipment issues the airspace will be deactivated.

6.4.2 The following mitigations were considered during consultation but will not be taken further:

- **Notification of Airspace activation.** The Consultation material had stated the airspace will be activated by NOTAM and promulgated via the AIS website. However, it was thought that one respondent was requesting RAFAT display times to be published on a daily basis. The Change Sponsor considered the possibility of publishing airspace activation for RAFAT activity, but on balance it was felt that if display times are published/advertised in advance then the risk of additional secondary spectators in the display area/buildup of traffic on the adjacent A15 is

increased; this is in part why display practice times were never published at Scampton.

- **Provision of an ATIS-like facility.** The Change Sponsor investigated the provision of an ATIS-like service during the SkyGuardian deployment in 2021 and for the TDA which is currently in place at RAF Syerston. It again considered its use for this ACP. For technical, regulatory and ATC workload reasons, the provision of a useful ATIS to broadcast real-time status of the proposed airspace is not considered practicable. The aspiration to provide airspace users with a means to determine whether a piece of airspace is hot or cold is unmanageable from a resource/workload point of view and, therefore, has flight safety implications (RAF Waddington ATC has conducted a safety assessment into the amount of information that can safely and accurately be uploaded for transmission via ATIS). However, Waddington Radar will provide a DAAIS and DACS on the Waddington LARS frequency of 119.5MHz. In the event of a last minute cancellation of the airspace and Waddington Radar is not available, London Information will provide a DAAIS on 124.6MHz.
- **Consolidation of operation days.** Whilst the Change Sponsor can see the merit in this, it would be difficult to manage in practice. During the work-up season RAFAT is likely to plan to fly every weekday in order to achieve its training objectives in time for the full display season. Protector will also be required to be flown to meet the training requirement of front line crews. Scheduling adequate time slots in shared training areas with other appropriate defence assets is key to achieve operational delivery and output for the MOD.
- **Pausing the ACP.** Regarding the suggestion of pausing the ACP pending a decision regarding the future of EG R313, the Change Sponsor has considered this, but is continuing with the ACP in order to meet the tight timescales for implementation of the proposed airspace in line with the Protector and RAFAT operational requirements. RAFAT has provided further indications as to how the proposed airspace at RAF Waddington may be used alongside EG R313, depending on the continued viability of EG R313 for RAFAT practice displays.
- **LOA with the British Parachute School (BPS), Skydive Langar.** A LOA was suggested by the BPS at Langer due to the close proximity of the Medium airspace design to their area of operation. Discussions within the Lincolnshire TATCC suggest that provided the Langar activity remains outside the proposed airspace, there is no requirement to amend current letter of agreement held between Langar and TATCC. All information regarding airspace activation, timings, frequencies etc. will be included in the relevant NOTAM. Clarification may be sought by Langar through the ATC switchboard at the Lincolnshire TATCC or via the Waddington LARS frequency of 119.5MHz. Langar could request a DACS if access to the proposed airspace is of benefit to Langar aircraft. BPS is content to continue without amendment.
- **LOA with Wickenby airfield.** Wickenby airfield conducts aerobatic training flights up to 4000 ft AAL and it was suggested the MOD should have regard to this as part of its ACP. RAF Waddington has a LOA with Wickenby airfield, but sees no requirement for it to be amended due to this proposed change; safe management of aerobatic activity at Wickenby is covered in the existing LOA.

## 7 Impacts and consultation

- 7.0.1 **Stage 1.** The Sponsor engaged with a wide variety of potential stakeholders and sought their feedback on the initial Design Principles (DPs) that was used to frame the Design Options during Stage 2. At this stage, the ACP was purely concerned with the integration of Protector into RAF Waddington (and UK airspace). Please see para 7.0.3 below regarding the incorporation of the RAFAT activity in Stage 2.
- 7.0.2 Engagement began on 23 Sep 19. The majority of engagement was conducted in writing and the Sponsor received 21 responses via email. The Sponsor also conducted in-person engagement with over 50 local stakeholders as part of the Lincolnshire Airspace Users Group at RAF Cranwell.
- 7.0.3 There was a relatively low response rate at this stage and some feedback was deemed to fall outside the scope of this stage of the ACP. Of the 8 DPs presented, one DP was removed and minor amendments were made to the remaining seven. Two additional DPs were proposed, but the Change Sponsor did not find one to be appropriate to the scope of the ACP and the other was deemed to be covered by the existing DPs. The major theme in the feedback received was concern that the change proposal would restrict freedom of manoeuvre for general aviation. An additional concern was that any change should not impact the national air traffic services route structure. Finally the draft principles were categorised in priority order.
- 7.0.3 **Stage 2.** Prior to the Change Sponsor going out to engage with the stakeholder community at Stage 2, a requirement emerged for RAFAT to be able to conduct flying display activity over RAF Waddington and after discussions with the CAA it was agreed that it would be appropriate for this new requirement to be integrated into this ACP. The Change Sponsor for ACP-2019-18 agreed with the CAA that the best way to meet both the Protector and RAFAT requirements is to do so under one ACP and has further agreed the means by which to do this without repeating Stage 1 of ACP-2019-18. This entailed a rationalisation of the DPs at Stage 1 for this ACP and the DPs agreed for ACP-2018-72 (Relocation of RAFAT training airspace). The Change Sponsor also completed a comparison of the stakeholder lists for both ACPs and incorporated any stakeholders from the RAFAT ACP into the Protector ACP. Taking into account feedback received it was felt that there was merit in including amplifying text to the original DP(a); this was amended and taken through to the design principle evaluation at Stage 2.
- 7.0.5 During Stage 2 the Sponsor invited Stakeholders to assess whether the DPs developed in Stage 1, were adhered to in the Design Options proposed.
- 7.0.6 Eight Design Options were proposed:

**Do Nothing** – This created the baseline to measure all the other options against but would not facilitate Protector or RAFAT operations.

**Six low airspace designs** as a method of providing segregation in order to enable Protector and RAFAT activity.



**Two medium airspace designs** as a method of providing segregation in order to enable Protector to access classes A and C airspace.

7.0.7 At the end of Stage 2 following feedback from the stakeholders and continued work with Protector’s manufacturer, the Change Sponsor had been able to reduce the low airspace design options to just one, which comprised the least volume of airspace and could accommodate both Protector and RAFAT activity.

7.0.8 **Stage 3.** Work continued to refine the medium airspace design options so that at Stage 3 the Change Sponsor presented just one option (comprising the low airspace design and just one medium airspace design) during a 12-week consultation (7 Sep - 30 Nov 22 ). The Consultation documentation included the Full Option Appraisal and a Frequently Asked Questions page.

7.0.9 A total of 248 previously identified stakeholders were contacted directly by email as shown in Table 1 below.

National Aviation Stakeholders	
National Air Traffic Management Advisory Committee (NATMAC) members	40
Waddington Aviation Stakeholders	72
Aviation Stakeholders from Royal Air Force Aerobatic Team (RAFAT) ACP	29
Other Aviation Stakeholders	10
Ministry of Defence (MOD) Aviation Stakeholders <sup>6</sup>	9
Non-Aviation Stakeholders	
Authorities	67
Other Local Stakeholders	9
Members of Parliament (MPs)	7
Environmental Organisations	5

*Table 1- Number of Stakeholders Contacted directly, by category.*

7.0.10 A total of 106 responses were received; 84 were from individuals and 22 were representing an organisation. Overall, 57 respondents did not support the ACP, compared to the 41 who did; the remainder indicated they were unsure.

7.0.11 Common themes identified throughout the feedback for are summarised as follows:

- **Safety.** 28 respondents were concerned with safety aspects of RAFAT displaying and low flying over built up areas, in addition to safety assurance for Protector activity in general.

<sup>6</sup> Contacted via Defence Airspace and Air Traffic Management (DAATM)

- **Environmental – Noise and Pollution.** The impact of noise from both RAFAT and Protector featured in 17 responses. The environmental impact of RAFAT utilisation of chemical dyes, jet fuel and diesel, together with air pollution in general, was highlighted in 3 responses.
- **Airspace Management.** Recurrent topics raised by Aviation stakeholders:
  - Limited access to airspace, particularly if more than one piece of segregated/restricted airspace were simultaneously active.
  - Requests for provision of, or further details regarding a Danger Area Crossing Service (DACS)/ Danger Area Activity Information Service (DAAIS) and other access procedures.
  - Suggestions for airspace status and/or promulgation of activation facilitated via Automatic Terminal Information Service (ATIS) or Notice to Airmen (NOTAM).
- **Utilisation of Drones.** 16 responses included reference to concerns or objections to the use of drones in general.
- **Basing.** The location of either RAFAT or Protector was not always specified by airframe, but it was raised by 20 responders. One response stated support in the basing location, whilst the others were against RAF Waddington as a base for one or both aircraft types.
- **Local infrastructure.** 5 respondents cited issues with current local infrastructure or potential for required improvements/adjustments such as a viewing area/visitors' centre and upgrades to road, walk and cycle ways.

## 7.1 Net Impacts summary for proposed route

7.1.1 No route is proposed.

## 7.2 Units affected by this proposal

7.2.1 **NATS.** The Change Sponsor has been working closely with the respondent<sup>7</sup> and has been able to overturn their initial objection to the ACP, in accordance with the agreements below:

- Safety argument (and CAA acceptance) for Protector operations without a full detect and avoid system: NATS accepted that this is outside of the scope of the ACP, but would like to review the safety argument prior to Protector entering service.
- Safety argument (and CAA acceptance) for Protector operations without a full detect and avoid system within an active TRA: NATS accepts that this is outside of the scope of the ACP but will need to assess the impact on the NATS Network and Operation. Therefore, they requested confirmation from the Change Sponsor that changes to the use of TRAs will be agreed prior to Protector entering service.

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<sup>7</sup> Please see Annex A for the most recent communication with NATS

- The Safety Argument/mitigations (and CAA acceptance) for the containment of activities and the prevention of ‘inadvertent excursions’ by RAFAT and Protector operations within the lower area (dispensation from the CAA SUA Buffer Policy): NATS has completed an initial review of the associated hazards based on the evidence provided by the MOD and accepted the mitigations presented by MOD and the Change Sponsor at this stage. The Change Sponsor’s dispensation application is at Annex A.
- The Safety Argument/mitigations (and CAA acceptance) for the Containment of activities and the prevention of ‘inadvertent excursions’ by Protector operations within the high area (dispensation from CAA SUA Buffer Policy): NATS completed an initial review of the associated hazards based on the evidence provided by the MOD and accepted the mitigations presented by MOD and the Change Sponsor for dispensation at this stage. The Change Sponsor’s dispensation application is at Annex A.

**7.3 Military impact and consultation.** Consultation has been conducted via Defence Airspace and Air Traffic Management (DAATM). In summary, an internal MOD Service Level Agreement/Letter of Agreement between relevant units on priorities and procedures was suggested, but may not be required; the Change Sponsor will continue dialogue on this with the respondent. MOD stakeholders also stressed the importance of the provision of a DACS and an efficient notification procedure for the proposed airspace. Clarification was sought on who would be the nominated Control Authority for the proposed airspace; the likely duration of Protector sorties; whether Protector will be allocated an RPAS-specific squawk and whether it will be necessary to activate the proposed airspace for the full sortie duration of Protector. These items were all addressed directly with the respondent. The Change Sponsor is refining and documenting procedures for the management of the proposed airspace, drafts of which are at Annex B Refs A – K. However, it is important to stress that implementation of this proposed airspace will have a positive impact on the military outputs associated with Protector and RAFAT.

**7.4 General Aviation impact and consultation.** The following GA stakeholders have been identified through consultation as being impacted:

**7.4.1 Kesteven Model Flyers.** The model aircraft club is located close to the outer limits of the low airspace design and had concerns regarding the impact to their operations. Waddington ATC has drafted a LOA (see Annex B Ref E) to enable members of Kesteven Model Flyers, and other locally situated British Model Flyers Association (BMFA) clubs to operate with minimal disruption during activation of the proposed airspace.

**7.5 Commercial Air Transport impact and consultation.** Following successful agreement with NATS the proposal will have no effect on commercial air traffic. However, the low airspace design could impact the activities of the National Grid Electricity Transmission. Waddington ATC has confirmed that ATC Co-ordinated access would be provided by the DACS service throughout to minimise the impact of the proposed airspace when it is active and maximise its flexible use. Waddington ATC anticipates creating procedures to ensure the maximum use of airspace below 500ft to limit the impact upon such essential movements. The Change Sponsor has presented the suggestion to use CADS to Waddington for consideration, but in any case tactical access to the airspace will be managed by Waddington ATC, particularly in the event that urgency is required. RAFAT has also offered a means by which forward advice of its activity can be acquired.

**7.6 CO2 environmental analysis impact and consultation.** The MOD scoped this out in Stage 2 of the ACP.

**7.7 Local environmental impacts and consultation.** During consultation, a common theme raised by stakeholders was the noise associated with the RAFAT activity. CAP 1616 specifies (at para B42) that for proposals sponsored by the Ministry of Defence, the environmental impacts that are a direct result of military aircraft or military operations (including civil aircraft carrying out military function under contract) are not required to be considered or assessed.

**7.8 Economic impacts.** No economic impacts have been identified as part of consultation.

## 8 Analysis of options

### 8.1 Summary of Options Appraisal

8.1.1 The Options Appraisals conducted at each stage of the ACP required an assessment of the impacts of the Design Options against a “Do Nothing” Option. The Appraisal for each stage can be found in Ref D, F and I. Since RAF Waddington is surrounded by class G airspace, it was not possible to quantifiably determine, for example, the impact on commercial or general air traffic transiting the area. The chosen methodology throughout the ACP was to conduct a qualitative assessment of the different options, against the headings identified in CAP 1616, Appendix E, Table E2: “Guide to expected approach to key analysis for a typical airspace change”. The application of a qualitative assessment has been applied previously in other ACPs of similar scale / proportionality and is compliant both with CAP 1616 and the Government Green Book<sup>5</sup>. The impact of this ACP on military air traffic is being managed internally by the MOD and has, therefore, not been included in this document.

8.1.2 At each stage, the options taken forward have been further appraised before being retained or discounted, following information received during engagement and consultation.

8.1.3 **During Stage 2**, the Options Appraisal Phase I Initial identified items where supplementary evidence might be collected which could be of benefit to the subsequent appraisals. In addition to the appraisal using the CAP 1616, Appendix E, Table E2 format, a 10-year forecast of traffic was provided and an assessment of noise impact and high level assessment of other costs and benefits for each airspace design option was conducted for each option including the Do-Nothing option.

8.1.4 **At Stage 3** the Change Sponsor provided the supplementary evidence identified at Stage 2 for inclusion in the Options Appraisal Phase III Full. Again it was not possible to provide any quantitative data to support the assessment, but the Change Sponsor did obtain from ATC at RAF Waddington two assessments of the potential consequential effect of the low airspace design on civil traffic. The first was a purely qualitative assessment provided by air traffic personnel, but a second assessment was provided in the form of supporting quantitative evidence using statistics on MATZ crossing requests. These statistics supported the qualitative estimate.

8.1.5 A qualitative environmental assessment was produced (see Options Appraisal Phase II Full, Annex A) with the following factors assessed:

- Noise
- CO<sub>2</sub> Emissions and Fuel Burn
- Air Quality
- Tranquillity and Biodiversity

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8.1.6 Table 1 details the appraisal of the low airspace design and the “Do-Nothing” baseline option against the high-level objectives and assessment criteria laid out in CAP 1616, Appendix E, Table E2.

<i>Table 2 - Summary of options appraisal for the low airspace design</i>			
<b>Group</b>	<b>Impact</b>	<b>Low airspace design</b>	<b>Do-Nothing</b>
Communities	Noise impact on health and quality of life	<p><b>Civil aircraft:</b> The mechanism for crossing the airspace associated with this option (DACS) would be very similar to that of crossing the MATZ. There is expected to be a very low (if any) increase in noise likely since the low airspace design has the same lateral footprint as the extant MATZ at RAF Waddington. The majority of civil pilots already call to cross the MATZ and they are required to avoid the ATZ. Vertically the low airspace design extends above the MATZ to FL105. Waddington ATC reports few civil aircraft transit within 5 nm from Waddington between 3000 ft AAL and FL105 and that it is rare that they would cross without calling on the radio. It is thought, therefore, that the majority of aircraft will continue to call to cross any segregated airspace implemented. The majority of aircraft will opt for a crossing service (e.g. DACS), which will be granted when possible. Occasional re-routing is envisaged if activity within the segregated airspace precludes a clearance. The potential for rerouting is likely to be increased during RAFAT flying display periods, but this should be balanced against the ability for aircraft to access the airspace over Scampton for transit, since Scampton and Waddington should not be simultaneously active for RAFAT. The majority of stakeholders who provided feedback in Stage 2 carry radios and speak to ATC so rerouting could be minimised. It is considered that any consequential impact on noise and therefore on health and quality of life from this option is very low over and above the impact of the Do-Nothing option.</p>	<p>Neither RAFAT nor Protector would be able to fly at RAF Waddington, so no increased noise impact from any new activity. No additional noise impact on health and quality of life since civil and military pilots would carry on as they do now – ATZ and MATZ would still be in existence.</p> <p>There is the likelihood that some rerouting already occurs below 3000 ft AAL under the Do-Nothing option which could already impact health and quality of life.</p>

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Table 2 - Summary of options appraisal for the low airspace design

Group	Impact	Low airspace design	Do-Nothing
		<p><b>Protector</b> is powered by a Honeywell TPE331-10 Turboprop engine; estimated no increase in noise impact compared with Do-Nothing option (see supplementary evidence).</p> <p><b>RAFAT</b> activity will be largely switching display practice locations between RAF Scampton and RAF Waddington. No additional noise effect anticipated as flying tempo will not change, but noise will impact different communities.</p>	
Communities	Air Quality	<p><b>Civil aircraft:</b> No impact envisaged in overall air quality through establishment of segregated airspace – see environmental assessment in Annex B.</p> <p>Similarly no reduction in air quality envisaged by military activity (see supplementary evidence)</p>	Change Sponsor estimates negligible impact on local air quality because of aviation activities.
Wider society	Greenhouse gas impact	<p>Whilst there is no additional flying anticipated from civil GA community in terms of numbers of aircraft, there may be a small increase in greenhouse gas if GA do not / cannot take advantage of a crossing service (e.g. DACS) to achieve a direct routing.</p> <p>Estimated Protector flying tempo is up to 3 flights per week initially, although requirement is evolving. Change Sponsor was unable to firm up the estimate (see supplementary evidence)</p> <p>No additional flying anticipated from RAFAT since the flying will just switch from one location to the other.</p> <p>Minimal increase anticipated in Greenhouse gas impact from Protector activity, although overall reduction in impact is likely in local area due to relocation/retirement of several flying assets from RAF Waddington (see supplementary evidence).</p>	<p>Neither RAFAT nor Protector would be able to fly at RAF Waddington, so there would be no increase in greenhouse gas from any new activity.</p> <p>No increase in greenhouse gas from existing aviation, since civil and military pilots would carry on as they do now – ATZ and MATZ would still be in existence.</p> <p>There is the likelihood that some rerouting already occurs below 3000 ft AAL under the Do-Nothing option which would already impact greenhouse gas levels.</p>
Wider society	Capacity / resilience	Not applicable	There would be no change from present since neither activities would be

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Table 2 - Summary of options appraisal for the low airspace design

Group	Impact	Low airspace design	Do-Nothing
			able to operate at RAF Waddington
General Aviation	Access	There may be a small impact on ease of access to the low airspace design by GA. Estimated initial Protector flying tempo will require activation of segregated airspace up to 3 days per week. Protector will spend minimal time (approximately 10 minutes during departure or recovery phase) in the low airspace design. Access by GA will be maximised by the ability to obtain a crossing service (e.g. DACS). Access to the low airspace design is likely to be impacted during RAFAT display practices. RAFAT is currently in the process of determining which of its display / training activities can be safely conducted at Waddington, which in turn will inform the estimate of usage, and thereby assist with impact on access to the airspace by GA. Change Sponsor was unable to firm up the estimate (see supplementary evidence). Worst case scenario 6 x 30-minute daily training slots (Monday-Friday) (see Annex A)	There would be no change from present since neither activities would be able to operate at RAF Waddington.  There is the likelihood that there are some minor access issues already occur below 3000 ft AAL under the Do-Nothing option.
General Aviation / commercial airlines	Economic impact from increased effective capacity	Not applicable	Not applicable
General Aviation / commercial airlines	Fuel burn	There may be a small increase in fuel burn if GA do not / cannot take advantage of a crossing service (e.g. DACS) to achieve a direct routing. Attempt to provide quantitative estimate by Change Sponsor (see environmental assessment).	Neither RAFAT nor Protector would be able to fly at RAF Waddington, so there would be no increase in fuel burn from any new activity. No increase in fuel burn from existing aviation, since civil and military pilots would carry on as they do now – ATZ and MATZ would still be in existence.



