Snowdonia Aerospace Airspace Change Proposal
Revised Design (Stage 4A), ACP-2019-58
Llanbedr Danger Area (DA)

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Document Details

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Second reviewer and release authorisation		Chief Executive

Issue	Amendment Details	Date
1.0	First formal release	8th February 2021
1.1	Minor update to ensure numerical consistency with the Stage 3D version 2 update with regard response categorisation	7th April 2021

Executive Summary

This report documents the Revised Airspace Design as part of the "Stage 4A Update Design" element of the Snowdonia Aerospace LLP submission for an Airspace Change Proposal, Reference: ACP-2019-58, Llanbedr Danger Area (DA), under the Civil Aviation Authority (CAA) CAP1616 Airspace Change Process.

Snowdonia Aerospace LLP is continuing to progress and further develop a number of complementary business opportunities at Llanbedr Aerodrome relating to aerospace Research, Development, Test and Evaluation (RDT&E) and military aircraft training. To support these operations (and others) action is required to upgrade and formalise the current airspace around the Aerodrome as the present provision is insufficient to meet the identified future need and risks restricting opportunities that are in the strategic economic interest of the UK and Welsh governments and required to sustain long term employment in the region. Snowdonia Aerospace LLP (hereafter also referred to as the Change Sponsor) is therefore developing two Airspace Change Proposals (ACPs) to underpin these activities:

- ACP-2019-58, Llanbedr Danger Area (DA), which can be accessed online via: https://airspacechange.caa.co.uk/PublicProposalArea?pID=193
- ACP-2020-02, Llanbedr Aerodrome Traffic Zone (ATZ), which can be accessed online via: https://airspacechange.caa.co.uk/PublicProposalArea?pID=211

The two Proposals are independent of each other and are being progressed separately.

The ACP-2020-02, which is specific to supporting ongoing and future military aircraft training, has presently been Paused and is NOT part of this forthcoming consultation. An opportunity to participate in the ongoing consultation of this ACP will follow at some stage in the future.

The basis of this document is specific to ACP-2019-58, which is solely in support of the RDT&E opportunities (and not related to military aircraft training), with a view to creating a permanent Danger Area that will enable Llanbedr Aerodrome to increase support to the RDT&E for next-generation UK aerospace - *e.g.* drones (particularly non-military "drones for good"), electric aircraft, urban/regional air mobility vehicles, balloons, airships, near-space testing *etc*.

The CAA Civil Aviation Publication CAP1616 defines a six-stage process through to implementation of a permanent airspace change, some of which have more than one step. Snowdonia Aerospace (SAC) has successfully completed the Stage 1 (Define) and Stage 2 (Develop and Assess) Gateways and all the supporting documentation can be found on the CAA Airspace Change Portal[1]. At this point the CAA determined that ACP-2019-58 was confirmed as a Level 1 change. SAC also successfully passed the Stage 3B (Consult) Gateway prior to launching a public consultation that ran from Monday 7th December 2020 through to Friday 22nd January 2021. A review of the consultation and a categorisation of the responses was reported at Stage 3D and the follow-on requirements for Stage 4A, Update Design, are as follows:

1. update the design of the airspace change in the light of the information received in the consultation responses.
2. update the Options Appraisal to the Final version (Phase III), using the same approach as the Phase II analysis conducted at Stage 3A, if this is needed in order to take account of any revised impacts of any new design features proposed.

This document addresses the requirement for (1), the Revised Design. Section 2 summarises the initial Stage 1 to 3 activities, including design principles development, design options development, airspace utilisation estimates and the feedback received during the public consultation. Section 3 then details the Revised Design that takes account of the feedback.

[1] Ref: https://airspacechange.caa.co.uk/PublicProposalArea?pID=193

As per the original design options promulgated at Stage 2, the revised design (Figure 1) combines a segregated area for RDT&E activities local to Llanbedr Aerodrome and a corridor connecting that area to the existing D201 Cardigan Bay Danger Area. The shape of the DA has been designed to reflect representations made during the consultation process and to be easy to interpret and implement. The size is designed to accommodate a range of different novel aerospace systems.

The design changes from Stage 2 to Stage 4 are:

A simplification of the sub-divisions for Areas E and F to provide easier assimilation and a clearer north-south transit corridor transit for General Aviation away from the higher ground.

A lengthening of Area D from 4 nautical miles to 5 nautical miles to provide a larger buffer between the Llanbedr DA and the existing D201 and reduce any funnelling effect for military aircraft transiting to the west between both Danger Areas.

Further clarification on the airspace management and air traffic management principles that will be applied to post-implementation operation of the Danger Area have also been set out in the main body of this Report.

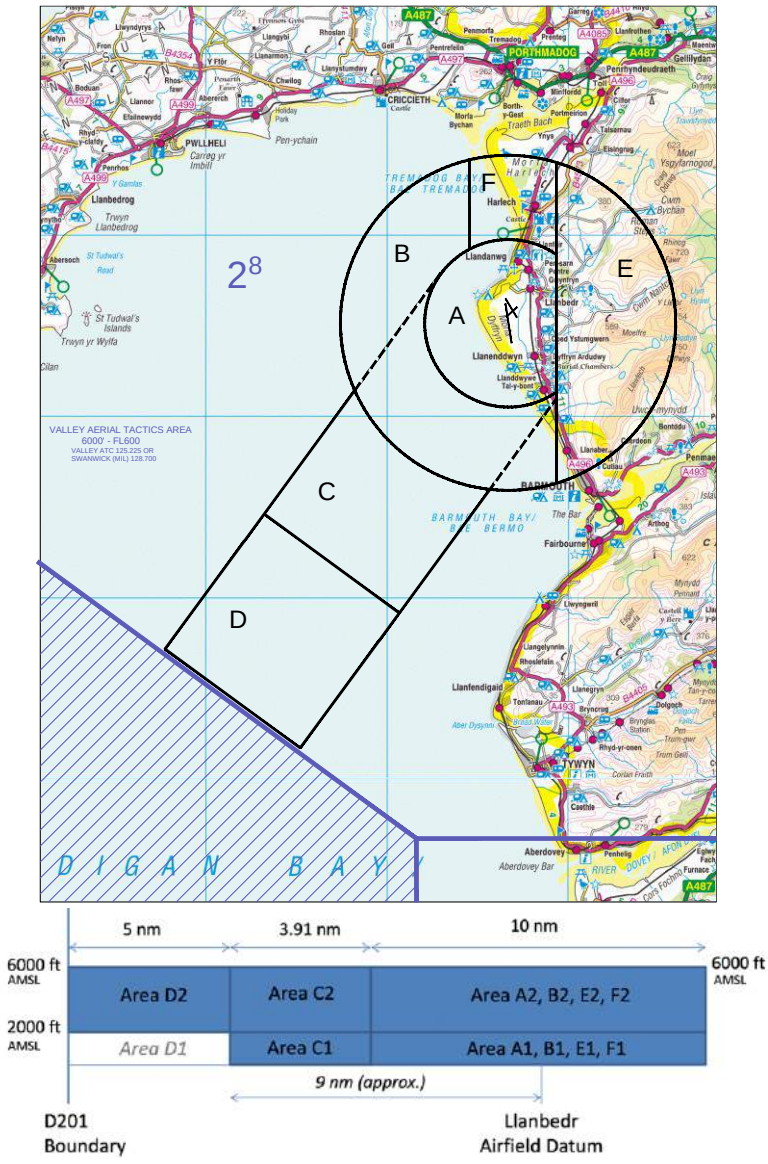

Fig. 1 *- Final Airspace Design (Option #2b) for ACP-2019-58, Llanbedr Danger Area, incorporating the revisions suggested from the consultation*

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1. Introduction

1.1. Background

Llanbedr Aerodrome (EGFD), Gwynedd (Figures 2a-2d), is sited on a coastal promontory at the northerly end of Cardigan Bay[2] with bi-directional over-water approaches to the 2000m+ main runway (17/35), which is at an elevation of 8m above mean sea level. There are two additional cross runways 05/23 and 15/33. Under upcoming aerodrome licensing proposals it is currently intended the runways will be 2,188m, 1,199 and 799m respectively. The local geography is predominantly coastal lowland and farmland within Snowdonia National Park that is bounded to the east by the Rhinog mountains, which rise to 756m at a distance of 9500m (approx.) from the main runway. The village of Llanbedr (population 645, 2011 census) is 2000m (approx.) to the north-east of the northern threshold and there's also a transitory population during summer months at the Shell Island campsite (approx. 1000m to the north-west of the main runway northern threshold) and the Dyffryn caravan park (approx. 500m to the south of the main runway southern threshold). The overall population density is consistent with that for Gwynedd as a whole - *i.e.* <50 people per square km[3,4].

Fig. 2a *- aerial view looking west*

Fig. 2b *- aerial view looking east*

Fig. 2c *- aerial view looking north*

Fig. 2d *- aerial view looking south*

Llanbedr Airfield has a long history and established use for the research, development, test and evaluation (RDT&E) flying activities, particularly associated with the use of target drones, and also as a secondary/tertiary operating site for RAF Valley (EGOV, approx. 58km north/north-west). An Aerodrome Traffic Zone (ATZ)[5] and the original Danger Area D202 supported these activities prior to QinetiQ/MOD vacating the site in 2004, along with extant Danger Area D201, the closest edge of which is 25km (approx.) south-west of Llanbedr[6].

