



ACP – 2022 – 104

Final Submission

CAELUS Project Trial D – Lothian and Borders

June 24

Version 9

## Contents

<b>1</b>	<b>INTRODUCTION</b>	<b>3</b>
1.1	CAELUS PROJECT	3
1.2	CAP 1616 ACP SUBMISSION	3
1.3	STATEMENT OF NEED	4
1.4	CONCEPT OF OPERATIONS	6
<b>2</b>	<b>AIRSPACE</b>	<b>7</b>
2.1	OVERVIEW OF OPERATIONS	7
<b>3</b>	<b>UAV AIRCRAFT</b>	<b>9</b>
<b>4</b>	<b>AIRSPACE</b>	<b>11</b>
<b>5</b>	<b>OPERATIONS</b>	<b>18</b>
5.1.1	Deconfliction Principles	18
5.1.2	Infringements	20
5.1.3	Communications	20
5.1.4	Emergency TDA/TSA Access	21
5.1.5	Weather	21
5.1.6	Emergencies	
<b>6</b>	<b>ENVIRONMENTAL AND NOISE IMPACTS</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>7</b>	<b>STAKEHOLDERS AND ENGAGEMENT</b>	<b>29</b>
<b>8</b>	<b>COMPLAINTS</b>	<b>29</b>
<b>9</b>	<b>SAFETY ASSESSMENT</b>	<b>30</b>
<b>10</b>	<b>SUMMARY</b>	<b>30</b>

Figure 1 : RIGITECH EIGER EVTOL

Figure 2 : Proposed TSA/TDA Routing

Figure 3 : Population density map with flight routes overlaid - Royal Infirmary of Edinburgh

Figure 4 : The closest buildings and sensitive noise receptors to the Royal Infirmary of Edinburgh TOLP

Figure 5 : Population density map with flight routes overlaid - East Lothian Community Hospital

Figure 6 : The closest buildings and sensitive noise receptors to the East Lothian TOLP

Figure 7 : Population density map with flight routes overlaid - Borders General Hospital

Figure 8: The closest buildings and sensitive noise receptors to the Borders General Hospital TOLP

## List of Tables

Table 1. Periods of Activation Proposed.....	10
Table 2. Rigitech EIGER EVTOL Specification .....	12

## Introduction

### 1.1 CAELUS Project

This temporary change for an airspace trial is in support of the CAELUS ConOps which looks to trial various aspects of an ecosystem that could be required to facilitate a drone service for NHS, capable of being scaled to operate nationally. The trials will aim to further understanding of the safe operations of BVLOS and indeed all airspace operations in controlled airspace while validating the important potential elements involving NHS services. The flights for this temporary change are planned within a TDA and where appropriate a TSA. UAS operations will need to scale to meet the demand of the populous associated with conurbations. This temporary change enables the project to evaluate and develop the supporting systems in the round across the whole ecosystem to ensure safe and equitable integration of crewed and uncrewed operations whilst providing NHS staff valuable opportunity to understand how a service might operate and to compare across diverse geographies by working within multiple health boards in Scotland. The TDA and TSA provides the safety of flight for all airspace users with the intention to reduce the segregation as these supporting systems are validated, developed and approved by the regulator.

### 1.2 CAP 1616 ACP Submission

CAELUS submitted a DAP 1916 22 Dec 22 for a trial ACP for BVLOS operations in the vicinity of Edinburgh Airport in the Borders and Lothian region to facilitate UAS operations between the Royal Infirmary of Edinburgh and East Lothian Community Hospital and also the Royal Infirmary of Edinburgh and the Borders General Hospital. An assessment meeting was held virtually on 03 May 23 between members of the CAELUS Consortium and the CAA Airspace Regulation (AR) team and RPAS Team. During the Assessment Meeting it was agreed that it would be appropriate for ACP 2022-

104 to follow the Temporary Change process as per CAP 1616. A redacted version of the minutes of that meeting was uploaded to the CAA portal on the 21 May 23 together with a redacted version of the presentation.

This document forms part of the CAELUS Consortium submission to the CAA for consideration under the CAP 1616 process for a temporary change and should be read in conjunction with the OSC submitted to the CAA RPAS team by Skyports.

### 1.3 Statement of Need

The Statement of Need submitted is replicated below for ease of reference:

#### Project Overview

The CAELUS (Care & Equity – Healthcare Logistics UAS Scotland) consortium is led by AGS Airports Ltd on behalf of NHS Scotland and the consortium partners and part funded by Innovate UK through the Industrial Strategy Challenge fund, Future Flight competition. The project which brings together AGS Airports, NHS Scotland, NATS, ATKINS, Cellnex, Connected Places Catapult and 10 other companies are working together to demonstrate the viability of a national drone network that can transport essential medicines, bloods and other medical supplies throughout Scotland. The project will deliver a Concept of Operations (CONOPS) for the transition to fully integrated UAS operations at a national level. This specific workstream, led by NATS will develop and publish a phased approach outlining proposed airspace constructs and detailing regulatory and technology gaps required to enable the transition. Elements of this CONOPS will be validated through live flight operations, differentiating CAELUS from other projects by seeking to move the industry forward by proposing and validating a method of operations that are fully integrated and sustainable.

#### Opportunities /Need

##### Healthcare opportunity

With approximately 26% of Scotland's population living in remote or rural areas spread across 69% of the land mass, service delivery can encounter constraints which contributes to treatment inequity. NHS Scotland encompassing the Territorial Boards and Scottish Ambulance Service (SAS) views the adoption of Unmanned Aircraft

Systems (UAS) or drones as an opportunity to transform the patient experience and reduce the impact of traffic congestion and CO2 emissions. Key to this is the driver of the NHS Scotland Recovery Plan (2021) which highlights the essential need for research, innovation and redesign as integral to the recovery of NHS Services. For both SAS and NHS Scotland equity in the delivery of healthcare is a key driver for involvement in this project as NHS Scotland considers how to remobilise and redesign services to address the needs of Scotland's health and social care challenges. A current strategic directive for SHIP (Scottish Health Industry Partnership) is to grow the economy (community wealth building) and support remobilisation, accelerating the adoption of Innovation into NHS and Social Care (Life Sciences in Scotland, 2022). A drone-based network has the potential to reduce mileage and produce significant time saving opportunities improving patient experience, outcomes and equity in care delivery. As a formal partner of the consortium, NHS Scotland via lead board NHS Grampian, are providing a joined-up approach bringing input and expertise from health boards and SAS under the "Once-for Scotland" banner. The NHS will define and support at ground level the clinical use cases that will be flown or simulated in the live and digital demonstrations.

