# **CAA Operational Assessment**

Title of airspace change proposal	BVLoS UAS Ops in non-segregated airspace	
Change sponsor	TRAX International Ltd.	
Project no.	ACP-2020-82	
SARG project leader	Technical Regulator	
Case study commencement date	29 Jan 2021	
Case study report as at	25 Feb 2021	
Instructions		
In providing a response for each question, please ensure that the 'status' column is completed using the following options:		
• yes • no • partially • n/a		

To aid the SARG project leader's efficient project management it may be useful that each question is also highlighted accordingly to illustrate what is:

resolved Green not resolved Amber not compliant ....Red...

#### **Executive Summary**

Consortium partners Trax International, uAvionix, Plane Finder and ANRA Technologies are working together with trial hosts Goodwood Aviation Innovation Centre and trial participants Skyports on a project that aims to prove a concept of safe Beyond Visual Line of Sights (BVLoS) Un-manned Aerial System (UAS) operations alongside conventional traffic in non-segregated airspace.

The trial will run in 2 parts – the first will enable the sponsors to prove the concept of safe operations within segregated airspace (including a TDA) and the second part will be the proving of the concept without the TDA (in non-segregated airspace, but with a TMZ). The trial will allow for greater use of BVLoS UAS ops in non-segregated airspace if proven to be safe and it will produce UTM procedures required to deliver and support it.

A trial strategy, at the request of the sponsors, was submitted to the CAA on 9 Dec 2020. This offered the CAA an opportunity to understand what the sponsors were proposing, but was not accepted as the formal Trial Plan, as it did not contain all the required information. One of the issues was understanding how long the TDA would be required for and that it would not be activated for a continuous period of 90days. There was ongoing dialogue with the sponsors, which can be found in the minutes on the CAA Portal <a href="here">here</a>, in order to agree the strategy for a phased 2 part trial.

A Trial Plan Part 1 and subsequent update (v2), following clarification questions, were provided to the CAA for assessment. This Operational Assessment only covers the aspects required for the approval of Part 1 and used v2(v3 for corrected noise calculations) of the trial plan part 1. A v3 was submitted 26 Feb 21, which corrected the noise calculations from v2, but nothing else material to the proposal.

1.	Justification for change and options analysis (operational/technical)	Status	
1.1	Is the explanation of the proposed change clear and understood?	YES	
	The Sponsors require the activation of a TDA in order to trial a concept that they hope to prove is acceptably safe, which vertialling BVLoS UAS operations in non-segregated airspace with other airspace users.		
1.2	Are the reasons for the change stated and acceptable?	YES	
	Yes, the activation of a TDA is an accepted way of mitigating the risk of non-participating aircraft interacting with a UAS operating BVLoS.		

1.3	Have all appropriate alternative options been considered, including the 'do nothing' option?  N/A		
	The CAA accepts that currently, the accepted safest way to mitigate the risks associated with UAS BVLoS operations is to establish a TDA, in which the UAS must remain, while operating. Therefore, the request for the establishment of a TDA was the sponsor's only safe option, if they wished to prove their concept.		
1.4	Is the justification for the selection of the proposed option sound and acceptable?		
	Yes; it aligns with policy and provided that the Operational Safety Cases (OSCs) for the UAS operations alongside notified other (manned) aircraft is accepted by the CAA UAS Team, then establishing a TDA is the correct option for the trial part 1 being proposed.		

2.	Airspace description and operational arrangements	Status
2.1	Is the type of proposed airspace design clearly stated and understood?	YES
The use of a TDA is appropriate. The details explaining the size of the TDA requirement was initially lacking (trial plan part following the submission of an updated Trial Plan Part 1 (v.2 received 19 Feb 21), it was better understood as to why the same requesting an approximate 5 mile radius TDA, up to 2000ft AMSL. The Sponsors wish to show, that if the concept is proved transferred to many different UAS applications. Therefore, in order to avoid flight over built up areas, build a suitable case BVLoS scenarios, allow interaction with participating manned aircraft above 400ft, ensure safe buffers in the event of 'avonecessary contingency volumes and allow the UAS to be tested sufficiently along different routes, the size requested is both and suitable for the sponsor to test their concept.  The TDA Operating Authority will be Goodwood Aerodrome.		e sponsors are ved, it can be ase for different avoidance', add the