[2] View on Google Maps
[3] Ref: National Statistics Wales, June 2018
[4] Ref: Annual Lower Super Output Area (LSOA) Population Estimates, 2018
[5] Aerodrome Traffic Zone (ATZ) as detailed in Article 5 of the Air Navigation Order, 2016, Ref: Air Navigation Order, 2016
[6] Ref: https://www.aurora.nats.co.uk/htmlAIP/Publications/2018-08-02/html/eAIC/EG-eAIC-2018-087-Y-en-GB.html

The airfield currently supports an increasing mix of small (<20kg) and light (<150kg) drone RDT&E and General Aviation (GA) operations together with visiting military aircraft (fixed wing and rotary) and others including the search and rescue (SAR) helicopter from Caernarfon (EGCK, approx. 35km north/north-west), Police helicopter and Air Ambulance. The airspace is currently Class G. A local Flight Information Service (FIS) has been provided to support day-to-day operations and a Temporary Danger Area (TDA) has previously been consulted on and implemented as and when required, either as a whole or in part, to support RDT&E activities and provide a safe corridor to D201. There are GA aircraft operations most flyable days with an average of 100 to 200 movements per month. The airfield has also been designated as one of the candidate sites for a UK Spaceport by the Department for Transport (DFT) and Snowdonia Aerospace LLP has recently received a grant award from the UK Space Agency to generate a Horizontal Spaceport Development Master Plan.

1.2. Opportunity to be addressed and Statement of Need

Snowdonia Aerospace LLP is continuing to progress and further develop a number of complementary business opportunities at Llanbedr Aerodrome relating to aerospace RDT&E and military aircraft training. To support these operations (and others) action is required to upgrade and formalise the current airspace around the Aerodrome as the present provision is insufficient to meet the identified future need and risks restricting opportunities that are in the strategic economic interest of the UK and Welsh governments and required to sustain long term employment in the region. Snowdonia Aerospace LLP (hereafter also referred to as the Change Sponsor) is therefore developing two Airspace Change Proposals (ACPs) to underpin these activities:

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The two Proposals are independent of each other and are being progressed separately. The ACP-2020-02, which is specific to supporting ongoing and future military aircraft training, has presently been Paused and has NOT been part of this consultation. An opportunity to participate in the ongoing consultation of this ACP will follow at some stage in the future. This consultation and the basis of this document and the Strategy now being proposed is specific to the ACP-2019-58 which is solely in support of the RDT&E opportunities (and not related to military aircraft training), with a view to creating a permanent Danger Area that will enable Llanbedr Aerodrome to increase support to the RDT&E for next-generation UK aerospace - *e.g.* drones (particularly non-military drones for good), electric aircraft, urban/regional air mobility vehicles, balloons, airships, near-space testing *etc*. The Statement of Need for the application is declared as follows:

- *To provide an environment for safe operation of all ongoing aerospace-related Research, Development, Test and Evaluation (RDT&E) activities in the vicinity of Llanbedr Airfield (EGFD) and the ability for associated aircraft to transit safely to/from Danger Area D201 to undertake extended range/endurance/altitude testing (in accordance with extant D201 procedures) without concern for other air traffic.*

The proposal explicitly supports the Airspace Modernisation Strategy (CAP1711) by creating a permanent test zone in which to explore the airspace integration issues associated with new airspace users such as drones that are currently identified as “unknowns” in Chapter 5 of CAP1711.

1.3. The cause of the opportunity and associated factors or requirements

The preface to the UK Government Aerospace Industrial Strategy, 2018, states that:

- *‘Environmentally-friendly aircraft will increasingly incorporate electric technologies, and we anticipate more aircraft operating autonomously in the future. New markets for drones and Urban Air Mobility vehicles will be developed. We want the UK to be at the cutting edge of these exciting developments much as we were when Sir Frank Whittle developed the world’s first jet engine’.*

Llanbedr has long been a UK national asset for aerospace RDT&E and there has been increased demand in recent years given its ideal location for Beyond Visual Line-of-Sight (BVLOS) drone testing. These activities have been satisfied to date by use of a Temporary Danger Area, but both customer demand and the need for confidence and reliance are now such that an application for a Permanent Airspace Change is warranted. The combination of safety, operational, technical and environmental factors already pertaining to low volume RDT&E activities is not expected to change.

Moving to a permanent Danger Area will allow an increase in throughput to satisfy the market need and provide UK businesses in these sectors with a surety of being able to operate in the UK on a reactive basis. Many UK businesses have chosen to undertake their testing abroad due to the uncertainties around availability of adequate and appropriate commercial trials environments. Figures 3a – 3f below gives an indication of some of the wide variety of novel aerospace systems and applications that have previously been tested at Llanbedr Aerodrome and which would benefit from a permanent Danger Area to help accelerate development and commercial exploitation.

***Fig. 3a** – Penguin B used to explore the potential for aeromedical delivery drones*

***Fig. 3b** – Vertical Aerospace electric Urban Air Mobility (UAM) vehicle*

***Fig. 3c** – Scheibel S100 Camcopter used to explore the potential for search/rescue drones*

***Fig. 3d** – Astigan solar-powered high altitude, long endurance (HALE) vehicle*

***Fig. 3e** – C-Astral Bramor used to explore the potential for mapping and surveying drones*

***Fig. 3f** – The view of Cardigan Bay from the B2Space near-space testing balloon*

2. Airspace Design Options Development to date

2.1. CAP1616 requirements and document scope

The CAA Civil Aviation Publication CAP1616[7] provides guidance on the regulatory process for changing the notified airspace design and planned and permanent redistribution of air traffic, and on providing airspace information.

CAP1616 defines a six-stage process through to implementation of a permanent airspace change, some of which have more than one step. However, it is recognised that requested airspace changes can vary hugely in size, scale and complexity and this variation has led the CAA to scale the process accordingly (CAP1616, Para. 50). Furthermore, the CAA will consider requests from the Change Sponsor for additional scaling of the process when there is a good reason and it is proportionate to do so.

Snowdonia Aerospace (SAC) has successfully completed the Stage 1 (Define) and Stage 2 (Develop and Assess) Gateways and all the supporting documentation can be found on the CAA Airspace Change Portal. At this point the CAA determined that ACP-2019-58 was confirmed as a Level 1 change. SAC also successfully passed the Stage 3B (Consult) Gateway prior to launching a public consultation that ran from Monday 7th December 2020 through to Friday 22nd January 2021. A review of the consultation and a categorisation of the responses was reported at Stage 3D and the follow-on requirements for Stage 4A, Update Design, are as follows:

3. update the design of the airspace change in the light of the information received in the consultation responses.
4. update the Options Appraisal to the Final version (Phase III), using the same approach as the Phase II analysis conducted at Stage 3A, as necessary in order to take account of any revised impacts of any new design features.

This document addresses the requirement for (1), the Revised Design. The remainder of this section summarises the initial Stage 1 to 3 activities, including Stage 1B design principles development, Stage 2A airspace design options development, Stage 2B / 3A airspace utilisation model and the feedback received during the Stage 3C consultation. Section 3 then details the Revised Design.

2.2. Design principles

The purpose of CAP1616 is to avoid “solutionising” and to impose a structured process that delivers a considered and balanced airspace design and implementation. In this regard the design principles preceded the development of design options.

Snowdonia Aerospace (SAC) undertook a number of stakeholder engagement activities to help shape the Danger Area (DA) design principles. In addition to a number of targeted stakeholder meetings, a questionnaire was also sent out directly to over 200 stakeholders and interested parties.

The initial draft design principles were reviewed and revised to take account of feedback and reflect the observations and comments made as part of the two-way engagement process. The final statement of DA design principles is presented in Table 1.

2.3. Design options

The design options were promulgated as Danger Areas (DA), rather than as Radio or Transponder Mandatory Zones (RMZ/TMZ) in order to be compliant with CAA CAP722 Unmanned Aircraft System Operations in UK Airspace – Guidance & Policy. CAP722 states that “Unless able to comply with the current requirements of the Air Navigation Order (ANO), including the Rules of the Air, Unmanned Aircraft System (UAS/drone) flights which are operated beyond the visual line of sight (BVLOS) of the remote pilot are required to be contained within segregated airspace. The UK uses DAs as the primary method of airspace segregation for UAS operations”.

[7] Ref: https://publicapps.caa.co.uk/docs/33/CAP1616_Airspace%20Change_Ed_3_Jan2020_interactive.pdf

ID	Category	Design Principle
1	Technical	The design will provide an area of segregated airspace local to Llanbedr Aerodrome for the research, development, test and evaluation (RDT&E) of novel aerospace systems
2	Technical	The design will also provide an air corridor that will link Llanbedr Aerodrome with the existing Danger Area D201
3	Technical / Operational	The design will consist of multiple segments that should, where possible, allow the area of segregated airspace to be kept to a minimum in line with Flexible Use of Airspace principles while still meeting operational requirements
4	Technical / Operational	The Danger Area (DA) design will be consistent with the operation of the Aerodrome Traffic Zone (ATZ) (assuming successful conclusion of ACP-2020-02)
5	Safety	The design will not adversely affect the safety of operations at other nearby aerodromes
6	Safety / Operational	Operating hours of the Flight Information Service (FIS) and DA will be linked to ensure consistent traffic procedures and radio calls, and demand for changes in operating hours of the FIS will require a corresponding change in the operating hours of the DA and vice-versa
7	Environmental / Operational	Any impact on the environment and associated leisure activities should, where possible, be minimised via operating procedures and should, where possible, take account of any local development projects or noise sensitive areas that are highlighted as a result of stakeholder engagement
8	Environmental	The design should, where possible, take account of local planning policy including that of the Snowdonia National Park Authority and the aerodrome registered Safeguarding Map
9	Operational	Impact on military aircraft training should, where possible, be minimised via operating procedures in line with Flexible Use of Airspace principles
10	Operational	Impact on General Aviation (GA), gliding, microlight flying, hang gliding, paragliding or model flying should, where possible, be minimised via operating procedures in line with Flexible Use of Airspace principles

***Table 1** - Final technical, safety, environmental and operational design principles for ACP-2019-58, Llanbedr Danger Area (DA)*

The design options were developed in light of the feedback received from stakeholders and interested parties in relation to the Stage 1B Design Principles, but also taking into account those comments relating to the technical definition of the proposed airspace change that were received from aviation stakeholders who already have a degree of familiarity with the Temporary Danger Area (TDA) and the second of our airspace change proposals that relates to provision of an Air Traffic Zone (ATZ). There were also a few neutral responses to the design principles that raised issues/questions relating to two principal factors: (*i*) the impact of segregation on the flexible use of airspace (FUA) for other aviation operators, and (*ii*) the potential noise/general nuisance impact on non-aviation leisure activities in Snowdonia National Park. We also sought to address these issues in the design options.

