



Bristow

Unmanned Aircraft Systems

Bristow UAS Prototype Service (UAS PS)

Airspace Trial Consultation Document
IAW CAP 1930/CAP1616

Date: - 16th October 2020

Airspace Consultation Response

Bristow Aerial Solutions Ltd
Unit 1 Dyce Avenue
Dyce
Aberdeen
AB21 0NT
Scotland
TEL +44 (0)1224 756246

Airspace Proposal Responsible Author/s

Responsible Authors: -

- David Scott - Bristow UAS
- Ricky Huntley – Bristow UAS
- Mike Smith - UK SAR Special Projects

For the purposes of this proposal, Bristow Aerial Solutions Ltd will be referred to as Bristow UAS. Only responsible authors may request amendment via Bristow Service Desk request. Notification of amendment details will be sent electronically to all personnel who are responsible for keeping an up to date copy of all Bristow UAS published documents. A current amendment of the proposal can always be accessed via the Bristow Portal and Bristow UAS workspace. All revisions will be listed and detailed in the table below.

Revision No	Affected Part	Auth Date	Revised By	Notes
Rev 1.0	All	23/09/2020	D.Scott	
Rev 2.0	9, 32, Annex A	16/10/2020	R Huntley	

Table of Contents

1 List of abbreviations

STAGE 1: DEFINE

2 Assessment Requirement
3 Statement of need
4 MCA letter of support
5 What is the change?
6 Why do you need to be consulted?
7 Aims
8 Objectives
9 Regulations
10 Consultation Period?
11 How to respond
12 What happens to your response?
13 Civil Aviation Authority
14 The Location
15 Current use (Bristow SAR(H))
16 Bristow UAS Legacy DA operations in the Region
17 UAS PS 2020
18 Danger Area Definition
19 Legacy Airspace Use in the Region
20 Unmanned Aircraft System (CAA definition)

STAGE 3: CONSULT

21 UAS operation Types
22 UAS Categories
23 UAS operational safety cases
24 Unmanned aircraft system to be operated
25 Why Caernarfon?
26 Airspace Trail Proposal
27 Airspace predicted usage
28 Activation / Deactivation of TDAs
29 Airspace Management
30 Airspace Flexibility
31 Emergency Access
32 Impact mitigation on existing users
33 Local landowners and Residents
34 Options Considered
35 Summary
36 Responding
37 List of Stakeholders

STAGE 4: UPDATE/SUBMISSION

38 Revisions following consultation (TBD)

ANNEX

Annex A – Feedback Questions

1. List of Abbreviations

ACP	Airspace Change Proposal
AIP	Aeronautical Information Publication
ALARP	As Low As Reasonably Practicable
ANSP	Air Navigation Service Provider
ASSI	Area of Special Scientific Interest
ATC	Air Traffic Control
BVLOS	Beyond Visual Line Of Sight
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CONOP	Concept of Operation
DACS	Danger Area Crossing Service
DAAIS	Danger Area Activity Information Service
D&D	Distress and Diversion
DfT	Department for Transport
EC	Electronic Conspicuity
FISO	Flight Information Services Officer
MCA	Maritime and Coastguard Agency
MUM-T	Manned Un Manned-Teaming
NATS	National Air Traffic Services
NOTAM	Notice to Airmen
OET	Operational Evaluation Team
PPR	Prior Permission Request
SARG	Safety and Airspace Regulation Group
SAR(H)	Search and Rescue Helicopter/s
TDA	Temporary Danger Area
UAS	Unmanned Aircraft System
UASPS	Unmanned Aircraft System Prototype Service
UKSAR	United Kingdom Search and Rescue
UTM	Unified/Unmanned Traffic Management System
WOR	Weekly Operations Report

- 1.1 Application Process.** With regard to this application, the scaled airspace trial **process** is detailed below. Further information can be found in CAP 1930 and CAP 1616.

Categories of airspace change

Table 1: Categories of airspace change

Category of change	Process applying
Changes to the notified airspace design	
A permanent change to the notified airspace design	The airspace change process described in this guidance document
A temporary change to the notified airspace design (usually less than 90 days, except in extraordinary circumstances)	Before implementation: Stages 1, 3, 4 and 5 of the airspace change process During operation: engagement, monitoring and feedback to the CAA
An airspace trial	Before implementation: Stage 1 and information provision During trial: engagement, monitoring and feedback to the CAA

STAGE1: DEFINE

2. Assessment Requirement

2.1 This document details a proposed change to airspace to facilitate an airspace trial in the vicinity of Caernarfon Airport. This is for use by Bristow Unmanned Aircraft Systems (Bristow UAS) in support of the Unmanned Aircraft System Prototype Service (UAS PS) on behalf of UK SAR and the Maritime and Coastguard Agency (MCA).

This document intends to:

- a. Inform you of the requirement for the change.
- b. Inform you of the project's State backing
- c. Inform you of the proposed scope of the change.
- c. Seek your feedback with a view to minimising the impact on other users of the airspace.

3. Statement of need

3.1 Operating from Caernarfon Airport, Bristow Group delivers UK SAR helicopter services nationwide on behalf of the MCA and HM Coastguard. The UK Government has committed to embrace UAS technology within future SAR provision. To meet this national intent, Bristow and the MCA have committed to trial, evaluate and exploit the potential of UAS to complement the current and future UK SAR services.

3.2 Current regulations mandate UAS operated Beyond Visual Line of Sight (BVLOS) of the UAS operator without detect and avoid capability must do so within 'Segregated Airspace'. This proposal documents Bristow's application for temporary danger area (TDA) for the purpose of airspace trial iaw CAP 1930/CAP1616.

4. MCA Letter of Support



Maritime &
Coastguard
Agency

Phil Hanson
Bay 3/27
Spring Place
105 Commercial Road
Southampton
SO15 1EG

Tel: +44 (0) 20 381 72567
E-mail: philip.hanson@mcga.gov.uk

To whom it may concern,

2 June 2020

Reference: Letter of support to accompany Bristow Level 2 Airspace Proposal

1. The MCA offers its full support to this proposal from Bristow Helicopters Limited (BHL) in support of their drone prototype service (BHL UAS PS).
2. Whilst this is a BHL initiated project, it was commenced in response to a clear statement of need from the MCA to increase the use of innovation in delivery of Search and Rescue (SAR), both to increase the efficiency of delivery and to reduce the risk to personnel involved in the rescue.
3. The MCA has just embarked on the procurement of the UK's second generation SAR service (UKSAR2G), which proposes revolutionary change and innovation in the way SAR is delivered. Key among which is the expectation that UAS could play a significant part by having the potential to transform the search component of SAR; specifically to:
 - a. Increase the efficiency of search leading to Improved outcomes, whereby isolated personnel are found more quickly, leading to less injuries and/or a less severe condition, and reduced anxiety.
 - b. Reduce the risk to life for all SAR personnel.
 - c. These efficiencies can be reinvested in terms of the deployment of assets such as MCA Coast Rescue Teams, lifeboats and SAR Helicopters by providing improved situational awareness (SA) giving up to date on scene information. The teams will therefore go in to a 'known' situation. It will also assist in the assessment of false alarms with good intent.