### Informing Regulation

Today, most beyond visual-line-of-sight (BVLOS) UAS operations can only be conducted within segregated airspace<sup>1</sup>. The most common way to achieve this is to establish temporary danger areas (TDAs) for the UAS to operate within. Current regulation is designed to consider a per flight basis without means to provide a scalable solution. Recognised detect and avoid capabilities are basic. CAELUS intend to validate a developed concept of operations around airspace structure and use that is scalable and sustainable.

### Proposed Operations

We aim to utilise volumes of segregated airspace across Scotland in a total of 5 locations to enable us to prove elements of our proposed future concept of integrated airspace. For this proposal, we intend to fly in the Borders and Lothian region representing use

---

<sup>1</sup> CAA Policy CAP 2533 requires the operation of BVLOS operations within Class D airspace to take place within a Temporary Segregated Area (TSA).

cases for NHS Lothian and NHS Borders. The use cases will require the airspace to be in place for a maximum of 8 weeks with expected flying during 4 of those weeks. Our proposal is that we activate the segregated airspace for limited duration. The airspace dimensions and duration of activation will be informed by stakeholder feedback. This segment of flying will be undertaken by Skyports. A system of ADS-B Receivers<sup>2</sup> will be deployed to demonstrate an additional layer of situational awareness to the UAV pilot along the flying routes and contribute to the Detect and Avoid solutions that will form part of the demonstrations.

## 1.4 Concept of Operations

1. The CAELUS project is supported by a ConOps that has been provided to the CAA and the flights conducted during the activation of the TDA's and TSA's in accordance with the SEGREGATED phase described in CAP 2533. Evidence gathered will be used to support this in order to work towards the ACCOMMODATION phase of BVLOS flights in unsegregated airspace and to meet the following objectives in a safe manner:
  - a. Demonstrate safe integrated BVLOS operations in the vicinity of commercial airport operations inside Controlled Airspace
  - b. Determine level of impact for crewed aviation
  - c. Demonstrate UA Remote Pilot (RP) can communicate with ATC to ensure airspace is only segregated when absolutely necessary, minimising impact to other airspace users.
  - d. Demonstrate the UTM capabilities that could enable upscaling and integration in the future through adoption of technology (such as sharing of flight intent data, mission requests, conformance monitoring)
  - e. Produce final report which can be used by CAA to enable a pathway to regulation.
2. The ConOps have been developed to align and be consistent with CAP 1711 CAA Airspace Modernisation Strategy 2033-2040 Pt 1 vision.

The CAELUS consortium has developed a mapping of the trial objectives that will be assessed during the flights planned for this ACP. This work has been completed through several workshops held within the CAELUS Consortium. The output of this is attached

---

<sup>2</sup> 1 It should be noted that this is part of the CAELUS trial and will in no way be used in operational context for separation standards, detect and avoid or any other safety measure but it will be used to gather data in support of the ConOps and CAELUS project.

to the ACP submission as Appendix 1 and demonstrates how each objective maps to a Future of Flight 3 'parent' objective together with details of the data and outcomes necessary to demonstrate the success of the trial objectives.

3. The following data will be gathered in order to validate success of the defined objectives and to inform any advice and recommendations to the stakeholders/regulators involved in similar trials:
  - a. Operations fully conducted as per identified procedures. Any deviations from ideal uninterrupted flights are in agreement with pre-defined contingency procedures (e.g., rally point landing) and pose no additional risk.
  - b. Record any events that would not have occurred if the UAV trial did not take place. That includes aircraft delays, refused/delayed clearances, transits of airspace.
  - c. Collection of feedback via interview/questionnaire by ATC and RP.
  - d. Gather CAA feedback on the received results. Agree on acceptable repetition required to confirm the concept; agree on any acceptable changes to the processes that would bring the trial a step closer to being considered "routine operations".
  - e. Calculations and data recording to determine the surveillance (non-operational) and UTM partners (Plane Finder and ANRA) systems benchmarks.

## 2 Airspace

### 2.1 Overview of Operations

The activity undertaken will consist of a series of live flights between Royal Infirmary of Edinburgh and East Lothian Community Hospital and also the Royal Infirmary of Edinburgh and the Borders General Hospital. The flights will take place over the course of 4 weeks (20 Flying Days) with a payload provided by the NHS. The live trial will see the Skyports UAV flying for 4 weeks during the validity of the AIC (target AIC publication date 25 July 24) and commencing on 29 July 24 at the earliest to ensure aviation stakeholders have sight of the AIC and promulgate of the activation via NOTAM prior to commencing operations.

Operations will take place over a 4-week period with periods of activation up to twice a day. In light of Engagement feedback and the potential for confliction with the Hang

Gliding community in the Borders we have adjusted the schedule so that activation of the TDA through the Borders is complete by 10:00L as shown in Table 1 below.

	AM Activation		PM Activation	Comments
Week One	0700 – 1000 L	or	1300 – 1600 L	The AM timeslot will be utilized solely for Edinburgh to Borders and the PM timeslot will be utilised solely for Edinburgh to East Lothian route. Only one TDA (Route) will be activated at a time. 3-6 one-way flights are expected to be completed (1-2 flights per hour) Only one TDA Route will be activated at a time.
Week Two	0700 – 1000 L	and	1300 – 1600 L	The AM timeslot will be utilized solely for Edinburgh to Borders and the PM timeslot will be utilised solely for Edinburgh to East Lothian route. Only one TDA (Route) will be activated at a time.
Week Three	0700 – 1000 L	and	1300 – 1600 L	The AM timeslot will be utilized solely for Edinburgh to Borders and the PM timeslot will be utilised solely for Edinburgh to East Lothian route. Only one TDA (Route) will be activated at a time.
Week Four	0700 – 1000 L	and	1300 – 1600 L	The AM timeslot will be utilized solely for Edinburgh to Borders and the PM timeslot will be utilised solely for Edinburgh to East Lothian route. Only one TDA (Route) will be activated at a time.
Note 1	Activation periods described above are maximum durations and could be reduced on particular days if not operationally required.			
Note 2	Special Use Airspace Activity Information Service will be provided by Edinburgh ATC and Scottish Information on the status of the TDAs.			
Note 3	Skyports will promulgate the TDA activation times and contact details of the Flight Operations Team by NOTAM at least 24 hours before the planned use.			

Table 1 Periods of activation proposed during the 4-week period



Activation periods described above are maximum durations and will be reduced on particular days if not operationally required.