With regard FUA and its application to the Llanbedr Danger Area, the key requirement is stated in CAP740, Appendix A (UK Flexible Use of Airspace Strategy), Paragraph 7b:

- *Minimise airspace segregation by activating airspace volumes based on need rather than routine activation through set times defined in the AIP11. Where possible the routine activation should be by Notice to Airmen (NOTAM) to facilitate Strategic Airspace Management.*

This is reflected explicitly in Design Principle #3 and drove the requirement to identify multiple DA airspace segments that will allow us to both minimise time and volume of segregation. In response to this requirement we identified an Area A in the immediate vicinity of the aerodrome that is common to all design options. Area A has the same dimension as an ATZ - a standard and well understood airspace safety management feature – and an area that reflects a minimum volume for anticipated DA activities. This will also allow the DA and ATZ (assuming successful conclusion of ACP-2020-02) to be managed in a consistent fashion.

As far as possible, beyond Area A, the shape of the DA was designed to be easy to interpret and implement and the size was designed to accommodate a range of different novel aerospace systems, examples of which are illustrated in Figure 3a – 3f.

The combination of a segregated area for RDT&E activities local to Llanbedr Aerodrome (Design Principle #1) and a corridor connecting that area to the existing D201 Cardigan Bay Danger Area (Design Principle #2) means that the Llanbedr DA will always have a natural "T" or "keyhole" shape, both angled to the south-west. It doesn't make sense for the corridor to be anything other than a rectangular/cuboid feature and we chose to adopt a circular/cylindrical format for the area local to the Aerodrome to be consistent with expansion of the ATZ volume, but also to maximise internal area/volume whilst minimising the segregated perimeter as far as possible. This is also consistent with FUA principles of minimisation, easy to interpret and implement, and avoids awkward corners that are difficult to navigate around.

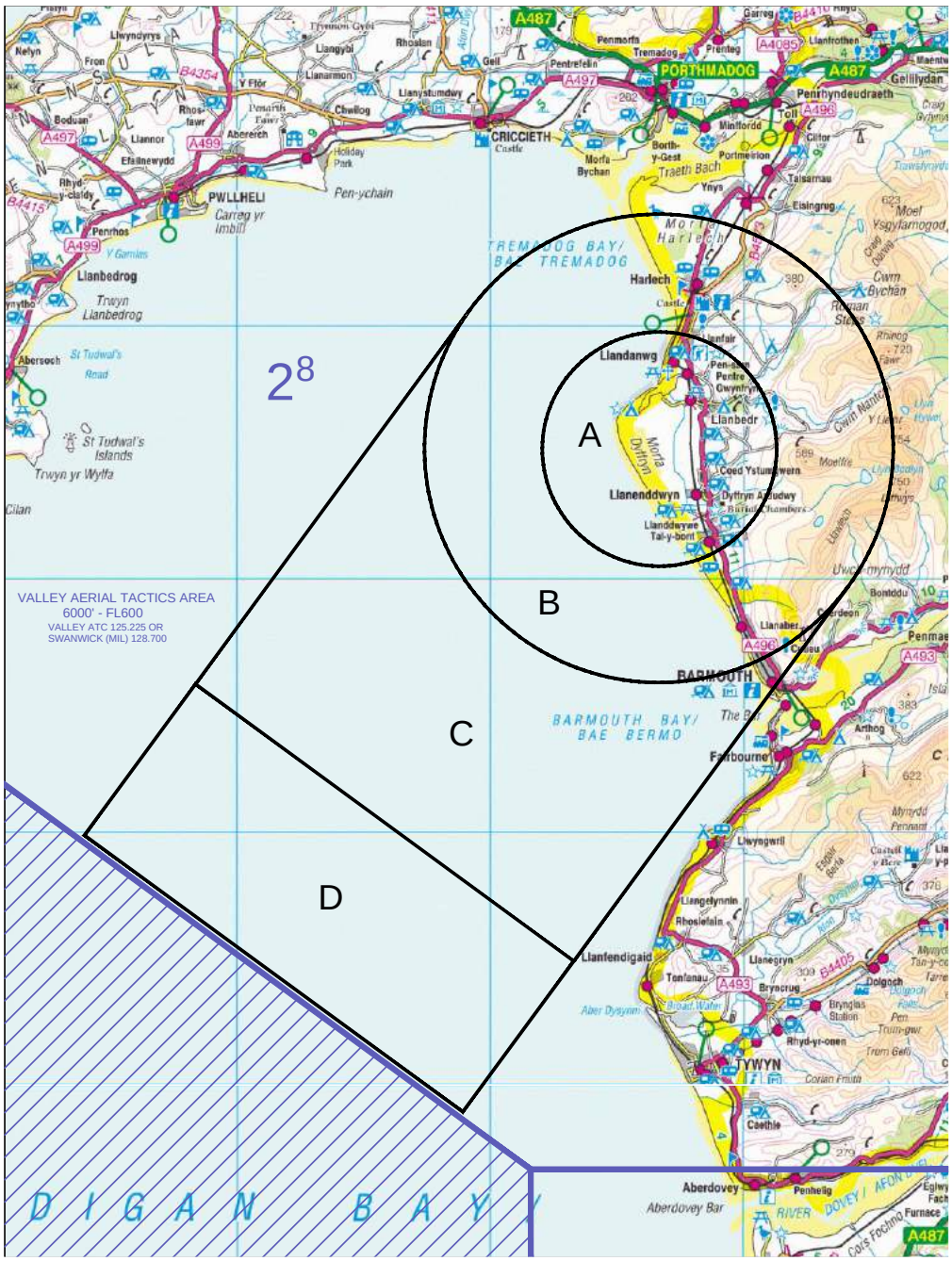
With regard size, we received feedback from existing and proposed future users of the DA that it would be useful to be able to transit 10km to 20km to conduct short-medium range testing of aircraft systems (particularly ground-to-air communications), to have sufficient altitude for testing of drone stall and spin characteristics and small-scale rocketry and to have a range of geographic features for operational testing. Equally we had requests from other airspace users to allow transit over the top of the DA, and/or to be able to pass along the coast to the west of the aerodrome if the DA is activated over land, and/or to be able to pass over the coastal lowland to the east if the DA is activated over water. Non-aviation stakeholders also wished to minimise the overland activation of the DA.

Reflecting the observations and comments captured above, SAC prepared two initial design options for the DA and took both forward into the Stage 3 consultation process. These options were intended to reflect (1) a maximum extent for the DA, and (2) a maximum segregation/minimum extent for the DA, and that additional design options could be generated by combining elements of both options. The only option that was discounted prior to the consultation was promulgation of the TDA in an unaltered form.

Option #1 (Figure 4) described a baseline for the permanent Danger Area (DA) airspace change based on the Temporary Danger Area (TDA) that was originally consulted on, approved and promulgated in 2014[8]. The TDA reflects the extant position under which SAC and others have operated to date, either in part or whole, to support the research, development, test and evaluation (RDT&E) of novel aerospace systems on an as-and-when-required basis. Option #1 took the TDA definition and identified an additional volume to reflect the proposed Aerodrome Traffic Zone (ATZ), the latter subject to a second Airspace Change application ACP-2020-02.

As a result of the two-way engagement process, Option #2 (Figure 5) was also developed for the permanent Danger Area (DA) airspace change as a derivation of Option #1, but with a reduced width of corridor to D201 and an increased degree of internal segmentation, both in terms of horizontal plan and vertical extent.

