CAA Operational Assessment

Title of airspace change proposal	Trial Airspace for National BVLOS Experimentation Centre
Change sponsor	Cranfield Airport Operations Ltd
Project no.	ACP-2020-007
SARG project leader	[redacted]
Case study commencement date	1 April 2021
Case study report as at	7 July 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
Cranfield University and Cranfield Airport in collaboration with industrial partners (Aveillant, Blue Bear Systems Research, Thales and Vodafone) are developing a BVLOS UAS corridor, "NBEC", extending broadly North East from the Cranfield ATZ in Class G airspace, that will be used for demonstrating a surveillance-based DAA capability and other navigational technologies. This is part of a larger trial programme but only the BVLOS corridor is within the scope of this ACP. Due to the BVLOS nature of the project, segregation via a TDA is required. Activation will be by NOTAM for specific periods on specific days, proposed to be within the period 26/8/21 to 24/11/21. (2/7/21 to 29/9/21 was proposed as the TDA period in the first submission but this could not be achieved with the need for follow-up engagement to be conducted.)

1.	Justification for change and options analysis (operational/technical)	Status
1.1	Is the explanation of the proposed change clear and understood?	YES
	A TDA complex from SFC to 500ft AGL, heading broadly North East from the Cranfield ATZ, with lateral boundaries as specified in the submission. The varying terrain height means that 2 individual adjoining TDAs will be defined from SFC to 800ft AMSL and SFC to 700ft AMSL.	
1.2	Are the reasons for the change stated and acceptable?	YES
	Yes, the activation of a TDA is the currently 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
	At present, only a TDA can provide the required segregation for BVLOS UAS activities in Class G airspace.	
1.4	Is the justification for the selection of the proposed option sound and acceptable?	YES

	Yes; it aligns with existing 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 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 for a BVLoS trial. The TDA Operating Authority will be Cranfield Airport.	
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 is proposed to take place between 26/8/21 and 24/11/21 inclusive. The actual dates and times of activation will be promulgated by NOTAM by the Friday of the week before the planned use. The TDAs will only be active on days or parts of days where operations within that TDA are taking place.	
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?	N/A
	The TDA is outside any CAS and there is no interaction with adjacent states or the high seas area. The TDA is also outside any ATZ for local airfields. It connects to Cranfield's ATZ but Cranfield ATC will be responsible for both the ATZ and the TDA.	
2.4	Is the supporting statistical evidence relevant and acceptable?	N/A

	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?	Yes
	This is a TDA at 500ft AGL and below in Class G airspace. The DACS and DAAIS will be provided by Cranfield ATC who are part of the Sponsor group. Stakeholder feedback indicates that the provision of a procedural DACS and DAAIS will address the key concerns raised. The provision of DACS and DAAIS by Cranfield has also been discussed with the relevant ATS Inspector.	
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?	N/A
	The only ATS unit involved is Cranfield ATC, who are part of the Sponsor group.	
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?	N/A
	Cranfield ATC will provide a DACS and a DAAIS. The precise shape and location of the TDA complex has been modified from the original concept following stakeholder inputs. Contact information for Cranfield ATC (radio frequency and telephone number) will be provided in the NOTAMs announcing each activation. A scheduled airspace activation plan will be provided to operators local to Cranfield, the BGA, the BGA and the MOD low flying cell. The vertical limits of the TDA complex (in AMSL) have been chosen to be a close match to the 500ft AGL limit below which manned aviation should not normally be flying. Since the end of the initial targeted stakeholder engagement, the proposed procedural DACS/DAAIS provision has been discussed with the relevant ATS Inspector and the stakeholders who would be most particularly interested in the practical implications. The conclusion is that the DACS/DAAIS provision should address all reasonably predictable scenarios.	

2.8	Is the evidence that the airspace design is compliant with ICAO SARPs, airspace design & FUA regulations, and Eurocontrol guidance satisfactory?	YES
	This is a Class G TDA in UK Domestic airspace.	
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.	
2.10	Within the constraints of safety and efficiency, does the airspace classification permit access to as many classes of user as practicable?	YES
	TDA with DACS and DAAIS within Class G airspace. Activation and utilisation will be periods of a few hours per day, weekdays only, for a few weeks. Urgent access will be facilitated via the provision of a procedural DACS.	
2.11	Is there assurance, as far as practicable, against unauthorised incursions? (This is usually done through the classification and promulgation.)	YES
	Local stakeholder engagement has taken place. A scheduled airspace activation plan will be provided to operators local to Cranfield, the BGA, the BHGA and the MOD low flying cell. Cranfield ATC will provide a DACS and DAAIS. NOTAMs will be filed to promulgate the activations – these will be published at the latest by the Friday of the week before the activation. The NOTAMs will include contact information for Cranfield ATC (radio frequency and telephone number).	
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?	N/A

