

CAA Environmental Assessment

Airspace Trial

Title of airspace change proposal	CAELUS Trial D – Lothian region
Change sponsor	AGS Airports Ltd
Project reference	ACP-2022-104
Account Manager	██████████
<p><i>Instructions</i></p> <p>In providing a response for each question, please ensure that the ‘status’ column is completed using the following options:</p> <ul style="list-style-type: none"> • YES • NO • PARTIALLY • N/A <p>To aid the decision maker, highlight each question accordingly to illustrate what is:</p> <p>resolved YES not resolved PARTIALLY not compliant NO</p>	
<h3>1. Introduction</h3> <p>AGS Airports Ltd (sponsor) submitted an Airspace Change Proposal (ACP) for a temporary change to airspace design to allow the delivery of a Concept of Operations (ConOps) for the transition to fully integrated Unmanned Aircraft (UA) at a national level. The sponsor intends to utilise volumes of segregated airspace in the vicinity of Edinburgh Airport in the Borders and Lothian region to prove elements of their proposed future concept of integrated airspace allowing Remotely Piloted Aircraft Systems (RPAS) Beyond Visual Line of Sight (BVLOS) operations to transport essential medicines, bloods, and other medical supplies, as part of the CAELUS2 Future Flight Challenge project.</p> <p>The proposed operations will consist of a series of flights between (a) the Royal Infirmary of Edinburgh and East Lothian Community Hospital and (b) the Royal Infirmary of Edinburgh and the Borders General Hospital over a four (4) week period (20 flying days) and with periods of activation up to twice a day. The RPAS will be a Rigitech EIGER, equipped with functioning Automatic Dependent Surveillance-Broadcast (ADS-B) in and out, and mode S capability, and will be operated by Skyports DS.</p> <p>To accommodate the BVLOS flights for routes (a) and (b) in unsegregated airspace the change sponsor requests the activation of Temporary Danger Area (TDA) in Class</p>	

G airspace and Temporary Segregated Airspace (TSA) in Class D airspace segments. The TDA and TSA segments are in the form of a corridor with vertical dimensions of surface level to a maximum of between 1000 and 1650ft above mean sea level (AMSL) considering ground elevation and lateral dimensions of 2- 4km (Fig. 1). The sponsor states that the drone will not operate above 400ft above ground level (AGL) at all times.

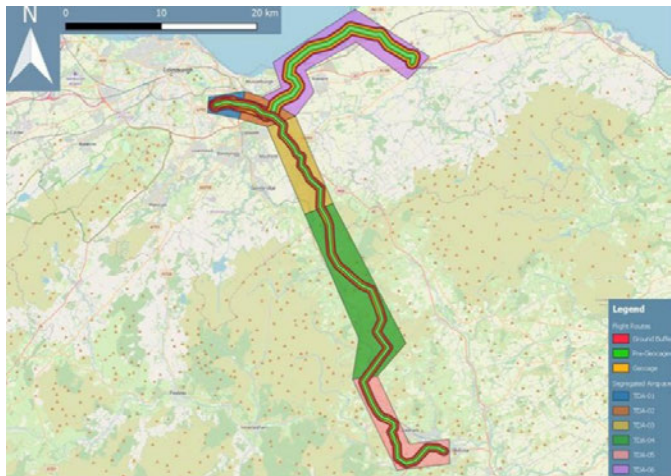


Fig. 1: Proposed route with TDA and TSA segments

The operations will take place over a 4-week period. Route (a) that includes TSA/TDA 1,2 and 6 will be activated between 13:00 and 1600L only and route (b) that includes (TSA/TDA 1,2,3,4 and 5) between 07:00 and 10:00L only. Times of activation of the TDA and TSA will be notified by NOTAM at least 24 hours in advance of the RPAS flight operations. The proposed periods of activation, as presented in the submitted documents are the below:

	AM Activation		PM Activation	Comments
Week One	0700 – 1000 L	or	1300 – 1600 L	The AM timeslot will be utilized for route (b) only and the PM timeslot for route (a) only. Only one TDA (route) will be activated at a time. 3-6 one-way flights are expected to be conducted (1-2 flights per hour).
Week Two	0700 – 1000 L	and	1300 – 1600 L	The AM timeslot will be utilized for route (b) only and the PM timeslot for route (a) only. 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 for route (b) only and the PM timeslot for route (a) only. 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 for route (b) only and the PM timeslot for route (a) only. Only one TDA (route) will be activated at a time.