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Table 2 - Summary of options appraisal for the low airspace design

Group	Impact	Low airspace design	Do-Nothing
			There is the likelihood that some rerouting already occurs below 3000 ft AAL under the Do-Nothing option which would already impact fuel burn.
Commercial airlines	Training costs	Not applicable	Not applicable
Commercial airlines	Other costs	Not applicable	Not applicable
Airport /ANSP	Infrastructure costs	Not applicable	Not applicable
Airport /ANSP	Operational costs	Not applicable	Not applicable
Airport /ANSP	Deployment costs	Not applicable	Not applicable
Safety Considerations (not exhaustive list)		<ul style="list-style-type: none"> <li>• Pilots being unaware of new airspace</li> <li>• Re-route through unfamiliar areas</li> <li>• Funnelling as a result of need to re-route</li> <li>• Increased risk of loss of safe separation / mid-air collision (LoSS/MAC) due to re-routing aircraft creating bottlenecks</li> <li>• Increased controller workload due to funnelling, DACS requests</li> <li>• Proximity of RAF Cranwell visual and radar circuit traffic</li> </ul>	There would be no additional safety considerations since neither activities would be able to operate at RAF Waddington

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8.1.7 Table 2 details the appraisal of the medium airspace design and the “do-nothing” option against the high-level objectives and assessment criteria laid out in CAP 1616, Appendix E, Table E2.

*Table 3 - Summary of options appraisal for the medium airspace design*

<b>Group</b>	<b>Impact</b>	<b>Medium airspace design</b>	<b>Do-Nothing</b>
Communities	Noise impact on health and quality of life	No noise impact anticipated as Protector only operating in segregated airspace for short duration and above FL105.	Protector would not be able to operate at RAF Waddington, so no increased noise impact from any new activity. No additional noise impact on health and quality of life since civil and military pilots would carry on as they do now
Communities	Air Quality	No reduction in air quality anticipated as Protector only operating in segregated airspace above FL105.	Protector would not be able to operate at RAF Waddington, so no reduction in air quality from any new activity. No additional reduction likely since civil and military pilots would carry on as they do now
Wider society	Greenhouse gas impact	Feedback from stakeholders and Waddington ATC suggest very few civil airspace users access the segregated airspace associate with the medium airspace design, so the consequential impact of this option is likely to be negligible in terms of greenhouse gases (see environmental assessment). Estimated Protector flying tempo is up to 3 flights per week initially, although requirement is evolving. Change Sponsor was unable to firm up the estimate (see supplementary evidence) Minimal increase anticipated in Greenhouse gas impact from Protector activity, although overall reduction in impact is likely in local area due to relocation/retirement of several flying assets from RAF Waddington (see supplementary evidence).	Protector would not be able to operate at RAF Waddington, so no change in greenhouse gas anticipated from any new activity. No additional reduction likely since civil and military pilots would carry on as they do now
Wider society	Capacity / resilience	Not applicable	There would be no change from present since the airspace above

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<i>Table 3 - Summary of options appraisal for the medium airspace design</i>			
<b>Group</b>	<b>Impact</b>	<b>Medium airspace design</b>	<b>Do-Nothing</b>
			FL105 would remain unaltered.
General Aviation	Access	Estimated Protector flying tempo will require activation of segregated airspace up to 3 days per week and will spend very little time in the medium airspace design. Whilst feedback from stakeholders revealed that few operated within the medium airspace design, access by GA will be maximised by the ability to obtain a crossing service (e.g. DACS). Avoided disruption to Skydive Langar by refinement of this option.	There would be no change from present since the airspace above FL105 would remain unaltered.
MOD/RAF Aviation	Access	May be some impact on access for MOD/RAF aviation conducting training sorties up to FL120 and accessing Gamston Corridor at FL190/ joining controlled airspace, although the Change Sponsor has made some refinement of medium airspace design to mitigate this. Impact should be minimal unless there is some reason why military pilots are unable to obtain DACS / crossing clearance.	There would be no change from present since the airspace above FL105 would remain unaltered.
General Aviation / commercial airlines	Economic impact from increased effective capacity	Not applicable	Not applicable
General Aviation / commercial airlines	Fuel burn	Negligible impact on fuel burn since few GA operate above FL105 (see environmental assessment).	No impact.
Commercial airlines	Training costs	Not applicable	Not applicable
Commercial airlines	Other costs	Not applicable	Not applicable

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*Table 3 - Summary of options appraisal for the medium airspace design*

<b>Group</b>	<b>Impact</b>	<b>Medium airspace design</b>	<b>Do-Nothing</b>
Airport /ANSP	Infrastructure costs	Not applicable	Not applicable
Airport /ANSP	Operational costs	Not applicable	Not applicable
Airport /ANSP	Deployment costs	Not applicable	Not applicable
Safety Considerations (not exhaustive list)		<ul style="list-style-type: none"> <li>• Pilots being unaware of new airspace</li> <li>• Re-route through unfamiliar airspace (proximity to controlled airspace)</li> <li>• Funnelling as a result of need to re-route</li> <li>• Increased risk of loss of safe separation / mid-air collision (LoSS/MAC) due to re-routing aircraft creating bottlenecks</li> <li>• Increased controller workload due to funnelling, DACS requests</li> <li>• CAA Safety Buffer Policy</li> </ul>	There would be no additional safety considerations since neither activities would be able to operate at RAF Waddington

8.1.8 The Change Sponsor has just one preferred airspace design, which is the combined low and medium design option; it consists of one design which is comprised as follows:

- One volume of airspace in the vicinity of RAF Waddington from surface up to FL105 (known as the **low airspace design** (Stage 2 Option 1));
- One volume of airspace in the vicinity of RAF Waddington FL105 - FL195 (known as the **medium airspace design** (refined Stage 2 Option 8)).

8.1.9 The Do-Nothing (baseline) option does not satisfy the Design Principles agreed in Stage 1 and does not provide any segregation or protection respectively for the operation of Protector BVLOS and RAFAT at RAF Waddington.

8.1.10 Further work has been completed with regard to the CAA safety buffer policy to determine whether the medium airspace design could be further reduced. It was ascertained that no further reduction was possible.

## 9 Airspace description requirements

	The proposal should provide a full description of the proposed change including the following:	Description for this proposal
a	The type of route or structure; for example, airway, UAR, Conditional Route, Advisory Route, CTR, SIDs/STARs, holding patterns, etc	Danger Area
b	The hours of operation of the airspace and any seasonal variations	Activated by NOTAM. No seasonal variation for Protector activity. RAFAT activation likely to be at its highest late September to late March, after which occasional use for in-season aircrew display currency.
c	Interaction with domestic and international en-route structures, TMAs or CTAs with an explanation of how connectivity is to be achieved. Connectivity to aerodromes not connected to CAS should be covered	Abuts the Lincolnshire CTA; CMATZ with RAF Cranwell; abuts EG R313; adjacent to RAF Coningsby; ivo Humberside airport
d	Airspace buffer requirements (if any). Where applicable describe how the CAA policy statement on 'Special Use Airspace – Safety Buffer Policy for Airspace Design Purposes' has been applied.	See Annex A
e	Supporting information on traffic data including statistics and forecasts for the various categories of aircraft movements (passenger, freight, test and training, aero club, other) and terminal passenger numbers	N/A
f	Analysis of the impact of the traffic mix on complexity and workload of operations	The airspace will be managed by military air traffic (see Annex B Refs A – K). Waddington already operate a LARS in the area.
g	Evidence of relevant draft Letters of Agreement, including any arising out of consultation and/or airspace management requirements	See Annex B for MOD ATC draft procedures and LOAs Ref A - K
h	Evidence that the airspace design is compliant with ICAO Standards and Recommended Practices (SARPs) and any other UK policy or	The airspace design is compliant with CAA Policy Document 20200721-“CAA Policy for the established for permanent and temporary Danger

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	filed differences, and UK policy on the Flexible Use of Airspace (or evidence of mitigation where it is not)	Areas” issued by the SARG and is in accordance with CAP 740.
i	The proposed airspace classification with justification for that classification	Danger Area – this will provide the most economical type of airspace to be implemented (in terms of hours of activation, access to airspace and manpower resource). The background classification of the airspace will be class G.
j	Demonstration of commitment to provide airspace users equitable access to the airspace as per the classification and where necessary indicate resources to be applied or a commitment to provide them in line with forecast traffic growth. 'Management by exclusion' would not be acceptable	See Annex B for MOD ATC draft procedures pack up (including LOAs Ref A – K).  A DACS will be provided by Waddington ATC when proposed airspace is active.
k	Details of and justification for any delegation of ATS	See Annex B Ref A – delegation of the medium airspace design FL160 -FL195 to 78 Sqn (Swanwick(Mil) for the management of Protector outbound into class C airspace and FL150 – FL195 as it leaves class C airspace on recovery.

## 10 Safety assessment

10.1 A safety assessment was presented with the Stage 2 Options Appraisal (Phase I) Initial and was developed within the Full and Final Options Appraisals. It is assessed that the information obtained during consultation supports the underlying assumptions made during Stage 2 and does not change the safety assessment outcomes on the use of segregated airspace in the form of a danger area. Why specifically segregated airspace is being requested for the Protector and RAFAT activities at RAF Waddington was covered at paras 6.1.2 - 6.1.3.

10.2 **Protector.** The MOD is following a full type certification process, under the jurisdiction of the Military Aviation Authority (MAA), which is expected to provide assurance that Protector is airworthy and suitably equipped to fly in UK airspace Classes A and C, under Instrument Flight Rules (IFR) as Operational Air Traffic (OAT) only. In addition, the MOD Protector programme is progressing an airspace integration safety assessment (AISA) that will provide argument and evidence that Protector will be safe to operate and operated safely in UK airspace. The AISA will be scrutinised by the MAA, but responsibility for its acceptance rests with the military risk owner: the Aviation Duty Holder. Since RAF Waddington is located within class G airspace, some form of airspace segregation is required for its transit through class G airspace in order to be able to achieve onward transit using classes A and C airspace.

10.3 Establishment of a danger area will permit Protector to perform its planned activities in a safe environment, maintain regulatory compliance, and provide protection to other airspace users of any associated and identified hazardous activities.

10.4 With regard to Protector’s operation within an active TRA, the MOD is working on a proposed way forward via the AISA which is likely to involve an airspace change to amend the current rules for TRAs, which will subsequently require approval by the CAA. A series of MOD/NATS meetings have been held to progress this; input from NATS as a key stakeholder is considered vital. The current proposal has been submitted for MAA opinion and its formal response is anticipated shortly, after which the Change Sponsor will update all interested parties of the way ahead.

10.5 **RAFAT.** Having some form of protected airspace is essential for the safety of RAFAT pilots and other airspace users. When display flying, the Team generally fly at 360kts, from 100ft above ground level (AGL) up to approximately 8000 ft AGL if the weather allows a vertical routine. This makes reaction times slow, and it can be cumbersome to reactively manoeuvre the formation. As all pilots take references from the Team leader, there are very few pairs of eyes looking out for other traffic and the Team relies on a radar service for early warning of intruders.

10.6 The MOD’s preference is to implement the segregated airspace in the form of a danger area. Section 4 of the Options Appraisal Phase III Final (Ref I) provides details on measures that will be put in place to ensure safety is managed within the proposed airspace

10.7 Safety assessments are conducted by the MOD in order to analyse hazards associated with military operations and ATM procedures and identify suitable mitigations. The hazard analysis is presented to the relevant Duty Holders for incorporation into their risk models, which inform their ALARP and Tolerable arguments. Annex B contains a pack-up of ATM procedures, letters of agreement and Safety Assessments of Change (SAoC), all at draft status, produced by MOD subject matter experts. Of particular interest to this section are Annex B Refs J and K which are the draft SAoCs produced by Waddington ATC and 2 Group Battlespace Management respectively.

## 11 Operational Impact

	An analysis of the impact of the change on all airspace users, airfields and traffic levels must be provided, and include an outline concept of operations describing how operations within the new airspace will be managed. Specifically, consideration should be given to:	Evidence of compliance / proposed mitigation
a	Impact on IFR general air traffic and operational air traffic or on VFR General Aviation (GA) traffic flow in or through the area	Negligible impact expected. Availability of a DACS through the proposed airspace should allow airways leavers and joiners to transit through the medium airspace design if required. Aircraft without radios will be the most affected.
b	Impact on VFR operations (including VFR routes where applicable);	There are no VFR routes within the proposed airspace. The DACS provision during Protector activity will provide airspace users with normal access to Waddington’s

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		overhead apart from a short time as Protector departs or arrives. If the airspace is active for RAFAT, there is likely to be more of an impact and a short re-route may be required. EG R313 should be available for transit instead if RAFAT is displaying over Waddington.
c	Consequential effects on procedures and capacity, i.e. on SIDs, STARs, and/or holding patterns. Details of existing or planned routes and holds	No impact anticipated on civil procedures and capacity, although the surrounding MOD aerodromes will feel an impact especially when RAFAT is operating. The local MOD ATC units are reviewing procedures to cater for QRA launches, instrument patterns particularly when RAFAT is displaying over Waddington
d	Impact on aerodromes and other specific activities within or adjacent to the proposed airspace	Local agreements have been drafted to co-ordinate military and civil activities. See Annex B Refs A – K.
e	Any flight planning restrictions and/or route requirements	Airspace users planning to transit the proposed airspace when notified as active should plan to obtain a DACS from Waddington ATC. However, should a DACS be refused, due to conflicting activity, airspace users must also be prepared to route around/above/below the proposed airspace.



## 12 Supporting infrastructure/resources

	General Requirements	Evidence of compliance / proposed mitigation
a	Evidence to support RNAV and conventional navigation as appropriate with details of planned availability and contingency procedures	N/A
b	Evidence to support primary and secondary surveillance radar (SSR) with details of planned availability and contingency procedures	N/A
c	Evidence of communications infrastructure including R/T coverage, with availability and contingency procedures	N/A
d	The effects of failure of equipment, procedures and/or personnel with respect to the overall management of the airspace must be considered	<p>Waddington ATC must be available to provide DACS throughout hours of activation of proposed airspace. If not, the will be deactivated.</p> <p>Following the establishment of the Lincolnshire TATCC, the likelihood of equipment failure is thought to be very low. The TATCC has multiple selectable primary radars which provide adequate redundancy. In addition the WAM installation provides increased resilience for the provision of secondary radar cover.</p>
e	Effective responses to the failure modes that will enable the functions associated with airspace to be carried out including details of navigation aid coverage, unit personnel levels, separation standards and the design of the airspace in respect of existing international standards or guidance material	N/A
f	A clear statement on SSR code assignment requirements	SSR code assignment in accordance with ENR 1.6 ATS Surveillance Services and Waddington ATC procedures.
g	Evidence of sufficient numbers of suitably qualified staff required to provide air traffic services following the implementation of a change	Waddington / Lincs TATCC already provides LARS service and has sufficient numbers of suitably qualified ATCOs to provide DACS. See Annex B Ref A

## 13 Airspace and infrastructure

	General Requirements	Evidence of compliance / proposed mitigation
a	The airspace structure must be of sufficient dimensions with regard to expected aircraft navigation performance and manoeuvrability to fully contain horizontal and vertical flight activity in both radar and non-radar environments	N/A
b	Where an additional airspace structure is required for radar control purposes, the dimensions shall be such that radar control manoeuvres can be contained within the structure, allowing a safety buffer. This safety buffer shall be in accordance with agreed parameters as set down in CAA policy statement 'Safety Buffer Policy for Airspace Design Purposes Segregated Airspace'. Describe how the safety buffer is applied, show how the safety buffer is portrayed to the relevant parties, and provide the required agreements between the relevant ANSPs/ airspace users detailing procedures on how the airspace will be used. This may be in the form of Letters of Agreement with the appropriate level of diagrammatic explanatory detail.	See Annex A – MOD application for dispensation from CAA policy statement 'Safety Buffer Policy for Airspace Design Purposes Segregated Airspace'
c	The Air Traffic Management system must be adequate to ensure that prescribed separation can be maintained between aircraft within the airspace structure and safe management of interfaces with other airspace structures	See Annex B for draft MOD ATM procedures pack-up
d	Air traffic control procedures are to ensure required separation between traffic inside a new airspace structure and traffic within existing adjacent or other new airspace structures	See Annex B for draft MOD ATM procedures pack-up
e	Within the constraints of safety and efficiency, the airspace classification should permit access to as many classes of user as practicable	When active transit of the Danger Area will be available through a DACS to any air user with a radio. When not activated the airspace reverts to Class G which is the most unrestrictive airspace classification.
f	There must be assurance, as far as practicable, against unauthorised incursions. This is usually done through the classification and promulgation	Changes to the airspace, if successful, will be notified through the AIRAC publication. Airspace will be published on aeronautical charts and detailed within the AIP. Notification of activation

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		will be promulgated via NOTAM. Both the low and medium airspace designs are very simple to interpret on a chart which reduces the likelihood of airspace infringement.
g	Pilots shall be notified of any failure of navigational facilities and of any suitable alternative facilities available and the method of identifying failure and notification should be specified	N/A
h	The notification of the implementation of new airspace structures or withdrawal of redundant airspace structures shall be adequate to allow interested parties sufficient time to comply with user requirements. This is normally done through the AIRAC cycle	Changes to the airspace, if successful, will be notified through publication that is promulgated via the AIRAC cycle.
i	There must be sufficient R/T coverage to support the Air Traffic Management system within the totality of proposed controlled airspace	Waddington air-ground-air radio provision is adequate for the entirety of the proposed airspace.
j	If the new structure lies close to another airspace structure or overlaps an associated airspace structure, the need for operating agreements shall be considered	See Annex B for draft MOD ATM procedures pack-up
k	Should there be any other aviation activity (low flying, gliding, parachuting, microlight site, etc) in the vicinity of the new airspace structure and no suitable operating agreements or air traffic control procedures can be devised, the change sponsor shall act to resolve any conflicting interests	See Annex B for draft MOD ATM procedures pack-up. Note - impacts on civil aviation activity in the vicinity include review of procedures with National Grid, establishment of LOA with local BMFA clubs and members
	ATS Route Requirements	Evidence of compliance / proposed mitigation
a	There must be sufficient accurate navigational guidance based on in-line VOR/DME or NDB or by approved RNAV derived sources, to contain the aircraft within the route to the published RNP value in accordance with ICAO/Eurocontrol standards	N/A
b	Where ATS routes adjoin terminal airspace there shall be suitable link routes as necessary for the ATM task	N/A
c	All new routes should be designed to accommodate P-RNAV navigational requirements	N/A
	Terminal Airspace Requirements	Evidence of compliance / proposed mitigation

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a	The airspace structure shall be of sufficient dimensions to contain appropriate procedures, holding patterns and their associated protected areas	N/A
b	There shall be effective integration of departure and arrival routes associated with the airspace structure and linking to designated runways and published instrument approach procedures (IAPs)	N/A
c	Where possible, there shall be suitable linking routes between the proposed terminal airspace and existing en-route airspace structure	N/A
d	The airspace structure shall be designed to ensure that adequate and appropriate terrain clearance can be readily applied within and adjacent to the proposed airspace	N/A
e	Suitable arrangement for the control of all classes of aircraft (including transits) operating within or adjacent to the airspace in question, in all meteorological conditions and under all flight rules, shall be in place or will be put into effect by the change sponsor upon implementation of the change in question (if they do not already exist)	N/A
f	The change sponsor shall ensure that sufficient visual reference points are established within or adjacent to the subject airspace to facilitate the effective integration of VFR arrivals, departures and transit of the airspace with IFR traffic	N/A
g	There shall be suitable availability of radar control facilities	Waddington surveillance equipment provides coverage of the entire airspace structure.
h	The change sponsor shall, upon implementation of any airspace change, devise the means of gathering (if these do not already exist) and of maintaining statistics on the number of aircraft transiting the airspace in question. Similarly, the change sponsor shall maintain records on the numbers of aircraft refused permission to transit the airspace in question, and reasons why. The change sponsor should note that such records would enable ATS managers to plan staffing requirements necessary to effectively manage the airspace under their control	In accordance with CAP 740 and Annex A Ref A Waddington ATC / Lincs TATCC will gather and maintain statistics for aircraft requesting transit of the DA, and specifically those refused a DACS.
i	All new procedures should, wherever possible, incorporate Continuous Descent Approach (CDA) profiles after aircraft leave the holding facility associated with that procedure	N/A

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	Off-route airspace requirements:	Evidence of compliance / proposed mitigations:
a	If the new structure lies close to another airspace structure or overlaps an associated airspace structure, the need for operating agreements shall be considered	See Annex B for draft MOD ATM procedures pack-up.
b	Should there be any other aviation activity (military low flying gliding, parachuting, microlight site etc) in the vicinity of the new airspace structure and no suitable operating agreements or air traffic control procedures can be devised, the change sponsor shall act to resolve any conflicting interests	See Annex B for draft MOD ATM procedures pack-up. Note - impacts on civil aviation activity in the vicinity include review of procedures with National Grid, establishment of LOA with local BMFA clubs and members.

