CAA CAP 1616 Options Appraisal Assessment (Phase II Full)

Title of airspace change proposal		Llanbedr Danger Area	
Change sponsor		Snowdonia Aerospace LLP	
Project no.		ACP-2019-58	
Case study commencement date	16/11/2020	**Case study report as at**	26/11/2020

Account Manager: [redacted]	**Airspace Regulator (Engagement & Consultation):** [redacted]	**IFP:** [redacted]	**OGC:** [redacted]
Airspace Regulator (Technical): [redacted]	**Airspace Regulator (Environmental):** [redacted]	**Airspace Regulator (Economist):** [redacted]	**ATM (Inspector ATS Ops):** [redacted]

Instructions

To aid the SARG project leader's efficient project management, please highlight the "status" cell for each question using one of the four colours to illustrate if it is:

Resolved - GREEN | Not Resolved – AMBER | Not Compliant – RED | Not Applicable - GREY

Guidance

The broad principle of economic impact analysis is **proportionality**; is the level of analysis involved proportionate to the likely impact from that ACP? There are three broad levels of economic analysis; qualitative discussion, quantified through metrics, and monetised in £ terms. The more significant the impact, the greater should be the effort by sponsors to quantify and monetise the impact.

1. Background – Identifying the impact of the shortlist of options (including Do Nothing (DN) / Do Minimum (DM))			Status
1.1	**Are the outcomes of DN/DM and DS scenarios clearly outlined in the proposal?**		☒ ☐ ☐ ☐
1.1.1	Has the change sponsor produced an Options Appraisal (Phase II - Full) which sets out how Initial appraisal is developed into a more detailed quantitative assessment, moving from qualitatively defined shortlist options to the selected preferred option? [E23]	Yes, the sponsor has produced the FOA (Full Options Appraisal) which was developed into a more detailed quantitative assessment for environmental impact excluding WebTAG assessment because it was anticipated that the airspace change would have a negligible overall impact on environment and therefore it'd be disproportionate for the sponsor to use WebTAG for monetisation purposes. On the other hand, the sponsor did not provide any cost benefit analysis due to the negligible impact to monetise and as an alternative, they referred to the information included in the IOA which suggested a multi-use aerospace site at Llanbedr could contribute 515 jobs and £19.5m/annum of GVA at the local level and 765 jobs and £34m/annum of additional FVA in Wales over the next 10 years.	☒ ☐ ☐ ☐
1.1.2	Does each shortlist option include the impacts in comparison to the 'do nothing / do minimum' option, in particular: -all reasonable costs and benefits quantified -all other costs and benefits described qualitatively -reasons why costs and benefits have not been quantified	The sponsor provided a detailed quantitative analysis for the impact on environment which are independent of options. All other impacts were assessed qualitatively, and the sponsor emphasised it'd be disproportionate to provide accost-benefit model because DA airspace users do not explicitly derive income from flight operations at Llanbedr but rather use the test and evaluation capabilities on offer to develop their products and services.	☒ ☐ ☐ ☐
1.1.3	Where options have been discounted, does the change sponsor clearly set out why?	The sponsor has not discounted any of the proposed options at this stage because Option 1 and Option 2 have different advantages and satisfy	☒ ☐ ☐ ☐

		the SoN.	
1.1.4	Has the change sponsor indicated their preferred option in the Options Appraisal (Phase II - Full)? [E23]	The sponsor stated according to the first feedback received from the engagement, Option 1 is easier to interpret and provides greater flexibility for operators using the DA whereas Option 2 is more complex but offers more advantages in terms of flexible use of airspace for other aviation operators. Therefore, the sponsor stated the feedback from wider group of stakeholders will be reviewed to consider the preferred option before submitting a Final Options Appraisal.	☒ ☐ ☐ ☐
1.1.5	Does the Full Options Appraisal (Phase II - Full) detail what evidence the change sponsor will collect, and how, to fill in any evidence gaps and how this will be used to develop the Options Appraisal (Phase III - Final)? Does the plan for evidence gathering cover all reasonable impacts of the change?	The FOA does not detail what evidence the sponsor will collect for the Final Options Appraisal because all the detailed environmental analysis has been provided and the sponsor provided the reasonable justification why it'd be disproportionate for them to carry out a monetised analysis for environmental and economic analysis. It is said that the analysis of future airspace use against the six key environmental criteria has shown there is negligible impact to monetise and the highly variable nature of the RDT&E market makes a 10-year forecast unrealistic. So, it is not the sponsor's intention to further develop the analysis to fill in any gaps.	☒ ☐ ☐ ☐