[8] Ref: "Request for TDA "Approval in Principle" For UAS operations at Llanbedr Aerodrome", QINETIQ/MS/AD/LET1404197, Sept 2014



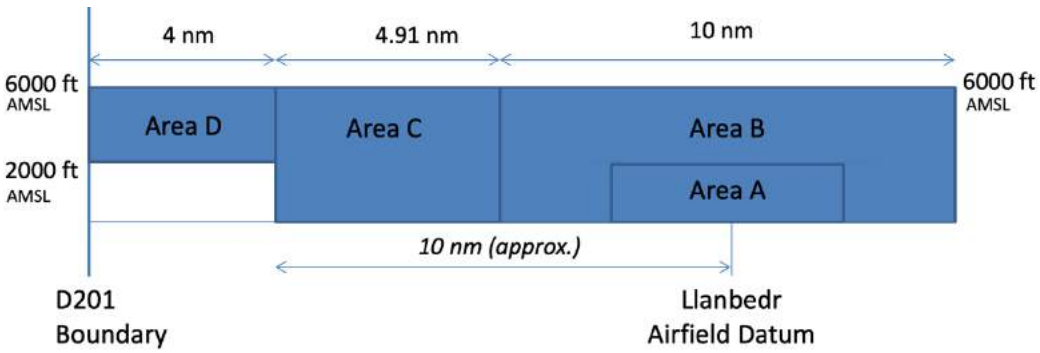
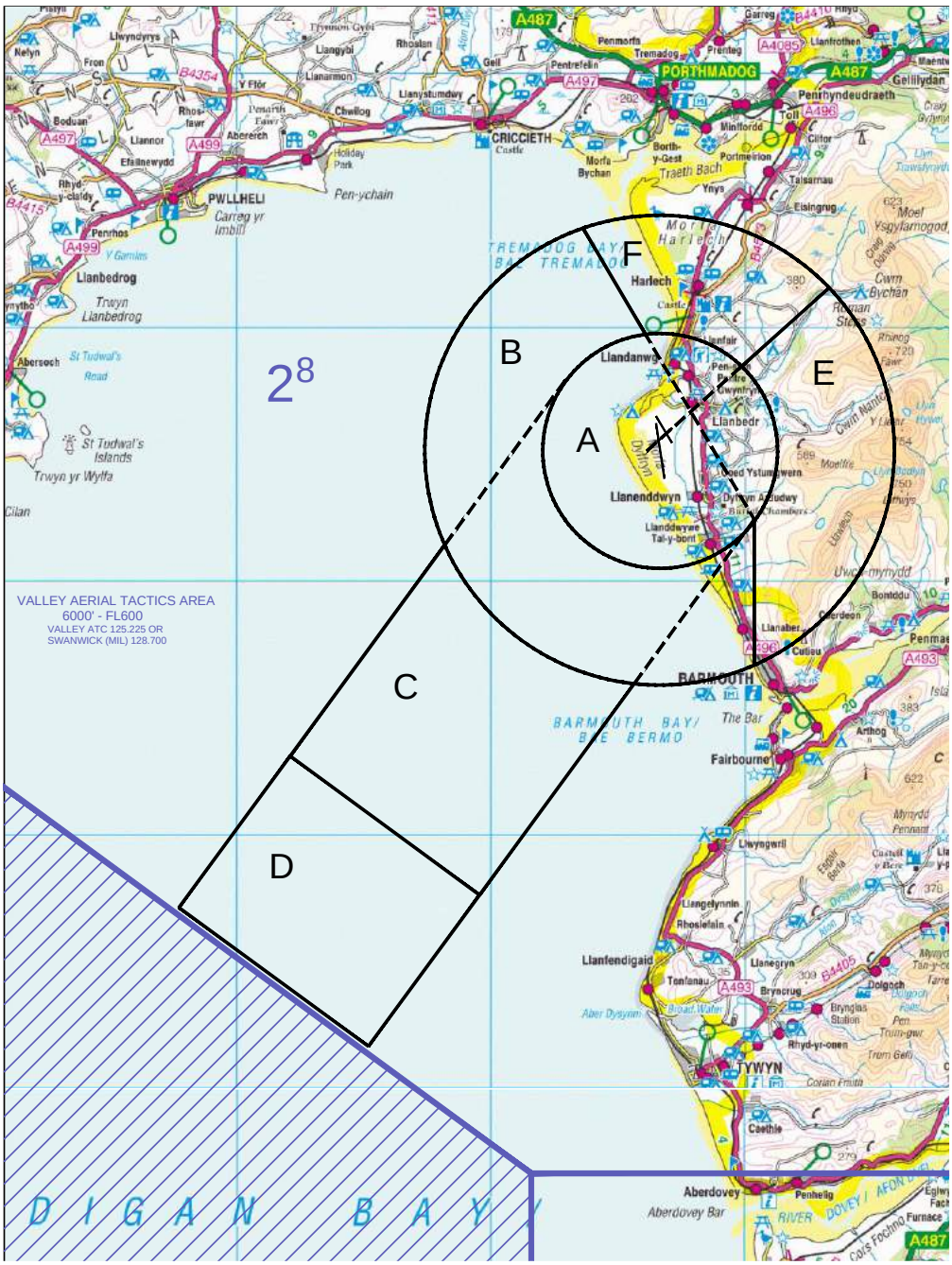


Figure 4 *– Draft airspace design Option #1 for ACP-2019-58, Llanbedr Danger Area (DA)*



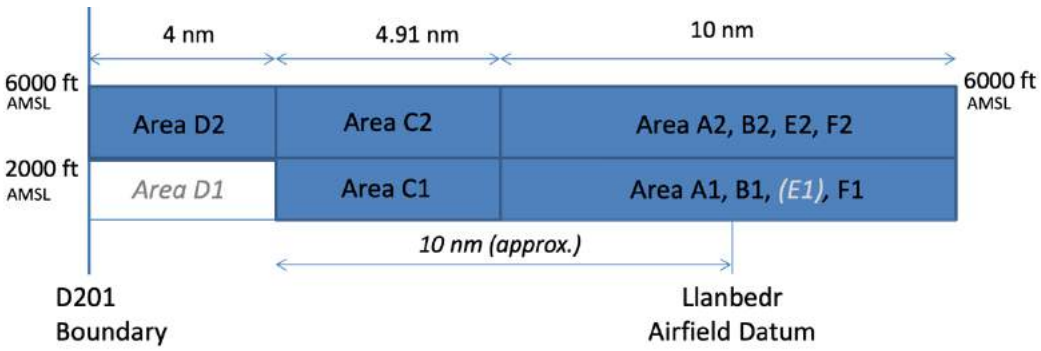


Figure 5 *– Draft airspace design Option #2 for ACP-2019-58, Llanbedr Danger Area (DA)*

2.4. Design options evaluation against design principles

Commensurate with Design Principles #1 and #2, the horizontal dimensions of each Design Option were set to satisfy the following requirements for a range of different novel aerospace systems:

i. System testing: the ability to conduct short-medium range testing (10km to 20km) of aircraft systems, particularly ground-to-air communications;

ii. Extended system testing: the ability to transit to D201 to conducted extended range, altitude and/or endurance testing of aircraft systems;

iii. System-of-systems testing: the ability to conduct systems-of-systems testing supporting wider airspace integration – *e.g.* Unmanned Traffic Management (UTM), detect-and-avoid *etc*.

iv. Operational testing: the ability to conduct testing in a range of operationally relevant environments – *e.g.* maritime/offshore, inshore/coastal, coastal/lowland, and upland/mountain.

In both cases, the DA was broken into a number of sub-areas as per Design Principle #3, none of the areas will be permanently active and will only be activated by NOTAM when RDT&E flying activities are scheduled to take place.

With regard the vertical dimensions, RAF Valley aircraft operate on the Regional Pressure Setting (RPS) when they are conducting their medium level activity and OC STANAT has confirmed that expressing the upper height as XXXX ft as opposed to Flight Level (FL) XX will make it easier for RAF Valley to safely deconflict. The 6000 feet upper altitude limit in Area D was defined previously as part of the TDA so as to enable an engine out emergency recovery without leaving segregated airspace for glide profiles <1000 feet per nautical mile. A similar 6000 feet upper altitude limit in the vicinity of Llanbedr Aerodrome – *i.e.* for Areas A and B – has also been identified by potential DA users as being valuable for testing of drone stall and spin characteristics and small-scale rocketry.

Making Area A coincident with the proposed Aerodrome Traffic Zone (ATZ) helps satisfy Design Principle #4, as does ensuring consistent operation of the Flight Information Service (FIS) in line with Design Principle #6. Furthermore, the combination of the FIS service and the explicit horizontal and vertical segmentation of the Danger Area will allow other air traffic to safely transit over the DA (above 2000ft) and past the DA to the west or east depending on which areas have been activated. This will minimise the impact on military and other general aviation and satisfies Design Principles #9 and #10.

The horizontal and vertical segmentation of the Danger Area will also allow us to minimise the impact on the environment, Snowdonia National Park and associated leisure activities in line with Design Principles #7 and #8.

Design Principle #5 is inherent in all operations at Llanbedr Aerodrome.

2.5. Assessment of airspace utilisation for proposed design options

With regard current novel aerospace RDT&E activity at Llanbedr Aerodrome, we have seen on-site occupancy increase from 30 days in 2017/18 to 40 days in 2018/19 and to 80 days in 2019/20. Looking ahead to the immediate future, both from existing demand together with support to the UK Research and Innovation Future Flight Challenge[9] we are forecasting, as a minimum, on site occupancy is going to double again to 160 days/annum in the period up to 2024 and that growth in the novel aerospace industry is likely to sustain this figure into the longer term.

Translating this forecast of on-site occupancy into the demand for activation of the permanent Danger Area (DA) is not straightforward because of the wide variation in types of novel aerospace systems (examples of which are illustrated in Figure 3a – 3f) and the associated type-specific flight test and evaluation requirements, but it is useful to make an estimate of the breakdown for the probable utilisation of the sub-areas identified in Design Options #1 and #2 to determine any potential impact on other airspace users, the local community and the surrounding environment.