## 14 Environmental assessment

14.1 As explained in Appendix B to CAP 1616, the CAA must only take account of civil environmental impacts, meaning that noise, carbon and local air quality assessments will exclude the impacts generated by military aircraft and operations. As stated at para 6.1 of the Options Appraisal Phase III Final (Ref I), only qualitative data has been used to assess environmental impact of this ACP.

	Theme	Content	Evidence of compliance / mitigation
a	WebTAG analysis	Output and conclusions of the analysis (if not already provided elsewhere in the proposal)	WebTAG was scoped out of this ACP in Stage 3 – see Options Appraisal Phase III Final Annex B.
b	Assessment of noise impacts (Level 1/ M1 proposals only)	Consideration of noise impacts, and where appropriate the related qualitative and/or quantitative analysis, including whether the anticipated noise impact meets the criteria for a proposal to be called- in by the Secretary of State. If the change sponsor expects that there will be no noise impacts, the rationale must be explained	Refer to Options Appraisal Phase III Final, Annex B for rationale to provide only qualitative analysis. Consequential noise impacts are assessed as negligible - refer to Options Appraisal Phase III Final, Annex B para B7.

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c	Assessment of CO2 emissions	Consideration of the impacts on CO2 emissions, and where appropriate the related qualitative and/or quantitative analysis. If the change sponsor expects that there will be no impact on CO2 emissions impacts, the rationale must be explained	Refer to Options Appraisal Phase III Final, Annex B for rationale to provide only qualitative analysis. The impact on CO <sub>2</sub> emissions and fuel burn is assessed to be very low - refer to Options Appraisal Phase III Final, Annex B para B17.
d	Assessment of local air quality (Level 1/ M1 proposals only)	Considerations of any impact on local air quality, and where appropriate the related qualitative and/or quantitative analysis. If the change sponsor expects that there will be no impact on local air quality, the rationale must be explained	Refer to Options Appraisal Phase III Final, Annex B, para B19 for rationale to scope out impact on air quality from this ACP.
e	Assessment of impacts upon tranquillity (Level 1/ M1 proposals only)	Considerations of any impact upon tranquillity, notably on Areas of Outstanding Natural Beauty or National Parks, and where appropriate the related qualitative and/or quantitative analysis. If the change sponsor expects that there will be no tranquillity impacts, the rationale must be explained	Refer to Options Appraisal Phase III Final, Annex B, para B20 for rationale to scope out impact on tranquillity from this ACP.
f	Operational diagrams	Any operational diagrams that have been used in the consultation to illustrate and aid understanding of environmental impacts must be provided	Refer to Options Appraisal Phase III Final, Annex B, para B6 for rationale to scope out the use of operational diagrams from this ACP.
g	Traffic forecasts	10-year traffic forecasts, from the anticipated date of implementation must be provided (if not already done so elsewhere in the proposal)	The MOD forecasts no increase in air traffic in the area as a result of the ACP for the years 2023 – 2033. See Options Appraisal Phase I Initial, para 12.

h	Summary of environmental impacts and conclusion	A summary of all of the environmental impacts detailed above plus the change sponsor's conclusions on those impacts	No quantitative data was obtained to support the assessment of the consequential impact on the environment relating to this ACP. It was summarised that this the introduction of this Danger Area would have a negligible impact on the environmental factors listed in CAP 1616.
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## 15 Annexes

- A. Application for Dispensation from the CAA Safety Buffer Policy wrt ACP-2019-18 (Protector & RAFAT operations in the UK)
- B. DRAFT MOD AIR TRAFFIC MANAGEMENT PROCEDURES FOR PROTECTOR AND RAFAT OPERATIONS IN SUPPORT OF ACP-2019-18.
  - Ref A: 00000000-LoA-LINCS TATCC-56Sqn-78Sqn-WAD-CWL-RAFAT Draft-O
  - Ref B: 00000000-LoA Lincs TATCC & 78 Sqn RPAS handovers-O
  - Ref C: 00000000-78 Sqn NATS RPAS Procedures Draft-O
  - Ref D: 00000000-WAD LoA with LNAA Draft-O
  - Ref E: 00000000-WAD Twr BMFA LOA Draft-O
  - Ref F: 00000000-CON Rwy 07RH GCA vs RAFAT Order-O
  - Ref G: 00000000-WAD Ops Airspace Booking Procedure Draft-O
  - Ref H: 00000000-WAD Protector Start procedure-O
  - Ref I: 00000000-WAD Protector Procedures-O
  - Ref J: 00000000-WAD SAoC Protector-O
  - Ref K: 00000000-2Gp BM SAofC-02\_23-Protector Operations-Draft-O
- C. RAFAT AIRSPACE REQUIREMENTS, INTENT AND PLANS dated 24 Feb 23

# Annex A

## Application for Dispensation from the CAA Safety Buffer Policy wrt ACP-2019-18 (Protector & RAFAT operations in the UK)

**Reference:** SARG - Policy Statement - SPECIAL USE AIRSPACE - SAFETY BUFFER POLICY FOR AIRSPACE DESIGN PURPOSES dated 22 August 2014

### 1 ACP-2019-18 Airspace Design

1.1 The proposed airspace associated with ACP-2019-18 comprises two areas of segregated airspace, in the form of danger areas, joined vertically (divisional level is FL105) as shown in Figure 1 below:

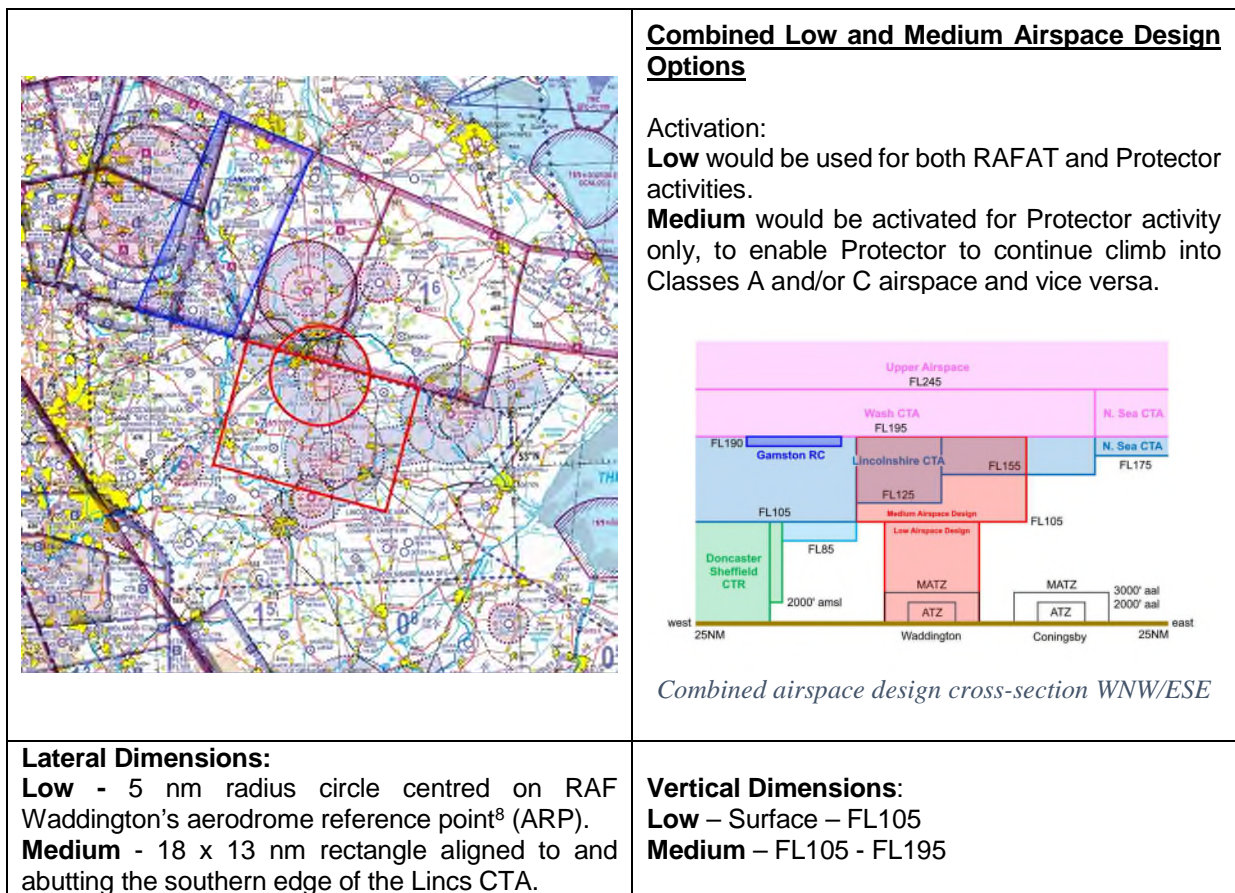


Figure 1– Combined Low and Medium Airspace Design Options

1.2 **Protector** requires access to Classes A & C from Class G segregated airspace in order to be able to transit to its UK operating areas. The design above, comprising the Low and Medium

<sup>8</sup> RAF Waddington's airfield reference point is the midpoint of RW02/20 (530958N 0003126W)



airspace designs was produced to enable Protector's flight in Class G airspace up to FL195, and subsequent climb into Class C or into Lincs CTA for airways crossing or airways join (Class A).

1.3 **RAFAT** will make use of the Low airspace design only where it will conduct flying display training.

## 2 Safety Buffer Policy

2.1 Para 2.5 of the reference document lays out the types of activity which require a buffer to be applied. Of note for ACP-2019-18, 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)*

*1.2.6 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.*

2.2 The document also contains the following note:

### *3.2 BVLOS UAS Operations*

*Where SUA is established only to support BVLOS UAS operating at IAS of 150kts or less, the airspace buffer may, subject to appropriate mitigation (see paragraph 3.1), be reduced from 5nm to 3nm from the edge of an airway, TMA, CTA or CTR, or from 10nm to 8nm from the centreline of Advisory or Upper ATS Routes.*

3 The ACP Change Sponsor is hereby applying for dispensation iaw Ref A, has assessed the separation requirements and presents the following application with appropriate mitigations.

3.1 The Low airspace design:

- Protector activity – designed with safety buffer policy requirements in mind.
  - Vertical dispensation is not required since the top level of the Low airspace design is 2000 ft below the relevant sectors of the Lincs CTA (CTA2 and CTA1)
  - CTA3 and CTA13 have base levels of FL105 and are located within 5 nm of the Low airspace design. Therefore, dispensation to reduce lateral separation between these structures is sought iaw para 3.2 of the document (UAS with IAS of 150kts or less). The MOD presents additional mitigation in the form of positive ATC management provision. The minimum distance of the boundary of the Low airspace design is 3.1 nm from the closest points of CTA3 and CTA13, so an external 3 nm lateral buffer is achieved.
- RAFAT activity – The MOD had considered that dispensation is not required since its activity is not listed in para 2.5. Some discussion has been had regarding this and the MOD wishes to present the following.
  - RAFAT is not conducting high energy manoeuvres such as those taking place in EG D323 where tactical manoeuvrability is often employed. Rather, RAFAT activity will be well-scripted, flying training routines with no intention to conduct unplanned, evasive manoeuvres; this activity is as per activity in EG R313 where no such buffer was required (albeit established pre-policy for new DAs); A DASOR search has revealed no reports of RAFAT inadvertently leaving their current display airspace. There were 13 reports of EG R313 infringement by other known/unknown aircraft. Whilst the lack of reports is not empirical evidence that RAFAT have not inadvertently left their operating airspace, it is evidence that there are no reports of it taking place.
  - **HOWEVER**, RAFAT has described an intention to avoid overflight of the city of Lincoln, whilst conducting routine display training at RAF Waddington. This will be achieved by restricting display training activity to the areas south and east of RW02/20 only, as outlined in the document provided by RAFAT included at Attachment 1 to this Annex. This internal flying limitation provides a minimum “buffer” of 7.3 nm from the adjacent CTA sectors (CTA3 and CTA13) which have base levels within 2000ft of the upper level on the Low airspace design.

3.2 The Medium airspace design:

- Protector activity – the volume of airspace has been designed with safety buffer policy in mind.

- Vertical dispensation is requested as the upper limit of the Medium airspace design 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. Such procedures are being developed by the MOD in collaboration with NATS. Specifically, procedures to ensure that Protector remains at or below FL175 within the Medium airspace design 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);
- Lateral dispensation is requested as the northern edge of the Medium airspace design directly abuts two sectors of the Lincs CTA (CTA2 and CTA1). Dispensation is requested iaw para 3.2 (UAS with IAS of 150kts or less). The MOD presents mitigations in the form of positive ATC management and the application of an internal 3 nm lateral buffer from the northern edge of the Medium airspace design when Protector is operating within 2000 ft of the base of the relevant sectors of the Lincs CTA. Figure 2 shows the proposed internal buffer below.

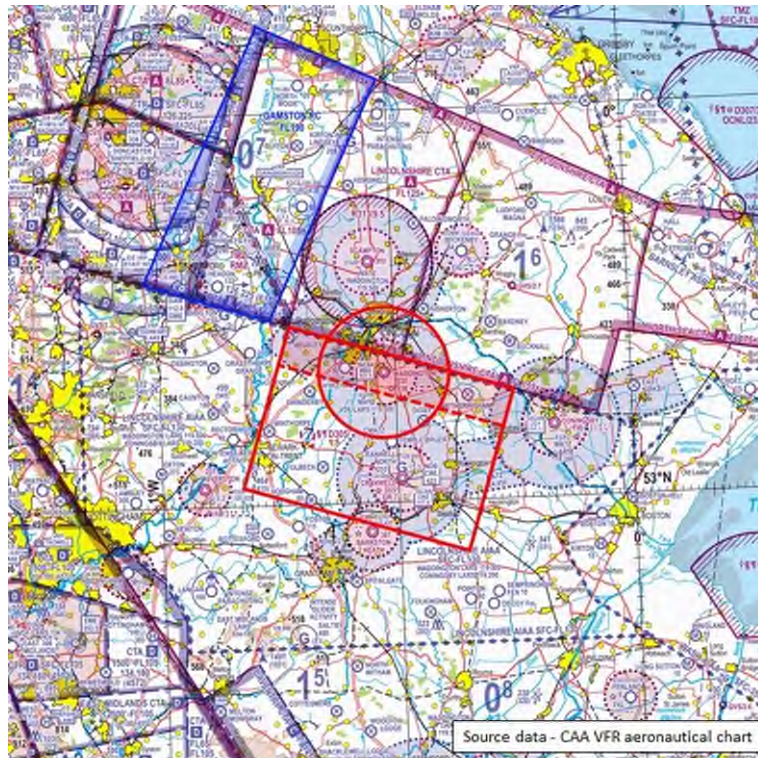


Figure 2 - 3 nm lateral buffer (hatched section) inserted from the northern edge of the Medium airspace design

**4. Loss of link procedures within the Low and Medium airspace designs**

4.1 In the event of a loss of link:

- Protector will remain within its segregated airspace at all times (Low and Medium airspace designs);
  
- When operating in the Medium airspace design Protector will not infringe the 3 nm internal buffer set against the Lincs CTA;
  
- On descending into the Medium airspace design, Protector will continue descent to FL175 or below and then onwards with an appropriately programmed profile;
  
- Whilst climbing into or operating in the Medium airspace design, Protector will be programmed to remain below FL175.

5 NATS has been consulted on this application and has accepted the mitigations presented by MOD at this stage and has no further comment or concerns (see Attachment 2 to this Annex)

Attachments

1. Letter from RAFAT - 20230126-ACP BUFFER\_ZONE\_RAFAT-O
2. Email from NATS to MOD dated 10 Mar 23

# Annex A - Attachment 1

From: [REDACTED] Display Wing

26 January 23

File reference: 20230126-ACP BUFFER ZONE\_RAFAT-O  
RAF WADDINGTON ACP BUFFER ZONE\_RAFAT  
Issue

1. The CAA's Policy Statement titled **SPECIAL USE AIRSPACE - SAFETY BUFFER POLICY FOR AIRSPACE DESIGN PURPOSES** dated 22 Aug 22 requires consideration with regard to ACP-2019-018 and the future use of RAF Waddington for RAFAT display flying. Of note the Policy Statement outlines the issue as follows:

*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.*

*d. 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.*

*e. 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.*

2. ACP-2019-018 is proposing a portion of segregated airspace of 5nm radius from the centre of RAF Waddington up to FL105 for RAFAT flying training. This airspace will come within 3.1nm of the southeastern edge of the Lincolnshire CTA (CTA3 & CTA13).

Whilst the Ministry of Defence (MOD) does not consider the RAFAT activity as "high energy manoeuvres", it is considered important to assure NATS that the proximity of the RAFAT activity within the proposed airspace will not constitute a risk to its network traffic within the Lincs CTA. The MOD can confirm that when RAFAT is conducting routine display training

over RAF Waddington, overflight of Lincoln city will be avoided and in doing so an internal flying restriction will be imposed. Figure 1 contains an aeronautical map of local area, with RAFAT's routine "limited" display training area shaded in yellow. This internal flying limitation will serve to provide a minimum "buffer" of 7.3 nm from the SE corners of CTA3 and CTA13.