### 3 UAV Aircraft

Skyports DS will be using the Rigittech EIGER for drone delivery operations, supplied by an unmanned aircraft system (UAS) manufacturer. The UAS has been specifically selected by Skyports to further enhance air safety through the addition of ADS-B 1090 IN and OUT, and Mode S, to further reduce the air risk profile of our operations and improve situational awareness.

Skyports have submitted their OSC to the CAA RPAS team and further details of this UAV can be found within Skyports OSC Vol.2 Rigittech EIGER. It is acknowledged that any approval of the ACP will be subject to the OSC approval, and no activation of the airspace will be possible without it.

An image of the Rigittech EIGER at Figure 1 and Table 2 below show the image and UAV specifications respectively.



*Figure 1 – Rigittech EIGER EVTOL*

Table 2. Rigittech EIGER EVTOL specifications

Name	Rigittech EIGER EVTOL
Flight Performance	<u>Max Range</u> 80 kms <u>Cruise Speed</u> 60 kts IAS
OEW/MTOW	19kgs/22kgs
Operating Conditions	<u>Max wind speed:</u> 30kts with gusts up to 44kts <u>Precipitation:</u> Light rain (less than 2.5mm per hour) indefinitely <u>Temperature range:</u> No flight in Icing Conditions
Transponders	Transponder 1090ES ADS-B Out and ADS-B IN, which can process uncertified ADS-B signals and Mode S

## 4 Airspace

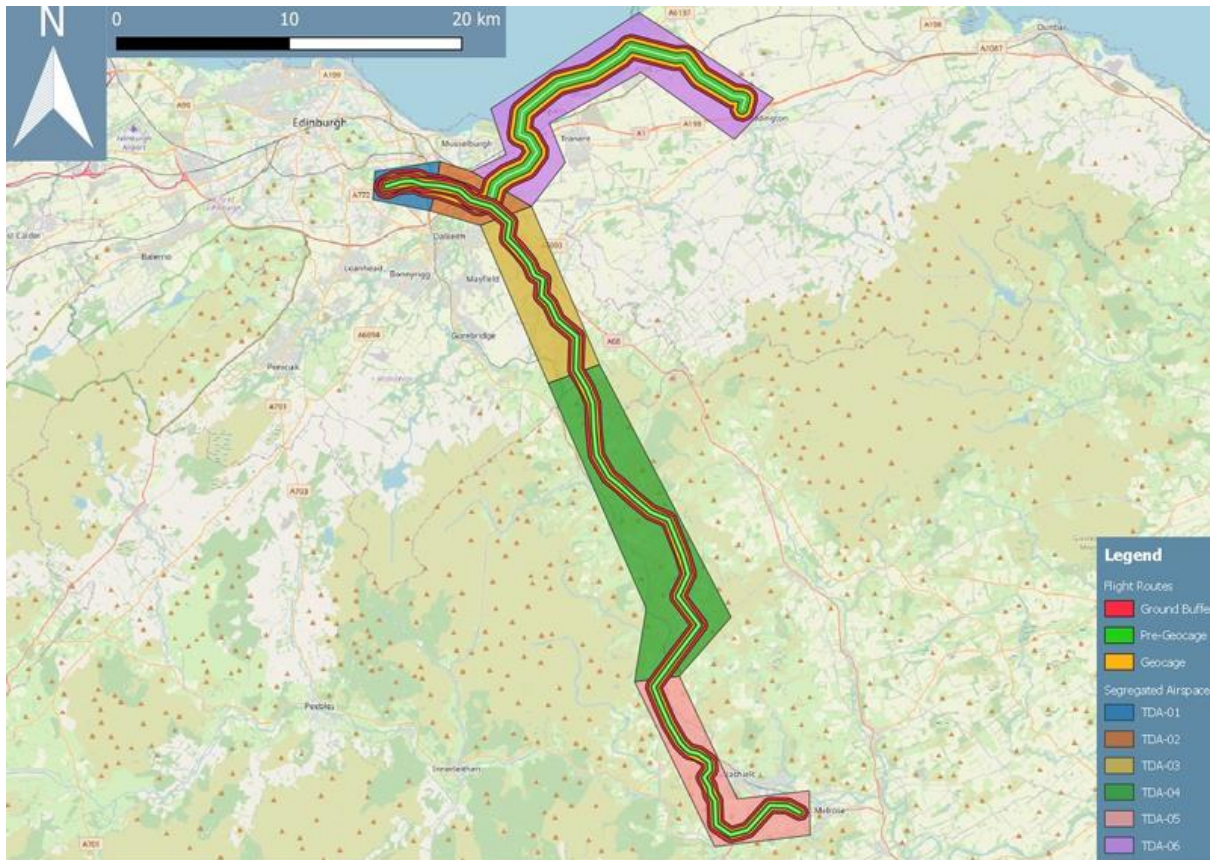


Figure 2 - Proposed routing with TDA and TSA segments detailed

The route itself is designed in such a way, so that it lies predominantly over sparsely populated areas and where possible over the sea (see noise assessment). The route is designed to mitigate populous and infrastructure ground risk, and the impact of noise pollution.

The TSA and TDA segments have vertical dimensions of Surface Level to a maximum of between 1000ft AMSL and 1650ft and lateral dimensions of 2-4 Kms and are in the form of a corridor which is segmented as shown at Figure 5 above. Either the East/West Route TSA/TDA 1,2 and 6 or the North/South Route, TSA/TDA 1,2,3,4 and 5 may be notified as active with the constituent TSA/TDA segments being subject to NOTAM.

At a meeting on 18 April 24 the CAA challenged the route between Royal Infirmary of Edinburgh and East Lothian Community Hospital. Through engagement EAST FORTUNE AIRFIELD and the BMAA were not content with the routing over the sea and we informed them at the time that the route minimises exposure to ground obstructions

and noise. They did not accept the argument. SKYPORTS have revisited the route and determined the following:

“Skyports has planned this route in line with its operations manual and safety management system that has been approved a number of times by the CAA. Within these documents, rules for route planning are set out which are adhered to by all of our pilots and route planners. Given this, Skyports is proceeding with the route suggested due to the lower ground risk associated with that route compared to flying over land”.

Therefore, having reviewed our decision regarding the use of an oversea route we intend to stay with the existing plan.

This route was revisited again on 6 June 24 in conjunction with the CAA to look again at the proposal by East Fortune Airfield/BMAA to further examine a route further south. The decision was still to remain with the proposed route to remain unchanged and following the coastal route because of these factors on the alternative route:

- The route goes over land rather than sea so ground risk cannot be mitigated to ALARP.
- The route is longer, so higher risk (ground and air, even though in a TDA) through longer "exposure".
- As the proposed new routing is longer, it would mean that battery swaps on would be required on both sides of the route and can't do return missions which impacts on the commercial viability significantly as more equipment, people required.
- The Approach path from proposed route is more challenging, requiring a tight turn and descent with short back transition leg.