[9] Ref: https://www.ukri.org/innovation/industrial-strategy-challenge-fund/future-flight1/

Any usage assessment is obviously going to have a degree of uncertainty, but for the purposes of the CAP1616 Stage 2B / 3A / 4A Design Options Appraisal, we have applied a simple multiplicative cascade estimation - *i.e.* we would expect the sub-areas further away from the aerodrome and / or at higher altitude to be used less - and that the respective probabilities associated with each step have been determined based on a mix of prior experience and market knowledge:

- We expect there to be a 66.6% probability (*i.e.* twice as likely as not) that we will need to activate the DA on any day when the airfield is supporting a novel aerospace system activity;
- We then expect there to be a similar 66.6% probability that we would need to activate more than one sub-area (Area A + Area B / C / D *etc*.);
- We further expect there to be a 66.6% probability that the additional sub-areas will be adjacent to Area A - *i.e.* Area B for Option 1 or Area B / E / F for Option 2 - and a corresponding 33.3% probability that the novel aircraft system would need to enter the Area C / D corridor;
- For Option #2 we would also expect there to be a 75% probability (*i.e.* three time as likely as not) that Area B would be activated in preference to Areas E or F;
- Again, for Option #2, if over-land sub-areas of the DA need to be activated, there is expected to be a 50% probability that it will be Area E or F;
- Finally, regardless of Design Option or sub-area, we expect there to be a 66.6% probability that the maximum altitude required will be 2000ft and a corresponding 33.3% probability that the maximum altitude required will be 6000ft.

Assuming a minimum target of 160 days occupancy per year, this gives the following predicted number of days Danger Area activation per year for each the various sub-areas:

	Design Option #1	**Design Option #2**
Area A (over the aerodrome)	107	107
Area B* (inshore+)	47	35
Area C/D (offshore corridor to D201)	24	24
Area E (toward Rhinog mountains)		6
Area F (coastal lowland / Harlech)		6
Max. altitude <2000ft	71	71
Max. altitude <6000ft	36	36

***Table 2** - Estimate of DA annual daily usage (*Note - Option #1, Area B = Option #2, Area B+E+F)*

Please note that these estimates are indicative only and intended primarily to show the usage of the various sub-areas relative to each other and to allow any potential impact on other airspace users, the local community and the surrounding environment to be determined. We have quoted daily occupation as the key metric as this is easier to predict and there are historical records for the past three years to substantiate this, but in terms of actual flights / aircraft movements, it would be reasonable to assume two flights on any given day as a guide.

The estimate of 100 days of Danger Area activation per annum and 200 novel aerospace system flights per annum (approximately) also needs to be set in the context of 1000 totals aircraft movements at Llanbedr during 2019 (approximately) and a historical average of 9500 movements per year (approximately) in the period prior to QinetiQ/MOD vacating the site in 2004. This estimate is also based primarily on a forecast of drone and electric aircraft operations in the period up to 2024. Beyond this period, we would expect a small but increasing number of space-related activities to increase the proportion of operations using the air corridor to connect to the D201 Cardigan Bay Range.

2.6. Feedback on proposed design options from public consultation

We adopted a “we asked, you said, we did” approach to setting out the qualitative assessment of consultation responses. We received 140 responses in total and to better interpret the comments and recommendations and identify common themes, we brigaded the data as follows:

- Local respondents within the DA (postcodes LL42 to LL47), 32 responses
- Other North Wales respondents (other LL postcodes), 35 responses
- General and Recreational Aviation respondents, 23 responses
- Commercial Aviation respondents, 13 responses
- Professional and Public Body respondents, 21 responses
- RDT&E community respondents, 30 responses

Note that of the total 140 respondents a number of these have be classified in more than one sub-category – *e.g.* a local resident could also be part of the General Aviation community *etc*.

As a result of the analysis conducted during the consultation review, we identified 7 responses as Category A – *i.e.* those responses which suggested changes to the airspace design that we will use to shape the final ACP submission. These suggestions highlighted two key issues:

1. A need to simplify the definition of the DA sub-divisions on the eastern side of the airfield to make it easier for General Aviation to understand the boundaries of the Danger Area and also to create a wider corridor for north / south transit when Area A, B and / or F sub-divisions of the DA are active.
2. A need to clarify airspace management and air traffic management processes for access to / from the D201 Cardigan Bay Danger Area, particularly at the western end of the corridor from Llanbedr and the potential need to deconflict military and civil aviation in this area.

A further 30 responses were received that will not have a direct impact on the final ACP submission, but which we identified as Category B responses that will form part of the holistic considerations for subsequent implementation and operation of the Danger Area. The additional issues raised in these responses were:

3. Timely notification of DA activation.
4. Weekend and out-of-hours operations.
5. Minimal overland operation, particularly over properties.
6. Minimal disruption to nearby maritime and land-based activities.

Consultees were also asked to express a preference between the two design options shown previously in Figures 4 and 5. Design Option #2 was supported or strongly supported by 68 respondents (48.6% of total respondents) and Design Option #1 was supported or strongly supported by 58 (41.4% of total respondents). Overall SAC considers that Option #2 offers more potential and flexibility for implementing the feedback identified in (1) and (2) above and hence forms the basis for the revised ACP airspace design discussed in Section 3.

3. Revised Design

3.1. Summary

The revised design, Option #2b, is presented in Figure 6. Compared to the original Option #2 design shown in Figure 5, Area D has been increased in length from 4 to 5 nautical miles and Areas E and F have been simplified to improve GA transit to the east when Areas A, B and / or F are activated and also to ease issues raised by some respondents in relation to overland operations. This has resulted in a clipping of Area A such that it would no longer be completely coincident with an ATZ (if one were to be implemented in future) but is still entirely consistent with the major dimensions.

Our previous assessment was that the limited number of days per year when the DA would be activated at heights greater than 2000ft and / or over land would not unduly impact the ability of General Aviation (GA) to transit over or around the DA, however a number of respondents during the consultation did express a preference for simplified sub-divisions that would make north-south transit to the east of airfield much easier when Areas A and B (and to a lesser extent F) are active. This has now been provided with the new definition of Area E. We do not plan to activate Areas B and F at the same time as Area E and so GA will still be able to transit north-south to the west of the airfield on the few days a year when Area E is activated (estimated to be approximately 6 days a year) with a maximum lateral deviation of 2.5 nautical miles.

One particular issue raised by the MOD was in relation, in their opinion (Appendix A), to the potential for GA and other low-level military traffic to be funnelled through Area D when Llanbedr and other DAs in the vicinity were active, which may lead to a perceived increased risk of inadvertent penetrations of D201, or potentially force aircraft to fly towards the high ground inland from Llanbedr. We believe that the two main changes to the airspace design which we have now implemented as a direct result of the consultation feedback, will significantly mitigate any perceived risk by (*i*) creating a corridor through Area E for GA aircraft to stay to the east of the airfield for the vast majority of the time that the DA is active without having to fly towards high ground, and (*ii*) lengthening Area D from 4 to 5 nautical miles to increase the buffer to D201 and also reduce the potential for funnelling. Addressing (*i*) will also benefit item (*ii*) because making it easier for GA to pass to the east of the airfield will obviate the need for them to divert far out to the west and thereby leave this area clear for military aircraft to transit over / under the Llanbedr DA corridor or through the gap between the Llanbedr DA and D201.

The dimensions of Area D were previously carried over from the original definition for the TDA and had been set so as to enable an engine out (or similar emergency) recovery back into Area C (or returning to D201) without dropping through the “floor” in Area D and inadvertently entering non-segregated Class G airspace. This assumed that the recovering aircraft would have a glide ratio greater than 6:1. Increasing the length of Area D increases the required glide ratio to greater than 7.5:1, but it should be noted that a glide ratio greater than 15:1 would actually be required to recover from the far edge of Area D back to Llanbedr without ditching. Given that other mitigations should be put in place so that the risk of such an event is as low as reasonably practicable – and will be assessed as part of the CAA review of individual Operating Safety Cases (OSC) – we feel that the recovery glide ratio should not be a driving factor in the definition of Area D and that the proposed revision still represents a reasonable and proportionate balance between the competing requirements of different airspace users.

Figures 7a to 7f show the most likely combinations of DA sub-areas that will be activated together showing the remaining areas to both east and west that will still be available for transiting aircraft – as well as over the top above 2000ft for two-thirds of the time and above 6000ft for the remainder – and the number of days of estimated utilisation per year for each combination. Note that the number of days per year for activation of Area A represents those times when it is activated in isolation and that it is estimated it will be activated on 107 days a year in total when also used in combination with other areas as per Table 2. It is also estimated that Area C will be activated for a total of 24 days a year when it is used in combination with Area D.