- d. The increased SA will also give the decision makers information to be able assess the task and deploy the most appropriate asset.
 - e. Reduced environmental impact by reduced flying time of SAR Helicopters
- 4. The MCA believes that the BHL UAS PS, alongside the MCA Drone Demonstration and Development Project (3DP), is designed to help prove the above hypotheses and provide empirical evidence to support procurement decision making.
- 5. The procurement is expected to take 2+ years, but the requirement will largely be fixed in the next 6-12 months, and therefore it is critical that outputs from the BHL UAS PS can be delivered in a timely manner.
- 6. The MCA is not only fully supportive of the BHL UAS PS, it will engage fully, playing its part in the proof of concept tasking and coordination process. Where the evidence is compelling, and subject to an approved business case, the MCA will also consider introducing UAS into service in the current UKSAR Helicopter contract, meaning that the drone can be offered as an MCA Declared Asset.

Yours sincerely



Phil Hanson

5. What is the change?

5.1 The nature of SAR taskings dictates that UAS involved in SAR operations must be proven in mountainous, coastal and maritime environments. The proposed airspace trial has therefore been designed to encompass areas to include all these environments whilst providing opportunity to develop and evolve the integration of UAS within UK airspace.

5.2 This airspace concept of operation will further support the evaluation of tactical UAS in support of UK SAR whilst providing a valuable body of evidence to best inform the future use of UAS in this role.

5.3 Airspace will be managed through signed agreements with RAF Valley and Caernarfon AT who will provide DAAIS and DACS as required. UAS activity will be routinely limited to individual sectors within the complex at any given time. Specifically, Caernarfon ATZ should only be affected as the UAS departs and recovers. To allow dynamic tasking and as agreed with the CAA and Caernarfon through signed agreement, there is no requirement to NOTAM Caernarfon ATZ.

5.4 For planned activity, it is proposed that each activation should be programmed in advance, with a NOTAM issued usually two to three days before activation, and never less than 24 hours prior.

6. Why do you need to be consulted?

- 6.1 Prior to any airspace change, the sponsor (Bristow) must consult with all stakeholders and third parties to identify the potential impacts of the airspace change. Bristow aims to engage with all parties to minimise impact on other airspace users; and, where practicable, will adjust its plans accordingly.
- 6.2 The views and opinions of all stakeholders will be submitted in full via the Airspace Change Portal for consideration by the CAA once Bristow. The proposed locations and concepts of operation detailed in this submission have been carefully selected to provide maximum benefit whilst minimising the impact to other airspace users.

7. Aims

- 1. Establish trials airspace to test and evaluate UAS as a potential complementary asset to current UK SAR capability.
- 2. Trial and evaluate emerging airspace management and OEM derived detect and avoid solutions with a view to evolving concepts of operation for wider UAS integration in UK airspace.
- 3. Provide a body of evidence to support UAS safety case development and a transition to more porous and dynamic airspace solutions to support UAS flight in non-segregated airspace.

8. Objectives

8.1 Key objectives:

1. Secure a temporary danger area (TDA) iaw CAP1930/1616 to support trial activity which will provide segregated airspace to enable the beyond visual line of sight (BVLOS) operation of the Schiebel S-100 Camcopter from Caernarfon Airport within the confines of the construct detailed later in this document. Airspace will be activated and de-activated as required by NOTAM.
2. The operational evaluation of the Schiebel S-100 Camcopter for potential future integration into UK SAR capability.
3. Trial and evaluation of OEM derived detect and avoid technology.
4. Trial and evaluation of emerging electronic conspicuity solutions to facilitate known traffic environments with the aim of providing wider airspace integration options for UAS.
5. Trial and evaluation of VHF re-broadcast system. (via UAS data link).
6. Use the minimum amount of airspace required to permit viable UAS operations whilst managing the impact to other stakeholders and manned aircraft through effective communications and air traffic integration.

9. Regulations

9.1 UK airspace is regulated by the Civil Aviation Authority (CAA) and as such all proposed airspace changes in relation to UAS and Airspace Trials are subject to its regulatory approval. Bristow are required to adhere to the process detailed in CAP1930/CAP1616 as managed via the CAA, Airspace Change Portal.

[CAP1930: Testing Novel Technology in UK Airspace: A Guide for Innovators](#)

[CAP1616: Airspace change: Guidance on the regulatory process for changing the notified airspace design and planned and permanent redistribution of air traffic, and on providing airspace information](#)

9.2 This document represents Bristow's consultation and invitation to external stakeholders to comment regarding this proposal. A full list of stakeholders can be found in Annex A.

9.3 In line with the CAP 1616 process and on completion of the consultation phase, this completed proposal and all stakeholder interaction will be submitted to the CAA for consideration. The decision of the regulator will be final in all cases regarding applications for airspace change.

10. Consultation period

10.1 In submitting this proposal, Bristow welcomes your feedback. This consultation period begins on 19th October 2020 and closes 16th November 2020.

11. How to Respond

11.1 Feedback is sought on the trial airspace proposal set out within this document.

11.2 Please provide responses using either of the correspondence details below:

Email:

- airspaceconsultation@bristowgroup.com
- When doing so please entitle the subject 'Bristow Airspace Trial Proposal'

or,

Address:

- **Bristow Airspace Trial**
Bristow UAS
Dyce Avenue Dyce,
Aberdeen
AB21 0LQ

11.3 Any responses must be received by 17th November 2020 for consideration.

12. What happens to your response?

12.1 All responses, both electronic and written will be reviewed by Bristow to inform and guide the application for the CAA to appropriately assess our proposal, all original stakeholder responses will have key identifying data redacted prior to uploading to the Airspace Change Portal as required by the CAA. The CAA Airspace Portal provides an open source platform to ensure transparency during the application process. All stakeholder responses are included with the application empowering the CAA to make an independent assessment and final judgement.

12.2 Bristow recognise it is particularly important that stakeholders have a voice within the application process and present this forum to pass comment on the proposal. Should your organisation have no comment, nil returns are appreciated and assumed as accepting.

12.3 Should Bristow require clarification regarding your response we may contact you to ensure we fully understand your concern.

12.4 In the interest of transparency, any personal information from the feedback received will be removed prior to any publishing by the CAA; the content however will remain unchanged. All data passed to the CAA is bound by the Data Protection Act 2018. All information processed will be done so in accordance with the Bristow GDPR policy.

13. Civil Aviation Authority

13.1 Any process related feedback should be directed to CAA airspace regulation department, who can be contacted using the following:

Email:

airspace.policy@caa.co.uk

or,

Address:

Airspace Regulation
Aviation House,
Gatwick Airport South
Gatwick
West Sussex
RH6 0YR