2.2	Are the hours of operation of the airspace and any seasonal variations stated and acceptable?  YES
	Yes, activation of the TDA will not be permanent, it will take place for no more than a total of 90 days between 8 <sup>th</sup> Apr 2021 and 23 <sup>rd</sup> Sep 2021. The daily hours of activation will take place between 0600-0900 and/or between 1800 and 2100 local, 7 days a week, with actual dates and times of activation promulgated by NOTAM at least 24 hrs in advance. The trial sponsors may also activate the TDA during the day (0900-1800 Summer months Apr-Oct) if Goodwood aerodrome is closed for another reason and it is safe to do so. The TDA will be promulgated via an AIC that the sponsor has produced, providing the details of opening times and criteria. If the sponsor were to activate for the full 90 days, for 6 hours a day, this would total 540 hours, which is 25% of the total hours available during a 90-day period.  The sponsor has acknowledged that, following feedback from GA stakeholders (particularly local glider pilots), the time period between 1800-1900 in the summer months are usually busy flying hours, so there will be further consideration regarding activating the TDA during these times, if the sponsors are informed that intense aerial activity will be taking place. It will be a condition of approval, that the sponsors actively endeavour to reduce the activation of the TDA during notified times of intense aerial activity close to the TDA.  The sponsors have also stipulated three Goodwood aerodrome events in May, July and Sep 21, during which the TDA will not be activated.
2.3	Is any interaction with adjacent domestic and international airspace structures stated and acceptable including an explanation of how connectivity is to be achieved? Has the agreement of adjacent States been secured in respect of High Seas airspace changes?
	The TDA is below and outside any CAS and there is no interaction with adjacent states or the high seas area. The lowest piece of airspace above is the EGLF Class E+ CTA which covers approximately half the proposed TDA, its base level being 5500ft QNH. The TDA, when activated, will also be adjacent (approx. 1.6miles away) to a section of the LTMA to the North with a base level of 4500ft QNH. However, the TDA will only be activated up to 2000ft AMSL. There is no requirement for any connectivity with adjacent structures.

2.4	Is the supporting statistical evidence relevant and acceptable?		
	There was no requirement for any statistical evidence, such as traffic numbers.		
2.5	Is the analysis of the impact of the traffic mix on complexity and workload of operations complete and satisfactory?  N/A		
	The TDA will only be active while Goodwood Aerodrome is closed. The Goodwood FISO that will be in place during the hours of activation can only provide a danger area activity information service (DAAIS). The TDA will ensure that the risk of unknown aircraft interacting with the participating aircraft and UAS will be acceptably mitigated. There is no requirement therefore for an analysis of workload on the FISO of UAS operator for the Trial Part 1, however, this is something that will need to be considered for Part 2 (TMZ).		
2.6	Are any draft Letters of Agreement and/or Memoranda of Understanding included and, if so, do they contain the commitments to resolve ATS procedures (ATSD) and airspace management requirements?  PARTIALLY		
	A condition of approval to activate the TDA will be that the ATS Inspector is satisfied that the TOIs for the FISO with regard to emergency access to the TDA for aircraft in distress and emergency service aircraft is agreed and accepted. A FISO cannot provide a clearance, to enter a TDA, so the TOIs needs to set out a safe process. There will also be an LoA between the Sponsor and Chichester and District Model Aero Club (CADMAC). (19 Feb 21 – the Sponsor has said they will provide TOIs for emergency procedures and a LoA with the model flying club).		
2.7	Should there be any other aviation activity (low flying, gliding, parachuting, microlight site etc) in the vicinity of the new airspace structure and no suitable operating agreements or ATC Procedures can be devised, what action has the change sponsor carried out to resolve any conflicting interests?		
	The shape of the TDA has been amended from a complete circle to a slightly different shape following stakeholder engagement (see the Trial Plan Part 1 for details). It will avoid the Bognor Regis Gliding Centre to the south east of Goodwood and the northern edge of the TDA has been 'flattened' to allow gliding activity along the southern edge of the South Downs.		