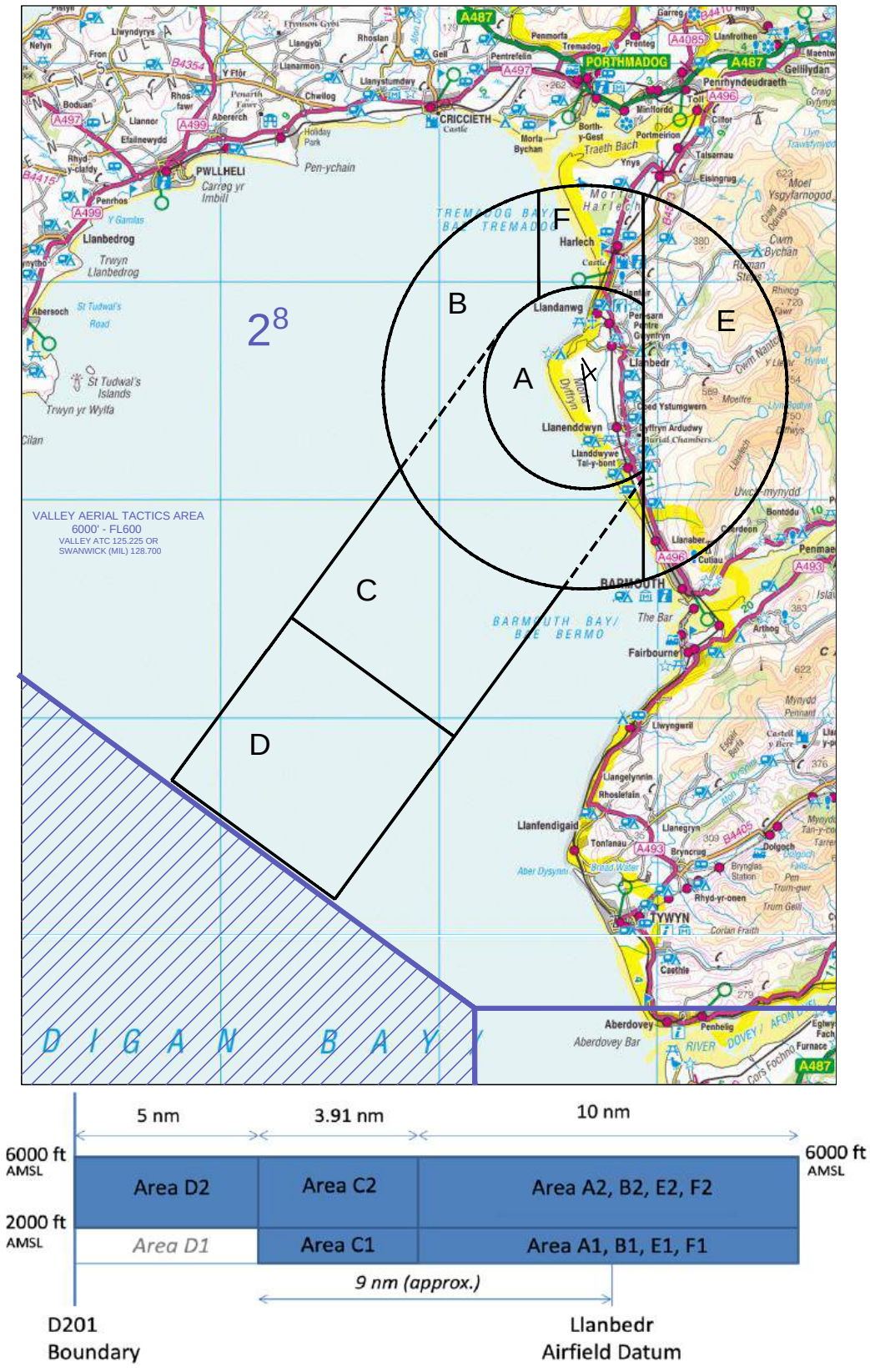


Fig. 6 *- Final Airspace Design (Option #2b) for ACP-2019-58, Llanbedr Danger Area, incorporating the revisions suggested from the consultation*

Fig. 7a - Area A, 36 days/year with 24 days/year below 2000ft

Fig. 7b - Area A + B, 35 days/year with 24 days/year below 2000ft

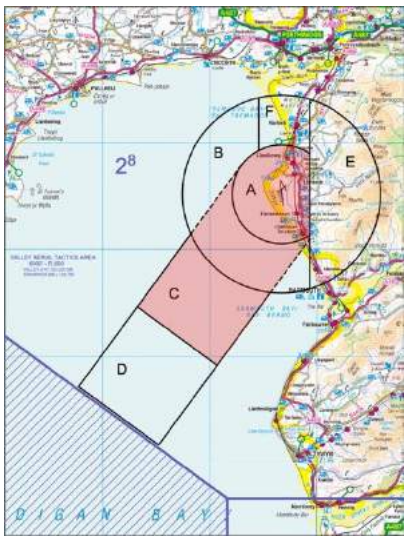


Fig. 7c - Area A + C, 12 days/year with 8 days/year below 2000ft

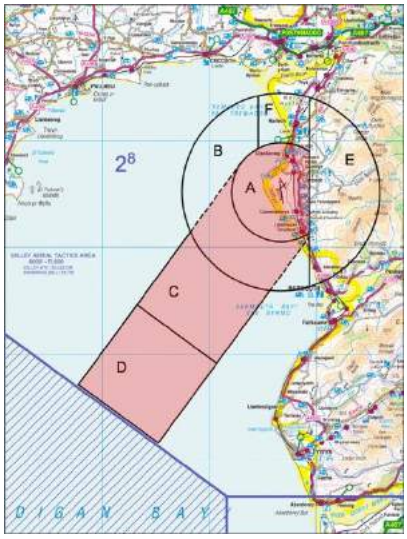


Fig. 7d - Area A+C+D, 12 days/yr with 0 days/year below 2000ft

Fig. 7e - Area A + E, 6 days/year with 4 days/year below 2000ft

Fig. 7f - Area A + F, 6 days/year with 4 days/year below 2000ft

There are also a number of combinations of sub-areas that do not envisage being activated together:

- Activation of Area E will not be combined with Areas B and / or C and / or F (and vice-versa) such that there will always be a transit route to the immediate east (or west) of the airfield for General Aviation when the DA is activated.
- Either Area B will be activated, or Area C will be activated, but they will not be activated together.

We believe the changes and clarifications to the airspace design reinforce the assessment that the ACP is anticipated to have a low to negligible impact on military, GA and recreational aviation.

3.2. Airspace design description

The proposed Danger Area dimensions are detailed below in terms of World Geodetic System 1984 (WGS84) co-ordinates of the boundaries, along with associated vertical levels proposed. The co-ordinates are in the format degrees, minutes and seconds.

- Area A1: a cylinder of 2.5 nautical mile radius, centred on the main runway 17/35, from surface to 2000 feet altitude above mean sea level (AMSL) that is consistent (in the main) with a potential Aerodrome Traffic Zone (ATZ) - which is the subject of the current second Airspace Change application ACP-2020-02 (currently paused) - but clipped to the east by approximately 1 nautical mile. The railway line and A496 main road provide useful (but not definitive) visual geographic features for delineation of the eastern boundary. Area A1 is bounded by:

  525022N 0040522W

  524617N 0040510W

  524817N 0040738W

  then clockwise by the arc of a circle radius 2.5 NM centred on

  524817N 0040738W

  to

  525022N 0040522W

- Area A2: extends Area A1 from an altitude of 2000 feet up to 6000 feet AMSL.
- Area B1: a partial annulus of 2.5 nautical mile inner radius, 5 nautical mile outer radius, centred on the main runway 17/35, extending to the west and angled west/south-west, from surface to 2000 feet altitude. Areas A+B combined provide an extended area for inshore/coastal operational testing. The Area B/F division is offset from the coast by approximately 1 nautical mile to minimise the impact on any paragliding and hang-gliding activities in the vicinity of Harlech. Area B is bounded by:

  524617N 0040510W

  524334N 0040503W

  524817N 0040738W

  then clockwise by the arc of a circle radius 5 NM centred on

  524817N 0040738W

  to

  525307N 0040947W

  525028N 0040939W

  524817N 0040738W

  then anti clockwise by the arc of a circle radius 2.5 NM centred on

  524817N 0040738W

  to

  524617N 0040510W

- Area B2: extends Area B1 from an altitude of 2000 feet up to 6000 feet AMSL.
- Area C1: a rectangle of 5 nautical mile width and 8.91 nautical mile length that extends from the centre of the airfield, coincident with Area A, tangentially out toward Danger Area D201. Areas A+C combined provide an extended area for offshore/maritime operational testing. Area C is bounded by:

524943N 0041102W

524223N 0041920W

523933N 0041233W

524605N 0040510W

524617N 0040510W

524817N 0040738W

then clockwise by the arc of a circle radius 2.5 NM centred on

524817N 0040738W

to

524943N 0041102W

- Area C2: extends Area C1 from an altitude of 2000 feet up to 6000 feet.
- *Area D1: It is proposed that this area remains outside the DA to maintain a "tunnel" from surface to 2000 feet for low-level air traffic transiting to / from RAF Valley*
- Area D2: a rectangle of 5 nautical mile width and 5 nautical mile length from the edge of Area C1/C2 that further extends Areas A+C to create either an extended straight-line testing route and / or a "bridge" into the existing Danger Area D201, from an altitude of 2000 feet up to 6000 feet. Access when required to D201 will provide an ability for extended range/endurance/altitude testing, which will be managed via Letter of Agreement with QinetiQ/MOD. The 6000 feet upper altitude limit is defined so as to enable an engine out recovery back into Area C (or D201) without leaving segregated airspace in Area D for glide profiles <1000 feet per nautical mile. Area D2 is bounded by:

  524223N 0041920W

  523933N 0041233W

  523526.44917N 0041712.24152W

  523815.50586N 0042358.49984W

  524223N 0041920W

- Area E1: an arc of 5 nautical mile outer radius, centred on the main runway 17/35, that extends the Danger Area to the east of the railway line and A496 main road toward the Rhinog mountains, from surface to 2000 feet AMSL. It is intended that a minimum altitude of 500 feet above ground level (AGL) will be maintained in this area at all times, subject to further CAA review of individual Operating Safety Cases (OSC). Area E is bounded by:

  524334N 0040503W

  525307N 0040530W

  524817N 0040738W

  then clockwise by the arc of a circle radius 5 NM centred on

  524817N 0040738W

  to

  524334N 0040503W

- Area E2: extends Area E1 from an altitude of 2000 feet up to 6000 feet AMSL.