Figure 1 - Local area map depicting RAFAT's lateral flying display training limitation

3. Dispensation in the vertical plane is not required since the lower levels of Lincs CTA1 & CTA2 is FL155 and FL125 respectively. The top level of the proposed airspace for RAFAT use is FL105, which provides at least 2000ft minimum separation.

4. NATS has asked for confirmation of the top-out heights for RAFAT's routine display training. The normal vertical extent of manoeuvring is 7000ft AGL at regular display heights and 9000ft AGL at the beginning of Winter training.

████████████████████ **Display Wing**

Skype. ██████████

████████████████████

# Annex A - Attachment 2

From: [REDACTED]

Sent: 10 March 2023 15:30

To: UASDCD-ACP <UASDCD-ACP@qinetiq.com>

Cc: [REDACTED]

Subject: RE: UC ACP-2019-18 Consultation feedback - MOD response

Hi [REDACTED]

Thank you for your response to the 4 questions posed by NATS during the ACP Consultation process. In general, discussion are progressing well between NATS and the Sponsor on the associated procedures associated with the introduction of this ACP. NATS NERL plc's comments are

1. The Safety Argument, and its acceptance by the CAA, for Protector operations without a full detect and avoid system within Classes A to C airspace, in order to validate the assumption that operating in Classes A-C is acceptable.

NATS accepts that this is outside of the scope of the ACP. However, the purpose of the ACP is to allow/permit access to Airspace for which NATS is the controlling authority. Prior to Protector entering service NATS would like to review the safety argument.

Also, any Letter of Agreement between NATS and the MOD will solely relate to ATC procedures associated between 78 SQN and Swanwick/Prestwick Centres for the crossing of Airspace for which NATS is the controlling authority. This LoA will not in any way endorse the permission for the airframe to fly in Controlled Airspace.

2. The Safety Argument, and its acceptance by the CAA, for Protector operations without a full detect and avoid system within an active TRA.

NATS accepts that this is outside of the scope of the ACP. However, in slower time, NATS needs to impact assess this change to the use of TRAs and the impact on the NATS Network and Operation. Therefore, whilst outside the scope of this ACP, NATS would seek confirmation from the Sponsor that changes to the use of TRAs need to be agreed before Protector enters service

3. The Safety Argument/mitigations, and their acceptance by the CAA, for the containment of activities and the prevention of 'inadvertent excursions' by RAFAT and Protector operations within the lower area (such that the CAAs SUA Buffer Policy for Airspace Design Purposes need not apply).

NATS understands the arguments made by MOD and the sponsor for dispensation from the CAA Buffer policy and has completed an initial review of the associated hazards based on the evidence provided by the MOD. Whilst further safety assurance work will be required to be undertaken with MOD once the design is approved by the CAA, NATS accepts that the mitigations presented by MOD and the Sponsor at this stage and has no further comment or concerns.

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4.

The Safety Argument/mitigations, and its acceptance by the CAA, for the containment of activities and the prevention of 'inadvertent excursions' by Protector operations within the high area (such that the CAAs SUA Buffer Policy for Airspace Design Purposes need not apply).

NATS understands the arguments made by MOD and the sponsor for dispensation from the CAA Buffer policy and has completed an initial review of the associated hazards based on the evidence provided by the MOD. Whilst further safety assurance work will be required to be undertaken with MOD once the design is approved by the CAA, NATS accepts that the mitigations presented by MOD and the Sponsor at this stage and has no further comment or concerns.

Regards

[REDACTED]

[REDACTED]

Manager NATS Operational Policy

[REDACTED]

[REDACTED]

NATS Internal

From: UASCDC-ACP <UASCDC-ACP@qinetiq.com>

Sent: 22 February 2023 13:30

To: [REDACTED]

Cc: [REDACTED]

Subject: UC ACP-2019-18 Consultation feedback - MOD response

Your attachments have been security checked by Mimecast Attachment Protection. Files where no threat or malware was detected are attached.



## Annex B

### DRAFT MOD AIR TRAFFIC MANAGEMENT PROCEDURES FOR PROTECTOR AND RAFAT OPERATIONS IN SUPPORT OF ACP-2019-18.

Sponsor – 2 Group, Battlespace Management Ops SO2 A3/5 Area

The following draft procedures summary has been developed following a series of working groups led by 2Gp BM Ops in support of the Protector and RAFAT<sup>9</sup> Airspace Change Proposal (ACP)<sup>10</sup> submission. It is acknowledged that further development and refinement of the Protector procedures will be required as it is brought into service, and that these procedures are subject to change in consultation with relevant Air Navigation Service Providers (ANSPs).

#### References:

Ref A: 00000000-LoA-LINCS TATCC-56Sqn-78Sqn-WAD-CWL-RAFAT Draft-O

Ref B: 00000000-LoA Lincs TATCC & 78 Sqn RPAS handovers-O

Ref C: 00000000-78 Sqn NATS RPAS Procedures Draft-O

Ref D: 00000000-WAD LoA with LNAA Draft-O

Ref E: 00000000-WAD Twr BMFA LOA Draft-O

Ref F: 00000000-CON Rwy 07RH GCA vs RAFAT Order-O

Ref G: 00000000-WAD Ops Airspace Booking Procedure Draft-O

Ref H: 00000000-WAD Protector Start procedure-O

Ref I: 00000000-WAD Protector Procedures-O

Ref J: 00000000-WAD SAoC Protector-O

Ref K: 00000000-2Gp BM SAofC-02\_23-Protector Operations-Draft-O

#### Letters of Agreement

1. The following major letters of agreement will be finalised prior to the commencement of RAFAT and Protector flying in Q3 2023:
  - a. A draft LoA between 56 Sqn/Waddington ATC/Lincs TATCC/78 Sqn is at **Ref A** and includes:
    - i. Airspace activation.
    - ii. Prenotification of sortie details.
    - iii. Conditions for transfer of control between agencies which is expanded via a further draft LoA at **Ref B** between Lincs TATCC and 78 Sqn.
    - iv. Provision of a Danger Area Crossing Service (DACS) and communication between agencies with respect to DACS.
    - v. Standing agreement coordination for the provision of separation minima against known, validated, and verified local sqks.
  - b. An LoA between NATS/78 Sqn, for which draft procedures are at **Ref C** will include:
    - i. Notification procedures of the aircraft's intended routing and levels.
    - ii. Co-ordination procedures.
    - iii. Communication procedures and actions in the event of 'lost link'.

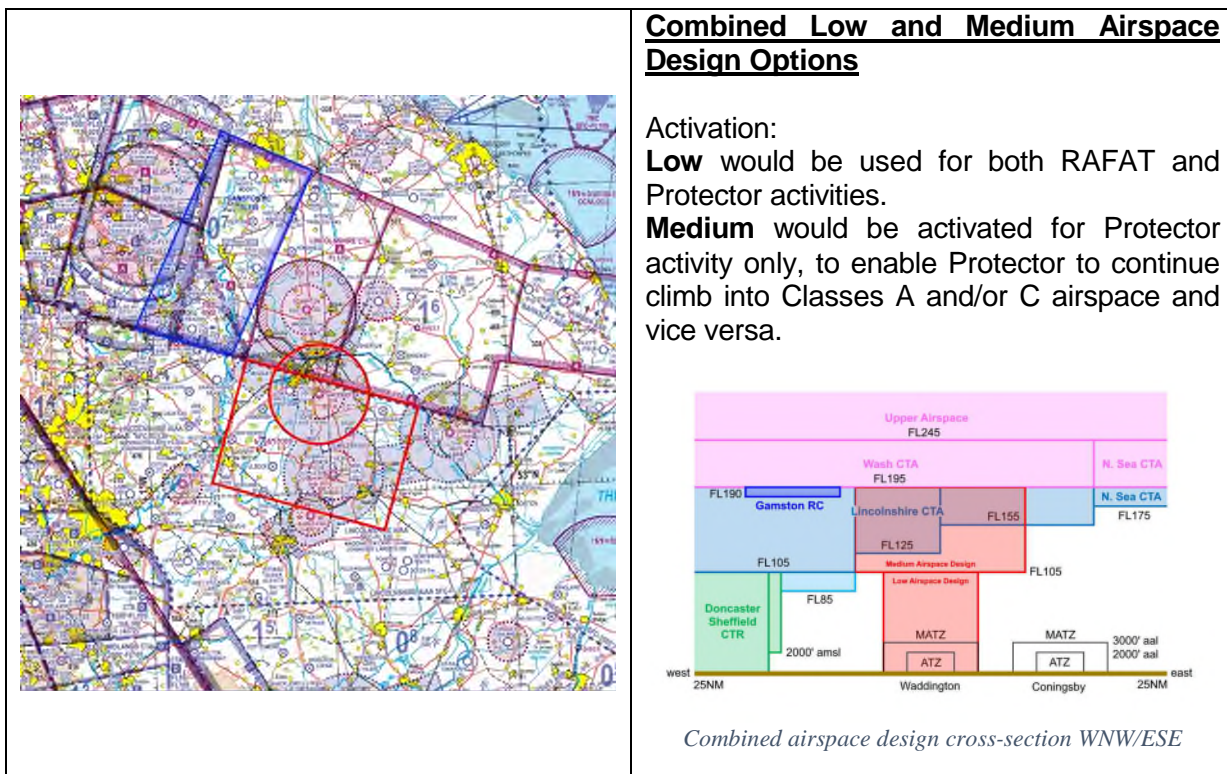
<sup>9</sup> Protector RG Mk1 is a certified category RPAS<sup>9</sup>, due to operate in UK airspace on the Military Register from 2023. Initially, Protector will only be authorised to fly in segregated or controlled airspace with the aim being to subsequently achieve Flight in Non-Segregated Airspace (FINAS). MAA RA1600 details the classification of RPAS.

<sup>10</sup> ACP-2019-18

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- 2. A review of extant letters of agreement held at local level (RAF Waddington, Cranwell, Coningsby ATC and TATCC) has been conducted and draft changes to agreements and procedures are at Ref D, E and F, these include:
  - a. **Ref D** – Draft LoA between Wad ATC and Lincs Air Ambulance
  - b. **Ref E** – Draft LoA between Wad ATC and the British Model Flying Association.
  - c. **Ref F** – Draft Changes to Cgy ATC procedures for operations when Rwy 07 is in use.

**Airspace Design for ACP-2019-18**



- 3. Protector requires access to Classes A & C from Class G segregated airspace in order to be able to transit to its UK operating areas. The design above, comprising the Low and Medium airspace designs was produced to enable Protector's flight in Class G airspace up to FL195, and subsequent climb into Class C or into Lincs CTA for airways crossing or airways join (Class A).
- 4. RAFAT will make use of the Low airspace design only where it will conduct flying display training.
- 5. The Low and Medium airspace designs will be implemented in the form of danger areas. For the purposes of this document, they will be referred to as the Cylinder (low airspace design) and the Box (medium airspace design).

**Airspace Activation**

- 6. The Danger Area (DA) as outlined in ACP-2019-18 will only be activated when Protector or RAFAT flying is due to take place. Waddington Stn Ops will be responsible for booking the

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requisite portions of the DA<sup>11</sup> via MAMC prior to D-1 0900hrs local, either the 'cylinder' alone for RAFAT flying, or the 'cylinder' and 'box' for Protector. The notification chain and procedures for airspace activation are detailed in both the LoA at **Ref A** and the RAF Waddington Station Operations Draft Procedure detailed at **Ref G**.

### **Aerodrome and Visual Circuit Procedures**

7. Detailed draft procedures for 'aircraft start' and operating within the ATZ and DA are at **Ref H** and **Ref I**.
8. Due to the lack of a full 'Detect and Avoid' (DAA) capability on Protector at ISD/IOC, Waddington ATC will ensure that the visual circuit is sterilised for Protector arrivals and departures. RAF Waddington Air Traffic Control have conducted a relevant safety assessment to determine how the cessation and commencement of VFR Ops within the (M)ATZ are conducted which is at **Ref J**.

### **Air Traffic Services within the DA Structure.**

9. To fulfil the criteria as defined in [MAA RA 2320](#) with respect to the layered safety approach, it is presumed that Protector will be required to receive a Deconfliction Service (DS) within the DA structure in class G airspace. The challenges of rigorously applying DS separation standards in accordance with CAP 774 against all traffic outside of, but in close proximity to the DA structure were discussed at ATM working groups and it was determined that:
  - a. BM Ops would explore an amendment to MAA RA 3238, that enables the use of current vertical deeming conventions to be utilised within the 'box' portion of the DA. This would prevent the issuing of avoiding action against traffic operating below the 'box' portion DA and has been approved in principle by MAA ATM Regulations<sup>12</sup>.
  - b. BM Ops would assist the Lincs TATCC in establishing standing agreement coordination procedures for use against known traffic operating outside of, but in close proximity to the DA. This will prevent the issuing of avoiding action against known traffic, maintaining outside of the DA and in receipt of an ATS from the Lincs TATCC.

### **Danger Area Crossing Service (DACS)**

10. DACS will be provided by the Lincs TATCC (Waddington RADAR) and will be available for the duration of the notified airspace activation. Details are laid out at **Ref A**.
11. Instructions for airspace users on who to contact for DACS will be contained within the Airspace Activation NOTAM and will be published within the UK AIP.

### **Air Traffic Services and Co-ordination within Controlled Airspace**

12. Until such time that Protector is capable of flight in non-segregated airspace and regulations permit control by civil controllers, ATS within CAS will be provided by MOD controllers at 78 Sqn.

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<sup>11</sup> The low airspace design is referred to here as the "cylinder" and will be activated for RAFAT and Protector activity; the medium airspace design is referred to here as the "box" and will only be activated for Protector activity.

<sup>12</sup> Discussed at a SQEP panel between RAF BM STANEVAL and the MAA on 5 Dec 22.

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13. Prior to the T&E flying phase, preferred levels, and routes to designated segregated airspace structures will be discussed and agreed with NATS at 2Gp BM Ops led working groups. These will be promulgated in any subsequent LoAs and are in draft form at **Ref C**.
14. Intended levels and routing for crossing CAS will be communicated to the relevant civil sectors by 78 Sqn at the earliest opportunity.

### Lost Link Procedures

15. Following a complete 'lost link' event, Protector will Squawk 7400 as per the Civ AIP ENR 1.6 and the aircraft will continue iaw its pre-programmed lost link mission, however this is configured. SOPs for its configuration are subject to agreement and can be developed iaw specific flight/airspace requirements. Example: 30min hold and proceed en-route or return to base. Specific procedures will be developed in due course through MOD ATM and NATS discussion and involvement in Protector sim activity. Further detail on lost link procedures and actions are contained within **Ref C** and **Ref I**.
16. Should the link be restored, tactical control of the RPAS may resume and normal ATC procedures will be recommenced.

### MOD BM Policy, Doctrine and Training

17. 2 Gp Aerodrome Ops and 2 Gp BM Ops will collaborate to compile a safety assessment that will:
  - a. Identify any additional training and policy items that need to be promulgated to the MOD ATM community prior to commencement of T&E flying.
  - b. Update policy and orders accordingly.
18. A draft safety assessment is in development and the latest iteration is at **Ref K** and will include an implementation action plan for any policy or order changes.

  
BM Ops SO2 Area  


# Annex B – Ref A

**LETTER OF AGREEMENT BETWEEN THE LINCOLNSHIRE TERMINAL AIR TRAFFIC CONTROL CENTRE, RAF WADDINGTON, RAFC CRANWELL, 78 SQN RAF(U) SWANWICK, 56 SQN, AND THE ROYAL AIR FORCE AEROBATICS TEAM (RAFAT) FOR THE CONTROL AND CO-ORDINATION OF EGD ## MILITARY DANGER AREAS.**

**Review Date: #####**

## **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), 78 Sqn RAF(U) Swanwick and RAF Waddington during Protector (PTR) and RAFAT operations.

## **SIGNATORY UNITS**

2. Units participating in this temporary LOA:
- a. RAF Waddington (WAD)
  - b. RAF Cranwell (CWL)
  - c. RAF Coningsby (CON)
  - d. Lincs TATCC (encompassing CON ATC, WAD Radar and CWL Radar)
  - e. 78 Squadron, RAF(U) Swanwick Mil (SWK)
  - f. 56 Sqn RAF Waddington (PTR).

## **INTRODUCTION**

3. WAD (N53 10 W000 31) will facilitate the Operations of the General Atomics MQ9B PTR, Remotely Piloted Aircraft System (RPAS) by 56 Sqn beginning Feb 24. It is anticipated that the Civil Aviation Authority will approve the establishment of Managed Danger Area (MDA), EGD ##, overhead WAD and CWL which will be activated for PTR and certain RAFAT operations. The MDA is split into two parts: the 'tube'; 5nm radius circle centred on WAD, active from surface to FL105, and a 'box'; which extends from the southern edge of the 'tube', active FL105 to FL195. These will allow PTR to climb and descend safely into a known air environment.

## **HOURS OF OPERATION**

4. The MDA activation 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 OPG Record of Decisions (RODs) will be provided to military signatory units of this LOA to enhance situational awareness and aid planning.
6. A Danger Area Crossing Service (DACS) will be available from Lincs TATCC iaw para.12 whenever EG D## is active to aid flexible use of airspace (FUoA).
7. Although PTR can remain airborne for up to 48 hours; during the test and evaluation period it is expected that local sorties will be 3-4 hours. Subsequent flights are expected to be within the WAD flying window subject to operational requirements. While PTR is airborne, the MDA will remain active via NOTAM as WAD airfield is the only location into which PTR can operate below FL105 and land. This provides WAD protection for short notice recoveries in the event PTR returns unexpectedly early.

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### PTR FLIGHT PROFILE SUMMARY

8. PTR will depart WAD and climb within a 3nm spiral pattern inside the 'tube' to 3000ft WAD QFE. Control will be transferred from WAD ADC to WAD Radar as it passes 1500ft WAD QFE. WAD Radar will then continue the climb PTR to FL105 inside the 'tube'. It will take approximately 10 minutes from departure to reach FL105. Once established at FL105, PTR will re-position into the 'box' and will be given a further climb to FL190. As PTR passes FL160 it will be handed to SWK. The MDA airspace from FL160 to FL195 will then be delegated to SWK. Once PTR has vacated the MDA, responsibility for the airspace from FL160 to FL195 will revert to WAD Radar.

9. On recovery, PTR will enter the 'box' at FL190 and will be instructed to descend not below FL150. It will then be handed to WAD Radar on passing FL160. Wad Radar will then provide further descent to FL105. Once established, PTR will re-position into the 'tube'. Further descent will be conducted within a 3nm spiral pattern on the WAD QFE and will be subject to other activity at Waddington with the aim of achieving height 3500ft QFE before transfer to Waddington ATC for final decent profile. The recovery from FL105 will take approximately 10 minutes.

### ATS AND COORDINATION

10. PTR will normally be under a Deconfliction Service (DS), with tactical co-ordination permitted ensuring a minimum of 1000ft separation.

11. Flight safety and expedition will be enhanced by the introduction of standing agreement coordination between the three units within Lincs TATCC and SWK, or by tactical coordination between WAD Radar and external agencies.

12. A DACS will be available from WAD Radar. Ac can contact WAD LARS on 119.5/232.7 and request a DACS, which will be subject to the position and intentions of PTR. The WAD Radar Supervisor will be responsible for monitoring traffic loading. When multiple DACS are being provided, WAD LARS may elect to offload other LARS ac to CON ATC and / or CWL Radar. A record will be kept of the number of aircraft requesting transit of the MDA, and specifically those refused a DACS.

