CAA CAP 1616 Options Appraisal Assessment (Phase II Full)

Title of airspace change proposal		SAIP AD6	
Change sponsor		NATS/London Luton Airport	
Project no.		2018-65	
Case study commencement date	07/08/2020	**Case study report as at**	[redacted]

Account Manager: N/A	**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 change sponsor produced the FOA which is built on the IOA into a more detailed quantitative and monetised analysis for noise, fuel burn, greenhouse gas impact and economic impact from increased effective capacity.	☒ ☐ ☐ ☐
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	Yes, the sponsor analysed Option 1 and Option 2 in comparison with the baseline option with all the reasonable costs and benefits quantified and monetised, and where quantification is not proportionate the sponsor provided the qualitative analysis for the costs and benefits with rationale provided for each impact.	☒ ☐ ☐ ☐
1.1.3	Where options have been discounted, does the change sponsor clearly set out why?	The sponsor listed individual option elements in the IOA due to the possibility of considering combinations of these and presented the two possible combination options at this stage which are both safe and viable.	☒ ☐ ☐ ☐
1.1.4	Has the change sponsor indicated their preferred option in the Options Appraisal (Phase II - Full)? [E23]	Yes, Option 2 is stated as preferred option which allows RNAV hold north of Luton with PBN routes and vectoring to the runway.	☒ ☐ ☐ ☐
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 sponsor provided all evidences related to noise, fuel burn and greenhouse gases, which are WebTAG spreadsheets for Option 1 and 2, and there are separate assumptions carried out for with DCO and without DCO scenarios.	☒ ☐ ☐ ☐

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)* See below.				
		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	X	N/A
2.1.5	Day-to-day operational costs / workload / risks	N/A			
2.1.6	Other (provide details)	N/A			
2.1.7	Comments The sponsor stated it is not expected to change airport or ANSP infrastructure, beyond the initial deployment phase which would require some systems engineering amendments for Option 1 and Option 2. In terms of deployment costs, the sponsor expects air traffic controllers would require significant training, in the order of 120-150 controllers and circa 50 assistants at NATS Swanwick, also 25 controllers and 5 assistants based at Luton Airport. In addition to this, it is also mentioned some staff may only require briefings and support staff are required to run simulator. The Sponsor raises a concern that during training times, operational rostering might become a factor as there is still a need to provide continuous service delivery.				
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	N/A	N/A

2.2.3	Reduced complexity / risk		X	N/A	N/A
2.2.4	Other (provide details)	N/A			
2.2.5	Comments It is explained in the FOA that under the baseline option, the intertwining of Luton arrivals with Stansted arrivals would continue, and there would be no opportunity to rebalance the workload which would cause extra complexity and workload for controllers and pilots. So, the sponsor aims to change the airspace design to avoid any potential latent safety impact that might occur during unsustainable periods of over-demand. The Sponsor uses MV (Monitoring Value) to describe the capacity issues in each segment of airspace being addressed. The Sponsor describes MV as broadly indicating the number of movements per hour which can be safely handled by the controllers operating the flows in each associated airspace sector. Both Option 1 and Option 2 will improve the MV for each airport as the LUTON flow is separated from the STANSTED flow and it would be moved into a new upstream flow, thus separating the flow dependency. Also, in terms of the resilience impact, the sponsor stated air traffic controllers can manage aircraft by vectoring and it is said the lower the need for radio exchanges (interactions) per flight, the more resilient the airspace system because controllers can spend more time managing the overall flows and less time making constant adjustments to individual flights. One of the proposed options (Option 1), controllers working with arrivals from the simplified upper system would require 6-8 fewer than the baseline radio exchanges which is said to be 21-28. So, the FOA indicates Option 1 will be more resilient than Option 0 by the predicted removal of 6-8 radio exchanges from the controllers' workloads. And Option 2 is declared to be the most resilient option by the predicted removal of up to 10 radio exchanges from the controllers' workloads. NATS can provide evidence of how they reached these resilience figures to justify them if required (Illustrations in Annex G FOA). In summary, the Options being proposed will improve capacity, resilience and ultimately reduce risk from an ATM perspective.				
2.3	**Where monetised, what is the net monetised impact on air traffic control (in net present value) over the project period?** N/A				
2.4	**Are the direct impacts on air traffic management analysed accurately and proportionately?** The sponsor presented all the air traffic management related impacts by touching on the probable costs and benefits for each impact with clear statements provided to explain the methodology for quantitative analysis where available and allow qualitative assessment where it is not proportionate to carry out quantitative analysis. This is considered to be in line with CAP 1616 approach.			☒ ☐ ☐ ☐	