2. Direct impact on air traffic control		**Status**
2.1	**Are there direct cost impacts on air traffic control / management systems?** **If so, please provide below details of the factors considered and the level in which this has been analysed.**	☒ ☐ ☐ ☐

2.1.1	*Examples of costs considered (please add costs that have been discussed, and any reasonable costs that the Airspace Regulator (Technical) feels have NOT been addressed)*				
		Not applicable	Qualitative	Quantified	Monetised
2.1.2	Infrastructure changes		X	N/A	N/A
2.1.3	Deployment		X	N/A	N/A
2.1.4	Training	X			
2.1.5	Day-to-day operational costs / workload / risks		X	N/A	N/A
2.1.6	Other (provide details)	X			
2.1.7	Comments The FOA stated for all proposed options plus the do-nothing option, there would be a need for further investment into the Aerodrome facilities to implement a UTM system. The related costs will be borne by the sponsor. In terms of the deployment/operational costs, the sponsor expects a need for additional Flight Information Service and Rescue & Fire-Fighting Services training which will be again borne by the sponsor.				
2.2	**Are there direct beneficial impacts on air traffic control / management systems?** **If so, please provide details and how they have been addressed:**				
2.2.1	*Examples of benefits considered*	Not applicable	Qualitative	Quantified	Monetised
2.2.2	Reduced work-load	X			
2.2.3	Reduced complexity / risk	X			
2.2.4	Other (provide details)		X	X	X
2.2.5	Comments The sponsor referred to a recent economic impact assessment that suggested a multi-use aerospace site at Llanbedr (with aerodrome licencing, ATZ and DA implementation as fundamental building blocks) could contribute 515 jobs and £19.5m/annum of GVA at the local level and 756 jobs and £34m/annum of additional GVA in Wales over the next ten years. The sponsor emphasised DA airspace users do not explicitly derive income from flight operations at Llanbedr, but rather use the test and evaluation capabilities on offer to develop their				

	products and services. That's why the sponsor considered to look at the value provided to the wider UK aerospace industry and the derived value back into the local economy.	
2.3	**Where monetised, what is the net monetised impact on air traffic control (in net present value) over the project period?** Please refer to the answer to Question 2.2.5.	
2.4	**Are the direct impacts on air traffic management analysed accurately and proportionately?** The sponsor analysed the direct impacts on air traffic management proportionately. The evidence on the economic impact assessment has not been provided to the CAA for validation purposes but because they refer to a previous economic impact assessment - "Economic Impact Assessment for the Masterplan Development Proposals for the Snowdonia Aerospace Centre incorporating Spaceport Snowdonia at Llanbedr Airfield" which was conducted by Wavehill Ltd. this is concluded to be proportionate with the nature of this ACP.	☒ ☐ ☐ ☐

3. Changes in air traffic movements / projections					**Status**
3.1	**What is the impact of the ACP on the following and has it been addressed in the ACP proposal?**				☒ ☐ ☐ ☐
		Not applicable	Qualitative	Quantified	Monetised
3.1.1	Number of aircraft movements		X	X	X
3.1.2	Type of aircraft movement	X			
3.1.3	Distance travelled	X			
3.1.4	Area flown over / affected		X	N/A	N/A
3.1.5	Other impacts	X			
3.1.6	Comments The sponsor explained in the FOA document that a permanent DA will significantly enhance the UK RDT&E capability in environmentally friendly aircraft and electric technologies.				
3.2	**Has the forecasting of traffic done reasonably using best available guidance (e.g. DfT WebTAG, the Green Book, Academic sources…etc?)** [redacted] No. The sponsor provided reasoned arguments regarding their expectations around the airspace systems (including their size and weight), site occupancy and Danger Area activation, as considerations for the forecast use of the site however I don't believe they were able to follow the available guidance. As the sponsor notes "these estimates are				☐ ☒ ☐ ☐

indicative only and primarily intended to show the usage of the various sub areas." The sponsor has quoted expected daily occupation based on historical records. Beyond this period, the sponsor notes they would expect a small but increasing of space related activities to increase the proportion of operations using the air corridor to connect to the D201 Cardigan Bay Range. The sponsor separately (under section 3.4 of the Full Options appraisal estimates there to be 200 novel aerospace system flights per year, flown by zero-carbon electric aircraft, but that as a result of the nature of these movements (50% of which are anticipated to be flown by zero carbon aircraft) that annual CO_2 emissions are unlikely to exceed 3 Tonnes.