### AGREED FACILITATING PROCEDURES

13. For the purpose of this LOA, the MDA will be described as 'active / inactive' when referencing its published NOTAM activity. The MDA will be described as 'hot / cold' when the MDA is tactically stood up or down by WAD Radar and communicated as such to signatory units of this LOA.

14. **WAD ATC / Radar actions for PTR departure.** When PTR is on engine start:

- a. WAD ATC will prenote WAD Radar who will declare the 'tube' MDA hot. A DACS will then be mandatory to all airspace users intending to penetrate the MDA.
- b. WAD Radar will assign PTR the squawk 3630 to aid identification and situational awareness of PTR to surrounding ATC units.

15. WAD Radar will then take the following actions:

- a. Notify SWK, who will co-ordinate the planned routing for PTR from the 'box' MDA if required, which should also be promulgated via an ACN.
- b. Prenote the ac to SWK and declare the 'box' MDA hot once PTR is airborne.
- c.

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d. When established en route, notify signatory units of this LOA that both elements of the MDA are cold, and de-select the TopSky overlays.

16. **WAD ATC / Radar action for PTR recovery.** Upon receiving a prenote from SWK that PTR is recovering WAD Radar will:

a. Provide the 3630 squawk and a frequency to SWK, declare the 'box' MDA hot, delegate FL150 – FL195 to SWK, and select the relevant TopSky overlays. A DACS will then be mandatory to all airspace users intending to penetrate the box MDA.

b. Once observed entering the 'box' MDA, WAD Radar will prenote WAD ATC (who will prepare circuit sterilisation), and declare the 'tube' MDA hot. If the 'tube' MDA is already hot for RAFAT, PTR will maintain FL105 in the 'box' MDA until RAFAT call complete. PTR can re-position into the 'tube' MDA at FL105 while RAFAT recover to Waddington.

c. Once established in the 'tube' MDA, provide a stepped descent to ensure IFR separation against any remaining circuit traffic is maintained. At 3500ft WAD QFE, PTR is to be transferred to WAD ATC.

17. Once PTR is in two-way comms with WAD ATC:

a. ADC will provide further descent to 1500ft WAD QFE to height deconflict against HELIMED activity, and eventually a final descent clearance when safe to do so.

b. WAD Radar will declare both MDAs cold. WAD ATC will inform AR Ops, so the NOTAM notifying the MDA as activate can be cancelled for the remainder of the day. A DACS will remain available for the remaining duration of the NOTAM.

c. When PTR has landed, LINCAS TATCC will make the airspace COLD and inform local units if required so they are able to use the airspace. WAD ATC will inform AR Ops, so the NOTAM notifying the MDA as activate can be cancelled for the remainder of the day, informing the general aviation community that the MDA has become inactive. DACS will be available until the NOTAM is active.

18. **78 Squadron, RAF(U) Swanwick.** SWK will adhere to the following:

a. Once notified the MDAs are hot or active, SWK shall contact WAD Radar for a clearance to cross the MDA or advise their ac to contact WAD Radar for a DACS.

b. On receipt of a PTR prenote, SWK are to provide a sqk and frequency. The handover should begin once PTR has passed FL160. Once PTR has vacated the confines of the 'box' MDA, they will notify WAD Radar that PTR is safely en route.

c. On recovery to WAD, SWK shall prenote WAD Radar allowing sufficient time for them to declare the MDAs as hot. The prenote will allow WAD Radar to delegate the airspace from FL150 to FL195 to SWK, provide them with the 3630 squawk and a WAD frequency. SWK shall not descend PTR below FL150 and will initiate a handover as it passes FL160. Once the handover is complete, responsibility for the airspace from FL150 to FL195 will revert to WAD Radar.

19. **CWL.** CWL Radar, ATC 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.

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b. Some instrument procedures are affected; prior planning should prevent these being used, alternative 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.

c. CWL visual circuits to Rwy 19 are also affected; this visual circuit will be closed unless by prior agreement with WAD radar.

d. 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 a CWL frequency before departing/recovery to facilitate an early DACS from WAD Radar.

e. Before commencing flying, CWL Gliding 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 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 either MDA is hot, permission for DACS will be requested from WAD Radar.

b. CON MID North, East or South departures will be restricted to FL090 until laterally clear of the MDAs. Westerly departures will be subject to coordination with WAD Radar. Performance departures can be approved with the caveat of 'remaining outside of the EG ## MDAs'.

c. Current IFR recovery profiles to Rwy 07RH require a 'sterile area' to be ceded by CWL radar to CON radar; this area infringes a small portion of the 'tube'. When IFR recoveries to Rwy 07RH are required, CON ATC will notify WAD radar as soon as able, and request a DACS. PTR may be able to stop climb/descent or delay take off if CON ac have priority, either by individual status or by volume of recoveries. A priorities list will be published under separate cover to aid decision making.

d. TACAN approach profiles to Rwy 07RH conflict with the 'tube' MDA. 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.

e. Additional procedures and full holdings for CON Ty operating to Rwy 07RH will be in force, including singletons only, downwind joins and circling approaches.

## LOST LINK

21. 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 the previous track back to Waddington. 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 Waddington.

## RAFAT



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22. The 'tube' MDA is also utilised for RAFAT to conduct display practices at WAD. Activation and publication procedures will be conducted iaw paras 4-6. Activity will mostly occur Mon to Fri 0800L-1730 local, but can also take place on weekends.

23. Restrictions on other local airspace during RAFAT activity will remain iaw paras 10-20. RAFAT are to be reminded not to overspill the airspace to the sector south to east during CON and CWL flying periods due to proximity of flying.

### DUAL OPERATIONS

24. Simultaneous PTR and RAFAT operations within the 'tube' MDA will be subject to height separation provided by WAD Radar (eg RAFAT operations permitted once PTR not below FLXX), and should be the exception, not the norm.

### 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. However, PTR should remain within the MDA when below FL100, only leaving in extremis to meet deconfliction minima. 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.

### SIGNATORIES

OC OSW, RAF Waddington (WAD)

OC Ops Wg, RAF Coningsby (CON)

OC Ops Wg, RAF Cranwell (CWL)

Lincs TATCC Cdr (encompassing CON ATC,  
WAD Radar and CWL Radar)

OC 78 Sqn, RAF(U) Swanwick Mil (SWK)

OC 56 Sqn, RAF Waddington (PTR)

OC Cranwell Gliding Club

# Annex B – Ref B

File Ref: 20230217-Protector TATCC to 78 Sqn Handovers

17 Feb 23

## LETTER OF AGREEMENT (LOA) – PROCEDURES FOR THE HANDOVER OF PROTECTOR REMOTELY PILOTED AIR SYSTEMS (RPAS) BETWEEN THE LINCOLNSHIRE AIR TRAFFIC CONTROL CENTRE (LINCS TATCC) AND 78 SQUADRON (SWANWICK MIL)

### References:

Ref A: RA 3233

### Aim

1. This LOA formalises arrangements between Lincs TATCC and 78 Sqn for Protector RPAS handover procedures between the two units. The aim of this procedure is to safely and expeditiously manage the transfer of control of RPAS within DAXX to facilitate efficient en-route transit from, and recovery to, RAF Waddington.

### User Requirements

2. The following procedures are agreed:

a. **Handover from Lincs TATCC to 78 Sqn.**

- 1) The RPAS is to be prenoted to 78 Sqn who will issue a 78 Sqn discrete SSR code and pre-brief frequency.
- 2) Lincs TATCC will climb the RPAS to FL190 and initiate the handover in accordance with Ref A, passing FL160.
- 3) As part of the handover, Lincs TATCC will provide 78 Sqn with clearance to operate within DAXX with appropriate level constraints, e.g., “not below FL160”.
- 4) 78 Sqn will verbally confirm “airspace clear” via landline once the RPAS has vacated DAXX

b. **Handover from 78 Sqn to Lincs TATCC**

- 1) The RPAS is to be prenoted to Lincs TATCC who will issue approval to enter DAXX between FL150-190 (or other suitable levels) and issue a discrete SSR code and pre-brief frequency.
- 2) Control of the RPAS will be transferred from 78 Sqn to Lincs TATCC within the confines of DAXX no later than passing FL160 in the descent.

3. This LoA remains in force from the date of signature and is to be reviewed no later than 5 years from signing. Either party may withdraw from the agreement and any time, after first giving notice to the other agency.

[REDACTED]  
Sdn Ldr  
Lincs TATCC Commander  
Royal Air Force Coningsby

[REDACTED]  
Wg Cdr  
Commanding Officer  
78 Sqn

DRAFT

# Annex B – Ref C

File Ref: 20230217-Protector CAS Crossing Procedures

17 Feb 23

## 78 SQN PROCEDURES FOR CROSSING CONTROLLED AIRSPACE WITH PROTECTOR RPAS

### References:

Ref A: Lincs TATCC and 78 Sqn LoA for the handover of Protector within the MDA structure

### Aim

1. This **draft** document outlines arrangements between 78 Sqn and NATS for the facilitation of CAS crossing for Protector RPAS.

### Background

2. During the test and evaluation phase of Protector flying and throughout its progression to IOC, CAS crossings will be required to enable Protector to transit from the Danger Area (SUA) structure above RAF Waddington, to the D323 complex and subsequently return.

### User Requirements

3. The following procedures are to be utilised:

a. **Handover from Lincs TATCC to 78 Sqn.**

1) The procedures for handover from Lincs TATCC to 78 Sqn are outlined in the LoA at Ref A and allow for sufficient time for negotiation between 78 Sqn and NATS controllers for the crossing of CAS.

b. **Crossing CAS**

1) 78 Sqn will negotiate a Cleared Flight Path (CFP) utilising one of the crossing routes detailed at Figure 1; however, should circumstances allow, tactical freedom to cross CAS using the most expeditious and direct routing will be negotiated between 78 Sqn and PC East.

2) Ordinarily, transits should be conducted in level flight between FL200 and FL240 to minimise impact on civil ATC, network operations and Civil Air Traffic (CAT). Tactical coordination can be undertaken between controllers, dependent on the traffic situation, to provide flexibility to the aircraft when the CAT situation dictates.

3)

4) Outbound, the RPAS will remain within the confines of the 'box' portion of the MDA, ensuring that the 3nm CAS buffer is observed and the 78 Sqn controller will request a cleared flight path (CFP) with the relevant civil sectors for the intended routing.

5) Inbound – Once notified by the RPAS operator of the intention to RTB, the 78 Sqn controller will confirm the intended routing with the RPAS operator and arrange a CFP with the relevant civil sectors.

c. **Lost Link Procedures**

1) Following a complete 'lost link' (LL) event, Protector will Squawk 7400 as per the Civ AIP ENR 1.6 and the aircraft will continue iaw its pre-programmed lost link mission, however this is configured, this should reflect the latest ATC clearance. Detailed LL procedures will be confirmed between both operations ahead of implementation and simulated using extant ATC and Protector simulators prior to live flying commencing.

2) Once an RPAS is determined to be operating LL, either via observation of a 7400 Sqn or through other communication means between the RPAS Ground Control Station (GCS) and the controller, the expected RPAS profile should be confirmed via landline.

3) The profile should be relayed to the appropriate civil sector and any other relevant ATM agencies to ensure that the profile can be flown unimpeded and enable both 78 Sqn and NATS controllers to enact any additional deconfliction/coordination.

4)

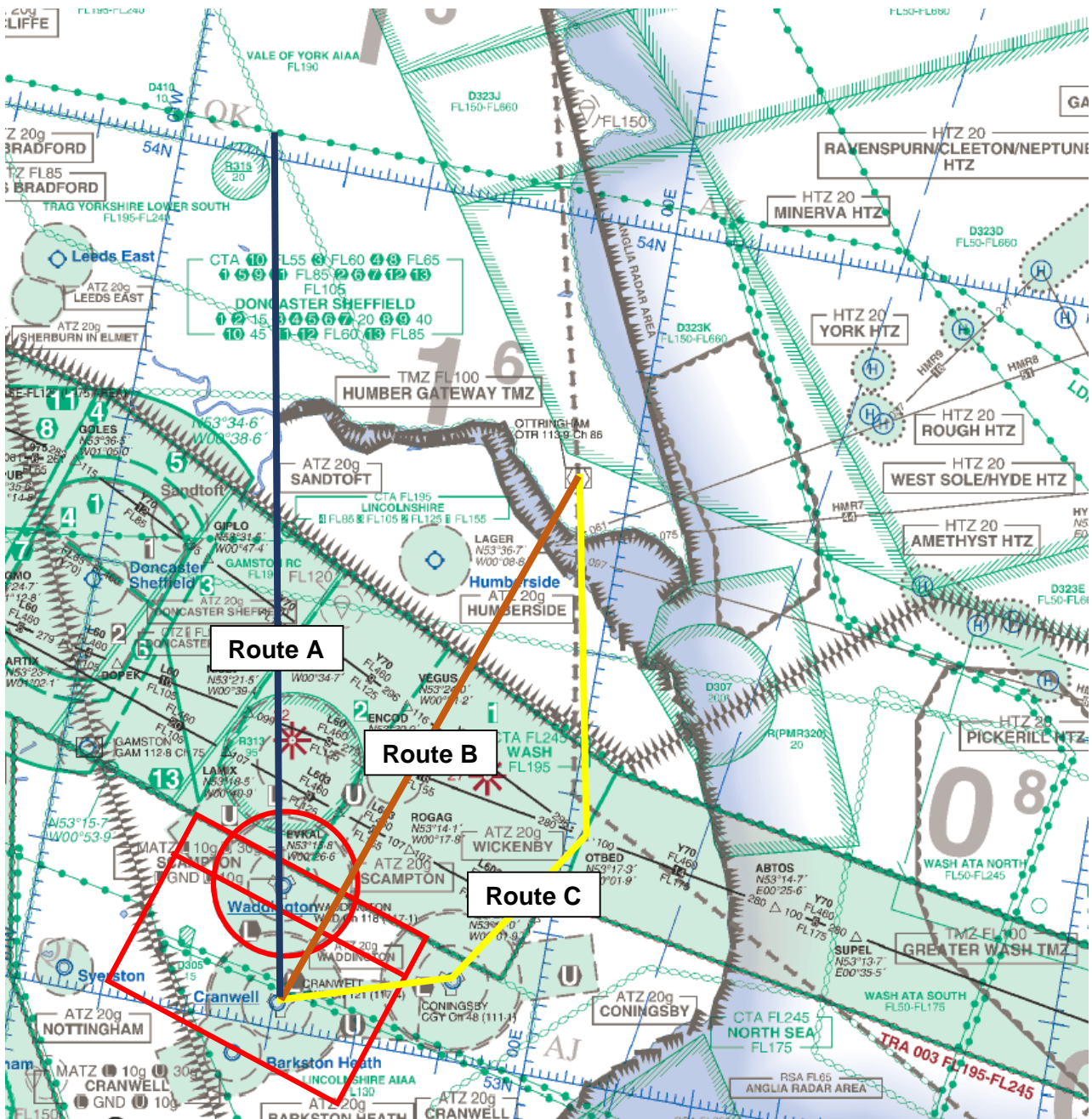


Figure 1

Route A (Dark Blue): CWL-ERKIT-323s

Route B (Orange): CWL-OTR-323s

Route C (Yellow): CWL-CGY-OTBED-OTR-323s

Note: All routes will be flown at or above FL200

# Annex B – Ref D

## Letter of Agreement Between RAF Waddington and Lincolnshire & Nottinghamshire Air Ambulance

### Introduction

1. The purpose of this Letter of Agreement (LoA) is to define the procedures for the use of RAF Waddington (WAD) by the Lincolnshire & Nottinghamshire Air Ambulance (LNAA), following their relocation to new premises adjacent to the A15 on 10 May 2021.

### Background

2. LNAA is a charity providing regional critical care via rotary and road assets; RAF Waddington station is within sufficient proximity to support the LNAA rotary flying activity within **5Nm** of RAF Waddington. During the **established flying window**, WAD provides Air Traffic Services (ATS) and limited material support in extremis to enable LNAA's operation.

### Basing

3. As of 10 May 2021, LNAA shall operate from their Headquarters known as 'Kookaburra' based alongside the A15, North of WAD airfield boundary (53.10.17.2N 000.30.2W). LNAA will provide its own handling, fuel and support.

### Provision of Air Traffic Services (ATS)

4. To ensure safe coordination of activity by both organisations, LNAA agree to comply with the RAF Waddington Defence Aerodrome Manual (DAM). The specifics of this activity are covered at Annex NN, Section B, Order 223.<sup>13</sup>

5. Upon rotors start and prior to take-off from Kookaburra, LNAA **will** notify of their intention to depart on Wad Twr Freq 121.30. Included in this transmission should be the numbers of persons on board, direction of travel, destination and any relevant information. While inside the WAD **MATZ**, LNAA should comply with any imposed restrictions communicated from WAD ATC in order to deconflict from other known aircraft. The LNAA task will be prioritised appropriately.

6. WAD ATS will be provided during published opening hours.

### Meteorological Information and Air Charts

7. During published opening hours, weather information prior to and during flight is available through WAD ATC on request and through ATIS on Tel:01522 727305, in all other respects WAD will offer no support in regards of Meteorological reports and updates. LNAA are advised to seek assistance from the MET Office under their own arrangements.

8. WAD will offer no provision of air charts and mapping. LNAA should seek to source items through their own channels and funding.

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<sup>13</sup> The DAM is available at Reference A and by request from [WAD-Ops-DutyOpsController@mod.gov.uk](mailto:WAD-Ops-DutyOpsController@mod.gov.uk).

9.

### **Contingency Plans**

10. In the event of a failure of LNAA refuelling assets, support from RAF Waddington may be available. LNAA should liaise with WAD Duty Ops Controller (DOC) on Tel: 01522 726532 in advance of undertaking sorties, to confirm availability of a refuelling provision from WAD. This capability will be provided on a 'best effort' basis with no guarantee of provision. Under no circumstances will refuelling vehicles be able to leave the confines of WAD.

11. In the event of Kookaburra HLS becoming unusable for operations, WAD will endeavour to provide an alternate operating area within the airfield boundary to enable LNAA operations to continue. This service will be provided on a 'best effort' basis with no guarantee of provision.

12. LNAA helicopters will not be afforded any air system de-icing whilst at WAD.

### **Fees & Fuel at RAF Waddington**

13. Prior to any use of WAD aerodrome, LNAA are to provide a current Certificate of Insurance detailing indemnity to the Crown iaw the Form of INDEM 3.81/Form 4a. This Certificate will be held on file within RAF Waddington Station Operations for the duration of its validity. LNAA are to provide updated Certificates of Insurance upon each renewal via email to [WAD-Ops-DutyOpsController@mod.gov.uk](mailto:WAD-Ops-DutyOpsController@mod.gov.uk).

14. LNAA helicopters landing at WAD will be waived landing and parking fees in accordance with Reference B, available on <https://www.gov.uk/>.

15. Any invoices for charged services will be forwarded to the address below for payment. Details of how to pay for services will be included in the invoice.

Lincs & Notts Air Ambulance Headquarters  
HEMS Way  
Bracebridge Heath  
Lincoln  
LN4 2GW

16. LNAA may request to conduct Flying Training activities within WAD circuit, these will be considered for approval on a case-by-case basis subject to planned station flying sorties. Requests should be made 24hr PPR.

### **Handling and refuelling at RAF Waddington**

17. The available fuel type at WAD is F-34 FSII (Fuel System Icing Inhibitor). This will be supplied via a fuel bowser with a non-pressurised gravity-fed fuel system.

18. WAD will not provide any ground handling or marshalling for LNAA helicopters. In addition, WAD personnel are not authorised to refuel LNAA helicopters; any refuelling activities must be undertaken by LNAA crews. Requests for fuel should be made through WAD DOC, preferably before landing. WAD will make every attempt to expedite the refuelling

19.