2.8	Is the evidence that the airspace design is compliant with ICAO SARPs, airspace design & FUA regulations, and Eurocontrol guidance satisfactory?		
	The TDA will be notified through an approved AIC. The co-ordinates for the structure do not need to be CAP1054 compliant.		
2.9	Is the proposed airspace classification stated and justification for that classification acceptable?  YES		
	No change in airspace classifications – the TDA facilitates hazardous activity taking place with sufficient notification to other airspace users and mitigates the risk of interaction with non-participating traffic. Any additional airspace structures, other than the TDA, proposed for the Trial Plan Part 2 will need additional assessment.		
2.10	Within the constraints of safety and efficiency, does the airspace classification permit access to as many classes of user as practicable?		
	The TDA adopts the lateral dimension of an approximate 5mile radius circle centred on Goodwood Aerodrome, up to 2000ft AMSL. Entry into the TDA by non-participating traffic cannot to be authorised by the TDA authority except for aircraft in emergency or notified and agreed out of hours aircraft. So only participating aircraft will be operating within the TDA while it is active. Activation will be by NOTAM at least 24hrs before the requirement.  The purpose of the TDA is to mitigate the risk to non-participating aircraft interacting with the hazardous activity taking place within the TDA.		
2.11	Is there assurance, as far as practicable, against unauthorised incursions? (This is usually done through the classification and promulgation.)		
	The sponsors acknowledge that the risk of an undetected infringement exists, however this risk will be satisfactorily mitigated:		
	The TDA will be promulgated through an AIC with specific TDA activations by NOTAM no later than H-24.  The UAS Operators OSC shows that there is an adequate buffer in place in order to reduce the risk of an UAS excursion from the TDA.  The availability of an EC surveillance system (ECSS) combined with having a Goodwood FISO in situ, offering a DAAIS, to help ensure the		

	safest possible operating environment.  The CAA has also given permission for the sponsor to utilise the Temporary Flight Restriction (TFR) field within standard FIS-B format to trial the notification of a temporarily activated volume of airspace, such as the TDA.  The sponsors state that they have spoken with EGLF ATC and that, 'In addition, NATS Farnborough ATC have advised that, when the TDA is active they will have it marked on their radar video maps and they will notify us if they observe any infringements however, there is no responsibility on them to be actively monitoring the TDA.' There is no LoA for this to occur, so it cannot be considered a mitigation to infringement.	
2.12	Is there a commitment to allow access to all airspace users seeking a transit through controlled airspace as per the classification, or in the event of such a request being denied, a service around the affected area?	
	The TDA will not afford transits or access of other aircraft. Only notified and agreed movements or participating aircraft from Goodwood will be allowed into the TDA while it is active. There will be a TOI agreed by local emergency aircraft and the Goodwood FISO in order to allow access and egress to the emergency services (condition of approval to activate the TDA). Aircraft in distress can also enter the TDA, following standard emergency procedures.	
2.13	Are appropriate arrangements for transiting aircraft in place in accordance with stated commitments?  YES	
	The TDA will activated for a maximum of 6 hours a day, on days when Goodwood Aerodrome has been or will be open. When Goodwood Aerodrome is notified as closed, it may be active for longer periods. The TDA operating authority (Goodwood Aerodrome) will activate the TDA for no longer than 90 days during Part 1 of the Trial. While the TDA is active, non-participating transiting aircraft will have to avoid the TDA. The impacts of activating the TDA will be reduced due to the sponsors commitment of limiting the period of time of activation. The sponsor has acknowledged that, following feedback from GA stakeholders (particularly local glider pilots), the time period between 1800-1900 in the summer months are usually busy flying hours, so there will be further consideration regarding activating the TDA during these times, if the sponsors are informed that intense local flying will be taking place. It will be a condition of approval, that the sponsor actively endeavours to reduce the activation of the TDA during notified times of intense aerial activity close to the TDA.	