Also on 6 June 24 the CAA questioned the routing towards Borders General Hospital in terms of the route being too adjacent to some buildings and in particular the Nursery adjacent to the TOLP. In agreement with the CAA the route has been amended accordingly providing more buffer against the identified buildings and the Nursery but without affecting the TDA dimensions.

## Special Use Area Policy

On 12 February 24 the CAA published “Policy Statement POLICY FOR THE ESTABLISHMENT AND OPERATION OF SPECIAL USE AIRSPACE”. This was the date of submission for this ACP which consequently did not include that Policy. However, now it is being resubmitted the new policy has been taken into account and is now reflected within this ACP. In particular the following design principles from the policy have been utilised.

- When designing SUA structures, the following design principles shall be considered:
  - It should be as small as practicable and should be contained within simple geometric limits to allow for easy reference to all concerned parties. (
  - The lateral and vertical limits should consider adjacent airspace and endeavour to minimise the impact to other airspace users.
  - Activation times should be the minimum required to facilitate the requirements for the SUA.

## Buffer Policy

The activity within the TSA and TDA is a hazardous activity in accordance with the CAA Buffer Policy. However, Edinburgh ATC are the controlling authority for the CTR within which the proposed TSA is embedded and have been part of the development of the TSA/TDA design and operating procedures, CAELUS2 is seeking dispensation from the buffer policy for the ACP-2022-104. The UA is also subject to an ORA approval, which contains the evidence that the hazardous activity of BVLOS flight can be contained within the planned volume of airspace. Edinburgh ATC have written a DRAFT LoA between themselves and Skyports which reflects the agreed procedures.

## Adjacent ACPs

The CAA Airspace Change Portal has been reviewed to check on any adjacent ACPs and if there is any impact on this ACP. There are no ACPs that impact in either time or space.



## DRAFT AIC

### TEMPORARY DANGER AREA LOTHIAN and BORDERS

#### BVLOS RPAS NHS DELIVERY SERVICE TRIAL

**29 July 2024 and 23 August 2024**

1. During the period between 29 July 24 and 23 August 24 a Remotely Piloted Aircraft System (RPAS) will conduct BVLOS operations between Edinburgh Royal Infirmary and East Lothian Community Hospital and between Edinburgh Royal Infirmary and Borders General Hospital in the BORDERS and LOTHIAN District of Scotland. Depending on location the RPAS will operate up to a maximum of 1650ft AMSL.
2. As the RPAS will be operating Beyond Visual Line of Sight and does not have full Detect and Avoid capability, a Temporary Danger Area complex will be established as below. The RPAS is also equipped with an ADS-B in/out and Mode-S transponder.
3. The TDA complex is sponsored by AGS Airports Ltd on behalf of the NHS for Scotland in accordance with Airspace Change reference ACP-2022-104
4. Only the danger areas required for each flight will be activated to minimize impact to other air users.
5. The required TDAs will be notified for activation by NOTAM no less than 24 hours prior to the planned flights.
6. **EGDXXX1**. When required between 29 July 24 and 23 August 24, a TSA is established within the area bounded by straight lines joining successively the following points and an arc or Radius centred on 555700N 032221W going clockwise from 555428N 030514W to 555559N 030442W.  
  
555559N 030442W  
  
555541N 030817W  
  
555448N 030824W  
  
555428N 030514W  
  
555559N 030442W
7. The TSA is established between surface and 1000 FT AMSL.
8. Within EGDXXX1, a Special Use Area Activity Information Service (SUA AIS) will be available from EDINBURGH RADAR on frequency 121.205 MHz.or SCOTTISH Information on 119.875MHz.

**9. EGDXXX2.** When required between 29 July 24 and 23 August 24, a TDA is established within the area bounded by straight lines joining successively the following points and an arc or Radius centered on 555700N 032221W going clockwise from 555559 N 030442 W to 555428 N 030514 W:

555428N 030514W

555401N 030228W

555436N 025938W

555541N 030257W

555559N 030442W

555428N 030514W

**10.** The TDA is established between surface and 1000 FT AMSL.

**11.** Within EGDXXX2, a Special Use Area Activity Information Service (SUAAIS) will be available from EDINBURGH RADAR on frequency 121.205 MHz.or SCOTTISH Information on 119.875MHz.

**12. EGDXXX3.** When required between 29 July 24 and 23 August 24, a TDA is established within the area bounded by straight lines joining successively the following points:

555401N 030228W

554907N 025843W

554942N 025553W

555436N 025938W

555401N 030228W

**13.** The TDA is established between surface and 1400 FT AMSL.

**14.** Within EGDXXX3, a Special Use Area Activity Information Service (SUAAIS) will be available from EDINBURGH RADAR on frequency 121.205 MHz.or SCOTTISH Information on 119.875MHz.

**15. EGDXXX4** When required between 29 July 24 and 23 August, a TDA is established within the area bounded by straight lines joining successively the following points:

554907N 025843W  
554207N 025319W  
553950N 025358W  
554001N 025130W  
554151N 024839W  
554942N 025553W  
554907N 025843W

**16.** The TDA is established between surface and 1650 FT AMSL.

**17.** Within EGDXXX4, a Special Use Area Activity Information Service (SUA AIS) will be available from EDINBURGH RADAR on frequency 121.205 MHz.or SCOTTISH Information on 119.875MHz.

**18. EGDXXX5.** When required between 29 July 24 and 23 August 24, a TDA is established within the area bounded by straight lines joining successively the following points:

**19.**

553950N 025358W  
553442N 024933W  
553504N-024417W  
553627N 024420W  
553611N-024818W  
554001N-025130W  
553950N 025358W

**20.** The TDA is established between surface and 1400 FT AMSL.

**21.** Within EGDXXX5, a Special Use Area Activity Information Service (SUA AIS) will be available from EDINBURGH RADAR on frequency 121.205 MHz.or SCOTTISH Information on 119.875MHz.