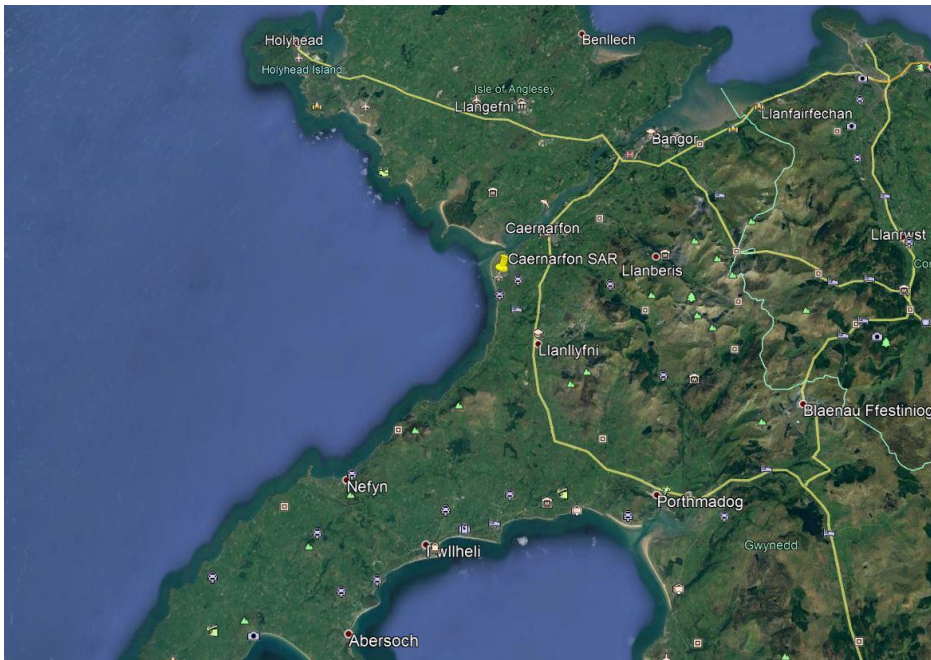
14. The Location

14.1 Located on the mainland coast of North Wales, separated from the Island of Anglesey by the Menai Strait, [Caernarfon Airport](#) has a CAA Ordinary Licence (Number P866) that allows flights for the public transport of passengers or for flying instruction as authorised by the licensee (Air Caernarfon Limited).

The airport has a licensed runway: 08/26, an unlicensed one: 02/20 and a disused runway which form a triangle layout.



Caernarfon Airport



Wider Area Google Image Overview

15. Current use (Bristow SAR(H))

15.1 Since 1 July 2015 Bristow has successfully and safely delivered SAR operations on behalf of HM Coastguard with Caernarfon Airport forming part of the new, national UK SAR infrastructure. The SAR helicopter base is equipped with two Sikorsky S92A aircraft at Caernarfon and provides 24/7, all weather SAR cover across the region.



15.2 Current use (Bristow SAR, UAS PS)

15.3 Collocated with Bristow SAR at Caernarfon, Bristow UAS commenced initial assessment operations in Jan 2020 and continue to operate two, civil registered Scheibel S100 Camcopter in support of the UAS PS project. Now fully endorsed by the MCA, Bristow UAS have also begun State UAS operations in support of UK SAR and HM Coastguard.

15.4 Flight operations are carried out within the previously approved Caernarfon TDA and North Wales TDA complex/s. Both areas were managed by RAF Valley/Caernarfon DAAIS as appropriate and are designed as such to assess the platform's suitability for wider UK SAR operations.



15.5 Other Users

15.6 Caernarfon airport is predominantly used by small fixed wing aircraft, helicopters and microlights. Several companies based at the airport offer flight training, air experience, pleasure flying and charters. RAF Valley aircraft routinely train within the area and other military traffic visits periodically for refuelling.



15.7 North Wales Flight Academy offers fixed wing training for the issue of a PPL (A) and other fixed wing qualifications. Microlight traffic forms a considerable part of the local aerodrome traffic and flight training is provided by The Microlight School. Helicopter training is also undertaken at the airport. There is also a helicopter simulator located inside the Air world Aviation Museum.

15.8 Effective stakeholder engagement and locally agreed SOPs has proven the siting of the UAS PS at Caernarfon Airport has had little to no effect on the resident GA community. All GA traffic is strictly PPR only.



15.9 Home to Helimed 61, providing emergency air cover for the whole of North Wales. Locally agreed with the operator, to date the UAS PS has successfully deconflicted UAS operations with HEMS activity through effective lines of communication and stakeholder engagement.

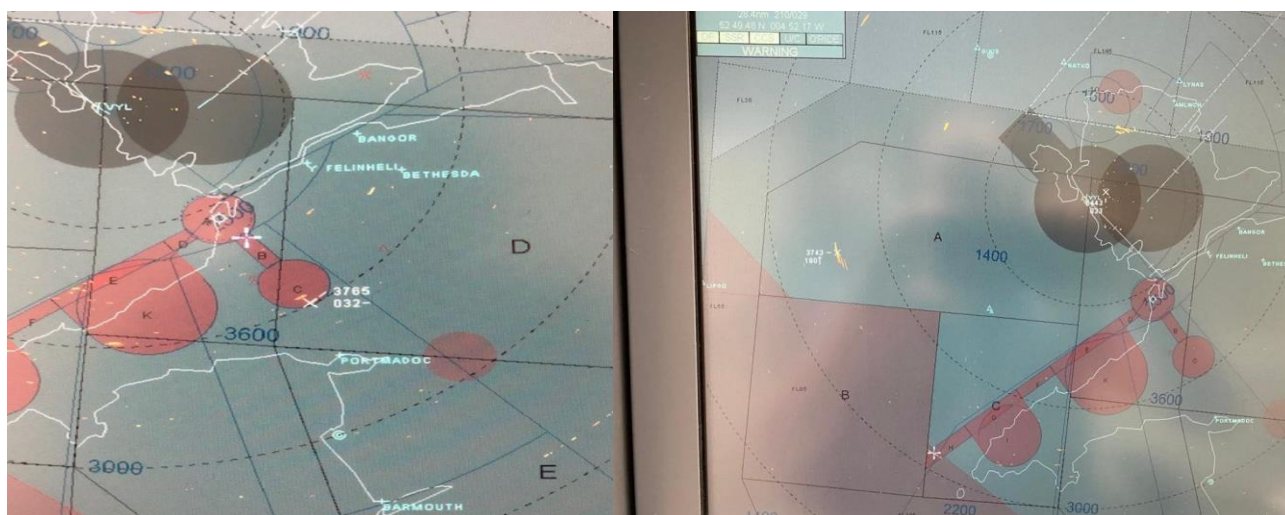


15.10 Caernarfon is also occasionally frequented by visiting military aircraft primarily exploiting the option to refuel at the airport. This activity is notified and pre-booked with the airport.

15.11 Wider Airspace Interaction (RAF Valley DAAIS/DACS)

15.12 In addition to local deconfliction and as evidenced through wider interaction with RAF Valley, UAS PS operations in the region continue to be successfully deconflicted with other air users and currently present no further complication to normal manned aviation in the region. Effective and continued flexible use of the 'segregated' airspace is achieved through agreed concepts of operation with Bristow, the CAA and RAF Valley. These 'first of type' approvals include key policy changes to allow Bristow UAS crews to broadcast on VHF as a 'faux' airborne asset allowing direct interaction with ATC authorities.

15.13 RAF Valley RADAR services have also played a pivotal role in early flight trials designed to validate the positional accuracy of the UAS via the interrogation of onboard electronic conspicuity devices. This has played a key role in establishing both operator and stakeholder confidence in the system.



16. Bristow UAS Legacy DA Operations in the Region

UAS CONOP Demo 2018

16.1 In summer 2018, Bristow UAS secured CAA permission to operate the Schiebel S100 Camcopter UAS Beyond Visual Line of Sight (BVLOS). A Temporary Danger Area (TDA) enabled Bristow UAS to conduct a successful, but limited, series of flying demonstrations based around SAR scenarios. These demonstrations included co-ordination and co-operation with manned SAR helicopters. The event was attended by key members from the CAA, MCA, DfT and UK emergency services.

16.2 The lessons learned and identified during this demonstration activity form the next stages of the Bristow trial and evaluation of the platform, and the CAA has been engaged throughout the development of the programme.