	The TDA is in Class G airspace below 500ft AGL, with Class G airspace above it. Manned aviation should not generally by flying that low but Cranfield ATC will provide both a DAAIS and a DACS in any case.	
2.13	Are appropriate arrangements for transiting aircraft in place in accordance with stated commitments?	Yes
	Cranfield ATC will provide a DACS on a procedural basis. The TDA will only be activated while Cranfield ATC are operational.	
2.14	Are any airspace user group's requirements not met?	No
	The provision of the DACS and timely promulgation of planned activations via NOTAM are key enablers. Post submission information from the sponsor has confirmed that the DACS will be provided on a procedural basis and that this is satisfactory to the most obviously affected stakeholders (emergency services).	
2.15	Is any delegation of ATS justified and acceptable? (If yes, refer to Delegated ATS Procedure).	N/A
	N/A.	
2.16	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?	Yes (in principle)
	The TDA proposed has been determined by the Sponsor, following stakeholder engagement, and taking the performance capabilities of the UAS platforms into account. CAA RPAS team have reviewed the platforms' performance capabilities against proposed TDA dimensions and are satisfied that the dimensions are appropriate for the planned activities using these platforms. However, at present the CAA RPAS Team have not approved the OSC – approval of the OSC is a condition for any NOTAMs activating the TDA being approved.	

2.17	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.)	N/A
	Buffer Policy for BVLOS UAS operations relates to lateral separation. This TDA will be in Class G airspace, and well below CAS, so the Buffer Policy criteria do not apply.	
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?	Yes
	TDA in Class G airspace, procedural DACS and DAAIS provided by Cranfield ATC.	
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?	Yes
	TDA with a ceiling of nominally 500ft AGL for the use of UAVs anticipated to be operating at around 400ft AGL.	
2.20	If the new structure lies close to another airspace structure or overlaps an associated airspace structure, have appropriate operating arrangements been agreed?	Yes
	TDA abuts Cranfield ATZ by design. Cranfield airport is one of the sites being used for the activity, and Cranfield ATC are the ATS unit supporting both the trial and the operation of the TDA.	
2.21	Where terminal and en-route structures adjoin, is the effective integration of departure and arrival routes achieved?	N/A

	N/A. No interaction with en route structure.	
3.	**Supporting resources and communications, navigation and surveillance (CNS) infrastructure**	**Status**
3.1	Is the evidence of supporting CNS infrastructure together with availability and contingency procedures complete and acceptable? The following are to be satisfied:	
	• **Communication**: 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?	Yes
	No new ATC or UAS control frequencies are required. All existing Cranfield ATC capabilities remain in place.	
	• **Navigation:** 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
	This will be a low altitude Class G operation, not reliant on the UK ATS navigation network.	
	• **Surveillance:** Radar provision – have radar diagrams been provided, and do they show that the ATS route/airspace structure can be supported?	N/A
	The trial is utilising a low altitude, extremely small and relatively slow-moving airborne platform operating in Class G airspace. Traditional ATS surveillance would not be relevant and in any case Cranfield ATC operate on a procedural, not surveillance basis.	

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?	Yes
	Commitment to provide a DACS and DAAIS (by Cranfield ATC) during operating hours. This will be on a procedural basis. As a 3 month trial, traffic growth forecasts are not relevant.	
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 sponsor has also provided a kmz file, allowing the coordinates to be plotted directly into Google Earth.	
4.2	Do the charts clearly indicate the proposed airspace change?	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 now been presented. CAA AR(U) will deal with the publication of this in accordance with normal practice. Since the initial ACP submission, the sponsor has identified the AMSL equivalents which would deliver an upper limit of approximately 500ft AGL. This has required dividing the TDA into 2, and updating both the draft AIC and the main ACP document.	
4.4	Has the change sponsor completed the WGS84 spreadsheet and submitted to the CAA for approval?	N/A
	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:	Yes
	a) Impact on IFR General Aviation traffic, on Operational air traffic or on VFR General Aviation traffic flow in or through the area.	Yes
	A TDA is intended to segregate Class G airspace in order to offer protection from the hazardous activity taking place within the TDA.	
	b) Impact on VFR Routes.	N/A

	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.	Yes
	As the sponsor, it is for Cranfield airport to manage any impact on its own traffic.	
	e) Any flight planning restrictions and/ or route requirements.	N/A
5.2	Does the change sponsor targeted engagement material reflect the likely operational impact of the change?	Yes
	The sponsor engaged with airspace users, air navigation service providers (ANSP's) and airports on safety and operational viability and have provided evidence in support of their online engagement activities. Although not required by the process they also engaged with some non-aviation stakeholders. An online survey invited stakeholders to provide detail on any potential impacts of the proposal on their activities and requested suggestions as to possible mitigations. A six-week window was provided for feedback which aligns with the scaled maximum length set out in the CAA's TDA policy. The engagement materials reflected the likely operational impact of the change. Fifteen responses were received, and feedback focussed on activation, communication and utilisation of the corridor. Concerns were raised regarding impact on the general aviation community having to land out in the area, the potential disturbance for horses, livestock and bird	