20. process but there may be a delay in the provision of fuel due to WAD operational commitments.

21. In the event of a fuel spill during the refuelling process of a LNAA helicopter, the fuel bowser driver will carry out initial containment measures and escalate the response as required. LNAA crews are requested to ensure the bowser driver is made aware of any fuel spills that may occur during the refuelling process.

22. In the event of LNAA helicopter unserviceability at whilst landing at WAD, the LNAA crew should inform WAD DOC immediately where the necessary coordination will take place to expedite the process of recovering the aircraft. LNAA will be expected to remove any unserviceable aircraft from WAD in a reasonable timeframe.

### Emergency Cover

23. In the event of a crash on or seen from the airfield involving LNAA, RAF Waddington Fire & Rescue Services will only be provided on a 'best effort' basis to help preserve life and maintain survivable conditions for the crew. Response times may be affected by the geographical location of LNAA HQ, other emergencies in progress or to prevent changes to the WAD Crash Category affecting operational capability.

### Application of this LoA

24. LNAA will ensure that the requirements and procedures within this LoA are made known to all crews and staff members.

25. All LNAA staff should ensure they are familiar with the WAD Defence Aerodrome Manual, available at Reference A and by request from [WAD-Ops-DutyOpsController@mod.gov.uk](mailto:WAD-Ops-DutyOpsController@mod.gov.uk)

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

27. WAD retain the right to refuse support at any time and to terminate this agreement with one month's notice.

28. This LoA will be reviewed **five-yearly**, led by WAD AO in consultation with LNAA staff.

### Signatories

██████████  
OC Operations Support Wing  
RAF Waddington  
High Dyke  
Waddington  
LN5 9NB

██████████  
Chief Executive Officer  
Lincolnshire & Nottinghamshire Air  
Ambulance, HEMS Way  
Bracebridge Heath, Lincoln  
LN4 2GW

References:

- A. [WAD Defence Aerodrome Manual](#)
- B. [JSP 360 - Use of Military Aerodromes by Civil Aircraft](#)

DRAFT

# Annex B – Ref E

File Ref: 20230217- Wad Twr BMFA LoA

17 Feb 23

## LETTER OF AGREEMENT (LOA) – PROCEDURES FOR THE FLYING OF MODEL AIRCRAFT WITHIN THE CONFINES OF DAXX

### Aim

4. This LOA formalises arrangements between RAF Waddington and the BMFA for the safe operation of model flying within the confines of DAXX. The aim of this procedure is to safely ensure the maximum flexible use of airspace.

### User Requirements

5. The following procedures are agreed:

- a. No flying is to take place when DAXX is NOTAM'd as active without prior approval from Waddington ATC.  
5.
- b. **PRIOR TO MODEL FLYING.** BMFA members are to ring Waddington ATC on 01522 727451 in order to request permission to fly. They are to provide Waddington ATC with levels, duration and area required and a means of communication.  
6.
- c. **On Completion of Flying.** BMFA members are to contact Waddington ATC on 01522 727451 to notify Waddington ATC they are complete.
- d. Suppression of Model Flying can be requested by WAD ATC on the pre agreed method of communication if safety measures require it.

6. This LoA remains in force from the date of signature and is to be reviewed no later than 5 years from signing. Either party may withdraw from the agreement and any time, after first giving notice to the other agency.

██████████  
Sdn Ldr  
RAF Waddington SATCO  
Royal Air Force Waddington

████████████████████  
BMFA

# Annex B – Ref F

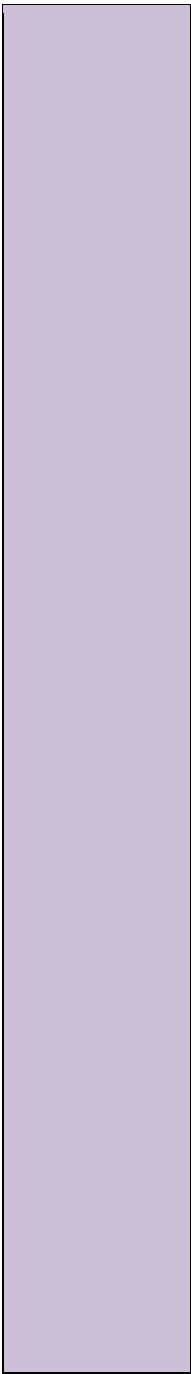
## LINCS TATCC OB – TEMPORARY ORDER 003/23

Lincs  
TATCC OB  
5.12

### Order 512 - CON ATC Instrument recoveries to Rwy 07RH whilst MDA ## active for RAFAT operations.

1. When MDA ## has been NOTAM'd as active, Con Stn Ops will publish a B+## fuel requirement in anticipation for potential delays iaw with paras 2.c-d.
2. The downwind leg of the CON Rwy 07RH standard pattern infringes on the WAD MATZ prior to the base leg turn at 10nm. When MDA ## is active for RAFAT activity, the following procedures are to be followed by CON ATC when recovering ac to Rwy 07RH:
  - a. If Met conditions allow it IAW with Ref A, all ac are to be recovered visually or vectored by CON ATC as either R2V or R2I, remaining outside of the MDA.
  - b. When instrument recoveries are required, CON ATC are to request co-ordination from WAD Radar/ATC. For typh singleton recoveries at 2200ft CON QFE, RAFAT will be asked to operate not below 3500ft WAD QFE. For pairs/ trials typh recoveries at 2700ft CON QFE, RAFAT will be asked to operate not below 4000ft WAD QFE. These agreements will achieve at least 1000ft separation.
  - c. When instrument recoveries are required and tactical coordination between WAD Radar and CON ATC is unachievable, circling approaches are available under the following parameters:
    - (1) The CON visual circuit is to be clear prior to the commencement of a circling approach
    - (2) All circling approaches are to land only
    - (3) Trials approaches are not permitted
    - (4) The procedure minimum for circling approaches is 700ft
    - (5) Circling approaches are prohibited when CWL are operating Rwy 26.
  - d. If the above procedures are unachievable CON ATC are to seek coordination with CWL Radar to facilitate feed-ins from the south, or extended line-ups from the west.

e. TACAN approaches to Rwy07RH are prohibited whilst MDA## is active.



DRAFT

**5.12**  
**References**

A. RAF Coningsby FOB

# Annex B – Ref G

## RAF WADDINGTON STATION OPERATIONS Draft Airspace Booking Procedure

<b>No</b>	TBC/23	<b>Date</b>	XX/03/2023
<b>Valid Fm</b>	WIE	<b>Valid To</b>	TFN
<b>Subject</b>	EG D (X) ACTIVATION		

All,

RAFAT / Protector Ops are to confirm on a Wednesday (Before 15:00L), via email (DOC Multi-user) their airspace requirements for the following week. Upon receiving this information, the DOC/DOS are to submit an activation request for EG D (X) if required.

RAFAT / Protector Ops should then update their slides on the OPG Teams site ready for discussion on a Thursday.

An example of how to correctly submit the activation request for EG D (X) is shown below.

### Activation EG D (X)

**Timeline:** In line with AIC (Airspace Link), EG D (X) will be notified for activation by NOTAM

Email [arops@caa.co.uk](mailto:arops@caa.co.uk) using the following template.

*Activation Request:*

*Activity Number:* TBC

*Date:* INSERT DATE

*Timings:* INSERT START - END TIME (it is important to specify local (L) or UTC (UTC or Z))

*TDA:* EG D (X)

Therefore, if you want to activate the airspace, 10:00 – 11:00 & 13:00 – 14:00 on 18 and 19 Mar 23, the email will read:

*Activation Request:*

*Activity Number:* TBC

*Date:* 18-19 Mar 23

*Timings:*

18<sup>th</sup> 10:00-11:00(L), 13:00-14:00(L)

19<sup>th</sup> 10:00-11:00(L), 13:00-14:00(L)

*TDA:* EG D (X)

Upon receiving confirmation that the NOTAM has been activated from AR Ops, the DOC/DOS should forward any notification / NOTAM number to the requesting Sqn/s.

# Annex B – Ref H

## Order X - Royal Air Force Waddington Protector Start

### General

1. Protector will be arriving at RAF Waddington, Oct 2023. Protector will be towed and started by the Ground Crew on MRE. After engine start the aircrew will then take control of the aircraft and check in on WAD GRD Frequency.

### ADC

2. Protector Ground Crew request start on MRE and are provided with the start approval with the Surface wind and QFE.

3. Protector Aircrew then check in on GRD frequency 342.125 with the correct ATIS code. If the ATIS code is incorrect the aircraft will then be provided with any new/correct information.

4. Protector is then treated the same as any other aircraft from this point with ATC being aware of a requirement for an increased lookout due to reduced visibility on this platform.

DRAFT

# Annex B – Ref I

## Order X - Royal Air Force Waddington Protector Operations

### General

1. Protector will be arriving at RAF Waddington, Oct 2023. A Danger Area (DAxx) will be established whilst Protector is airborne, with a 5nm radius centred around WAD, from the surface up to FL105. Whilst Protector is airborne the DA will remain active as currently WAD is the only location that Protector can land.
2. Protector will take off from WAD and climb within the DA up to FL105 which will take approximately 10 minutes. On passing 3000' WAD ATC will then handover control of Protector to Lincs TATCC. On recovery, Protector will descend within the DA to land at WAD; this will take approximately 10 minutes.

### ADC

3. When Protector calls for start, an information call is to be passed to Lincs TATCC at the earliest opportunity to allow them to establish 'DA HOT'.
4. Protector will operate on QFE in HPa.
5. The circuit and MATZ is to be sterile for all Protector movements. Therefore, a 'Call for Release' will be imposed by RA.
6. A minimum of 3 minutes separation is to exist if departing/arriving after another AS due to wake turbulence limitations.
7. Protector has a max approach speed of 113 KIAS and is classified as CAT B.
8. Protector is equipped with retractable gear, therefore SOP for gear checks apply.
9. Wind limitations. Max crosswind for take-off and landing is 20kts. Max tail wind is 10kts.
10. Protector is not cleared to trample RHAGs, therefore back tracking and amended taxi patterns may be required. However standard RHAG configuration can be maintained during operations in support of diversion commitments. Protector can take off and land with the overrun RHAG up.
11. Expect departure instruction to be "climb to height 3000ft report passing height 1500ft" this is to facilitate the safe separation of the LNAA and minimise the impact on their procedures
12. On recovery, Lincs TATCC will prenote WAD ATC on Protector entering the 'Box'. WAD ATC will then sterilise the visual circuit. Lincs TATCC will descend Protector to not below 3500ft QFE and H/O to WAD ATC. Once two-way with WAD ATC, the phraseology for the descent should be Join RWY\_\_\_, QFE\_\_\_, Circuit State, descend NOT BELOW Height 1500ft".
13. The phraseology for starting the ATLC to land is "Final descent approved, report final gear down". On reporting the gear is down the aircraft is given clearance to land.
14. Helimed and [TBC] have agreed that if Helimed is visual with Protector, then Helimed can continue to operate when Protector is making its final descent or climbing out.

### ACR ASOS

15. When receiving the 'DA HOT' information it is to be annotated in the information box on the weather page of TopSky. This information is also to be passed to Stn Ops.

### RWC

16. SOPs apply.



17. All TRC Controllers are to conduct a 'walk around' of the AS in order to familiarise themselves with the system before the flying phase of the trial commences. These visits should be arranged through the ASOM.

### Other Information

18. Protector will require 1000ft separation from other traffic.

19. Once Protector has vacated the DA and is safely en-route, DA COLD is then updated on TopSky. Remember, the DA remains active by NOTAM until the customer has completed their use for it on the day (RAFAT/Protector).

20. Once established in the DA, a staggered descent can be used to allow sufficient time for DACS/circuit and radar traffic to vacate the DA. Lincs TATCC shall not descend Protector below 3500ft QFE unless authorised by WAD ATC.

21. The Protector TCAS mode is selectable by the remote pilot, but usually it will be in RA mode, which enables automatic execution of RAs. The pilot can override the automatic manoeuvre. If the aircraft goes Lost Link, it will automatically set the TCAS to TA only, so that auto RA manoeuvres are inhibited, but the aircraft will still coordinate with other TCAS-equipped aircraft if a collision avoidance manoeuvre is needed.

22. When Protector has completed the last sortie of the day, inform Stn Ops is 'DA INACTIVE' (as opposed to 'COLD' because the NOTAM is about to be cancelled) COLD'. Lincs TATCC 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.

23. For NOTAM cancellations at the weekend, this should be conducted direct with the [NOTAM office](#) linked here. 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

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

a. Emergency ATC reference cards<sup>14</sup> are located in the VCR, ACR and TRC.

25. 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 Waddington.

### Security

26. In the event of any frequency interference, report immediately to [REDACTED] and include any relevant details, i.e. frequency, channel number, time.

27. CONPLAN 5<sup>15</sup>. In the event of any unauthorised or malicious use of UASs within the RAF Waddington Flight Restriction Zone (FRZ) CONPLAN 5 is to be followed.

### Communications

28. The GCSs will have direct landline communications which can be used to enhance planning and communications with the pilot and other crew during normal operations or in an emergency or loss of RT communications. The incoming phone numbers the GCSs will use to contact ATC [REDACTED].

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<sup>14</sup> SkyGuardian ATC Emergency Reference Cards

<sup>15</sup> [RAF Waddington CONPLAN5](#)

# Annex B – Ref J

## SAFETY ASSESSMENT OF CHANGE RAF WADDINGTON PROTECTOR – 2023/01

<b>Part 1a: Background</b>	
<b>Introduction</b>	<p>RAF Waddington (WAD) has been selected to station MQ-9B Protector, Remote Piloted Aircraft System (RPAS) from Oct 23. With authority from the CAA a Danger Area (DA) will be established whilst Protector is airborne, with a 5nm radius centred around WAD, from the surface up to FL100. This allows Protector to climb and descend safely within a known air environment.</p> <p>Protector can remain airborne for up to 48 hours. Whilst Protector is airborne the DA will remain active as WAD is the only location that Protector will be provided with the segregated airspace required for the ATLC required for safe arrivals/departures. This provides WAD protection for short notice recoveries in the event Protector returns early due to weather or suffers a technical issue.</p> <p>Protector will take off from WAD and climb within a 3nm spiral pattern inside the DA up to FL100 which will take approximately 10 minutes. WAD ATC will handover control of Protector to WAD Radar (Lincs TATCC) on passing 3000'. On recovery, Protector will descend within the DA to land at WAD; this will take approximately 10 minutes. The aircraft will be handed over to WAD ATC from WAD Radar (Lincs TATCC) on passing 3000'.</p> <p>Protector will normally be operating under a Deconfliction Service (DS) and should be treated the same as any other Air System (AS), separation minima remain the same as per CAP 774 and Protector will be treated as IFR.</p>
<b>Assessment Process</b>	<p>The process has involved holding online SQEP panels with surrounding aerodromes and airspace users to identify any potential hazards and to discuss ways of working to reduce the impact and cause as little disruption to the wider aviation community as possible.</p> <p>We will utilise the safety work carried out by SkyGuardian and look for any LFE PTN to further assess.</p> <p>Liaising with all Sqns based at WAD as well as regular airfield users discussing any concerns of operating alongside a RPAS.</p> <p>Bowties and analysis occurred regularly between key pers at WAD and surrounding units to help form this safety assessment.</p> <p>References as link (live): Also attached at the bottom of this doc (not controlled)</p> <p>SkyGuardianUK21 SAoC</p> <p>Protector Procedures SQEP Panel</p>
<b>Key Stakeholders</b>	<p>WAD Aerodrome Operator</p> <p>WAD HoE</p>

	<p>ISTAR Fce DDH (WAD Cdr Air Wing)</p> <p>CON DDH</p> <p>RAFAT DDH</p> <p>3 FTS DDH</p> <p>6 FTS DDH</p> <p>GA DDH equivalent</p>
<b>Pers Conducting Assessment</b>	<p>██████████ (BMFSO)</p> <p>██████████</p> <p>██████████ (Dep BMFSO/ Occ Manager)</p> <p>██████████ (LEMSCO)</p>

**Part 1b: Proposal (for change only)**

<b>Details of Change</b>	<p>To allow Protector to operate in UK airspace the CAA require segregated airspace inside uncontrolled airspace (Class G).</p> <p>The CAA elected for a DA to be established around WAD. This provides a safe, known air environment for Protector to operate within.</p> <p>As this is the first-time a Beyond Visual Line of Sight (BVLOS) RPAS has stationed at a Main Operating Base (MOB) in the UK this SAoC highlights potential hazards when Protector operates on the ground and in the local airspace around WAD.</p> <p>This SAoC will only cover up to IOC for Protector at WAD but can be used to help form other SAoC in the future.</p>
<b>Proposed Date of Introduction</b>	TBC

<b>Part 2.1: BM Hazard Analysis (can be supported by Bow Tie)</b>	
<b>Hazard</b>	Protector operator view limited / no peripheral vision on the ground and ATC line of site restricted
<b>Undesirable Event</b>	Ground collision leading to damage to Protector, operating surface, air system, vehicle, or person
<b>Causal Factor</b>	Shared operating surface. (Protector vs vehicles, pedestrians, air systems, wildlife)
<b>Pre-Existing Preventative Controls</b>	<ul style="list-style-type: none"> <li>• ATC Lookout</li> <li>• RPAS Pilot Lookout (limited)</li> <li>• Red lights at entrance to movement areas</li> <li>• All airfield drivers trained and have AAP</li> <li>• Runway Caravan</li> <li>• AWCU</li> <li>• CCTV</li> <li>• Third party visually detecting an object and calling ATC Emergency Ext 333</li> </ul>
<b>Pre-Existing Recovery Barriers</b>	<ul style="list-style-type: none"> <li>• ATC instructing RPAS to hold position</li> <li>• ARFF</li> <li>• PCM</li> <li>• MCO to manage the media Lines to Take</li> </ul>
<b>Consequence</b>	<ul style="list-style-type: none"> <li>• Near miss between Protector and vehicle, AS, pedestrian or wildlife</li> <li>• Collision between Protector and other AS, vehicle, pedestrian, or object leading to death or injury, damage to object, loss of capability</li> <li>• Reputational damage to General Atomics / RAF, especially being the first time operating in the UK at a MOB</li> </ul>
<b>Worst Credible Consequence</b>	<ul style="list-style-type: none"> <li>• Near miss between Protector and vehicle, AS, pedestrian, wildlife.</li> </ul> <p>8. Pre-existing barriers are sufficient to reduce the likelihood of a collision.</p>
<b>Potential Preventative Controls</b>	<ol style="list-style-type: none"> <li>a. Extra training for all regular airfield users</li> <li>b. Familiarisation of WAD airfield to Protector pilots</li> <li>c. All Sqn pilots briefed by Sqn reps about Protector limited field of view</li> <li>d. Installation of barriers at all entry points of the AOS</li> <li>e. Dedicated access to runway, bypassing normal taxi / vehicle route (QRA Track)</li> <li>f. Improved camera capability / field of vision on Protector</li> </ol>
<b>Potential Additional Recovery Barriers</b>	<ol style="list-style-type: none"> <li>g. Protector Crash TTX</li> </ol>
<b>Barrier Measures for implementation</b>	<ul style="list-style-type: none"> <li>• A – E &amp; G</li> </ul>