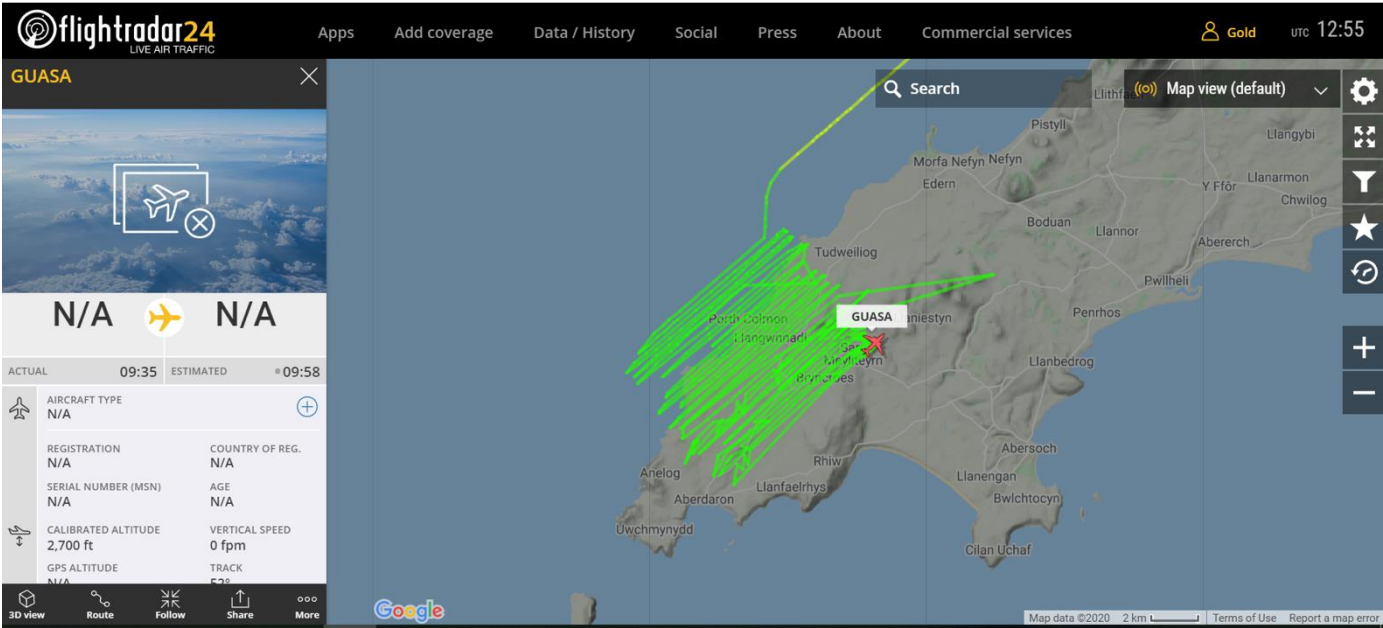
16.3 Along with key partners, Bristow UAS activity will further the overall evolution of unified or unmanned traffic management systems (UTM) in support of future UAS operations in non-segregated airspace.



17. UAS_PS 2020

17.1 Bristow launched the UAS PS based from Caernarfon Airport employing two Scheibel S100 Camcopter UAS in January 2020. Whilst leveraging the advantages of co-location with UK SAR (H), the main project objectives were the initial evaluation of the S-100 platform and its potential sensor configuration as a viable option for complementary operations in the SAR role.

17.2 To support this activity bespoke operating approvals and airspace agreements were established to provide access to the key environments required to rigorously test and evaluate the platform and sensors in maritime, coastal and mountainous regions.



18. Danger Area Definition

18.1 UK law as described within the Air Navigation Order (ANO) the following definition is given:

‘A Danger Area is a defined portion of airspace which has been notified as such within which activities dangerous to the flight of aircraft may take place or exist at such times as may be notified’

normally activated by a Notice to Airmen (NOTAM).

The ANO can be accessed at the following web site:

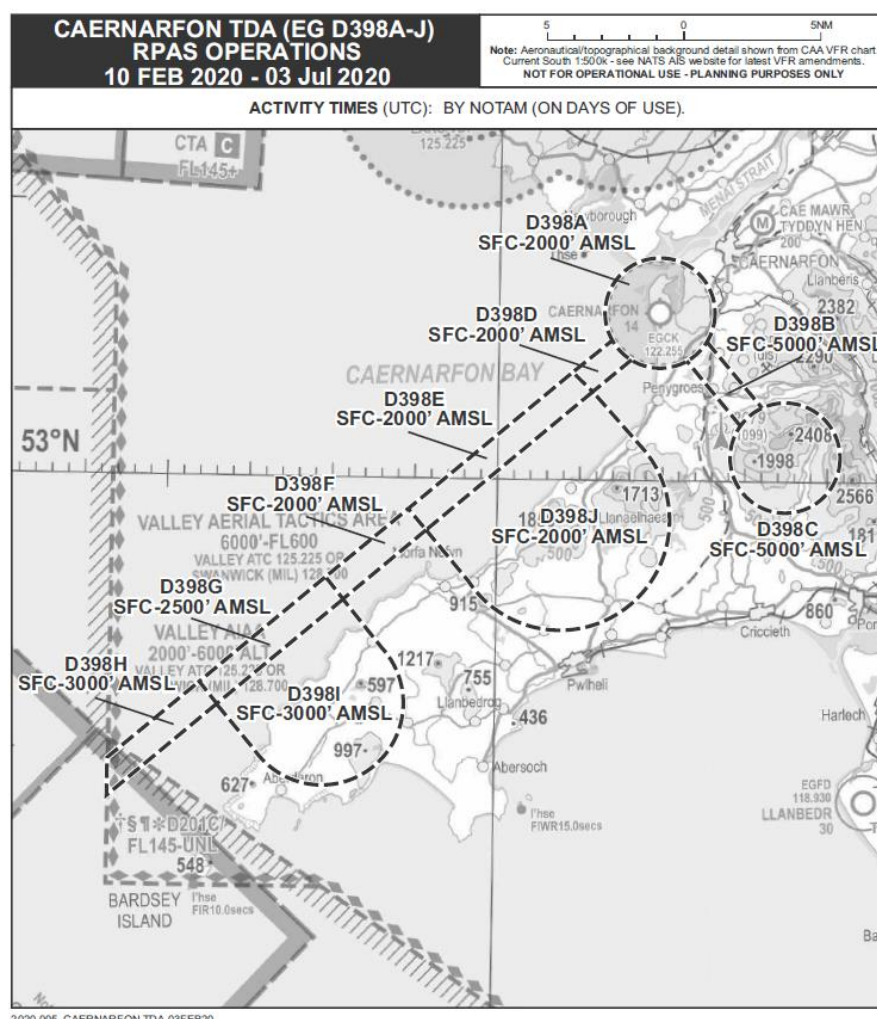
http://publicapps.caa.co.uk/docs/33/CAP393_Fifth_edition_Amendment_13_March_2019.pdf

19. Legacy Airspace Use in the Region

Caernarfon TDA Complex

19.1 The following airspace was established to facilitate initial BVLOS UAS trial and evaluation in the SAR role in 2020. Due to the nature of temporary airspace its use was restricted to a maximum of 90 days from activation. Following successful completion of this first viability trial, Bristow have taken the decision to further investigate UAS capability under a more appropriate and enduring airspace trial solution. This application forms part of Bristow's next steps to evaluate UAS in scenario-based trial activity along with testing novel technology to support the development of wider UAS integration within UK airspace.

19.2 Previous approvals detailed below. Note: - D398A (Caernarfon ATZ) does not require activation and extension of this TDA complex is granted until 02 August 2020 due to the impact of Covid-19.