**22. EGDXXX6.** When required between 29 July 24 and 23 August 24, a TDA is established within the area bounded by straight lines joining successively the following points:

555436N 025938W  
555557N 025747W  
555710N 025840W  
555845N 025336W  
555640N 024827W  
555756N 024618W  
560035N 025343W  
555737N 030153W  
555612N 030103W  
555541N 030257W  
555436N 025938W



- 23.** The TDA is established between surface and 1000 FT AMSL.
- 24.** Within EGDXXX6, a Special Use Area Activity Information Service (SUAAIS) will be available from EDINBURGH RADAR on frequency 121.205 MHz.or SCOTTISH Information on 119.875MHz.
- 25.** Further information regarding a SUACS/SUAAIS can be found within UK Enroute Information ENR 1.1 – General Rules.
- 26.** Further enquiries can be made to Airspace Regulation (Utilisation), Safety and Airspace Regulation Group, Civil Aviation Authority on telephone number 01293768202.
- 27.** As part of the ACP process requirements, AGS Airports Ltd collecting feedback and complaints regarding this TDA and its impact over its duration which will be shared with the CAA. All feedback regarding this may be sent via email to caelus2airspace@traxinternational.co.uk
- 28.** Note: Further enquiries can be made to Airspace Regulation (Utilisation), Safety and Airspace Regulation Group, Civil Aviation Authority via email to arops@caa.co.uk

## 5 Operations

There will be no change to established aircraft routes below 7000ft, no change to existing promulgated airspace including holds or VFR reporting points. A Temporary Operating Instruction (TOI) will be in place for Edinburgh ATC and Letters of Agreement will be held between Edinburgh ATC and the UAV operator (Skyports). The Letter of Agreement is agreed in draft form subject to this ACP submission, has been submitted with this ACP submission and will be in place prior to any operations taking place and will be subject to approval from the CAA Aerodrome Inspector.

### 5.1.1 Deconfliction Principles

As the ANSP, Edinburgh ATC will be supporting the segregation of the UAV operating area and other airspace users. Temporary Danger Areas (TDA) in Class G airspace and Temporary Segregated Areas (TSA) in Class D airspace will be established and promulgated via AIC. Times of activation will be notified by NOTAM at least 24 hours in advance of drone flight operations.

There are two routes defined: Royal Infirmary of Edinburgh to East Lothian Community Hospital (TSA/TDA 1,2 and 6) which will be activated between 13:00 and 1600L only and Royal Infirmary of Edinburgh to Borders General Hospital (TSA/TDA 1,2,3,4 and 5) which will be activated between 07:00 and 10:00L only.

The TDA/TSA are sectorised and the upper limit of most sectors is 1000ft AMSL however there are two sectors on the Edinburgh to Borders route to the South of Edinburgh Airport whose upper limit is 1400ft AMSL and one sector whose upper limit is 1650ft AMSL due to the ground elevation in these areas. The drone will operate not above 400ft AGL at all times.

Engagement shows that we have reacted to comment and discussion with CLASS G Airspace users to significantly reduce any perceived impact users by clearly defining our operational timings, both in terms of operating Days and daily operating hours and by altering the TDA route where appropriate,

A Special Use Airspace Activity Information Service (SUAAIS) will be provided by Edinburgh ATC to inform airspace users of the Activity state of the TDAs in accordance

with the daily NOTAM. Much discussion took place regarding whether a Special Use Airspace Crossing Service (SUACS) or SUA AIS would be more appropriate for Edinburgh ATC to provide for this TDA complex. In making a decision to provide SUA AIS the following factors were taken into account:

- Edinburgh ATC is not a Lower Airspace Radar Service (LARS) Provider.
- The ability for Edinburgh ATC to provide an ATS throughout the TDA complex is limited due to RT coverage because of the low-level nature of the operation and the terrain in the Borders.
- The Helicopter borne Emergency Services (HEMS, SAR, Police) all require the ability to access any part of the TDA complex at short notice and that can only be achieved by direct contact with the Remote Pilot via telephone. That will be achieved directly from their AIRWAVE radios or via their own operating authorities. The mechanism to achieve that is detailed in the appropriate LoAs and is acceptable to all parties. That is reflected by emails within the Engagement Summary.
- The Helicopter borne Emergency Services require a common method for entering the TDA complex at any given point otherwise the procedure would be too complex which would be very poor from an HF point of view.

A TSA however is totally segregated airspace and when active access by other aircraft is totally forbidden. If access is required by other aircraft the TSA must be tactically deactivated by Edinburgh ATC following co-ordination with Skyports. Further details will be included in the TOI which will be subject to approval by the ATM Inspector and will be part of the condition upon which the TSA may be activated. The TSA will be operated in accordance with CAA Policy Document "Policy Statement POLICY FOR THE ESTABLISHMENT AND OPERATION OF SPECIAL USE AIRSPACE" published 12 Feb 24. In accordance with the ANSL/SKYPORTS LOA, Edinburgh ATC will be informed of the intention of any RPAS operation prior to take off with an estimate of vacating the TSA and on recovery an estimate of when the RPAS is due to enter the TSA. Additional calls will be made by SKYPORTS to confirm when the RPAS has landed safely.

We believe that due to the time limits of the operation, 20 working days, 6 hours per day, the overall impact on other airspace users is very limited and provision of SUACS over SUA AIS would not bring much additional benefit, even if it was achievable throughout the TDA Complex.

The MoD have advised us that Exercise STORM WARRIOR will be taking place that will coincide with the planned dates for this ACP. The activity is based in and around EGD 514 which has a base level of FL85. Despite the altitude differential there is a potential for an increase in Low-Level Activity associated with the Exercise during the following dates and times:

13, 15, 20, 22 August 240915-1200L.

**Project CAELUS has agreed with the MoD that it will not operate during those periods.**

### 5.1.2 Infringements

In the event of an aircraft in emergency/priority flights or infringement of CAS by unknown aircraft, the ATCOs will follow the procedures as set out in the LoA/TOI subject to approval by the CAA Aerodrome Inspector. It is acknowledged that the final approval of this ACP will be conditional upon the approval of the of the LoA/TOI.

### 5.1.3 Communications

The Remote Pilot (RP) of the drone will be located remotely at Skyports facility in Buckinghamshire. The RP has 2-way communications with Hub Operators (HO) located at each of the take-off and landing sites.

All communications between ATC and the RP will be via duplicated mobile phones for redundancy.

### 5.1.4 Emergency Access to TDA

In some circumstances Emergency Helicopters (HEMS/SAR/Police) may require access to an Active TDA. In accordance with the Skyports OSC and Edinburgh LoA the crew will contact the Remote Pilot directly on the Mobile Phone Number published on the relevant NOTAM and coordinate access to the TSA/TDA. The Remote pilot will vacate the TDA segment required by the most expeditious method following this procedure which will be captured in the appropriate LoA.