<b>Part 2.2: BM Hazard Analysis (can be supported by Bow Tie)</b>	
<b>Hazard</b>	Protector operator unfamiliar with WAD AOS layout
<b>Undesirable Event</b>	<ul style="list-style-type: none"> <li>• Protector Runway / taxiway incursion</li> </ul>
<b>Causal Factor</b>	<ul style="list-style-type: none"> <li>• Protector operator not familiar with WAD airfield layout</li> </ul>
<b>Pre-Existing Preventative Controls</b>	<ul style="list-style-type: none"> <li>• ATC Lookout</li> <li>• Runway Caravan Lookout</li> <li>• Pilot Lookout</li> <li>• HFCT (ATC Pers)</li> <li>• CCTV</li> <li>• Third party detecting and calling ATC Emergency ext 333</li> </ul>
<b>Pre-Existing Recovery Barriers</b>	<ul style="list-style-type: none"> <li>• ATC Lookout</li> <li>• Runway Caravan Lookout</li> <li>• Pilot Lookout</li> <li>• ARFF</li> <li>• PCM</li> </ul>
<b>Consequence</b>	<ul style="list-style-type: none"> <li>• Protector taxi onto runway where an AS has been issued a clearance to use the runway, resulting in a go around / near miss or crash</li> <li>• ATC / Pilot initiated go around after clearance has been given</li> <li>• Protector taxi enters an incorrect taxiway</li> </ul>
<b>Worst Credible Consequence</b>	<ul style="list-style-type: none"> <li>• ATC / Pilot initiated go around after clearance has been given.</li> </ul> <p>9. Due to WAD layout, most likely scenario would be Protector entering the runway at Charlie Holding Point when taxiing to 02 threshold</p>
<b>Potential Preventative Controls</b>	<ol style="list-style-type: none"> <li>ATC aircrew brief</li> <li>Staged integration</li> <li>Regular washups</li> <li>MRE broadcast informing Protector taxiing</li> <li>Info call of Protector location when other AS call for taxi</li> <li>Block off entrance to AOS</li> </ol>
<b>Potential Additional Recovery Barriers</b>	<ul style="list-style-type: none"> <li>• Nil</li> </ul>
<b>Barrier Measures for implementation</b>	<ul style="list-style-type: none"> <li>• A - F</li> </ul>
<b>Part 2.3: BM Hazard Analysis (can be supported by Bow Tie)</b>	

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<b>Hazard</b>	Protector has no equivalent detect and avoid capability
<b>Undesirable Event</b>	<ul style="list-style-type: none"> <li>• MAC / Airprox / near miss / TCAS TA/RA</li> </ul>
<b>Causal Factor</b>	<ul style="list-style-type: none"> <li>• Pilot in the visual circuit unable to visually identify Protector due to its low profile / colour</li> <li>• Pilot losing situational awareness against Protector</li> <li>• Protector not detecting non cooperative traffic</li> <li>• Protector reduced ability to see and avoid using on board cameras</li> </ul>
<b>Pre-Existing Preventative Controls</b>	<ul style="list-style-type: none"> <li>• Pilot lookout</li> <li>• Limited RPAS lookout</li> <li>• ATC Lookout</li> <li>• Runway Caravan Lookout</li> <li>• TCAS</li> <li>• ADS-B</li> <li>• DA protection</li> <li>• Air Traffic Monitor (ATM) in VCR</li> </ul>
<b>Pre-Existing Recovery Barriers</b>	<ul style="list-style-type: none"> <li>• TCAS RA/TA</li> <li>• ATC traffic information / deconfliction advice</li> </ul>
<b>Consequence</b>	<ul style="list-style-type: none"> <li>• AS unable to visually identify Protector at certain angles due to its slim profile and grey colour</li> <li>• AS loses visual ident with Protector when banking</li> <li>• Airprox</li> <li>• MAC</li> </ul>
<b>Worst Credible Consequence</b>	<ul style="list-style-type: none"> <li>• Airprox.</li> </ul> <p>10. Aircraft in visual circuit rely on pilots being visual with each other, if manned AS loses visual ident on unmanned AS, there is a greater chance of an airprox in the visual circuit</p>
<b>Potential Preventative Controls</b>	<ol style="list-style-type: none"> <li>a. Clear Visual CCT during Protector departures / recoveries (below 3000')</li> <li>b. No booking PD's during Protector arrivals/departures</li> <li>c. Segregation by sequencing</li> <li>d. Co-ordinate Station flying with Protector at the weekly OPG.</li> <li>e. Establish DAXX for Protector operations</li> <li>f. Liaise with LNAA to establish a procedure to allow CAT A flights to continue</li> <li>g. No MFTS trainees during Protector departures / recoveries (below 3000')</li> <li>h. Sterilise the MATZ for Protector operations</li> <li>i. Protector broadcast its location IVO WAD visual circuit</li> </ol>

<b>Potential Additional Recovery Barriers</b>	k. Use of the ATM in the VCR to call traffic info if visual ident lost
<b>Barrier Measures for implementation</b>	<ul style="list-style-type: none"> <li>A - I &amp; K</li> </ul>

<b>Part 2.4: BM Hazard Analysis (can be supported by Bow Tie)</b>	
<b>Hazard</b>	WAD runway not available for a Protector recovery
<b>Undesirable Event</b>	<ul style="list-style-type: none"> <li>Protector will have to orbit until at BINGO fuel</li> </ul>
<b>Causal Factor</b>	<ul style="list-style-type: none"> <li>AS crash at WAD, obstructing or damaging the operating surface</li> <li>Weather out of limits for Protector landing</li> </ul>
<b>Pre-Existing Preventative Controls</b>	<ul style="list-style-type: none"> <li>MET Office forecasting</li> <li>Eng support</li> <li>Airfield support elements</li> <li>PCM</li> </ul>
<b>Pre-Existing Recovery Barriers</b>	<ul style="list-style-type: none"> <li>ARFF</li> <li>MCO manage media interaction</li> </ul>
<b>Consequence</b>	<ul style="list-style-type: none"> <li>Protector orbit until WAD RWY is fit for use</li> <li>Protector unable to land at WAD and terminate IAW ACN</li> <li>WAD RWY remains unfit and utilise another area inside the TDA to land safely</li> </ul>
<b>Worst Credible Consequence</b>	<ul style="list-style-type: none"> <li>Protector unable to land at WAD and terminate.</li> </ul> <p>11. WAD RWY unavailable due to incident</p>
<b>Potential Preventative Controls</b>	<ol style="list-style-type: none"> <li>Designate another area to establish a DA</li> <li>Protector carry more fuel reserves</li> <li>Limit Practice Diversions at WAD</li> <li>Ensure equipment readily available at WAD to repair RWY if damaged</li> </ol>

<b>Potential Additional Recovery Barriers</b>	<ol style="list-style-type: none"> <li>Create a procedure to utilise Delta taxiway as alternative landing area in emergencies only</li> <li>Protector fly to another country where it can operate in another countries FIR to land</li> </ol>
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	g. Allow Protector to have a known 'crash site' for when WAD aerodrome isn't available.
<b>Barrier Measures for implementation</b>	<ul style="list-style-type: none"> <li>• D,E</li> <li>• Operator led discussions for B, C &amp; F</li> </ul>

<b>Part 2: BM Hazard Analysis (can be supported by Bow Tie)</b>	
<b>Hazard</b>	<i>This table is to be reproduced for each hazard when required. A Hazard is defined as any condition, event or circumstance that could induce an accident (ESARR 4). For instance, 'controllers' are not a hazard in and of themselves because there is no context; however, 'a controller who makes an error in assessing ac separation' is a hazard, with the separation assessment giving the context.</i>
<b>Undesirable Event</b>	<i>A stage in the incident sequence where the credible outcome will occur, unless an active recovery measure is available and is successfully used. Thus, continuing the example above, the loss of the ability of the ATM system to maintain separation would be an undesirable event that indicates that pre-existing barriers failed.</i>
<b>Causal Factor</b>	<i>A factor which, in isolation or in combination with other causal factors, could result in an undesirable event. Typically, BM related causes tend to occur from within 3 specific areas 'People', 'Procedures/Process' and 'Eqpt'. List all causal factors.</i>
<b>Pre-Existing Preventative Controls</b>	<i>A preventative control is something that prevents a cause from leading to an undesirable event, in effect, it reduces the likelihood of the event occurring. List all pre-existing preventative controls and provide comment on their efficacy.</i>
<b>Pre-Existing Recovery Barriers</b>	<i>A recovery barrier is something that reduces the severity of an undesirable event. List all pre-existing recovery barriers and provide comment where appropriate on their efficacy.</i>
<b>Consequence</b>	<i>Each undesirable event will have a series of credible consequences which range in severity from 'Catastrophic', which has a relatively low likelihood of occurrence, to 'Negligible', which has a higher likelihood of occurrence. List the credible consequences of each undesirable event.</i>
<b>Worst Credible Consequence</b>	<i>State the worst credible consequence and provide a justification for its choice. The rationale should be based on existing quantitative evidence where appropriate and/or available, explaining the incident sequence and which pre-existing barriers and mitigations were breached.</i>
<b>Potential Preventative Controls</b>	<i>When considering mitigation strategies, nothing should be discounted, especially if it initially appears too difficult or too costly to introduce. Costly or difficult to implement strategies should be part of the decision-making process at higher levels. List all potential preventative controls, adding more rows as required.</i>
<b>Potential Additional Recovery Barriers</b>	<i>When considering mitigation strategies, nothing should be discounted, especially if it initially appears too difficult or too costly to introduce. Costly or difficult to implement strategies should be part of the decision-making process at higher levels. List all potential additional recovery barriers, adding more rows as required.</i>
<b>Barrier Measures for implementation</b>	<i>Not all preventative controls and recovery barriers will be feasible; list those that are to be implemented to control the hazard, for example, a, b and e. A rationale for the selection should be included.</i>



<b>Part 3: Action Plan</b>				
<b>Ser No</b>	<b>Actions Required</b>	<b>Action Lead</b>	<b>Due Date</b>	<b>Date Completed</b>
1	Review Current LoA's	DSATCO	Mar 23	
2	Create Protector Aircrew brief	LEMSCO	Sep 23	
3	Create ATC brief on Protector operations	LEMSCO	Sep 23	
4	Create ATC order for RPAS Start/Taxi LNAA RPAS ATLC H/O to Radar	UStanO	Mar 23	
5	Create Protector brief for all Sqns at WAD informing them of hazards and actions on certain events	BM Cap Dev	Sep 23	
6	Create Protector brief to send to sections of all regular AAP holders	UStanO	Sep 23	
7	Create orders for utilising Delta as a secondary landing area	BMFSO	Aug 23	

**PART 4: Key Stakeholders Comments - WAD Aerodrome Operator**

<b>Name/Appt</b>		<b>Date</b>	

**PART 4: Key Stakeholders Comments – WAD HoE**

<b>Name/Appt</b>		<b>Date</b>	

**PART 4: Key Stakeholders Comments - ISTAR Fce DDH**

<b>Name/Appt</b>		<b>Date</b>	

**PART 4: Key Stakeholders Comments – CON DDH**

<b>Name/Appt</b>		<b>Date</b>	

**PART 4: Key Stakeholders Comments – RAFAT DDH**

<b>Name/Appt</b>		<b>Date</b>	

PART 4: Key Stakeholders Comments – 3 FTS DDH			
Name/Appt		Date	
PART 4: Key Stakeholders Comments – 6 FTS DDH			
Name/Appt		Date	

Part 5: BM Unit Cdr Comments			
Name/Appt		Date	

Part 6: Force HQ Comments (only required for an assessment of change)			
Name/Appt		Date	

Part 7: Hazard Owner Statement			
Name/Appt		Date	

Part 8: Review (for change only)			
Name/Appt		Date	

Part 9: Closure			
Name/Appt		Date	

# Annex B – Ref K

03 March 2023

File reference: 20230303-2Gp BM SAofC-02\_23-Protector Operations-DRAFT

## 2Gp BM SAofC 02/23 – Protector Operations

### Introduction

1. Protector operations are expected to commence from RAF Waddington in Q3 2023, subject to joint CAA and MAA approval of the Protector Airspace Change Proposal (ACP). In support of the ACP, 2 Gp BM are required to assess the unique Air Traffic Service (ATS) requirements of Protector when compared to conventional air systems. Where necessary procedure development is then required to facilitate Protector operations throughout both IOC and FOC.

### Background

2. In Mar 22 the MAA released an initial Airspace Integration Position Paper that informed the development of the Protector Programme. Whilst providing guidance on attainment of a Military Type Certificate the paper also provided direction regarding the ATS provision and airspace requirements for Protector operations.

3. Whilst Flight in Non-Segregated Airspace (FINAS) is a key requirement of Protector FOC, the MAA require assurance regarding the capabilities of Protector's Detect and Avoid (DAA) capability. At the current IOC stage this 'level' of AI has not been assessed as suitable for FINAS, resulting in IOC operations being restricted to segregated or controlled airspace. In addition to the airspace restriction there is also a requirement for separation assurance through an ATS that ensures deconfliction from other air systems.

4. The Danger Area (DA) proposed within the ACP and outlined at Annex A is fundamental to IOC Protector operations because of the restriction on FINAS. The DA provides segregated airspace to facilitate the transit of Protector between RAF Waddington and controlled airspace above FL195. Whilst the low-level airspace element will also be utilised for RAFAT operations the medium-level airspace is solely for Protector operations.

### Assessment Model

5. The assessment process consists of an overarching 2 Gp BM Safety Assessment (SA) that considers the ATS requirements across the BM AOR. This is then supported by individual unit level SAs / SQEP panels that consider the impact to unit level procedures and agreements. Whilst the unit level assessments focus on the requirements for each ATS provider independently the overarching BM SA assesses ATS provision to Protector in terms of each operating stage. Linked below are the individual unit level SAs / SQEP panels. The hazards and proposed mitigations from these are then collated within the Combined BM Hazard Analysis at Annex B.

- a. [Waddington ATC SAofC 01/23 – Protector Operations](#)
- b. [Lincs TATCC SQEP Panel – Protector Operations](#)
- c. 78 Sqn CTA Transit Profile Discussion

## Hazard Identification

6. **Stage 1 – DA Establishment and Management.** Waddington Stn Ops will be responsible for DA establishment via MAMC on a D-1 basis, with notification to the aviation community through NOTAM. Due to the temporary nature of the DA there is a hazard that both military and civil aircrew will be unaware of the Waddington DA in the same way they would be aware of permanent airspace restrictions. ([Haz 1a](#)).
7. Whilst the DA's purpose is to facilitate Protector operations, along with RAFAT training, there will be periods of time where the DA is officially active but not in use by either Protector or RAFAT. To allow flexible use of the airspace during these periods a DACS will be offered, however with multiple ATS agencies involved there is potential for confusion in DA ownership between the ATS agencies. ([Haz 1b](#)).
8. **Stage 2 – Ground Operations.** The Protector ground operation consists of a Ground crew managed start followed by a Flight crew managed taxi. Whilst Flight crew can communicate with ATC via radio, Ground crew cannot and therefore require start-up approval to be passed via MRE. This presents an alternative process to conventional AS ground operations as MRE is routinely managed by ASOS pers and not ATCOs. ([Haz 1c](#)).
9. **Stage 3 – Visual Circuit Operations.** In line with the MAA's direction, regarding the requirement for an ATS that ensures deconfliction, Protector will require a sterilised visual circuit during take-off and landing phases. Whilst the DA will provide an element of airspace protection, the airspace is also an active airfield supporting other activities. The possibility of interaction between Protector during take-off / landing and another AS within the Waddington visual circuit therefore presents a hazard ([Haz 3a](#)).
10. **Stage 4 – DA Operations.** Whilst the DA will be established entirely within Class G airspace, the MAA's requirement for an ATS that ensures deconfliction restricts the ATS options to Deconfliction Service (DS) only. Unlike conventional AS that ATCOs are familiar with the performance characteristics of Protector will require additional consideration when providing a DS. ATCOs will be required to issue avoiding actions instructions at a greater range than usual to ensure separation standards are achieved. The change in mindset and AS appreciation that is required by ATCOs therefore presents a hazard ([Haz 4a](#)).
11. Due to its location and surrounding controlled airspace there is a significant level of both civil and military traffic into the DA airspace. Whilst the provision of DS is achievable, the requirement for ATCOs to maintain standard separation of 5nm and 3000ft between Protector and all non-coordinated traffic will present a significant impact on Protector's freedom to manoeuvre through multiple avoiding action (AA) instructions. When combined with the requirement for Protector to remain within the DA structure this further restricts the ability to manoeuvre potentially to point that prevents operations ([Haz 4b](#)). There is currently no regulation or standing practice regarding the provision of DS within a DA. To address the balance between DS provision and operating freedom, a range of ATS provision options are outlined at Annex C.
12. Whilst acknowledging that the DA provides airspace protection, the potential for an unauthorised airspace infringement will always remain. Should this occur and ATCOs are required to provide AA there is a hazard that Protector may exit the DA structure whilst following the AA ([Haz 4c](#)). ATCO responsibilities in the event of exiting the DA are included within the ATS provision options at Annex C.

13. **Stage 5 – Controlled Airspace (CAS) Operations.** Whilst the DA structure will provide Protector with a means of transiting into CAS, upon initial exit from the DA Protector will enter a Temporary Reserved Area (TRA)<sup>16</sup>. The TRA exists between FL195 and FL245 and whilst classified as Class C, ATS provision is iaw UK Flight Information Services (FIS). With TRAs enabling military aircraft to enter and operate autonomously within them, whilst a DS is achievable the airspace doesn't prevent non-cooperative traffic from interacting with Protector ([Haz 5a](#)).

14. Protector is expected to conduct IOC operations within the D323, D513 and D613 MDA structures. To access these there is therefore a requirement to cross both the Wash CTA and North Sea CTA. Recognising the performance characteristics expected of Protector dynamic crossings of CTAs will present a significant challenge for Civil sector ATCOs ([Haz 5b](#)).

15. **Stage 6 – Managed Danger Area (MDA) Operations.** Whilst operating within the MDA structure, Protector will retain a DS iaw MAA direction and BM orders<sup>17</sup>. Operations with co-operating traffic also in receipt of an ATS / Tactical Control will be deconflicted. However, for co-operating traffic operating autonomously there will be no clear deconfliction process available ([Haz 6a](#)).

16. **Stage 7 – Lost Link Procedure.** In the event of a lost link, Protector will initially display the mode 3A code of 7400 before then continuing iaw the last clearance. This expected behaviour will both inform relevant ATS agencies whilst also providing a predictable initial response. On completion of the last clearance i.e., reaching the waypoint, Protector is expected to establish an orbit for a period of time before then recovering along the reciprocal route. Although these procedures still require confirmation as part of the operating manual, all activities during individual lost link profiles will be subject to authorisation from the relevant ATS agencies. With the unknown nature of both Protector and specifically Lost Link procedures there is a potential that both ATCOs, both mil and civ, will make inaccurate presumptions regarding Protectors Lost Link profile ([Haz 7a](#)).

17. **Stage 8 – Diversion Procedure.** At present due to the unique operating characteristics of Protector there are no authorised diversion aerodromes. There is an expectation that Leuchars will become the routine diversion however to achieve this a separate ACP will be required to establish segregated airspace iaw the IOC limitations of Protector. To support this ACP a SAofC will be conducted specific to Leuchars, identifying any specific hazards.

**Sqn Ldr Aaron Cobb**  
**SO2 BM Safety A5**

Annexes:

- A. Combined Low and Medium Level Airspace Designs.
- B. Combined BM Hazard Analysis.
- C. ATS Provision Options.