19.3 MCA State Requirement Airspace

19.4 Due to the impact of COVID-19 on some Search and Rescue functions, an urgent requirement to implement RPAS systems to conduct patrols and the search function of SAR operations to ensure manned assets remain available where required was identified. In order to implement this replacement service, the Civil Aviation Authority deemed it appropriate to promulgate several Temporary Danger Areas of accommodate this state requirement.



20. Unmanned Aircraft Systems (CAA definition)

20.1 Unmanned Aircraft Systems (UAS) are a new and evolutionary component of the aviation system, offering several new and exciting opportunities, as well as a number of challenges.

- Unmanned aircraft come in a variety of shapes and sizes, ranging from small handheld types up to large aircraft, potentially a similar size to airliners and, just like manned aircraft, they may be of a fixed wing design, rotary winged, or a combination of both. It is CAA policy that UAS operating in the UK must meet at least the same safety and operational standards as manned aircraft. Thus, UAS operations must be as safe as manned aircraft insofar as they must not present or create a greater hazard to persons, property, vehicles or vessels, whilst in the air or on the ground.

20.2 Unmanned Aircraft may also be referred to as:

- Drones
- Remotely Piloted Aircraft Systems (RPAS)

- Unmanned Aerial Vehicles (UAV)
- Model Aircraft
- Radio Controlled Aircraft

20.3 Regardless of the name used, they all share the common characteristic that the person responsible for piloting the aircraft is not on-board. Just like any other aircraft, however, an unmanned aircraft must always be flown in a safe manner, both with respect to other aircraft in the air and to people and properties on the ground.

20.4 The CAA's primary aim is to enable the full and safe integration of all UAS operations into the UK's total aviation system.

21. UAS operation Types

21.1 The first principle when discussing the regulation of any UAS is to determine how it is being operated and what process is being used to avoid it colliding with other aircraft, objects or people, which is the primary responsibility of anyone who flies any aircraft.

21.2 UAS are either operated:

21.3 Within the Visual Line of Sight (VLOS) of the person flying the aircraft

21.4 This means that the aircraft must be able to be clearly seen by the person flying it at all times when it is airborne. By doing this, the person flying the aircraft is able to monitor its flight path and so manoeuvre it clear of anything that it may collide with. While corrective spectacles can be used to look at the aircraft, the use of binoculars, telescopes, or any other image enhancing devices are not permitted.

In simple terms, the aircraft must not be flown out of sight of a human eye.

21.5 Beyond the Visual Line of Sight (BVLOS) of the person flying the aircraft

21.6 If the person flying the aircraft is unable to maintain direct unaided visual contact with it while it is airborne, then an alternative method of collision avoidance must be employed in order to ensure that it can still be flown safely.

21.7 BVLOS flight will normally require either:

- a technical capability which is equivalent to the ability of a pilot of a manned aircraft uses to 'see and avoid' potential conflicts - this is referred to as a Detect and Avoid (DAA) capability;
- a block of airspace to operate in which the unmanned aircraft is 'segregated' from other aircraft - because other aircraft are not permitted to enter this airspace block, the unmanned aircraft can operate without the risk of collision, or the need for other collision avoidance capabilities;
- clear evidence that the intended operation will have 'no aviation threat' and that the safety of persons and objects on the ground has been properly addressed.

22. UAS Categories

22.1 Within the UK, UAS are currently split into separate categories according to their weight (or mass) as follows:

- 20kg or less - Small Unmanned Aircraft - this class covers all types including traditional remotely controlled model aeroplanes, helicopters or gliders, as well as the increasingly popular multirotor

'drones' and remotely controlled 'toy' aircraft. They normally have a reduced level of regulation imposed on them which is aimed at being proportionate to the risk and complexity or their types of operation.

- >20kg - UAS Unmanned aircraft within this class will normally be subjected to the same level of regulatory approval requirement as would be used for traditional manned aircraft. They will normally be assessed in accordance with by the European Aviation Safety Agency (EASA) guidelines. As Bristow are the incumbent Search and Rescue contract holder, Bristow unmanned aircraft will be operated under State remit and be classed as Annex II aircraft.

22.2 Further Guidance on UAS operations within UK airspace can be found in the UK guidance document CAP

722. https://publicapps.caa.co.uk/docs/33/CAP722_Edition7_A3_SEP2019_20190903.pdf

23. UAS Operational Safety Cases

23.1 Bristow UAS hold all relevant CAA exemptions for the Schiebel S-100 BVLOS flight in accordance with the requirements stipulated in CAP 722 Edition 7 Sept 2019 and CAP 722A First Edition.

24. Unmanned Aircraft System to be operated

- 24.1 Bristow UAS are currently evaluating the Schiebel S-100 Camcopter and various payloads as part of the UAS PS.



Schiebel S-100 Camcopter fitted with Wescam MX10 and Oceanwatch PT8 'Vidar'

24.2 The Schiebel S-100 Camcopter is a sub 150kg (dry) UAS employed by military and civilian organisations alike with some 400+ units operating worldwide. It has accrued in excess of 50,000 flying hours. This robust Vertical Take-off and Landing (VTOL) UAS needs no prepared area or supporting launch or recovery equipment.

24.3 The aircraft can operate for up to 10 hours depending on role fit during both day and night (standard role fit 5-6 hours endurance), under adverse weather conditions. The UAS has a potential operating range of 200 km, both on land and at sea. The S-100 navigates automatically via pre-programmed GPS waypoints or can be operated directly with a pilot control unit. Missions are planned and controlled via a simple point-and-click graphical user interface. Encrypted, high-definition payload imagery is transmitted to the UAS control station in real time and can be exported securely to key stakeholders.

24.4 Utilising "fly-by-wire" technology and controlled by redundant flight computers, the UAV can complete its mission automatically in complex environments akin to manned rotary capability at significantly lower risk and cost. Its carbon fibre and titanium fuselage can accommodate a wide range of payload / endurance combinations.

24.5 Electronic conspicuity is provided by a dedicated transponder module consisting of a Mode S transponder and optional ADS-B transponder. The Bristow UAS ground station is also equipped with a VHF radio to allow UAS crews, air traffic control agencies and other manned aircraft to communicate directly on the appropriate channel. In addition to its surveillance payloads the S-100 is also fitted with a forward-looking camera, permanently displayed and monitored in the ground control station to assist in terrain, obstacle and traffic avoidance.