- Area F1: a partial annulus of 2.5 nautical mile inner radius, 5 nautical mile outer radius, centred on the main runway 17/35, extending Area A1 to the north, from surface to 2000 feet altitude. Areas A+F combined provide an extended area for coastal/lowland operational testing, but it is intended that no novel aerospace activity will be conducted to the east of the railway line and A496 main road in Area F. Area F is bounded by:

  525028N 0040939W

  525307N 0040947W

  524817N 0040738W

  then anti clockwise by the arc of a circle radius 5 NM centred on

  524817N 0040738W

  to

  525307N 0040530W

  525022N 0040522W

  524817N 0040738W

  then clockwise by the arc of a circle radius 2.5 NM centred on

  524817N 0040738W

  to

  525028N 0040939W

- Area F2: extends Area F1 from an altitude of 2000 feet up to 6000 feet.

3.3. Airspace management principles

European Commission Regulation (EC) No 2150/2005 of 23 December 2005[10] lays down common rules for the flexible use of airspace (FUA), defined as follows:

- *"Flexible use of airspace is an airspace management concept described by the International Civil Aviation Organisation (ICAO) and developed by the European Organisation for the Safety of Aviation (Eurocontrol), according to which airspace should not be designated as either purely civil or purely military airspace, but should rather be considered as one continuum in which all users' requirements have to be accommodated to the maximum extent possible".*

In the UK, CAP 740, UK Airspace Management Policy[11], serves as a means of compliance to the essential requirements of both Reg (EC) 2150/2005 (Flexible Use of Airspace Regulation) and Reg (EU) 373/2017 (Common requirements for providers of air traffic management/air navigation services). CAP 740 also ensures compliance with supporting Eurocontrol guidance.

With regard FUA and its application to the Llanbedr Danger Area, the key requirement is stated in CAP740, Appendix A (UK Flexible Use of Airspace Strategy), Paragraph 7b:

- *Minimise airspace segregation by activating airspace volumes based on need rather than routine activation through set times defined in the AIP11. Where possible the routine activation should be by Notice to Airmen (NOTAM) to facilitate Strategic Airspace Management.*

SAC intend to fully follow these stated principles within the operation of the proposed ACP-2019-58 for the Llanbedr Danger Area. Section C10 of Appendix C (Military ASM Policy) shall also be considered, where possible, when it applies to a civil DA, and Collaborative Decision Making (CDM) will be implemented via Letters of Agreement (see Section 3.4 below).

[10] Ref: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32005R2150&from=EN
[11] Ref: https://publicapps.caa.co.uk/docs/33/CAP740_Issue7_Am1_Nov_2019(cor).pdf

3.4. Air Traffic Management principles

The following Air Traffic Management principles will also apply within the operation of the proposed ACP-2019-58 for the Llanbedr Danger Area:

- None of the areas of the proposed DA will be permanently active and will only be activated by Notice to Airmen (NOTAM) when novel aerospace flying activities are scheduled to take place.
- Activation via NOTAM will be provided 24 hours in advance and the DA will only be active for the minimum time necessary. Airfield contact details will be included in the NOTAM.
- Normal operating hours for novel aerospace activities will be 0900 to 1700, Monday to Friday, apart from rare and exceptional circumstances. Weekend and out-of-hours operations will be available for general and recreational aviation activities.
- A FISO service will be provided by Snowdonia Aerospace from take-off to landing for all novel aerospace operations within the proposed DA. The core FIS will be augmented with an Unmanned Traffic Management (UTM) system with a minimum ADS-B Traffic Display. Llanbedr FIS will also provide a Danger Area Activity Information Service (DAAIS) for all airspace users in the vicinity of the DA. The appropriateness of a DAAIS was confirmed with CAA Airspace Regulation during a post-consultation meeting (see Appendix B), where it was stated that:

  "When determining the provision of a DACS or DAAIS, consideration should be given to the context, such as the nature of the airspace and the environment it sits in. In certain situations, a DACS or DAAIS although desirable may not be required conversely in certain situations a DACS may ultimately be a requirement due to the potential impact to other users. It is for the Sponsor to discuss and put forward in their proposals within the ACP considering that context."

  The primary points of context that support the use of a DAAIS for the Llanbedr Danger Area are:

  a) The overall utilisation figures detailed in Table 2, with an estimated maximum of 107 days per year of DA activation;

  b) The number of transit routes for other airspace users that remain available around the DA even on the estimated 71 days a year when multiple sub areas are activated (Figures 7b to 7f);

  c) The limited number of days of activation above 2000 feet AMSL (estimate ≈ 36 days);

  d) The Letters of Agreement (LOA) that will be put in place with other local airspace users.

- With regard training operations from RAF Valley, SAC can confirm that a Letter of Agreement (LOA) will be produced detailing our commitment to take part in regular planning meetings and mutually agreed time and / or height deconfliction of airspace use, to alleviate any potential conflicts and issues and ensure that the airspace is utilised as effectively as possible whilst mitigating the impact to a key Defence task (see also Appendix A).
- Likewise, SAC can also confirm that it will put in place a Letter of Agreement through DE&S and SO1 DAAM to be able to access D201 and utilise ATM services that are subcontracted to other partners within the D201 airspace (see also Appendix A).
- QinetiQ / MOD Aberporth Air Traffic Control (ATC) will be notified of all novel aerospace operations that intend to transit through Area D to operate in D201 or further into D202.
- Via the LOA we would engage a DACS service from NATS / QinetiQ / MOD Aberporth for any aircraft seeking to enter D201 with the boundary for handover between Llanbedr FIS / DAAIS and NATS / QinetiQ / MOD Aberporth DACS being where Area D meets D201J.
- It is anticipated that the novel aerospace system will be equipped with an ADS-B Out transponder as a minimum electronic conspicuity capability when operating outside of Area A.

- The novel aerospace system crew is responsible for monitoring flight systems and communicating directly with Llanbedr FIS or QinetiQ / MOD Aberporth ATC.
- In addition, the novel aerospace system crew is to ensure that the aircraft remains within the confines of the segregated airspace during both normal operation and in the event of any routine emergency. The novel aerospace system will be expected to “geo-fence” and maintain a buffer to prevent inadvertent departure from the DA. This, and other safety-related issues, will need to be addressed within the Operating Safety Case (OSC) for the novel aerospace system and will be subject to review and approval by the CAA before operation within the DA will be allowed.

This concludes the definition of the revised airspace design for ACP-2019-58, Llanbedr Danger Area (DA).

Appendix A – Feedback from MOD

FORMAL MOD RESPONSE TO ACP-2019-58 LLANBEDR DANGER AREA

The MOD would like to thank Snowdonia Aerospace for the opportunity to provide feedback on ACP-2019-58 Llanbedr Danger Area (DA) and for the open and honest discussions that have taken place so far regarding this matter.

The MOD believe that there are elements of the DA proposal that require further liaison and thought for it to be acceptable to the MOD. The concerns can be broken down into the following areas; issues affecting RAF Valley, usage of EG D201 Aberporth and ATS provision and wider MOD concerns; all of which are described in more detail below.

RAF Valley

RAF Valley operate the Texan T1 and Hawk T2 aircraft in the Valley Aerial Tactics Area, Valley Area of Intense Aerial Activity and Low Flying Area 7 down to 4000ft for Medium Level sorties and 250ft for Low Level sorties; laterally and vertically conflicting with the proposed DA at Llanbedr. There has been a significant increase in the amount of aircraft operating out of Valley in the last year with the initial introduction of 10 x Texan T1 and a further 4 aircraft being added to the fleet in 2021. The current flying rate plans for 80 fast jet sorties per day, increasing to 96 sorties per day by 2022/2023. Valley aircraft routinely operate in the same geographical area as the proposed DA on a daily basis (usually weekdays) between 0800 and 1845/2000 (depending on the time of year). There is an obvious confliction with the proposed DA, in particular when it is activated to 6000ft, impacting all Valley sortie profiles in that area.

To ensure that the airspace is utilised as effectively as possible whilst mitigating the impact to a key Defence task, the MOD believe that Snowdonia Aerospace should consider creation of a Letter of Agreement detailing the requirement for taking part in regular planning meetings and mutually agreed time and/or height deconfliction of airspace use, to alleviate any potential conflicts and issues.

Whilst the MOD appreciates that a corridor from surface to 2000ft underneath Area D would allow aircraft to pass underneath the activated DA, it should be noted that Valley aircraft require to transit closer to the coastline than Area D. Therefore, the MOD would like to continue discussing the possibility of extending the low-level corridor into Areas B and C when activated to 6000ft.

EG D201 Aberporth

The MOD would like to inform Snowdonia Aerospace that they would require a Letter of Agreement in place through DE&S and SO1 DAAM to be able to access D201 and utilise ATM services that are subcontracted to other partners within D201 airspace (such as QinetiQ). D201 is a MOD asset and therefore any commercial activity requests would be subject to a priority system determined by planned activity, as well as short or no-notice utilisation by the MOD which may impact on any planned usage by Snowdonia Aerospace. Weekend opportunities for Snowdonia Aerospace to utilise D201 with another ATM service provider may be a viable option, again requiring formal agreements with the relevant area of the MOD.

The MOD would like to understand how Snowdonia Aerospace plan to provide an ATS, DACS or radar monitoring to any RPAS transiting to D201 through the ‘floating airspace’ i.e. current Area D and any potential changes to the design options such as a corridor underneath Area C. In previous MOD ACPs the CAA have mandated that radar monitoring, or a Deconfliction Service, is provided to air systems within the floating airspace. ATM provision in Areas C and D could be available to Snowdonia Aerospace through a formal agreement with the MOD. However, this may require testing of the current equipment and radar coverage to ensure it meets requirements for ATS provision in that area.

GA and other low-level military traffic will be funnelled when Llanbedr and other DAs in the vicinity are active, which may lead to an increased risk of inadvertent penetrations of D201, or force aircraft to fly towards the high ground inland from Llanbedr. The MOD believe that Snowdonia Aerospace should look into potential protocols determining which areas could be left inactive when larger portions of the airspace are activated, especially if Area C was to remain without a corridor below it for aircraft transiting close to the coastline.