The change sponsor mentions that the activation periods included above refer to the maximum duration and will be reduced on specific days if not operationally required to minimise the impact on other airspace users.

Section 70 (2) of the Transport Act 2000 requires the CAA to take account of any guidance on environmental objectives given to it by the Secretary of State (SofS) when

carrying out its air navigation functions, namely the Air Navigation Guidance 2017 (ANG 2017). For temporary changes to airspace design, ANG 2017 paragraph 2.13 requires that the CAA consider the sponsor’s assessment of the noise impact before a decision on the proposal is made, unless the CAA is satisfied that the specific details of the proposal mean that this is not needed. In addition, ANG 2017 paragraph 2.3 states that in circumstances where a temporary airspace arrangement would affect the distribution of air traffic below 7,000 ft., where practicable, the communities that may be affected should be informed prior to the change being implemented. The sponsor is therefore also expected to consider the anticipated noise impacts as a result of any consequential changes on other airspace users (i.e., impacts below 7,000 ft.). CAP1616 (v4) paragraphs B81-B85 outline the environmental assessment requirements that sponsors of temporary ACPs are required to follow. Due to the short-term nature of temporary changes, there is no requirement for the sponsor to assess longer-term environmental impacts (i.e., CO2, local air quality, tranquillity, biodiversity).

2. Statement of Need		Yes/No
2.1	Does the Statement of Need include any environmental factors?	YES
	The statement of need does not include any specific environmental factors, but it identifies the adoption of UAS as an opportunity to reduce mileage and the impact of traffic congestion and CO2 emissions while transporting medical supplies.	

3. Information to be conveyed to those affected		Status
3.1	Has the change sponsor adequately provided a justification for the change?	YES
	The change sponsor has justified that, as per CAP2533 the operation of BVLOS operations within class D airspace can only be conducted within segregated airspace and the most common way to achieve this is to establish TDAs for the UAS to operate within. The change sponsor has proposed a TDA/TSA structure to be established to provide this segregation and enable them to conduct their operations.	
3.2	Has the change sponsor adequately confirmed the effective period of the change?	YES
	Yes, the change sponsor has stated that the proposed change will be in place for a maximum of 8 weeks with expected flying during 4 of those weeks. The flights will take place over the course of 4 weeks (20 flying days) during the validity of the AIC (target AIC publication date 25 July 24) and commencing on 29 July 24 at the earliest. The sponsor has provided information detailing the proposed activation times and duration of activation periods over the four-week period.	