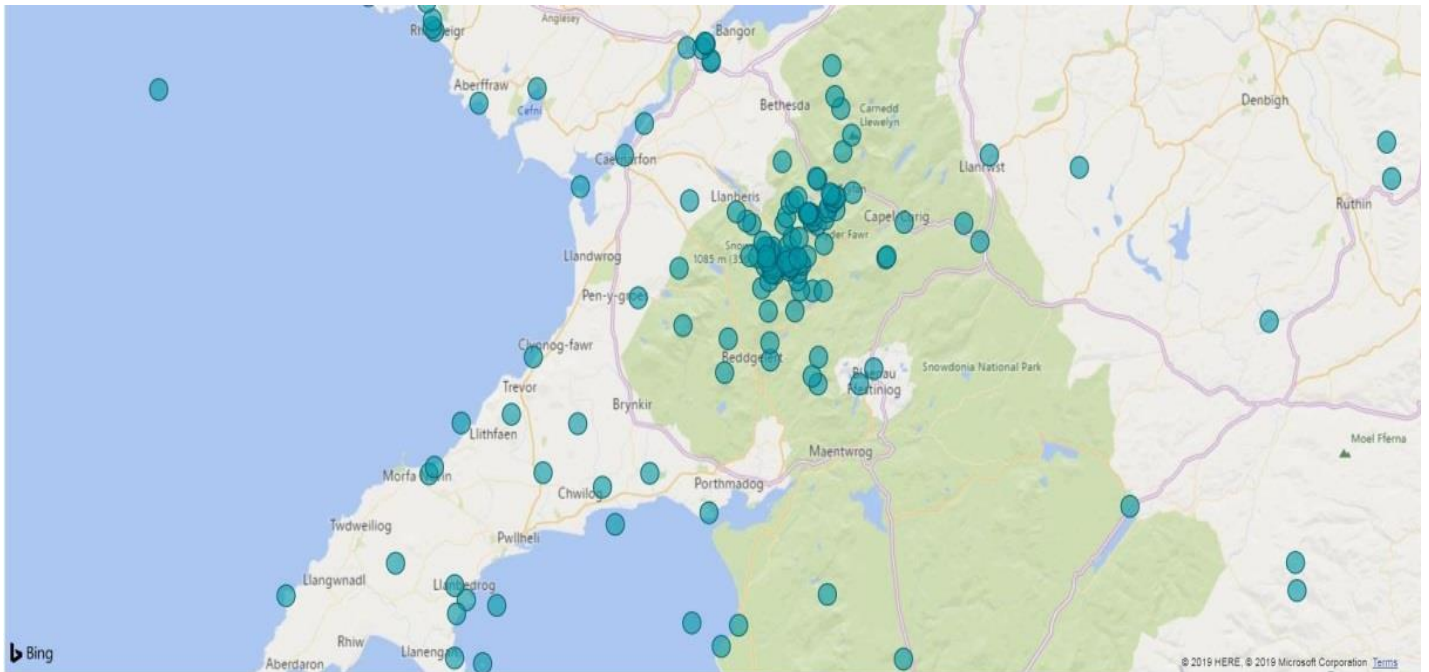
STAGE 3: CONSULT

25. Why Caernarfon?

25.1 Caernarfon has been selected for a range of reasons. These include:

1. Leverage current airfield facilities, regional air traffic control and established Bristow infrastructure on site. **Importantly**, Caernarfon will provide Bristow with the opportunity to co-locate both manned and unmanned SAR assets together in a region of high operational commitment. This is considered crucial in understanding the potential benefits of UAS and its support to manned SAR aviation.
2. Provide an opportunity for cohesive trial operations and further UAS CONOP development with Bristow SAR(H), other local air users and the Maritime Coastguard Agency.
3. Provide a realistic and varied environment for both maritime, coastal and mountainous operations within the Irish Sea and North Wales.
4. Provide an opportunity to further develop effective UTM through the exploitation of electronic conspicuity (EC) equipment and effective integration with local air traffic control agencies.
5. Provide opportunity to trial and evaluate emerging airspace management technology and OEM derived detect and avoid solutions with a view to evolving concepts of operation for wider UAS integration in UK airspace.

25.2 Regional SAR(H) tasking statistics

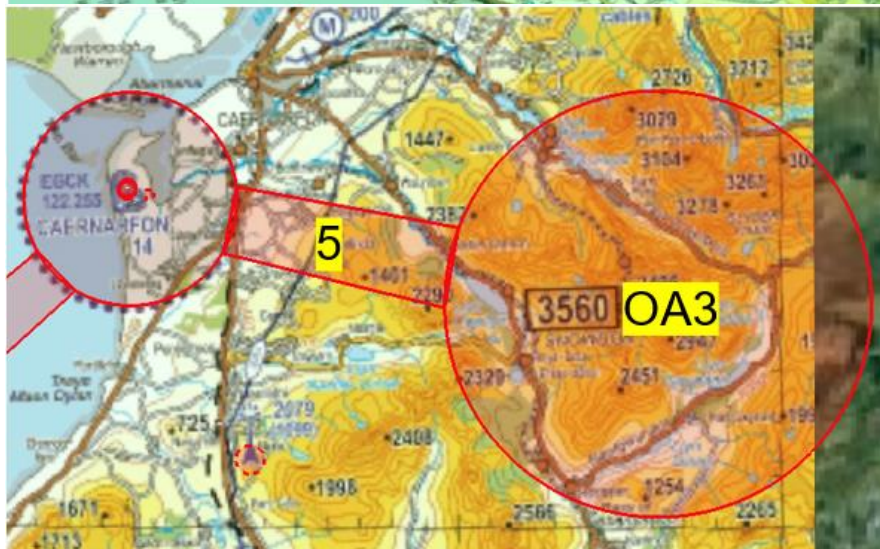
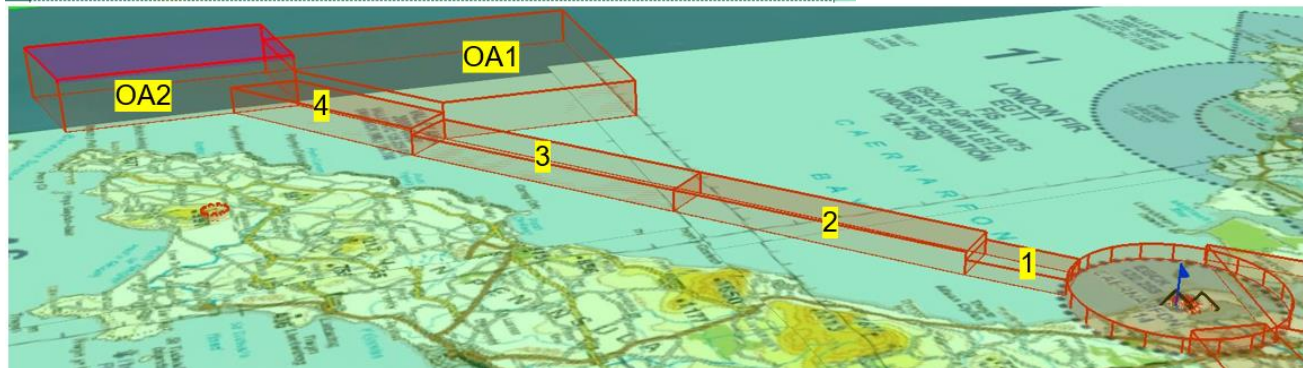