*“Emergency services shall indicate their intended point of interest by sharing grid reference. Skyports shall confirm the current location of the RPAS in relation to the helicopter. If the RPAS is flying within the same sector as the intended helicopter route, or the next TDA sector in the route, then the RPAS should aim to land within 5 minutes of getting the notification as vacating a sector might not be sufficient if extensive SAR is required. If the RPAS is in the TDA prior to the search area then the aircraft shall perform a return to base manoeuvre.”*

### 5.1.5 Weather

Drone flying weather limitations will be in accordance with the RIGITECH EIGER limitations as described in the OSC related to this ACP.

For any flight within the TSA approval of activity by Edinburgh ATC will be subject to the Edinburgh METAR showing a minimum cloud base of 1500FT and 5k visibility based on VFR within CLASS D Airspace.

The drone has a number of other weather requirements which include wind speed, temperature and precipitation. Skyports will be responsible for continuing to monitor Edinburgh METARS and TAFS to ensure all weather minima are complied with.

### 5.1.6 Emergencies

Emergency procedures are detailed in the Skyports OSC which has been submitted to the CAA RPAS Team. Further ATC emergency procedures are contained within the TOI and subject to the CAA Aerodrome Inspector.

Edinburgh ATC will develop a TOI for the safe operations of the BVLOS flights within the TSA and TDA proposed under this ACP and will be subject to CAA regulatory approval. It is understood that any airspace approved under this ACP will not be activated without the relevant TOIs having been approved.

## 6 Environmental and Noise Impacts

As part of ConOps development, the flights were carefully planned to minimise noise in the areas of operations. Skyports do not envisage any adverse impact on tranquility when operating over inhabited areas due to the following reasons:

According to previous measurements, the mean maximum sound pressure level ( $L_{ASmax}$ ) of the Swoop Kookaburra Mk III (a typical VTOL UA Skyports uses) during take-off and landing is 76dB, and that when the UA is cruising at a height of 200ft AGL is 49dB, which is virtually\_undetectable from ground<sup>3</sup>. The most audible part of the flight, i.e. take-off and landing, typically takes 17.57 seconds at standard climb/descend rate, and 8.98 seconds at maximum climb/descend rate. The UA is a hybrid-powered lift transitional platform which takes off and lands vertically. In normal circumstances, the UA will cruise at a height of 400ft AGL. While the precise noise measurement of the UA to be used on this part of the CAELUS, the Rigitech Eiger, is not available, as it shares a lot of similarities in design with the Kookaburra (both of them being fixed-wing, VTOL), and it is an even smaller, lighter model with fewer motors, we believe the noise impact of the Eiger to be very similar, if not lower, than that of the Kookaburra. The operations will take place over 4 weeks. Skyports believes the noise impact with such a short span of time, and small noise footprint, is negligible.

The routes were carefully designed so that we prioritise operating over sparsely populated areas, and also where possible over the sea. At key locations such as TOLPs, they were also chosen to be located outside/away from residential areas to minimise the noise impact during take-off and landing.

---

<sup>3</sup> 86dB and 59dB if a 10dB noise penalty is added to account for the tonal nature of drones.

**TOLP - Royal Infirmary of Edinburgh, 51 Little France Cres, Old Dalkeith Rd, Edinburgh, EH16 4SA, United Kingdom (555508N, 030746W)**

Royal Infirmary of Edinburgh - East Lothian Community Hospital

Parameter	Image
<p>Royal Infirmary of Edinburgh - Arrival and Departure</p>	<p>Figure 7: Royal Infirmary of Edinburgh Approach and Departure</p> <p>Figure 3: Population density map with flight routes overlaid - Royal Infirmary of Edinburgh</p>

Figure 3 - Population density map with flight routes overlaid - Royal Infirmary of Edinburgh