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A TDA is intended to segregate Class G airspace in order to offer protection from the Hazardous activity taking place within the TDA, so GA will have to avoid it if they are not planned to go to Goodwood Aerodrome. However, this TDA should not have a significant impact on other airspace user groups as the sponsors will limit its activation during the trial and will endeavour to be flexible during peak activity periods, noted following engagement to occur sometimes between 1800-1900 during the summer months.
Is any delegation of ATS justified and acceptable? (If yes, refer to Delegated ATS Procedure).
N/A.
Is the airspace design of sufficient dimensions with regard to expected aircraft navigation performance and manoeuvrability to contain horizontal and vertical flight activity (including holding patterns) and associated protected areas in both radar and non-radar environments?
The TDA established for Part 1 is the size and dimensions requested by the Sponsor, following stakeholder feed-back and in order for the Sponsors to meet their objectives safely. The OSC's from the UAS operators provide further explanation on the airspace requirements.
Have all safety buffer requirements (or mitigation of these) been identified and described satisfactorily (to be in accordance with the agreed parameters or show acceptable mitigation)? (Refer to buffer policy letter.)
For Part 1 the OSCs from the UAS operators will provide justification for the required internal buffer, that is meant to mitigate the risk of UAS egress.

2.18	Do ATC procedures ensure the maintenance of prescribed separation between traffic inside a new airspace structure and traffic within existing adjacent or other new airspace structures?
	The FISO at Goodwood can only provide a DAAIS. The Sponsor has yet to provide us with the TOIs for emergency service aircraft to operate in and out of the TDA. The proposed use of a Flight Information Display (FID) in order to provide extra awareness to the FISO has also not yet been approved. (18 Feb 21). A condition of approval will be that the CAA review and are subsequently satisfied with the TOIs prior to the TDA being activated.
2.19	Is the airspace structure designed to ensure that adequate and appropriate terrain clearance can be readily applied within and adjacent to the proposed airspace?
	Transiting aircraft will either have to fly above or around the TDA. If a transit flies around the TDA to the south, but wishes to avoid flying over water, then there will be a slight funnelling effect along the coast. The risks associated by funnelling to the south are mitigated by the limited times that the TDA is active, the fact that it is only up to 2000ft AMSL and that the trial sponsor will endeavour to reduce evening activations, by 1 hour during the summer, where possible.
2.20	If the new structure lies close to another airspace structure or overlaps an associated airspace structure, have appropriate operating arrangements been agreed?
	N/A. There are no overlapping structures or contiguous airspace.
2.21	Where terminal and en-route structures adjoin, is the effective integration of departure and arrival routes achieved?
	N/A

	s the evidence of supporting CNS infrastructure together with availability and contingency procedures complete and acceptable? The following are to be satisfied:	
•	<b>Communication</b> : Is the evidence of communications infrastructure including RT coverage together with availability and contingency procedures complete and acceptable? Has this frequency been agreed with AAA Infrastructure?	N/A
No	o change.	
•	<b>Navigation:</b> Is there sufficient accurate navigational guidance based on in-line VOR or NDB or by approved RNAV-derived sources, to contain the aircraft within the route to the published RNP value in accordance with ICAO/ Eurocontrol standards? For example, for navaids, has coverage assessment been made, such as a DEMETER report, and if so, is it satisfactory?	N/A
No	o change.	
-	Surveillance: Radar provision – have radar diagrams been provided, and do they show that the ATS route/airspace structure can be supported?	N/A

3.2	Where appropriate, are there any indications of the resources to be applied, or a commitment to provide them, in line with current forecast traffic growth acceptable?	N/A
	N/A	
4.	Maps/charts/diagrams	Status
4.1	Is a diagram of the proposed airspace included in the proposal, clearly showing the dimensions and WGS84 co-ordinates?  (We would expect sponsors to include clear maps and diagrams of the proposed airspace structure(s) — they do not have to accord with aeronautical cartographical standards (see airspace change guidance), rather they should be clear and unambiguous and reflect precisely the narrative descriptions of the proposals.)  Yes the AIC provides a clear map and the required co-ordinates for the proposed NOTAM in order to activate the TDA.	YES
4.2	Do the charts clearly indicate the proposed airspace change?	YES
	Yes.	
4.3	Has the change sponsor identified AIP pages affected by the change proposal and provided a draft amendment?	YES