3.3	<p>Has the change sponsor provided sufficient details on the expected frequency of flights participating in the trial?</p> <p><i>For trials longer than 90 days yet shorter than 12 months, sufficient details on the expected frequency (both absolute and as a percentage of total traffic during the trial period) of flights participating in the trial must be provided.</i></p>	<p>YES</p>
<p>The change sponsor plans to conduct operations over a 4-week period with periods of activation up to twice a day. Details on the frequency of flights and hours of activation per route have been provided (see also Question 1). The sponsor will communicate the TDA and TSA activation times and contact details of the Flight Operations Team by NOTAM at least 24 hours before the planned use.</p>		
3.4	<p>Has the change sponsor provided sufficient details on the timing of flights participating in the trial?</p>	<p>YES</p>
<p>The change sponsor provides details on the proposed periods of activation over the 4-week period, as presented in Question 1.</p>		
3.5	<p>Has the change sponsor provided sufficient details on the typical altitudes of flights?</p>	<p>YES</p>
<p>The change sponsor has stated that the RPAS flights will be operated at a cruising altitude not above 400ft above ground level (AGL). The TDA/TSA are sectorised; the segments have an upper limit that ranges from 1000 to 1650ft AGL due to ground elevation.</p>		
3.6	<p>Has the change sponsor adequately provided a qualitative description of changes to traffic patterns, illustrated using operational diagrams overlaid on Ordnance Survey maps or similar?</p> <p><i>For trials longer than 90 days yet shorter than 12 months, operational diagrams that illustrate the estimated overflight swathe of trial traffic, up to 7,000 feet must be provided.</i></p> <p><i>The diagrams should be of sufficient detail for those affected to identify where they live in relation of the changes in traffic pattern.</i></p>	<p>YES</p>
<p>The change sponsor describes that there will be no change to established aircraft routes below 7000ft and 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 (LoA) will be held between Edinburgh ATC and the RPAS operator. TDA in Class G and 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. Edinburgh ATC will be supporting the segregation of the RPAS operating area and other airspace users. A Special Use Airspace Activity Information Service (SUA AIS) will be provided by Edinburgh ATC to inform airspace users of the Activity state of the TDAs in accordance with the daily NOTAM.</p> <p>The change sponsor states that Helicopter borne Emergency Services (HEMS, SAR, Police) will be able to access any parts of the TDA complex at short notice by direct contact with the Remote Pilot via telephone; this will be achieved directly from their AIRWAVE radios or via their own operating authorities and the mechanism is detailed in the appropriate LoAs.</p>		

	<p>The change sponsor mentions that there is an agreement with MoD to avoid operations during periods that exercises are taking place in the area.</p> <p>Considering the submitted evidence the change sponsor has taken steps to address concerns raised by stakeholders and mitigate the impact of the trial to airspace users; they have amended the proposed periods of activation to address concerns of MoD and the hang-gliding and paragliding community.</p> <p>The change sponsor states that concerns of the East of Scotland Microlights (EOSM), who perceive that the trial and the establishment of TDA/TSA will impact their training routes significantly were reviewed. However, the change sponsor states that due the TDA activation times and the level of risk associated with the suggested, by the EOSM, route, they did not proceed in amending the proposed routes. If the microlights activity will have to reroute this may suggest changes to traffic patterns in the area of interest.</p> <p>The change sponsor provided operational diagrams of the proposed RPAS routes overlaid on maps allowing high level identification of likely exposed noise sensitive receptors, together with population density charts to demonstrate the level of impact.</p>	
<p>3.7</p>	<p>Has the change sponsor adequately provided an assessment of noise impacts?</p> <p><i>For trials of 90 days or less, typical noise levels at key locations must be provided.</i></p> <p><i>For trials longer than 90 days yet shorter than 12 months, L_{Amax} footprints illustrating the loudest and most frequent types of aircraft that will be participating in the trial must be provided:</i></p> <ul style="list-style-type: none"> • 65 dBA L_{max} footprints for noise from day flights (0700 to 2300) • 60 dBA L_{max} footprints for noise from night flights (2300 to 0700). <p><i>For trials longer than 90 days yet shorter than 12 months, equivalent footprints that illustrate where the trial traffic would otherwise have flown (this assumes that any aircraft that partakes in the trial would have flown on an alternate route that reflects current operations).</i></p> <p><i>For trials extending beyond 12 months, noise assessments using annualised noise metrics must be provided.</i></p>	<p style="text-align: center;">YES</p>
	<p>The change sponsor has provided typical noise data for the Swoop Kookaburra Mk III RPAS. The UAS to be used in respect of this ACP is the Rigittech Eiger, a hybrid-powered lift transitional platform which takes off and lands vertically. Precise noise measurements for the specific UAS have not been submitted, but the change sponsor mentions that it shares similarities in design with the Swoop Kookaburra (fixed wing VTOL), yet it is a smaller and lighter model with fewer motors and is expected by the sponsor to have the same or lower noise impact. On this basis, the change sponsor indicated that the noise levels (maximum spot point noise levels, L_{ASmax}) from the RPAS are expected to be:</p> <ul style="list-style-type: none"> • 76dB L_{ASmax} during take-offs and landing (86dB L_{ASmax} considering a noise penalty of 10 dB) • 49dB L_{ASmax} during cruising at a height of 200ft above ground level (59dB L_{ASmax} considering a noise penalty of 10 dB) <p>The noise penalty has been added to take account of tonal frequencies associated with multi-rotor UAS in line with CAA guidance.</p> <p>According to the submitted documentation, under normal circumstances, the RPAS will cruise at a height of 400ft AGL. Typical L_{ASmax} at this altitude have not been provided, however, considering the reduction of sound intensity over distance, the predicted noise level on the ground is likely to be less than 59dB L_{ASmax}, considering the noise penalty. The change sponsor mentions that take-off and landing, which constitutes the most impactful part of the</p>	