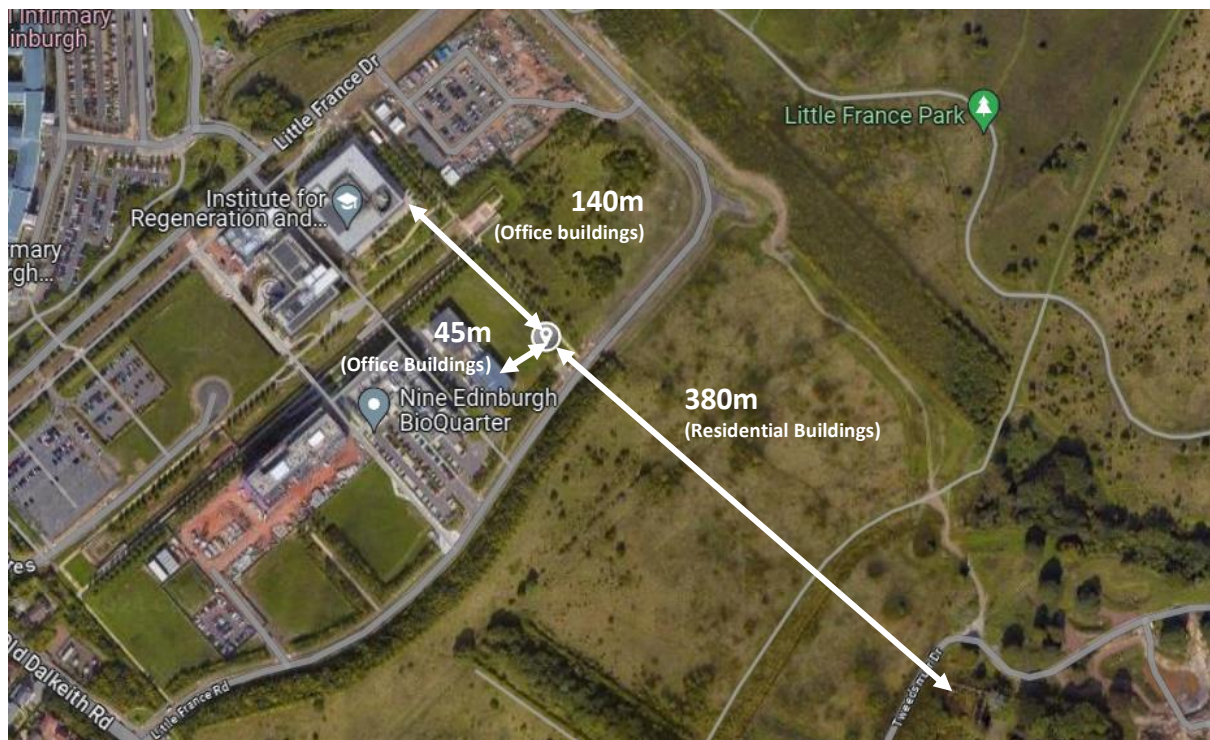


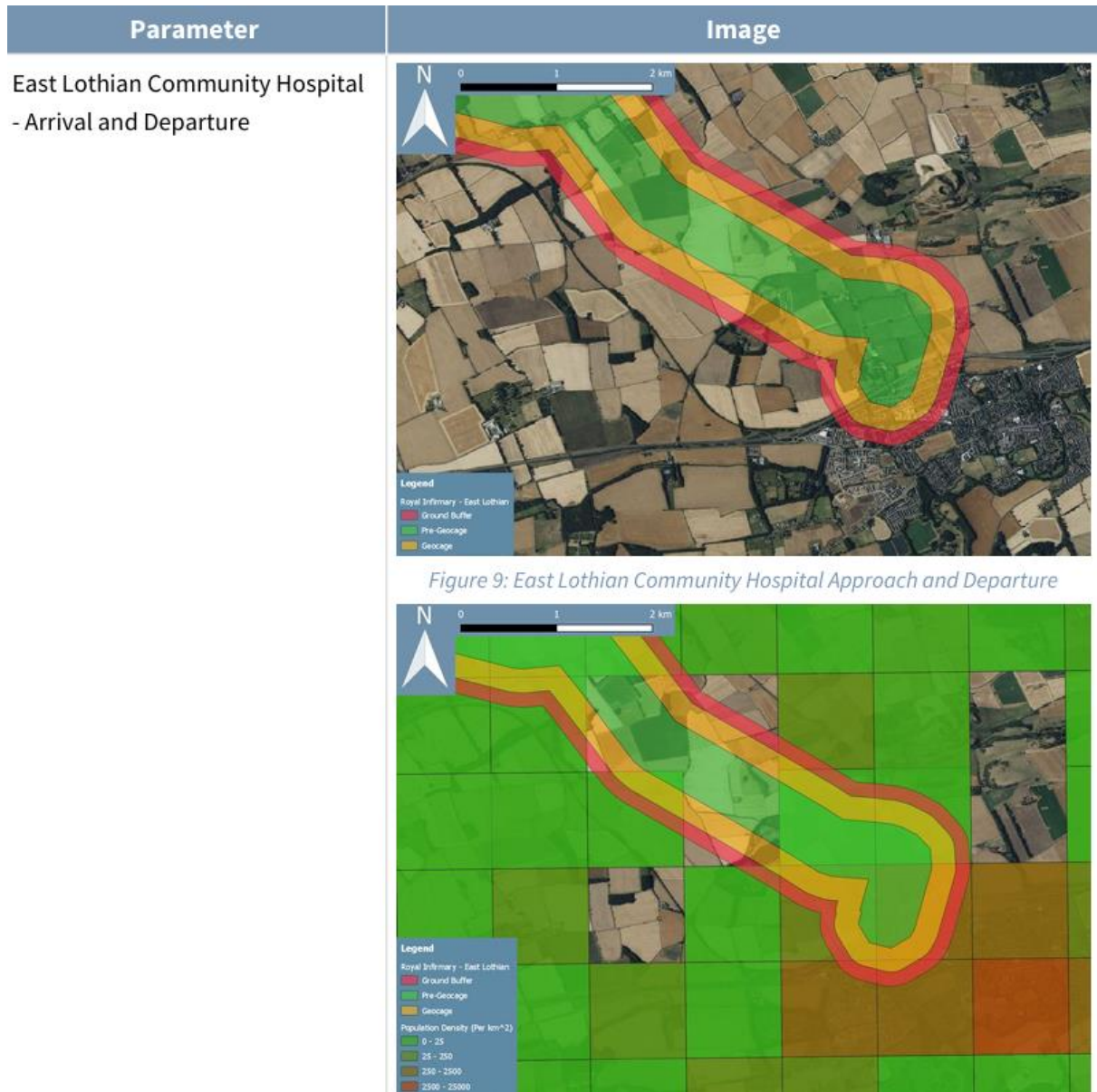
Figure 4 – The closest buildings and sensitive noise receptors to the Royal Infirmary of Edinburgh TOLP

The Royal Infirmary of Edinburgh TOLP is located on a grassland to the side of the Edinburgh BioQuarter (EBQ), which is a life science and healthcare R&D business park adjacent to the Royal Infirmary of Edinburgh. The closest buildings to the TOLP are offices and laboratories which are unlikely to be affected by the noise of the UA. It is noted that while the selected TOLP is close to an office building, this point was selected by the landowners as their preferred take-off point, compared to others that may be slightly further away from offices. The closest sensitive noise receptors are residential buildings to the southeast of the TOLP, and the Royal Infirmary of Edinburgh itself, which are both approximately 380m away. At such distance we do not expect the noise emitted by the aircraft to have significant impact on the residents there.

The EBQ is surrounded by greenbelt and woodlands of Little France Park, which is where the UA will be headed shortly after take-off. However, as the UA will only be overflying this area for a short period of time, we do not foresee any adverse impact on the tranquillity of the environment and the wildlife.



**TOLP - East Lothian Community Hospital, Alderston Rd, Haddington EH41 3PF, United Kingdom (555736N, 024802W)**



*Figure 5 - Population density map with flight routes overlaid - East Lothian Community Hospital*