	A draft AIC has been submitted to promulgate the NOTAM for the TDA during the Trial Plan Part 1.				
4.4	Has the change sponsor completed the WGS84 spreadsheet and submitted to the CAA for approval?	NO			
	There is no requirement for the trial sponsor to meet ADQ compliance for an AIC.				
5.	Operational impact	Status			
5.1	Is the change sponsor's analysis of the impact of the change on all airspace users, airfields and traffic levels, and evidence of mitigation of the effects of the change on any of these, complete and satisfactory?  Consideration should be given to:				
	a) Impact on IFR General Aviation traffic, on Operational air traffic or on VFR General Aviation traffic flow in or through the area.	YES			
	The Sponsors have acknowledged that there will be some impact to transiting GA, while the TDA is activated. They state that transiting aircraft will have to avoid the TDA. This is an accepted consequence in order to reduce the risk of a MAC between the UAS and transiting GA aircraft.  A TDA is intended to segregate Class G airspace in order to offer protection from the hazardous activity taking place within the TDA. However, this TDA will not have a significant impact on other airspace user groups as the sponsor will limit its activation during the trial and will endeavour to be flexible during notified intense aerial activity periods, noted following engagement to sometimes occur between 1800 1900 during the summer months. It will be a condition of approval, that the sponsor actively endeavours to reduce the activation of the TDA during notified times of intense aerial activity close to the TDA.				

	b) Impact on VFR Routes.				
	The sponsors do not state if there are any impacts on specified VFR routes. As described above, transiting aircraft will have to avoid the TDA while it is active.				
	c) Consequential effects on procedures and capacity, i.e. on SIDs, STARs, holds. Details of existing or planned routes and holds.				
	N/A				
	d) Impact on airfields and other specific activities within or adjacent to the proposed airspace.				
	The sponsors have engaged with a number of local airfields and gliding sites. As a result of this engagement, the proposed TDA shape was altered to avoid Bognor Regis Gliding Club. Also, as a result of engagement with the Sly Surfing Club the northern edge of the TDA was flattened, to allow the club to operate along the southern edge of the south downs.  EGLF have been engaged with and will mark the TDA on their radar maps. They have also stated that they will notify the trial sponsor of an infringements to the TDA that they witness; however, as this process has not been formalised, and will not impact on EGLF operations it was not be considered a mitigation to infringements of the TDA.				
	e) Any flight planning restrictions and/ or route requirements.				
	N/A				
5.2	Does the change sponsor consultation material reflect the likely operational impact of the change?  YES				

The information provided during the engagement made it clear when the TDA would be activated and why the trial sponsor was requesting the TDA to be the stated dimensions. However, as a result of engagement the proposal has changed, with the more detail being added to the v2(remained the same in v3, which only corrected the noise calculations) of the Trial Plan Part 1.

### Case study conclusions – to be completed by SARG project leader

Yes/No

Has the change sponsor met the SARG airspace change proposal requirements and airspace regulatory requirements above?

YES

Yes. The Sponsors have produced a detailed trial plan, as per CAP1616.

## RECOMMENDATIONS/CONDITIONS/PIR DATA REQUIREMENTS

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.

NO

**GUIDANCE NOTE:** Recommendations are something that the change sponsor <u>should try</u> 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.

Are there any Condition(s) which the change sponsor <u>must fulfil</u> either before or after implementation (if approved)? If yes, please list them below.

**GUIDANCE NOTE:** Conditions are something that the change sponsor <u>must fulfil</u> either before or after implementation, if indeed the airspace change proposal is approved. If their proposal is approved, change sponsors <u>must observe</u> any condition(s) contained within the regulatory decision; failure to do so <u>will usually</u> result in the approval being revoked. Conditions should specify the consequence of failing to meet that condition, whether that be revoking the ACP or some alternative.

The CAA needs to confirm acceptance of the conditions established for part 1 of the trial plan, from the Sponsors, before activation of the TDA can proceed.