operation in terms of noise, typically takes 17.57 seconds at standard climb/descend rate, and 8.98 seconds at maximum climb/descend rate.

The change sponsor has provided maps with the proposed RPAS routes plotted on population density charts to illustrate the take-off, landing, and routing of the RPAS. The sponsor states that the design of the routes has been conducted in a way to avoid populated areas and where possible over the sea to minimise the noise impact. Also, the key locations, such as the Take Off and Landing Points (TOLPs), have been positioned away from residential areas to minimise the noise impact during take-off and landing:

- The Royal Infirmary of Edinburgh TOLP (Fig. 2) is located on a grassland to the side of the Edinburgh BioQuarter (EBQ), a life science and healthcare R&D business park adjacent to the Royal Infirmary of Edinburgh. The nearest noise receptors are identified as office buildings and laboratories (approximately 45-140m from the TOLP). The change sponsor states that this TOLP has been selected by the landowner as the preferred point. The closest sensitive noise receptors are residential buildings approximately 380-400m to the southeast of the TOLP, the Institute for Regeneration and Repair (university) approximately 140m and the Royal Infirmary of Edinburgh, around 400m away.
- The East Lothian Community Hospital TOLP (Fig. 3) is in a field, approximately 400m north of the East Lothian Community Hospital, separated by the A1 (constant flow of traffic at 70mph). The nearest noise receptors are office buildings, approximately 100m away and a disused community centre, around 180m away from the TOLP. The closest sensitive noise receptors are residential buildings, approximately 150m south and southeast of the TOLP, a veterinary practice, 120m south of the TOLP and the East Lothian Community Hospital, around 400m away.
- The Borders General Hospital TOLP (Fig. 4) is located on a grassland next to the Melrose Cricket Club, west of the hospital facilities. The nearest noise receptors are identified as the hospital wards, residences and offices in the hospital building at approximately 70-160m away and the Busy Bees nursery, approximately 100m away from the TOLP. It is noted that the initial location of the TOLP was closer to the nursery (30m) but the change sponsor subsequently moved the location further from the nursery to reduce the impact. The proposed route to the TOLP was also amended in the last submission to provide more buffer against the nursery and identified buildings.