2018 SAR(H) taskings: - DfT)

26. Airspace Trial Proposal

26.1 N/A

26.2 Airspace Trial Overview



26.3 Airspace Trial Coordinates

Area Name	Area Description	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Height - Relative to sea level
Transit 1	Transit Corridor	N53°03'55.00°	W04°25'31.00°	SFC - 2000ft AMSL
Transit 1	Transit Corridor	N53°05'8.00°	W04°23'8.00°	SFC - 2000ft AMSL
Transit 1	Transit Corridor	N53°04'24.00°	W04°21'57.00°	SFC - 2000ft AMSL
Transit 1	Transit Corridor	N53°03'4.72°	W04°24'21.11°	SFC - 2000ft AMSL
Transit 1	Transit Corridor	N53°03'55.00	W04°25'31.00°	SFC - 2000ft AMSL
Transit 2	Transit Corridor	N52°59'46.23°	W04°33'38.79°	SFC - 3000ft AMSL
Transit 2	Transit Corridor	N53°03'55.00°	W04°25'31.00°	SFC - 3000ft AMSL
Transit 2	Transit Corridor	N53°03'4.72°	W04°24'21.11°	SFC - 3000ft AMSL
Transit 2	Transit Corridor	N52°58'53.54°	W04°32'25.18°	SFC - 3000ft AMSL
Transit 2	Transit Corridor	N52°59'46.23°	W04°33'38.79°	SFC - 3000ft AMSL
Transit 3	Transit Corridor	N52°55'18.90°	W04°42'20.03°	SFC - 3000ft AMSL
Transit 3	Transit Corridor	N52°59'46.23°	W04°33'38.79°	SFC - 3000ft AMSL
Transit 3	Transit Corridor	N52°58'53.54°	W04°32'25.18°	SFC - 3000ft AMSL
Transit 3	Transit Corridor	N52°54'24.65°	W04°40'59.60°	SFC - 3000ft AMSL
Transit 3	Transit Corridor	N52°55'18.90°	W04°42'20.03°	SFC - 3000ft AMSL
Transit 4	Transit Corridor	N52°52'23.63°	W04°48'20.93°	SFC - 4000ft AMSL
Transit 4	Transit Corridor	N52°55'18.90°	W04°42'20.03°	SFC - 4000ft AMSL
Transit 4	Transit Corridor	N52°54'24.49°	W04°40'59.55°	SFC - 4000ft AMSL
Transit 4	Transit Corridor	N52°50'50.53°	W04°48'20.26°	SFC - 4000ft AMSL
Transit 4	Transit Corridor	N52°52'23.63°	W04°48'20.93°	SFC - 4000ft AMSL
OA1	Operating Area	N53°00'0.00°	W04°53'21.00°	SFC - 5500ft AMSL
OA1	Operating Area	N53°00'0.00°	W04°42'19.00°	SFC - 5500ft AMSL
OA1	Operating Area	N52°55'18.90°	W04°42'20.03°	SFC - 5500ft AMSL
OA1	Operating Area	N52°52'23.63°	W04°48'20.93°	SFC - 5500ft AMSL
OA1	Operating Area	N52°51'55.00°	W04°53'20.99°	SFC - 5500ft AMSL
OA1	Operating Area	N53°00'0.00°	W04°53'21.00°	SFC - 5500ft AMSL
OA2	Operating Area	N52°52'23.63°	W04°48'20.93°	SFC - 8000ft AMSL
OA2	Operating Area	N52°46'59.00°	W04°48'20.00°	SFC - 8000ft AMSL
OA2	Operating Area	N52°46'12.00°	W04°53'21.00°	SFC - 8000ft AMSL
OA2	Operating Area	N52°51'55.00°	W04°53'21.00°	SFC - 8000ft AMSL
OA2	Operating Area	N52°52'23.63°	W04°48'20.93°	SFC - 8000ft AMSL
Transit 5	Transit Corridor	N53°04'05°	W0041029	SFC - 3000ft AMSL
Transit 5	Transit Corridor	N530506	W0041721	SFC - 3000ft AMSL
Transit 5	Transit Corridor	N530607	W0042015	SFC - 3000ft AMSL
Transit 5	Transit Corridor	N530506	W0041721	SFC - 3000ft AMSL
Transit 5	Transit Corridor	N530627	W0041657	SFC - 3000ft AMSL
Transit 5	Transit Corridor	N530627	W0041657	SFC - 3000ft AMSL
Transit 5	Transit Corridor	N530535	W0041003	SFC - 3000ft AMSL
Transit 5	Transit Corridor	N530409	W0040351	SFC - 3000ft AMSL
Transit 5	Transit Corridor	N530435	W0041003	SFC - 3000ft AMSL
Transit 5	Transit Corridor	N530505	W0041029	SFC - 3000ft AMSL
OA3	Operating Area	N530409	W0040351	SFC - 7000ft AMSL

27. Airspace predicted usage

27.1 Maritime Complex

- Areas: Transit 1 - 4, OA1 and OA2. (Likely OA1 or OA2)
- DACS provided by RAF Valley during opening times.
- Estimated average usage 2 to 3 days per week.
- Monday – Sunday. Weekend use likely to be 1 weekend per month.

27.2 Land / Mountainous Complex

- Areas: Transit 5 and OA3.
- DAIS provided by Caernarfon Tower during opening times.
- Estimated average usage 1 day per week, subject to LOA.
- Monday – Sunday. Weekend use likely to be 1 weekend per month.

28. Activation/Deactivation of TDAs

28.1 The TDA by their very nature, would not be permanently active but would instead be activated by utilising Notice to Airmen (NOTAM). A NOTAM is an aviation specific notification system that is widely used and understood within the aviation community. This activation would occur a minimum of 24 hours prior to use but in general would occur two-three days prior. This would therefore enable dissemination of the information through the Standard NOTAM system.

28.2 TDAs will only be activated for the duration of the UAS serial and would be deactivated on completion. Bristow does not intend to use more than one unmanned air vehicle at a time.

28.3 Through effective consultation and planning, TDA activation will aim to optimise periods when traffic from other users is at a minimum.

29. Airspace Management

29.1 Airspace management will be conducted in accordance with Caernarfon AT and RAF Valley LoAs and agreed procedures. All the afore mentioned documents support this application and form part of the Bristow UAS approved OSC.

- RAF Valley will manage and provide DAAIS and DACS when the TDA complex is open.
- In times when RAF Valley is closed, Caernarfon Airport will provide DAAIS as arranged.
- Detailed communications plan can be found in the afore mentioned LoAs and within the Bristow UAS OSC as approved by the CAA.

29.2 ***It is not Bristow's intent to deny airspace.*** Mirroring manned traffic management, the DAAIS will manage all airborne assets in the complex and allow, access through, under or over the sector in question if deemed safe to do so. The S100's positional accuracy has been verified by RAF Valley RADAR during collaborative flight trials. This will be achieved through effective communication with the air traffic controlling authority and interrogation of electronic conspicuity as detailed in Bristow UAS BVLOS operating safety case.

29.3 The CAA is supportive of the managed segregation within the Caernarfon ATZ, Caernarfon TDA via agreed local procedures. There is no requirement to NOTAM Caernarfon ATZ as a TDA sector.

29.4 The CAA's policy on managed and flexible segregation requires TDAs to be broken down into sectors. While these are less easy to plot, and to draw to the attention of traffic unfamiliar with them, they will be much less restrictive to those who regularly and routinely use this airspace. This revised system has been employed successfully since inception in Jan 2020 and means that other traffic need only avoid the sector that the UAS is within at that time.

29.5 UAS Electronic Conspicuity (EC) is provided by an integrated MODE S/ADS-B transponder module providing visibility, tracking and real time location of the UAS. This system also integrates with detect and avoidance technology such as the Traffic Collision Avoidance System (TCAS II), as fitted to Bristow SAR(H) and RAF Valley, military aircraft. The S-100 is also fitted with a forward-looking camera, permanently displayed and monitored in the ground control station to assist in terrain, obstacle and traffic avoidance.

29.6 The UAS system incorporates a VHF radio allowing direct communication between the UAS crew, ATC and other aircraft operating on the appropriate frequency. ***This mirrors the concept of operation for manned airspace management.*** The system already forms part of the CAA approved, Bristow UAS operational safety case and was successfully demonstrated during UAS operations from Llanbedr airfield in 2018 and continues as a vital cornerstone of UAS PS operations. Bristow UAS S-100 unmanned aircraft and Bristow S92 SAR (H) operated together during simulated SAR taskings in both the Cardigan Bay and inland over mountainous terrain.