	migration, impact in the event of a fly away, concern regarding integration with other airspace users including emergency vehicles, gliders and hang gliders, what form of collision avoidance the UAV's would have and NOTAM activation. A specific request was made by the National Police Air Service (NPAS) for information on Danger Area Crossing Service/Danger Area Activity Information Service (DACS/DAAIS) provision. The sponsor addressed each of the points raised by stakeholders in their targeted engagement report. The targeted engagement feedback led to a change in the routing of the flight path to minimise overflight of residential areas and to be coherent with operational procedures agreed with Cranfield ATC. NOTAM arrangements were clarified, and the sponsor stated that a DACS and a DAAIS would be provided by Cranfield Air Traffic Control (ATC). Dedicated noise measurements were taken at Cranfield Airport in response to concerns raised regarding UAV noise levels in the area. In response to a requirement by the CAA for stakeholders to be updated on modifications made to the proposal, the sponsor conducted a period of re-engagement for three weeks from 28.05.21 by emailing their revised targeted engagement report V.2.2 and informing stakeholders of: the plan for a revised routing of the TDA, the plans for NOTAM and DACS/DAAIS provision, the revised timeline for operations, the adjustment to the final airspace volume due to the descending landscape away from Cranfield Airport's ATZ and the outcome of the acoustic noise level assessments taken after the first engagement activity. Proactive engagement has taken place regarding DACS/DAAIS provision. Five responses were received to the re-engagement activity. On receipt of clarification regarding DACS/DAAIS provision, the operator (Babcock International)/chief pilot of the local HEMS/Air Ambulance Service based at RAF Benson expressed their satisfaction with the arrangements. The Light Aircraft Association (LAA) reminded the sponsor about the September 2021 LAA Rally at Sywell Aerodrome. The sponsor stated that the Rally and any other intense GA activities would be considered as part of flight planning to minimise impact and risk. The sponsor has referenced the monitoring of complaints. Appropriate measures should be put in place for the collating and reporting on the level and contents of complaints to the CAA in the event of the proposal's approval and stakeholders should be notified of the arrangements. The CAA would expect reporting on complaints on a two-weekly basis throughout the operation of the TDA.
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

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 **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.*

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

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. Conditions should specify the consequence of failing to meet that condition, whether that be revoking the ACP or some alternative.

1. The Operational Safety Case for this activity must be signed off before any NOTAMs are raised to activate the TDA.
2. The full range of stakeholder groups must be informed of the CAA's regulatory decision, provided with confirmation of when the decision will be implemented and be made fully aware of the contents of any related Temporary Operating Instructions as required, and specifically the actions to take should access to the TDA be required.
3. While the temporary change is in operation, the sponsor must undertake regular engagement with stakeholders.
4. Appropriate measures must be put in place for the monitoring, collating and reporting on the level and contents of complaints to the CAA and stakeholders should be notified of the arrangements. The CAA expect reporting on complaints on a two-weekly basis throughout the operation of the TDA.

5. The sponsor must record all approvals and denials to enter the TDA complex while it is active.
6. Prior to activation of the TDA, the ATS Inspector for Cranfield Aerodrome must have received and be satisfied with the TOI's for the ATC in support of the operations are acceptable including the provision of DACs and DAAIS within the TDA.
7. The sponsor shall submit all NOTAM requests for TDA activation to the CAA Airspace Regulation (Utilisation) team not later than 10:00 on the Friday of the week before they apply.
8. Should the sponsor satisfy themselves that they have met the criteria for project success as stated in Section 2.2 of the" Final ACP Document" (version 2.6) before the end of the 90 TDA applicability period, 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.	N/A

GUIDANCE NOTE: PIR data requirements concerns any specific data which the change sponsor **must** 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.

N/A

General summary

This ACP is for a low-level TDA complex in Class G airspace to support the ongoing work to future BVLOS UAS operations integrated with the rest of the aviation community. It is for a relatively small piece of airspace, at low altitudes, for a few hours per day (when activated) across a 90 day period.

Comments and observations

As with some other BVLOS UAS TDAs, there is a synchronisation issue with the OSC as this has not yet been approved by the CAA RPAS team. Consequently, Condition 1 of approving the TDA would be that the OSC is approved before the TDA is NOTAMed as Active.

Operational assessment sign-off/ approvals	Name	Signature	Date
Operational assessment completed by:	AR Technical Regulator	[redacted]	07/07/21
Operational assessment approved by:	Manager Airspace Regulation	[redacted]	16/07/2021

I have reviewed this proposal and accept the rationale for the establishment of a TDA in support of this trial. It is recognised that continued application of TDAs in the long-term would not be the means of facilitating BVLOS operations in Class G airspace due to the constraints on other users of Class G airspace even though this is of a temporary nature. I have decided to approve this trial as part of the aim for BVLOS outside of TDAs in Class G. This approval is subject to all conditions specified within this decision being met prior to implementation.