Activation: 8 Apr 21 -23 Sep 21

The CAA approves the use of a Temporary Danger Area (TDA) to prove the safe integration of BVLoS UAS Operations with other conventional aircraft, scheduled to take place between 8 Apr 21 -23 Sep21, subject to the following conditions:

- 1. Operational Safety Cases (OSCs) from the different drone operators, must be approved by the CAA, prior to activation of the TDA.
- 2. Prior to activation of the TDA, the ATS Inspector for Goodwood Aerodrome, must be have received and be satisfied that the TOI's for the FISO in support of access and egress of the TDA for emergency service aircraft and aircraft in distress, are acceptable.
- 3. Engagement activities should continue with all impacted stakeholders and the wider GA community. Mitigations to safely reduce or eliminate the impact on transiting GA, should be pursued to the maximum extent possible, including careful consideration not to activate between 1800-1900 (summer-time) whenever feasible or if notified of intense aerial activity close to the TDA.
- 4. The CAA's Airspace Technical Regulator, for this airspace change proposal, should be updated regularly on the progress of the above engagement activity, together with evidence of the outcomes relating to points 1 and 2.
- 5. Should the sponsors satisfy themselves that they have met the criteria for project success as stated on p29 of the trial plan part 1 (v2,v3) before the end of the TDA activation period, then they are to withdraw the AIC for the TDA immediately.

Are there any specific requirements in terms of the data to be collected by the change sponsor for the Post Implementation Review (if approved)? If yes, please list them below.

<u>GUIDANCE NOTE:</u> PIR data requirements concerns any specific data which the change sponsor <u>must</u> collate post-implementation, if indeed the airspace change proposal is approved. Please use this section to list any such requirements so that they can be captured in the regulatory decision accordingly.

The sponsor has specified the aims of the trial (p29 of v2,v3), which includes elements of data capture and analysis in order to determine the effectiveness of the concept, UTM protocols and the impact on other airspace users as part of testing its concept in a TDA before the request to move to the use of a TMZ.

#### **General summary**

The Sponsors have developed a detailed trial plan (v1,v2,v3) for part 1 of the trial that requires the use of a TDA. A TDA, of 5 miles radius, up to 2000ft AMSL, located on the south coast will impact some other airspace users; however, the sponsor has endeavoured to mitigate the impacts through engagement, restricting the times of activation and allowing safe access into Goodwood Aerodrome through prior notification, the use of an established ECSS and of a FISO offering a DAAIS. The activation of this TDA, in the absence of any other CAA approved mitigation, should be viewed as proportionate method of ensuring that the risks to non-participating aircraft associated while operating close to UASs, are kept acceptably low. This trial aims to safely prove a concept that will reduce the need for TDAs, for BVLoS UAS operations, in the future.

Furthermore, following feed-back received during the sponsor's engagement, we have also made it a condition of approval that the sponsor is to safely reduce or eliminate the impact on transiting GA, to the maximum extent possible, including careful consideration not to activate between 1800-1900 (summer time) whenever feasible or if notified of intense aerial activity close to the TDA.

Given the mitigations that will be in place and the sponsors proactive approach to the flexible activation of the TDA during the trial part 1, the proposal for a TDA in order to meet the objectives of the trial is proportionate.

The TDA approval, which forms a part of Part 1 of this Trial has been approved with conditions, therefore the risk of any delay to activating the TDA as a result of the conditions not being met, does not automatically mean that an extension to the approved activation period will be granted. Any extension requests will follow the requirements of CAP1616 paras 321-323.

Part 2 of the Trial will be subject to a separate review and approval.

	Comments and observations				
Ī	NIL				

Operational assessment sign- off/ approvals	Name	Signature	Date
Operational assessment completed by:	AR Technical Regulator		25 Feb 2021
Operational assessment approved by:	Manager Airspace Regulation		25 Feb 2021

Manager Airspace Regulation comments: I accept the rationale for a TDA in support of this trial. Currently TDA is the means by which the CAA segregates BVLOS UAS operations from other Class G users. TDA cannot however be the medium to long-term way of facilitating BVLOS UAS operations in Class G because of the constraints (albeit temporary) they place on other Class G users, they are unlikely to facilitate all the types of BVLOS operation the operators would like to undertake in Class G and, ultimately, the number of BVLOS TDA that can be approved or active at any one time will be self-limiting. I am supportive of this trial because it is ultimately about BVLOS getting out of TDAs in Class G.