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<sup>16</sup> [UK Civ AIP ENR 5.1.5](#)

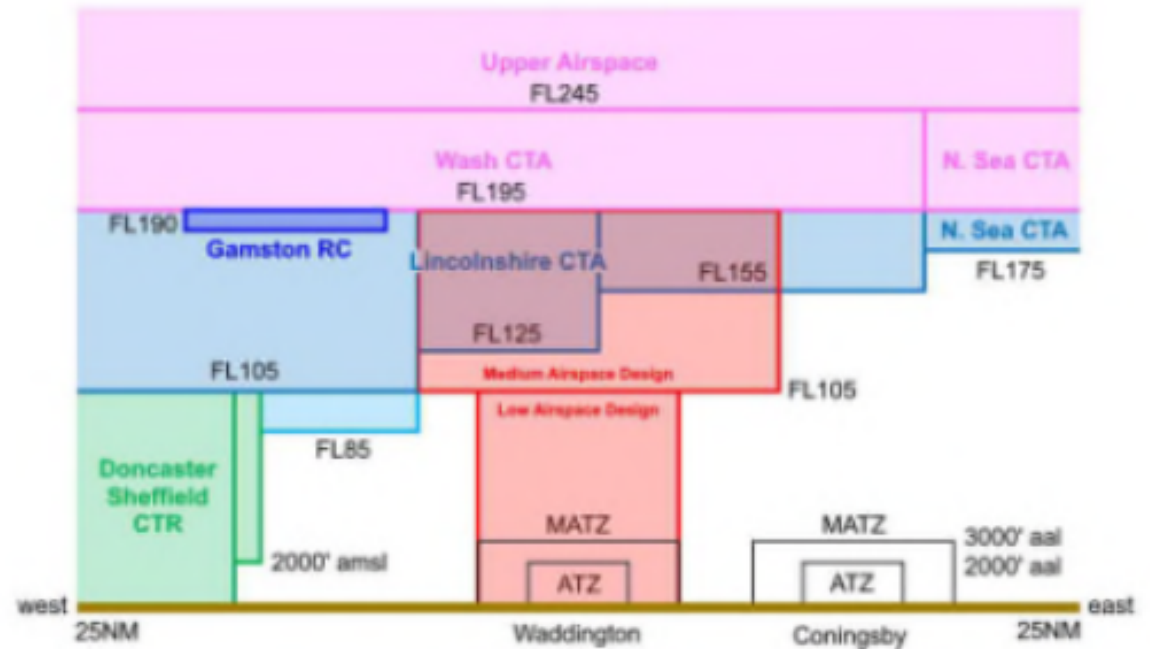
<sup>17</sup> [BM Orders 128](#)

Annex A to

File reference 20230303-2Gp BM SAofC-02\_23-Protector Operations-DRAFT

03 March 2023

Combined Low and Medium Level Airspace Designs



**Low-Level Airspace**

5nm radius circle centred on RAF Waddington's aerodrome reference point (ARP).

Surface to FL105.

Intended for use by both RAFAT and Protector.

**Medium-Level Airspace**

18 x 13nm rectangle aligned to and abutting the southern edge of the Lincs CTA.

FL105 to FL195.

Intended for use by Protector only, enabling transit in/out of controlled airspace.

Annex B to

File reference 20230303-2Gp BM SAofC-02\_23-Protector Operations-DRAFT

03 March 2023

Combined BM Hazard Analysis

<b>Black:</b> BM AOR wide hazards	<b>Red:</b> Waddington specific	<b>Blue:</b> Lincs TATCC specific	<b>Green:</b> 78 Sqn specific
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Hazard	Undesirable event & causal factor	Consequence <i>(Worse credible in bold)</i>	Mitigations
<b>Stage 1) Danger Area Establishment &amp; Management</b>			
<b>1a) Non-awareness of DA by military / civil aircrew.</b>	Unauthorised airspace infringement of the Waddington DA, through non-awareness.	<b>Airprox</b>  Loss of Safe Separation Avoiding Action	AS in receipt of an ATS from Lincs TATCC will be reminded of the DA status dependent on the transit routing.  Protector will be in receipt of a DS throughout, enabling monitoring of the DA and provision of Avoiding Action as required.  Education of the local aviation community through Regional Airspace User Working Groups to increase DA awareness.
<b>1b) Confusion in DA ownership between ATS agencies when providing a DACS.</b>	DACS provided by an ATS agency whilst not the DA airspace owner.	<b>Loss of Safe Separation</b>  Avoiding Action Restriction of Waddington Circuit activity	Establishment of clear DA Airspace ownership procedures between the multiple ATS agencies.

Stage 2) Ground Operations			
<b>2a) Start Clearance passed through MRE to ASOS rather than ATCO.</b>	ASOS unaware of Protector start operation and fails to follow the correct procedure.	<b>Protector authorised for start without the required airfield support</b>  Protector start delayed	Protector start-up procedure to be clearly outlined in Waddington Local Order with both ASOS and ATCOs trained accordingly.
<b>2b) Restricted operator view during taxi</b>	Ground collision due to both ATC line of sight restricted and restricted operator view	<b>Ground collision</b>  Ground near miss	Review of and amendment to Airfield Access orders that ensures suitability and awareness of Protector taxi routes for all airfield users.
Hazard	Undesirable event & causal factor	Consequence <i>(Worse credible in bold)</i>	Mitigations
Stage 3) Visual Circuit Operations			
<b>3a) Interaction between Protector and AS during take-off and landing phases.</b>	Protector is authorised to commence the take-off / landing phases whilst the ATZ/MATZ is active with either cooperative or non-cooperative AS.	<b>Loss of Safe Separation</b>  Avoiding Action  Cancellation of take-off/landing approval.	Establishment of clear visual circuit sterilisation procedures at RAF Waddington, that are instigated by Waddington ATC prior to authorising Protector to commence take-off/landing phases.  Call for Release requirement introduced on all Protector take-off authorisations to ensure sterilisation of the DA, ATZ & MATZ.
Stage 4) Danger Area (DA) Operations			



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<p><b>4a) Appreciation of Protector performance characteristics.</b></p>	<p>ATCOs fail to appreciate the unique performance characteristics when providing an ATS.</p>	<p><b>Loss of Safe Separation</b></p> <p>Late Avoiding Action</p>	<p>Creation of synthetic packages for ATCOs, that provide awareness of Protectors performance characteristics and what level of anticipation is required to provide a DS.</p>
<p><b>4b) Provision of DS within a high traffic area.</b></p>	<p>Protector's freedom to manoeuvre is significantly restricted due to the standard separation requirements of DS.</p>	<p><b>Cancellation of sortie</b></p> <p>Elements of sortie not completed</p>	<p>To address the balance between DS provision and freedom to manoeuvre a range of ATS provision options are outlined at Annex C.</p>
<p><b>4c) Protector exits the DA.</b></p>	<p>Protector exits the DA whilst following an AA.</p>	<p><b>Operation in Class G without MAA approval</b></p>	
<p><b>4d) Local Airspace Users</b></p>	<p>Interaction between Protector and a Local Airspace user, previously authorised to operate within the DA.</p>	<p><b>Airprox</b></p> <p>Loss of Safe Separation</p>	<p>Review and amendment of LoAs between Lincs TATCC / Waddington and Local Airspace users to ensure awareness of Protector operations and DA restrictions.</p>
<p><b>4e) Handover between Lincs TATCC and 78 Sqn</b></p>	<p>Handover conducted without associated control of airspace, reducing airspace protection.</p>	<p><b>Loss of Safe Separation</b></p> <p>DA Infringement</p>	<p>Establishment of a clear LOA between Lincs TATCC and 78 Sqn that addresses AS handover alongside airspace authority transfer.</p>
<p><b>4f) Adjacent unit departure and approach profiles</b></p>	<p>DA infringement due to an adjacent unit departure / recovery profile.</p>	<p><b>Loss of Safe Separation</b></p> <p>DA Infringement</p>	<p>Amendment of the CWL MID1C departure and CON RW07 Ext feed to ensure DA deconfliction.</p>

Hazard	Undesirable event & causal factor	Consequence <i>(Worse credible in bold)</i>	Mitigations
<b>Stage 5) Controlled Airspace (CAS) Operations</b>			
<b>5a) Autonomous operations within the TRA.</b>	Interaction between Protector and non-cooperative autonomous AS operating within the TRA.	<b>Airprox</b>  Loss of Safe Separation	Removal of the ability for military AS to enter and operate autonomously within the TRA structure.
<b>5b) Dynamic crossing of CTAs.</b>	Dynamic CTA crossing of Protector results in Civil sector ATCOs having to delay / amend GAT routings.	<b>Avoiding Action</b>  Defensive control instruction Delay to GAT routing	Restriction on dynamic crossing for Protector. All CTA crossings to be conducted iaw an electronic / verbal Cleared Flight Paths utilising designated crossing routes agreed with relevant civil sectors.
<b>Stage 6) Managed Danger Area (MDA) Operations</b>			
<b>6a) Operations with co-operating autonomous traffic.</b>	No active deconfliction because of traffic not being in receipt of an ATS / Tactical control.	<b>Airprox</b>  Loss of Safe Separation	For operations with autonomous but co-operating traffic airspace segregation should be formally established as part of the MAMC airspace allocation plan.
<b>Stage 7) Lost Link Procedure</b>			
<b>7a) Incorrect presumptions of Lost Link profile.</b>	Mil / Civ ATCO incorrectly presume the Lost Link profile of Protector, through a lack of awareness.	<b>Loss of Safe Separation</b>  Incorrect avoiding action  Incorrect defensive control	Creation of a BM order that advises military ATCOs regarding the Lost Link profile of Protector and what to expect. This would then be included in the NATS / Mil LOA to ensure civil ATCO awareness.
<b>Stage 8) Diversion Procedure</b>			

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<b>8a) Lack of diversion with unavailability of Waddington runway.</b>	Protector has no diversion aerodrome and Waddington runway is declared black.	<b>Loss of Protector AS</b>	Development of emergency procedures at Waddington that enable taxiway Delta to be utilised for landing.
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## Annex C to

File reference 20230303-2Gp BM SAofC-02\_23-Protector Operations-DRAFT

03 March 2023

## ATS Provision Proposal

### Background

1. **Separation Standards.** Under a DS iaw CAP 774<sup>1</sup>, ATCOs are required to ensure deconfliction minima against uncoordinated traffic of 5NM laterally or 3000ft vertically. RA 3228<sup>2</sup> then enables military ATCOs to apply reduced separation of 3NM laterally or 500ft vertically, providing a range of requirements are met. The application of reduced vertical separation to civil AS should be exceptional rather than routine, and there is standing practice of ensuring 1000ft vertical separation between manned and unmanned AS. Therefore, reduced vertical separation will not be applied to Protector during the IOC phase.
2. The separation standards outlined above are based upon interactions between AS operating in airspace of the same classification. When operating within CAS, RA 3238<sup>3</sup> enables ATCOs to deem separation to exist between the AS under control and AS operating outside of CAS subject to a range of criteria. However, when operating with DAs there is no equivalent regulation regarding deeming conventions.
3. Most traffic transiting ivo Waddington will request an ATS from Waddington LARS. Whilst military traffic is generally mandated to be in receipt of a TS / DS which requires identification, civil traffic will routinely only request a BS and therefore there is no requirement for identification. Without identification of traffic, ATCOs are unable to apply reduced separation through standing agreement co-ordination and subsequently need to either ensure standard separation or verbally co-ordinate individual AS.

### CoA Proposals

4. To address the balance between DS provision iaw above and freedom to manoeuvre for Protector, a range of ATS provision options are outlined below with comparison provided in Appendix 1. Subject to the ACP approval, these will then be presented to the MAA for agreement before presentation to Protector DDH.
5. **CoA 1) Standard DS.** Protector is provided with a standard DS iaw CAP 774 ensuring 5NM and 3000ft separation throughout, irrespective of the airspace protection provided by the DA. With the DA radius being 5NM, for non-cooperating traffic transiting at the DA edge this would result in Protector's operating area being restricted by half until the traffic had passed. Reduced lateral separation of 3NM could be applied against identified traffic in receipt of an ATS however this would require all BS LARS transits to be identified which would increase controller workload at the Lincs TATCC significantly.
6. **CoA 2) DS with Deeming.** Protector is provided with a DS iaw CAP 774 .
7. **CoA 3) Airspace Deeming.**

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<sup>1</sup> [CAP 774 - UK Flight Information Services](#)

<sup>2</sup> [RA 3228 – Separation Standards](#)

<sup>3</sup> [RA 3238 – Controlled Airspace Deeming Conventions](#)

Appendix 1 to

Annex C to

File reference 20230303-2Gp BM SAofC-02\_23-Protector Operations-DRAFT

03 March 2023

**ATS Provision Proposal Comparisons**


# Annex C

## RAFAT AIRSPACE REQUIREMENTS, INTENT AND PLANS dated 24 Feb 23

### **Background.**

The Royal Air Force Aerobatic Team, officially known as RAFAT but more commonly referred to as The Red Arrows, perform high energy, highly dynamic low-level aerobatic displays in formations of up to 9 aircraft. They display in front of UK audiences during the summer and regularly deploy overseas as a key element of UK 'soft power' to promote UK interests worldwide. They are a British national asset, not just an RAF capability.

### **RAFAT Annual Training Programme.**

RAFAT training in the UK has hitherto taken place from late September to late March using protected airspace over the Team's home-base at RAF Scampton. This airspace volume has a 5nm radius, extends from the surface up to 9300ft AGL and is designated as EG R313. While training in the UK, there are normally 6 x 30-minute daily training slots (Monday-Friday), to allow 3 x slots for the main section and 3 x slots for the Synchro Pair. In early March the Team will put the different formation elements together and start their 9-ship training, with a requirement for only 3 x 30-minute daily training slots. The Team then depart the UK to perfect their display routine abroad, typically in eastern Europe where they take advantage of better weather. Following the Team's return to the UK in late May having achieved Public Display Authority, the UK Display Season typically provides the currency the Team need to keep their routine honed and thus practice display flying is infrequent during the summer months. Occasional in-season practices are however required for currency.

### **Airspace.**

Having protected airspace is deemed essential for the safety of the Team pilots and other airspace users to mitigate Loss of Safe Separation and Mid-Air Collision. When display flying, the Team generally fly at 360kts, from 100ft AGL up to approximately 8000ft AGL when the weather allows a vertical display routine. These flight profiles make reaction times slow, and it can be cumbersome to manoeuvre the formation reactively in response to a traffic sighting or alert. As all pilots take their formation references from the Team Leader, there are very few pairs of eyes looking out for other traffic and the Team rely on a radar service for early warning of intruders.

### **Future of RAF Scampton.**

Following the RAF's decision to sell RAF Scampton, the Team relocated to RAF Waddington in late 2022. There is considerable uncertainty about what will happen to RAF Scampton after it is sold by the MoD. Whatever the land area is used for in the future (and who owns it) will determine whether EG R313 remains useable by RAFAT for their display training. Therefore the RAF has had to examine alternative locations and airspace volumes for RAFAT practice flying.

The RAF's intent has been, and remains, to use EG R313 for as long as it is available and safe to do so. If and when it becomes clear that the airspace is not viable, alternative locations will have to be used by RAFAT to train and practice their display; one of the RAF's highest-profile operational outputs. This planning can be broken down into 3 broad options depending on what happens to RAF Scampton. These are outlined below:

**Option 1.** Continue to use EG R313 as the primary display practice location, but complete occasional 30-minute practice slots over RAF Waddington using the ACP-2019-018 airspace volume. This would allow the Team's supervisory chain to have regular opportunities to watch the training, which is harder to achieve when the Team practice entirely at a different location. It would also allow the Team's important charitable and corporate engagement programme to continue without the complications of having to transport people to/from Scampton. This option would also allow the local community to gain exposure to the Team's display activity and help RAFAT embed into RAF Waddington. This option will only see infrequent RAFAT flying over RAF Waddington utilising protected airspace proposed under this ACP, probably no more than 3-4 sorties per week during the peak corporate visit programme which normally runs from

January to March. Such activity will be limited to the minimum required and will be almost completely restricted to the winter training months before the Team deploy abroad in late March/early April each year. Such limited training will also provide vital information about the suitability of the site, should a different option be required.

**Option 2.** This option caters for a scenario where EG R313 becomes non-viable for RAFAT use in the near future. This is a realistic possibility. Should this occur, the Team will be forced to enact a contingency plan that has been developed to ensure they can continue training. This would see far greater use of RAF Waddington and the ACP-2019-018 airspace for Team training. RAFAT are currently assessing the suitability of RAF Waddington as a practice display location, including live use of the site using RA(T)s to gather data. Collected evidence and table-top assessment will lead to the production of a detailed risk assessment for sign-off by the Aviation Duty Holder and the Head of Establishment. If approved in full, RAFAT will be able to use RAF Waddington for all their training requirements.

**Option 3.**

RAFAT also currently have a TDA in place at RAF Syerston for evaluation as a Synchro Pair training site if RAF Waddington is not deemed suitable for all elements of their flying. In this event, the intent would be to use the TDA evidence to support a full ACP to establish airspace for the Synchro Pair to use RAF Syerston for approximately 3 months every winter, with main formation flying taking place at RAF Waddington. If the risk assessment concludes that RAF Waddington could be used for the Synchro Pair as well, then RAF Syerston will not be considered further.

**Downselecting Options and Making Compensating Reductions.**

The closure of RAF Scampton has required a reassessment of where RAFAT should train in the UK over the winter period. There are a great number of factors to consider for each location; ultimately the operating risk associated with each must be minimised as much as possible while still enabling maintenance of the operational output. The current interest in 3 different sites might give the impression of the RAF 'hedging its bets'; this is not the case. Because of the high-technical merit flying that RAFAT perform, very careful consideration must be given to each site in advance of it being chosen, including live-flying trials which themselves require protected airspace volumes. The continued uncertainty surrounding Scampton and EG R313 is also making future planning more challenging.

Once the best option is chosen (or events dictate which option we have to use), the RAF fully understand that airspace volumes which are no longer required may have to be discarded and removed. The RAF also understands the operational impact to other airspace users of simultaneous activation of large volumes of segregated airspace in close proximity; we would put protocols or mechanisms in place to reduce or avoid such simultaneous activations.

**Conclusion.**

Uncertainty surrounding the future of the Scampton site post-sale is making planning future RAFAT training operations challenging. What is clear is that RAFAT will require a large volume of protected airspace to mitigate the MAC risk while they train and in turn to preserve a safe operating environment for all airspace users. The RAF is assessing a number of sites for their suitability as RAFAT training locations should EG R313 become non-viable. Once an option is selected, the RAF understands that airspace volumes not planned for use will need to be removed in order to minimise impact on other airspace users.

## RAFAT DISPLAY SAFETY ASSURANCE

**Background.** RAFAT display activity is governed by both military and civil regulations: Military Aviation Authority Regulatory Article 2335 (MAA RA 2335) and Civil Air Authority Civilian Air Publication 403 (CAP403). Whilst the applicability of the regulations can differ for some display activity (RA 2335 over MOD Property, CAP 403 over Non-MOD Property) the most restrictive of the regulations will be applied.

**Assurance Activity.** Display activity, including practice displays, will only be conducted within the bounds of an (MAA or CAA as required) approved display area and remains subject to the same rigorous levels of supervision, coordination, and control, of a full public display. The approval of a display area and profile considers the proximity of congested areas and the risk to 3rd parties. In addition, each practice is subject to authorisation and supervision by the Flying Display Supervisor who holds an accredited Flying Display Director qualification. All display activity overhead RAF Waddington will be monitored by Air Traffic Control and the Flying Display Supervisor who maintains direct radio communications to the participating aircraft. All displays (including practice) are video recorded to support rigorous debrief. The first and highest priority of any debrief is always any safety elements.

**Conclusion.** RAFAT display flying, as with all military flying, is risk managed to levels that are 'As Low as Reasonably Practicable' and 'Tolerable'. Any activity that does not meet these criteria shall be ceased immediately until appropriate mitigation can be applied to assure continued safe conduct.