[redacted] In the IOA the sponsor provided the below estimate of future permanent DA annual daily usage per year. In the FOA, the sponsor underlined the fact that the highly variable nature of the RDT&E market makes a 10-year forecast unrealistic.

	Design Option =1	Design Option =2
Area A (over the aerodrome)	107	107
Area B* (inshore+)	47	35
Area C/D (offshore corridor to D201)	24	24
Area E (coastal lowland/Harlech)		6
Area F (toward Rhinog mountains)		6
Max. altitude <2000ft	71	71
Max. altitude <6000ft	36	36

3.3 **What is the impact of the above changes (3.1) on the following factors?**

[redacted] CO_2 assessed based on sponsor's estimates.

		Not applicable	Qualitative	Quantified	Monetised
3.3.1	Noise		X	N/A	N/A
3.3.2	Fuel Burn		X	X	N/A
3.3.3	CO2 Emissions		X	X	N/A

3.3.4	Operational complexities for users of airspace		X	N/A	N/A
3.3.5	Number of air passengers / cargo	X			
3.3.6	Flight time savings / Delays	X			
3.3.7	Air Quality	X			
3.3.8	Tranquillity	X			
3.4	**Are the traffic forecast and the associate impact analysed proportionately and accurately according to available guidelines (e.g. WebTAG or the Green Book?)** CO_2 impacts estimates only based on sponsors assessment. The FOA provides information on the CO_2 impact with further quantification details carried forward from the IOA. The sponsor said Penguin B drone used approximately 0.35kg of fuel per flight and with regard the flight profile for the small jet-engined drone the simulation predicted a fuel burn of 6kg to travel 35km in 15 minutes. The sponsor's conclusion on the fuel burn and CO_2 emissions is that it is unlikely that fuel burn would exceed 1 tonne and the annual CO_2 emissions to exceed 3 tonnes as it is assumed that there will be approximately 200 novel airspace system flights per year in total and 50% of these will be flown by zero-carbon electric aircraft. Bearing in mind the fact that the highly variable nature of the RDT&E market makes a 10-year forecast unrealistic as suggested by the sponsor, considering a constant yearly estimate on the number of novel airspace system flights is proportionate to reach a conclusion on the impact analysis for fuel burn and CO_2.				
3.5	**What is the total monetised impact of 3.3? (Provide comments)** N/A				

4. Benefits of ACP					**Status**
4.1	**Does the ACP impact refer to the following groups and how they are impacted by the ACP?**				
		Not applicable	Qualitative	Quantified	Monetised
4.1.1	Air Passengers	X			
4.1.2	Air Cargo Users	X			

4.1.3	General aviation users		X	N/A	N/A
4.1.4	Airlines	X			
4.1.5	Airports		X	X	X
4.1.6	Local communities		X		
4.1.7	Wider Public / Economy		X	X	X
4.1.8	Comments [redacted] Llanbedr airport is not in the vicinity of any designated Air Quality Management Areas (AQMAs), the noise impact was reasonably estimated to be negligible and not quantified. Tranquillity is expected to be unaffected. [redacted] The sponsor explained in the IOA that 789 movements in 2019 is unlikely to be impacted by the DA. The estimation is that DA will be active 2 days / week on average and with the potential for increased flexible use of airspace via greater DA segmentation and with mechanisms in place for safe transit. For the impact on airports and wider public/economy, please review the answer to Q2.1.7 and Q2.2.5.				
4.2	**How are the above groups impacted by the ACP, especially (but not exclusively) looking at the following factors below:**				
4.2.1	Improved journey time for customers of air travel	N/A			
4.2.2	Increase choice of frequency and destinations from airport	N/A			
4.2.3	Reduced price due to additional competition because of new capacity	N/A			
4.2.4	Wider economic benefits	A multi-use aerospace site at Llanbedr could contribute 515 jobs and £19.5m/annum of GVA at the local level and 765 jobs and £34m/annum of additional GVA in Wales over the next 10 years			
4.2.5	Other impacts	A permanent DA enhancement in the UK RDT&E capability and in the AMS by creating a test zone in which to explore the airspace integration issues associated with new airspace users like drones			
4.2.6	Comments				
4.3	**What is the overall monetised impacts associated with 4.1 and 4.2 the above?** The economic impact assessment is referred in the IOA and FOA and sponsor said a multi-use aerospace site at Llanbedr could contribute 515 jobs and £19.5m/annum of GVA at the local level and 765 jobs and £34m/annum of additional GVA in Wales over the next 10 years.				
4.4	**What are the non-monetised but quantified impacts of the above? (Insert details of description)**				