Generic MOD Comments

The MOD are aware that a DACS will not be provided by the FISOs at Llanbedr; however, we understand that a DAAIS will be provided. The MOD note that a DAAIS does not provide a clearance to cross an active DA. However, there may be instances where MOD aircraft require access through the DA for national security, or other operational reasons. Information on how to contact the Llanbedr FISO via landline communications as well as a relevant frequency would be required for these instances, both in the AIP and by NOTAM, or other relevant notification processes. The chances of this occurring are small; however, it is a possibility that the DA operator should be aware of.

If usage of the DA increases from the figures quoted in the consultation document, the MOD believe that Snowdonia Aerospace should review the requirement for provision of a DACS. This would help alleviate the further congestion and funnelling issues that may be caused by increased DA activation. Both airspace design options lead to potential funnelling of GA and military aircraft, thus increasing the risk of AIRPROX or Mid-Air Collision (MAC) in that area. However, Option 2 is the favoured option of the MOD as the DA dimensions cover a smaller area and allow safer and more efficient use of the airspace for all users, both within, and outside of, the DA.

RAF(U) Swanwick are an ATS provider in that area and due to the constraints of the equipment provided by NATS, radar mapping is only updated on a quarterly basis in line with an AIRAC cycle. Therefore, they require a longer than normal lead in time of between 3 and 5 months to accurately depict the DA in their surveillance displays. We would be grateful if Snowdonia Aerospace could bear this in mind when confirming and promulgating DA coordinates.

Please do not hesitate to contact the undersigned if further information or discussion is required. The MOD look forward to continuing the working relationship with Snowdonia Aerospace on this ACP.

Appendix B – Minutes from post-consultation meeting with CAA Airspace Regulation

Note of meeting held between Snowdonia Aerospace and Airspace Regulation, CAA 27th January 2021, via TEAMS

Present for Snowdonia Aerospace LLP (SA):
[redacted]

Present for Airspace Regulation (AR), CAA:
[redacted]

1. Introduction

1.1 SA had requested a meeting with AR to discuss technical queries resulting from the Llanbedr Danger Area (ACP-2019-58) consultation. The queries were presented to AR as four questions a day prior to the meeting. AR confirmed that a meeting note would be taken.

2. Question 1 - When is a Danger Area Activity Information Service (DAAIS) sufficient and when is a Danger Area Crossing Service (DACS) necessary?

2.1 AR confirmed that there is not a precise number/formula to determine when a DACS or DAAIS is appropriate; it should be considered case-by-case. AR advised that where possible a DACS is generally always preferable because it is a means to enable access to airspace, whereas a DAAIS is an information service to inform users of the state of the airspace. When determining the provision of a DACS or DAAIS, consideration should be given to the context, such as the nature of the airspace and the environment it sits in. AR suggested that SA may receive stakeholder feedback as to which provision is appropriate for their context. SA confirmed that this was their understanding too and the question had been prompted following discussion with a stakeholder concerning the number of days of Danger Area activation per year up to 6000ft. The stakeholder would like a DACS when operations are up to 6000ft. But, the number of days SA would need to activate up to 6000ft does not in their view represent a major burden on RAF Valley, but SA wanted to clarify that with AR. AR said they could not talk specifics about this ACP. AR did note there were examples of where a DACS/DAAIS were transferred between entities, these are however subject to agreements. Everyone is going to want a DACS, but that can't always be achieved, it does not mean that you have to have a DACS but it is very much a question of context.*

**Post meeting Note from CAA: When determining the provision of a DACS or DAAIS, consideration should be given to the context, such as the nature of the airspace and the environment it sits in. In certain situations, a DACS or DAAIS although desirable may not be required conversely in certain situations a DACS may ultimately be a requirement due to the potential impact to other users. It is for the Sponsor to discuss and put forward in their proposals within the ACP considering that context.*

3. Question 2 - When the two Danger Areas are activated simultaneously (i.e. D201 by MOD and Llanbedr DA by SAC), what distance would constitute a safe separation between the two DAs through which other aviation could pass?

3.1 AR advised that like question 1, there is no fixed figure that defines this, and context is paramount. Noted within airspace design there is an existing Buffer Policy, this Policy applies between Special Use airspace (SUA) and other airspace structures, such as CTRs, etc.

3.2 There is no fixed separation requirement between Danger Areas. The distance should be determined by context (including where you are, and the nature of the activity being conducted within the Danger Area and outside). If you have a low traffic density a few miles might be sufficient conversely there may be a requirement for a larger gap to avoid funnelling etc., it will be down to the analysis presented. AR confirmed that it would be useful for SA to address the issue in the ACP submission.

4. Question 3 - Does a bridge/tunnel element of a DA with "hanging" airspace require a different level of Flight Information Service or Air Traffic Service to the main body of the DA that extends to/from ground/sea level?

4.1 SA explained that some elements of the previous Temporary Danger Area design had been replicated into the current ACP (2019-58). The original design featured a corridor from Llanbedr Airfield to D201 that spilt into two. The section closest to Llanbedr Airfield was surface to 6000ft. The section closest to D201 was 2000ft-6000ft, with a tunnel underneath that was surface to 2000ft and 4nm miles wide and designed to enable RAF Valley traffic to cross from mid-wales training area to RAF Valley. SA advised that it is RAF Valley's view that this 'tunnel' necessitates a DACS. SA's view is that the traffic is not crossing through the Danger Area, but going underneath or above and therefore a DAAIS would be sufficient.

4.2 AR quested the relevance of the FIS element of the question, however stated they would not speak to the specific submission question and summarised the question as 'if you have floating/hanging airspace is a DACS or DAAIS required?' and confirmed that, like the answer to questions 1 and 2, there was no policy that mandated this, and the ACP would be considered on a case-by-case basis. AR reinforced, as was the case for question 1, that the provision of a DACS or DAAIS should be identified from analysis of stakeholder feedback and the context of the operation. AR confirmed that there are many Danger Areas that are not contiguous with the ground and whilst most will have a DACS, it is not a specific policy requirement, though a DACS is preferable where it can be achieved. This can also link to sponsors' airspace management processes.

4.3 SA discussed low level traffic at 250ft amsl, 1,500ft below the DA airspace above when active, and the movement of traffic, singleton unmanned aircraft through into D201 and the FISO role in that situation. SA emphasised that in their view, the Llanbedr Airfield Flight Information Service Officer (FISO) will be in a position to provide sufficient information to a pilot as to the whereabouts of an aircraft in the Danger Area and it is the pilot's decision how to proceed. AR again noted they would not speak to specifics of this ACP however stated that a FISO is able to advise on the status of a Danger Area and it is the pilot's judgement as to whether they transit that airspace. A FISO is not able to provide a DACS

4.4 SA highlighted that to move an aircraft local to Llanbedr Airfield to D201, the Danger Area corridor would be activated, with the aircraft transit taking only a few minutes. SA explained that ideally they would deactivate the Danger Area corridor after the few minutes of transit and return it to other airspace users, with reactivation on the aircraft's return. However, SA cannot do this, as there might be an issue with the aircraft that necessitates it's return sooner than planned. SA's view is that the corridor would normally have to be activated for as long as the aircraft was away from Llanbedr Airfield. Again, AR stated they are not able to speak to a specific submission. In general, a Danger Area is required to be activated in accordance with the Operational Safety Case of an activity which would be dependent upon each use case. In accordance with policy, minimum notification should be NOTAM day minus 1 to give pilots

sufficient time to brief themselves and understand the airspace picture. SA agreed and stated they would take a conservative approach, but were mindful that a single aircraft would only use the corridor for minutes and they were keen to enable other airspace users access to cross the corridor in a safe and appropriate way. AR agreed this was the challenge that SA have, and advised that the ACP should articulate the SA airspace management process.

5. Question 4 - Does CAA consider a bridge/tunnel element of a DA with "hanging" airspace to be a useful compromise that meets the need of multiple airspace users or an unnecessary complication given the limited number of days utilisation per year and the fallback ability to pass over the top at 6000ft+?

5.1 AR did not answer the question and advised that it was for SA to determine and present in the ACP.

6. CAP 1616 Stage 5 Decision

6.1 SA asked for clarity of CAP 1616 Stage 5 Decision and if a change sponsor has the opportunity to subsequently provide a revision to the ACP submission in order to secure approval. AR confirmed that the final ACP submission will be reviewed and assessed in detail by the CAA and whilst the CAA may require additional information or clarification in order to progress the assessments, a full revision is unlikely. Any adjustments to the proposal would be considered on a case-by-case basis and must not impact either the application of the CAP 1616 process or the validity of the consultation. CAP 1616, Appendix G, para G5 provides more guidance on technical queries or clarifications to the proposal. AR confirmed that if the proposal was not approved, any further airspace change proposal should commence at the start of the CAP 1616 process with a new Statement of Need.

7. Post-implementation Review (PIR)

7.1 AR confirmed that the PIR will assess how the airspace change has performed and if the impacts and benefits in the original proposal are as expected. The purpose of the PIR is to validate the assumptions put forward in the proposal and review if the airspace structure works as intended.

8. CAP740

8.1 SA asked if they should take account of CAP740 in their ACP submission. AR advised that CAP740 is aimed at airways interaction (NATS and Military). AR suggested that there are principles within CAP740 that SA may wish to consider, and it may aid their understanding of best practice. AR expects compliance with the Danger Area Policy Statement.

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