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			
3.1.2	Type of aircraft movement		X	N/A	N/A
3.1.3	Distance travelled		X	X	X
3.1.4	Area flown over / affected		X	N/A	N/A
3.1.5	Other impacts				
3.1.6	Comments The sponsor underlined the fact that Luton and Stansted arrival flows cannot be separated without changing the airspace design. Therefore, Option 1 and 2 are being proposed under which, the Luton flow is separated from the Stansted flow and as anticipated by the sponsor, this would be moved into a new upstream flow which enables the separation of the flow dependency. The sponsor aims to create an extra capacity by separating the Luton flow from the Stansted upstream flow which would then remove the probability of upstream delay. The sponsor explained that such change in the airspace would have the broader impact of delay to the travelling public, businesses and local communities would reduce and it is anticipated that there'd be additional capacity to absorb delay to cater for the forecast increase in air traffic. The sponsor assumed for Option 1 and Option 2 that these structures would delay individual delays which are less than or equal to 15 minutes. To monetise the cost of avoiding such delay, the sponsor benefited from NATS analysis produced in April 2018 which assumes per minute delay costs at £3.68 where delay ≤15 mins. The monetisation is presented in the FOA with the following details which applies to both Option 1 and Option 2: For 2021, a net delay avoidance is reported as c. 10,200 minutes in total. 10,200*£3.68=£37,500pa For 2031, a net delay avoidance is reported as c. 11,200 minutes in total. 11,200*£3.68=£41,200pa				

3.2	**Has the forecasting of traffic done reasonably using best available guidance (e.g. DfT WebTAG, the Green Book, Academic sources…etc?)** According to the sponsor, in terms of fuel burn, the forecast traffic numbers analysed as part of the previous submission can be adapted to reflect the changed time period covered, it will still however represent a 10-year forecast. This challenge is harder with relation to the noise analysis considerations, particularly as the only major difference aside from the change of the years covered, is a slight increase (of 1.1%) in forecast traffic. The assessment results have therefore been presented qualitatively. This is considered acceptable.	☒ ☐ ☐ ☐
3.3	**What is the impact of the above changes (3.1) on the following factors?** In order to evaluate Tranquillity, the sponsor has given BOTH qualitative evidence and also quantified this through the means of a count of the numbers of aircraft passing overhead the AONB in a representative set of aircraft trajectories.	

		Not applicable	Qualitative	Quantified	Monetised
3.3.1	Noise		X	X	X
3.3.2	Fuel Burn		X	X	X
3.3.3	CO2 Emissions		X	X	X
3.3.4	Operational complexities for users of airspace		X	X	N/A
3.3.5	Number of air passengers / cargo	N/A			
3.3.6	Flight time savings / Delays		X	X	X
3.3.7	Air Quality		X	N/A	N/A
3.3.8	Tranquillity		X	X	N/A

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?)** The sponsor carried out WebTAG analysis in line with the process for the noise and greenhouse gas impact assessment. In addition to this, the sponsor also monetised the fuel burn impact for both options using the non-DCO and with-DCO traffic forecasts which forms the baseline data of the WebTAG greenhouse gases spreadsheet. The FOA also addresses the economic impact assessment from increased effective capacity. The methodologies are all in line with CAP 1616 process.	☒ ☐ ☐ ☐
3.5	**What is the total monetised impact of 3.3? (Provide comments)** The total monetised impact for Option 1 and Option 2 for both with and without DCO scenarios were shown in the below cost-benefit analysis	

tables which is a requirement under CAP 1616 Appendix E.

Negative values are cost or disbenefit	2022	2023	2024	2025	2026	202$7$	2028	2029	2030	2031	2032	Net
Year	0	1	2	3	4	5	6	7	8	9	10	Present
Discount factor	1	0.9662	0.9335	0.9019	0.8714	0.8420	0.8135	0.7860	0.7594	0.7337	0.7089	Value
Option 1 Without DCO												
Net community benefit (Noise)	-£5,282	-£3,069	-£957	£1,068	£3,015	£4,894	£6,711	£8,470	£10,178	£11,832	£13,430	
Net community benefit (CO_2)	-£140,249	-£136,293	-£132,375	-£128,577	-£124,819	-£121,178	-£119,086	-£115,539	-£112,037	-£116,600	-£121,803	
Net airspace users benefit (CO_2)	-£235,823	-£283,708	-£326,808	-£357,796	-£392,582	-£423,454	-£444,049	-£468,137	-£489,078	-£507,063	-£527,761	
Net airspace users benefit (Fuel costs)	-£2,084,000	-£2,062,000	-£2,039,000	-£2,017,000	-£1,995,000	-£1,973,000	-£1,951,000	-£1,929,000	-£1,906,000	-£1,884,000	-£1,862,000	
Net airspace users benefit (Delay)	£37,500	£37,870	£38,240	£38,610	£38,980	£39,350	£39,720	£40,090	£40,460	£40,830	£41,200	NPV
Present value (rounded to nearest whole £1,000, NPV is sum of	-£2,428,000	-£2,379,000	-£2,328,000	-£2,270,000	-£2,219,000	-£2,168,000	-£2,111,000	-£2,060,000	-£2,008,000	-£1,964,000	-£1,927,000	**-£23,861,000**