	Please see the answer to Question 3.4 for the quantified impact analysis of fuel burn and CO_2 emissions. Also, the sponsor tried to quantify the noise levels for different types of drones by interpolating between the existing data to construct additional noise estimates for a 20kg maximum take-off weight drone (e.g. a Penguin) and a 150 kg drone (e.g. Shadow) at 100 m above ground level and presented the below figures. **Aircraft type** / **Sound Pressure Level @ 100m AGL** Small fixed-wing drone *e.g.* AeroVironment Raven — 50dB Large quadcopter *e.g.* DJI Mavic Pro — 55dB* *20kg MTOW drone e.g. UAV Factory Penguin B* — *60dB**** *150kg MTOW drone e.g. AAI Shadow 200* — *70dB**** Small manned fixed-wing aircraft *e.g.* Robin DR400 — 75dB Medium manned helicopter — 95dB * Consistent with a measurement of 75dB 'close-in', ** Estimated	
4.5	**What are the qualitative / strategic impacts described above?** The sponsor aims to enhance the UK research, development, test and evaluation (RDT&E) capability in environmentally friendly aircraft and electric technologies in accordance with the 2018 Aerospace Industrial Strategy, also generate jobs and related economic benefit in local communities.	
4.6	**What is the overall monetised benefits-costs ratio (BCR) of the policy? Is it more than 1?** N/A	
4.7	**Have the sponsors provided reasonable justification for the proportionality of analysis above?** The sponsor said the analysis of future airspace use against the key environmental criteria has shown there would be negligible impact to monetise, so they didn't carry out any WebTAG analysis for noise and greenhouse gas impact. However, they provided detailed analysis and quantified noise and CO_2 impacts. The sponsor also referred to a recent economic impact assessment carried out by Wavehill Ltd. in March 2020 to indicate the expectation on the jobs that would be generated as an outcome of the implementation and the related local economic benefit.	☒ ☐ ☐ ☐
4.8	**If the BCR is less than 1, are the quantitative and qualitative strategic impacts proportional to the costs of the ACP?** N/A	

5. Other aspects	
5.1	Nil

6. Summary of Assessment of Economic Impacts & Conclusions	
6.1	The FOA is developed into a more detailed quantitative assessment on the potential environmental impacts. The sponsor managed to quantify and explain the anticipated noise impact and the CO2 emissions associated with flying activities at Llanbedr as a result of the change with the reasons why costs and benefits have not been monetised. In summary, the sponsor anticipated a permanent DA would significantly enhance the UK RDT&E capability in environmentally-friendly aircraft and electric technologies and also support the CAA Airspace Modernisation Strategy by creating a test zone in which to explore the airspace integration issues associated with new airspace users such as drones. In addition to this, the sponsor also highlighted a permanent DA would enable UK business to retain future flight test programmes within the UK rather than operating abroad, thereby retaining economic activity and jobs in the UK economy. The Full Options Appraisal emphasises the environmental and economic impact are same for the proposed options. Therefore, the sponsor has not mentioned any preferred option at this stage because they want to consider the feedback from a wider group of stakeholders before submitting their Final Options Appraisal. The conclusion for this stage is that the sponsor adopted a proportionate and reasonable approach for this stage given the fact that all disadvantages and advantages are highlighted in the FOA for Option 1 and Option 2.

Outstanding issues?		
Serial	Issue	Action required
None		

CAA Full Options Appraisal Assessment Completed by	Name	Signature	Date
Airspace Regulator (Economist)	[redacted]	[redacted]	16/11/2020

Airspace Regulator (Environmentalist)	[redacted]	[redacted]	26/11/2020
Airspace Regulator (Technical)	[redacted]	[redacted]	26/11/2020
ATM – Inspector ATS (Ops)	[redacted]	[redacted]	26/11/2020