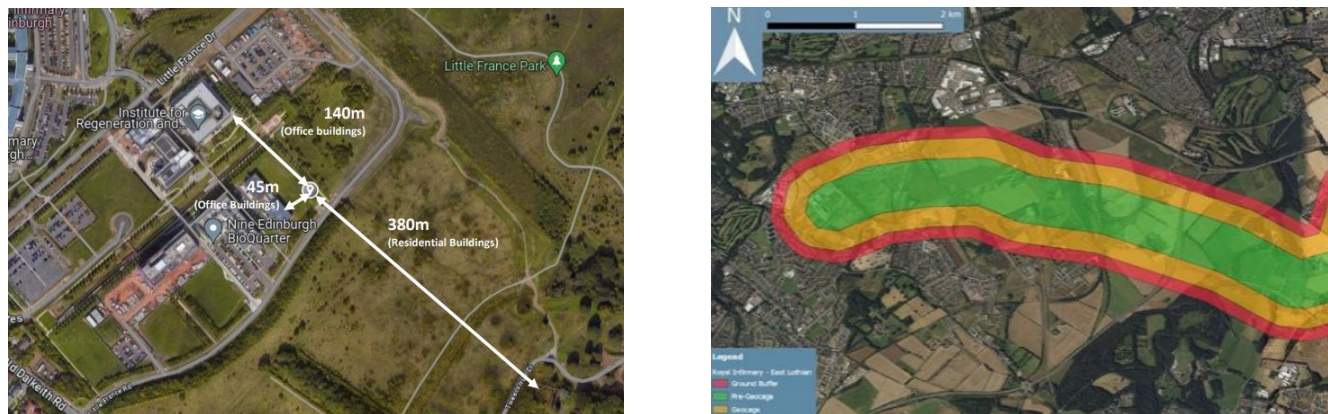


Fig. 2: The Royal Infirmary of Edinburgh TOLP (left) and population density map with flight routes overlaid (right)



Fig. 3: The East Lothian Community Hospital TOLP (left) and population density map with flight routes overlaid (right)



Fig. 4: The Borders General Hospital TOLP (left) and population density map with flight routes overlaid (right)

The change sponsor mentions that they will inform stakeholders of updated operations 2 weeks before any planned flying to remind them of the operations; however, they do not provide information to support whether they have informed the noise receptors mentioned above about the expected noise levels. The sensitive noise receptors will unlikely be subject to noise levels more than 65 dB $L_{A_{max}}$, considering the provided noise data, the volume and frequency of flights and the distance from the TOLPs.

	Consequential noise impact from other airspace users has not been assessed by the change sponsor.	
4. Assessment of noise impacts		Status
4.1	Has the assessment of noise impacts identified in Question 3.7 been adequately assessed and presented in the final submission to the CAA?	YES
	<p>The change sponsor assessed and presented the noise impacts in the document 'CAELUS Project Trial D – Lothian and Borders – Final Submission v2' (dated May 2024) - Chapter 6. Environmental and Noise Impacts.</p> <p>The change sponsor indicates the typical noise levels from the Swoop Kookaburra Mk III RPAS; however, the RPAS that will be used for the trial is different and the noise impact although reasonably comparable it may not be the same.</p> <p>The change sponsor provides operational diagrams showing the proposed flight routes and states that the flights were designed in a way that minimised noise in the area of operations. Affected communities near the RPAS TOLPs areas can identify their location in the provided images. The change sponsor concludes that they do not envisage any adverse impact due to small noise footprint and short span of time of operations.</p> <p>The change sponsor has identified sensitive noise receptors near the RPAS TOLPs that are likely to be exposed to noise from the UAS but hasn't provided information to suggest that they have been informed about the potential noise disturbance. However, the anticipated impact will likely be minimal for most sensitive noise receptors (see Question 3.7) as receptors will unlikely be subject to noise levels of more than 65 dB L_{ASmax}, considering the provided noise data, the volume and frequency of flights and the distance from the TOLPs. It should be noted that, the RPAS that will be used for the trial is different to that informing the noise data and the noise impact although reasonably comparable it may not be exactly the same.</p> <p>Consequential noise impact from other airspace users has not been assessed by the change sponsor. The change sponsor makes reference to the mitigation measures they will undertake to address concerns of airspace users. However, they do not provide details on the potential change to the microlights activity and what this may mean in terms of noise impact.</p>	
4.2	Summary of anticipated noise impacts from the final proposed airspace trial.	
	<p>The change sponsor has indicated the following typical noise levels from the proposed UAS operations (based on proxy UAS Swoop Kookaburra Mk III UA (fixed-wing VTOL):</p> <ul style="list-style-type: none"> • 76dB L_{ASmax} during take-offs and landing (86dB L_{ASmax} considering a noise penalty of 10 dB) • 49dB L_{ASmax} during cruising at a height of 200ft above ground level (59dB L_{ASmax} considering a noise penalty of 10 dB) <p>However, the RPAS that will be used for the trial is different and the noise impact although reasonably comparable it may not be the same.</p> <p>The change sponsor mentions that take-off and landing, which constitutes the most impactful part of the operation in terms of noise, typically takes 17.57 seconds at standard climb/descend rate, and 8.98 seconds at maximum climb/descend rate. The sponsor states that under normal circumstances</p>	