29.7 Effective deconfliction with manned assets occurs on an almost daily basis during UAS PS flight serials.

29.8 Redundant ground radio and/or telephone links will be established between Bristow UAS, Bristow SAR, Caernarfon Radio and Valley ATC prior to ops to mitigate against air-air communications failure.

29.9 Co-location at Caernarfon Airport facilitates joint pre-flight briefing between SAR(H), UAS crews and AT thus providing the maximum potential for operational understanding and safe MUM-T events.

30. Airspace Flexibility

30.1 Segregation of the new airspace into clearly defined areas increases airspace flexibility. Sector TDAs can be opened and closed dynamically. Use of Caernarfon ATZ will be limited to periods when the UAS is departing and recovering or as arranged and coordinated through Caernarfon Ops. Where safe to do so, AT may permit take off and landings from Caernarfon Airport and along with coordination with RAF Valley, crossings of the required Temporary Danger Areas sector/s by other aircraft as required.

30.2 This will be facilitated via established radio communication between the UAS crew, the governing AT authority/s and the asset/authority requesting access to the TDA sector. Caernarfon AT will provide an advisory role to local traffic, providing information on what sectors of the TDA are active. RAF Valley ATC will control and coordinate its traffic in the vicinity of the NOTAM and provide tactical control of the TDA/s. This is detailed and agreed within Letter of Agreement (LOA) between Bristow and RAF Valley.

31. Emergency Access

31.1 In the event emergency access is required for take-off/landing or access into the TDA by other manned aircraft such as Wales Air Ambulance or Bristow SAR(H), then this would be facilitated and coordinated by the relevant AT authority. The UAS will be instructed by ATC to either return to base via a safe route, hold current position, ascend/descend or move to one of the other TDAs to provide safe separation from the required flight path of the emergency response aircraft.

32. Impact Mitigation on Existing Users

32.1 Caernarfon has wide ranging existing users. In order to reduce the impact to those users the following mitigating steps exist/will be taken:

1. UAS will be operated from existing Bristow SAR location routinely used by UK SAR helicopters.
2. The intended operation of UAS from Caernarfon does not involve a planned increase in existing infrastructure.
3. Caernarfon UAS operations will not involve extensive 'circuits' being flown. The UAS will launch, climb to altitude and then depart on task. On recovery, the UAS will return to base under the control of ATC and establish within the area, descend and then recover.
4. The S-100 leads the UAS market in terms of regulatory approvals, safety and redundancy systems.
5. Bristow UAS will be flown by highly experienced, former military manned and unmanned pilots.

6. Access to airspace not currently occupied by the UAS will be coordinated by the relevant DAAIS as NOTAM'd allowing the day to day operation at the airport and the wider region to continue. Details for approaching aircraft are provided via AIC and will be added to the NOTAM.
7. All non-emergency air traffic into Caernarfon is based on Prior Permission Request (PPR).
8. UAS operations are proposed to take place over a three-day period within any seven-day calendar week. Night flying will be rare.
9. TDAs will be activated via NOTAM by BHL as required.

33. Local Landowners and Residents

33.1 Permission was sought and granted from the airfield owner; AIR CAERNARFON LTD to base the Bristow UAS capability at Caernarfon Airport. UAS will conform to the flight procedures and restrictions detailed in the previously mentioned Aeronautical Information Publication (AIP) for Caernarfon Airport and agreed Caernarfon UAS SOPs.

http://www.ead.eurocontrol.int/eadbasic/pamslight-EF6F8EA1E85656848A1E6928468698F7/7FE5QZZF3FXUS/EN/AIP/AD/EG_AD_2_EGCK_en_2018-11-08.pdf

33.2 Landowners and residents living out with this jurisdiction can be overflown in accordance with the approvals granted to Bristow UAS by the CAA. No overflight of a congested area of a city or settlement will be attempted in accordance with the definition of a 'congested area' laid out in the Air Navigation Order (CAP 393).

http://publicapps.caa.co.uk/docs/33/CAP393_Fifth_edition_Amendment_13_March_2019.pdf

33.3 All Bristow UAS operations will be carried out in accordance with the Bristow UAS operational safety case approved by the CAA.

34. Options Considered.

34.1 No Action

- Currently, the CAA stipulates that UAS must operate in segregated and managed airspace in the form of danger areas.
- BVLOS UAS operations would therefore not be permitted from Caernarfon without the establishment of this segregated/managed airspace.

34.2 Use Existing Danger Areas/Segregated Airspace

34.3 There are established danger areas within the region where UAS are already permitted to operate BVLOS. A proposal to utilise these areas to achieve the aim was considered. This option has the following disadvantages:

- None of the existing danger areas, which enable BVLOS UAS operations, connect to Caernarfon Airport.
- No option to collocate UAS with SAR(H) without redeployment of manned assets on live, 24hr call.
- Limit the scope and quality of UAS trial and evaluation in the SAR role over varied terrain.

- Expose Bristow commercial Intellectual Property to third parties.
- Less opportunity to develop UTM.
- Limit the opportunity to evolve and integrate UAS.
- Reduced the size of the TDAs.
- The TDAs have been designed to deliver no more than the absolute minimum space to safely and effectively deliver the trial objectives.

35. Summary

35.1 Bristow intends to amend and develop an established TDA complex in the vicinity of Caernarfon Airport as supported by the MCA. This is to undertake essential, government sponsored, UAS developmental work in support of UK SAR operations.

35.2 The Schiebel S-100 is a market leader in terms of its technical maturity, safety and redundancy systems. Bristow UAS S-100 crews are highly experienced ex-military aviators. The TDAs and their management thereof, have been designed to minimise impact on other airspace users whilst providing maximum potential benefit.

35.3 In accordance with CAP 722 on completion of the consultation period an agreed proposal will be submitted to the CAA SARG to make the final regulatory decision.

36. Responding

36.1 To aid response a series of questions have been included within Annex A and to help form consultees responses.

36.2 Please provide responses using either of the correspondence details below:

Email:

- airspacetrialconsultation@bristowgroup.com
- When doing so please entitle the subject 'Bristow Airspace Trial Proposal'

or,

Address:

- **Bristow Airspace Trial**
Bristow UAS
Dyce Avenue Dyce,
Aberdeen
AB21 0LQ

36.3 Any responses must be received by 17th November 2020 for consideration.

37. List of Stakeholders

37.1 A list of both internal and external stakeholders is laid out within Bristow UAS stakeholder Management Manual.

STAGE 4: UPDATE/SUBMISSION

38. Revisions following stakeholder engagement

38.1 None to effect.

Annex A

Airspace Proposal Response Questions

1. What type of air user are you (examples below)?

- Member of the General Aviation community:
 - Balloon
 - Fixed Wing 0-2 Tonne MTOW
 - Fixed Wing 2+ Tonne MTOW
 - Glider
 - Hang Gliding and Paragliding
 - Helicopter
 - Microlight
 - Model aircraft
 - Unmanned Aerial System Operator
 - Other. Please specify (below).

- Member of the commercial aviation industry, broken down further by:
 - Airline
 - Airport
 - Air Navigation Service Provider
 - Business Aviation
 - Unmanned Aerial System Operator
 - Other. Please specify (free text box)

- Central or local government body including military

- National representative organisation e.g. trade association ▪ Local organisation e.g. community action group.

- Other. Please specify (free text box)

2. Where do you normally operate from / travel to?

3. Do you have any safety concerns?

4. What if any impact will this airspace proposal have on your activities?

5. If relevant, How can we amend the proposal to minimise any long-term effects on your aviation activities?

6. Do you have any other feedback?