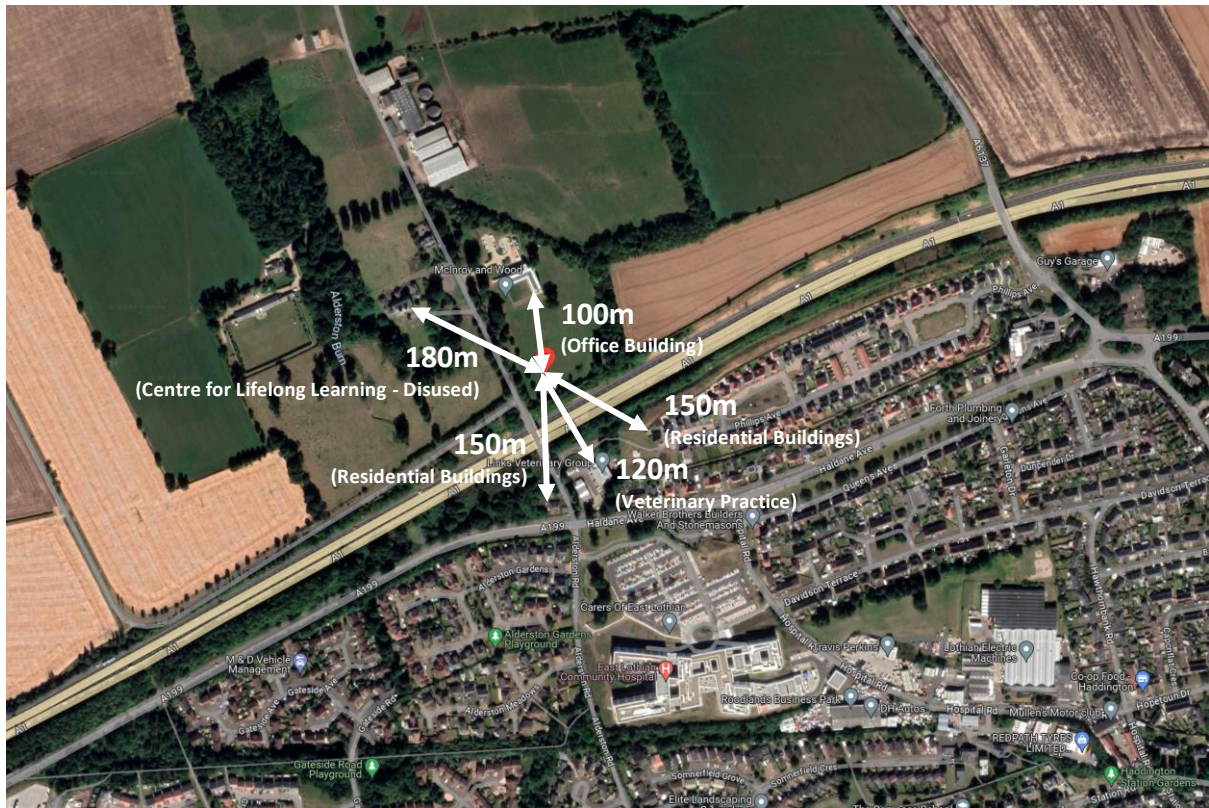


Figure 6 - The closest buildings and sensitive noise receptors to the East Lothian TOLP

The East Lothian TOLP is located at a grassland at approximately 400m north of the East Lothian Community Hospital, separated by the A1. As the hospital is located in a congested area, the TOLP was chosen at a distance from the hospital to minimise ground risk from safety and operational perspective, and noise impact from environmental perspective. The closest buildings from the TOLP are an office building and a disused community centre which are unlikely to be affected by the noise of the UA. On the opposite side of the A1, there are commercial buildings and residential areas at 120-150m to the south of the TOLP. However, given the constant flow of traffic at 70 mph (the speed limit of that section of the A1), the size of the populated area in Haddington and the fact that the aircraft would route north upon take off, we expect the level and tonal nature of the noise emitted by the aircraft during take-off and landing would be similar, if not muffled by the ambience sounds. Therefore, we anticipate the noise of the UA to have minimal impact on residents living nearby.



**TOLP- Borders General Hospital, Huntlyburn Terrace, Melrose, TD6 9BS, United Kingdom (533546N, 024450W)**

Parameter	Image
-----------	-------

Borders General Hospital - Arrival and Departure



Figure 19: Borders General Hospital - Satellite View



Figure 7 - Population density map with flight routes overlaid - Borders General Hospital



Figure 8 - The closest buildings and sensitive noise receptors to the Borders General Hospital TOLP

The Borders General Hospital TOLP is located at a grassland on the Melrose Cricket Club to the West of the hospital which gives easy access to the hospital. The TOLP is between 70m and 160m away from hospital related buildings such as offices or wards. Given the short time use of this TOLP, and the short time for take-off and landing of the aircraft, these distances are deemed appropriate and shall not cause undue disturbances. The TOLP is also 100m from a nursery. Given this TOLP is used early in the morning it is not expected that the noise from the drone shall cause a disturbance, with the noise also reduced due to the TOLP being 100m away from the nursery. After advice from the CAA on 6 June 24 the final route into the TOLP has been adjusted to reduce impact on the Nursery even further.

## 7 Stakeholders and Engagement

The CAA CAP 1616 includes the requirement for Sponsors to engage with aviation stakeholders and relevant stakeholders and give due consideration to the potential impacts of the change on airspace users. The proposal is subject to those requirements for a temporary change as detailed in CAP 1616. The stakeholder methodology and summary of feedback and also stakeholder evidence are attached at Appendix 2 and 3 respectfully.

CAELUS undertakes to engage with stakeholders post the decision of the CAA regarding this ACP to inform them of the outcome. CAELUS undertakes to also inform stakeholders of updated operations 2 weeks prior to any planned flying to remind them of the operations and enable schedule deconfliction. Promulgation will also take place via the AIC which will be published in accordance with the cycle and NOTAMs issued at least 24 hours prior to any activation.

## 8 Complaints

It is understood by CAELUS that complaints may be received regarding the activation of the TSA/TDA and that these complaints need to be recorded and addressed appropriately. The stakeholders engaged so far have corresponded successfully via the [caelus2airspace@traxinternational.co.uk](mailto:caelus2airspace@traxinternational.co.uk) email address and this email address will be provided in the email informing the stakeholders of the outcome as a method by which complaints can be raised. The AIC will contain this email address and ask that all are forwarded to the same for addressing. All complaints, together with any infringements, will be addressed and recorded accordingly.

The CAA AR team will be furnished with copies of any complaints, infringements and the outcomes of the same. The CAELUS consortium is made up of in part NATS and AGS and Skyports and there is a mature relationship between all parties, as well as an established relationship with Edinburgh ATC which will allow the raising of any complaints that have been made by other methods, such as through Edinburgh ATC direct, and the recording and addressing of the same. Again, the CAA will be furnished with copies of any complaints that are brought to the attention of any of the CAELUS partners in connection to this ACP.

## 9 Safety Assessment

Temporary Operating Instructions by Edinburgh ATC for the operation of the airspace (to be approved by the aerodrome inspector) and Letters of Agreement with the UAV operator will be in place to ensure safe operations prior to commencement of operations planned for 29 July 2024. A HAZID will be conducted at Edinburgh ATC with the relevant stakeholders and that will form the basis for the TOI.

Skyports DS OSC Vol 3. RIGITECH Eiger contains further details of each hazard, mitigations, evidence, statements of tolerability and the safety risk summary statement for the operation of the platform to demonstrate the safe operation of the platform.

## 10 Summary

CAELUS seeks to develop the NHS Scotland use cases as detailed in the Statement of Need together with validation of the objectives in support of the CAELUS ConOps being developed by NATS. It is submitted that the temporary airspace is designed to minimise impact to other aviation users yet sufficient to contain the hazardous activity of the BVLOS flight. The stakeholder response was encouraging with several stakeholders engaging with meaningful discussions and their input was used to inform the final design and operations of the airspace. The final trial is also supported by a provision of SUAAS by Edinburgh ATC who have been fully engaged with the process.