	<p>the RPAS will cruise at an altitude of 400ft above ground level. Typical LAS_{max} at this altitude have not been provided, however, considering the reduction of sound intensity over distance, the predicted noise level on the ground is likely to be less than 59dB LAS_{max}, (including addition of a 10dB noise penalty to adjust for tonal characteristics associated with multi-rotor UAS).</p> <p>The change sponsor has overlaid the operational diagrams of the proposed RPAS routings on population density charts to demonstrate the RPAS take-offs, landings and tracks have been designed to minimise overflight of populated areas. Also, the sponsor has identified sensitive noise receptors in close proximity to the RPAS TOLPs (as described in 3.7) that are likely to be exposed to noise levels but has not provided evidence to support that they have informed them about the likely noise impacts.</p> <p>Considering the provided information, the noise levels, the duration of the change, the low volume of flights and the distance of the TOLPs from the nearest noise receptors it is unlikely that sensitive noise receptors will be subject to noise levels in excess of 65 dB LAS_{max}.</p> <p>Consequential noise impact from other airspace users has not been assessed by the change sponsor but this is likely to be minimal given the duration of the trial and the proposed mitigation measures. However, we cannot predict with certainty the likely impact as a result of the potential rerouting of affected airspace users, especially as regards the microlight activity, the concerns of which have not sufficiently addressed by the change sponsor.</p>	
5. Compliance with relevant policy and guidance from Government or the CAA		Status
5.1	<p>Has the change sponsor satisfied all relevant policy and/or guidance, with regards to environmental impacts of the proposed airspace change?</p> <p><i>Notably, has the change sponsor complied with the environmental requirements in:</i></p> <ul style="list-style-type: none"> • <i>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;</i> • <i>CAP1616a: Airspace Change: Environmental requirements technical annex;</i> • <i>DfT Air Navigation Guidance 2017: Guidance to the CAA on its environmental objectives when carrying out its air navigation functions, and to the CAA and wider industry on airspace and noise management.</i> <p>If a change sponsor has not complied with any aspect of those documents, have they provided a rationale and is it reasonable?</p>	<p style="text-align: center;">PARTIALLY</p>
	<p>There are two conditions the change sponsor must fulfil either before or after the implementation of the ACP (if approved) – see Question 6.2. Once the conditions are fulfilled, the change sponsor will have satisfied all relevant policy and/or guidance regarding the environmental impacts of the proposed airspace change.</p>	

6. Recommendations/Conditions		Status
6.1	<p>Are there any Recommendations which the change sponsor should try to address either before or after implementation (if approved)? If yes, please list them below.</p> <p>GUIDANCE NOTE: Recommendations are something that the change sponsor should try to address either before or after implementation, if indeed the airspace change proposal is approved. They may relate to an area in which the change sponsor is reliant upon a third party to actually come to an agreement and consequently they do not carry the same 'weight' as a Condition.</p>	No
	There are no recommendations that the change sponsor should try to address either before or after the implementation of the ACP (if approved).	
6.2	<p>Are there any Condition(s) which the change sponsor must fulfil either before or after implementation (if approved)? If yes, please list them below.</p> <p>GUIDANCE NOTE: Conditions are something that the change sponsor must fulfil either before or after implementation, if indeed the airspace change proposal is approved. If their proposal is approved, change sponsors must observe any condition(s) contained within the regulatory decision; failure to do so will usually result in the approval being revoked.</p>	Yes
	<p>Yes, the change sponsor must fulfil the following Conditions before the implementation of the trial (if approved).</p> <ul style="list-style-type: none"> The change sponsor is required to convey the environmental impacts of the proposed change to any communities and their representatives that may be affected before the trial commences (if approved), especially the ones close to the take-off and landing points, where the noise impacts are expected to be more significant. The change sponsor is required to collate, monitor and report to the CAA on the level and contents of any complaints associated with the trial throughout its period of operation (if approved). 	

Environmental assessment sign-off	Name	Signature	Date
Environmental assessment completed by Airspace Regulator (Environment)	[REDACTED]	[REDACTED]	10/06/2024

Environmental assessment approved by Principal Airspace Regulator	[REDACTED]	[REDACTED]	10/06/2024
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