Negative values are cost or disbenefit	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Net
Year	0	1	2	3	4	5	6	7	8	9	10	Present
Discount factor	1	0.9662	0.9335	0.9019	0.8714	0.8420	0.8135	0.7860	0.7594	0.7337	0.7089	Value
Option 1 With DCO												
Net community benefit (Noise)	-£5,282	-£2,748	-£329	£1,990	£4,222	£6,375	£8,459	£10,476	£12,436	£14,332	£16,165	
Net community benefit (CO_2)	-£140,249	-£136,293	-£132,375	-£137,136	-£133,198	-£130,872	-£131,653	-£130,727	-£129,725	-£136,133	-£143,447	
Net airspace users benefit (CO_2)	-£235,823	-£283,708	-£326,808	-£382,419	-£419,916	-£458,693	-£492,917	-£532,595	-£570,196	-£596,741	-£627,097	
Net airspace users benefit (Fuel costs)	-£2,084,000	-£2,062,000	-£2,039,000	-£2,155,000	-£2,133,000	-£2,136,000	-£2,164,000	-£2,192,000	-£2,220,000	-£2,214,000	-£2,209,000	
Net airspace users benefit (Delay)	£37,500	£37,870	£38,240	£38,610	£38,980	£39,350	£39,720	£40,090	£40,460	£40,830	£41,200	NPV
Present value (rounded to nearest whole £1,000, NPV is sum of	-£2,428,000	-£2,378,000	-£2,327,000	-£2,426,000	-£2,374,000	-£2,349,000	-£2,344,000	-£2,344,000	-£2,343,000	-£2,313,000	-£2,291,000	**-£25,918,000**

Negative values are cost or disbenefit	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Net
Year	0	1	2	3	4	5	6	7	8	9	10	Present
Discount factor	1	0.9662	0.9335	0.9019	0.8714	0.8420	0.8135	0.7860	0.7594	0.7337	0.7089	Value
Option 2 Without DCO												
Net community benefit (Noise)	-£36,442	-£35,490	-£34,620	-£33,821	-£33,079	-£32,389	-£31,745	-£31,127	-£30,550	-£29,981	-£29,420	
Net community benefit (CO_2)	-£140,249	-£136,293	-£132,375	-£128,577	-£124,819	-£121,178	-£119,086	-£115,539	-£112,037	-£116,600	-£121,803	
Net airspace users benefit (CO_2)	-£235,823	-£283,708	-£326,808	-£357,796	-£392,582	-£423,454	-£444,049	-£468,137	-£489,078	-£507,063	-£527,761	
Net airspace users benefit (Fuel costs)	-£2,084,000	-£2,062,000	-£2,039,000	-£2,017,000	-£1,995,000	-£1,973,000	-£1,951,000	-£1,929,000	-£1,906,000	-£1,884,000	-£1,862,000	
Net airspace users benefit (Delay)	£37,500	£37,870	£38,240	£38,610	£38,980	£39,350	£39,720	£40,090	£40,460	£40,830	£41,200	NPV
Present value (rounded to nearest whole £1,000, NPV is sum of	-£2,459,000	-£2,411,000	-£2,362,000	-£2,305,000	-£2,255,000	-£2,205,000	-£2,150,000	-£2,099,000	-£2,048,000	-£2,006,000	-£1,970,000	**-£24,270,000**

Negative values are cost or disbenefit	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Net
Year	0	1	2	3	4	5	6	7	8	9	10	Present
Discount factor	1	0.9662	0.9335	0.9019	0.8714	0.8420	0.8135	0.7860	0.7594	0.7337	0.7089	Value
Option 2 With DCO												
Net community benefit (Noise)	-£36,442	-£33,909	-£31,526	-£29,272	-£27,129	-£25,084	-£23,126	-£21,237	-£19,422	-£17,657	-£15,940	
Net community benefit (CO_2)	-£140,249	-£136,293	-£132,375	-£137,136	-£133,198	-£130,872	-£131,653	-£130,727	-£129,725	-£136,133	-£143,447	
Net airspace users benefit (CO_2)	-£235,823	-£283,708	-£326,808	-£382,419	-£419,916	-£458,693	-£492,917	-£532,595	-£570,196	-£596,741	-£627,097	
Net airspace users benefit (Fuel costs)	-£2,084,000	-£2,062,000	-£2,039,000	-£2,155,000	-£2,133,000	-£2,136,000	-£2,164,000	-£2,192,000	-£2,220,000	-£2,214,000	-£2,209,000	
Net airspace users benefit (Delay)	£37,500	£37,870	£38,240	£38,610	£38,980	£39,350	£39,720	£40,090	£40,460	£40,830	£41,200	NPV
Present value (rounded to nearest whole £1,000, NPV is sum of	-£2,459,000	-£2,410,000	-£2,358,000	-£2,458,000	-£2,405,000	-£2,380,000	-£2,376,000	-£2,376,000	-£2,375,000	-£2,345,000	-£2,323,000	**-£26,264,000**

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	X	X
4.1.4	Airlines		X	X	X
4.1.5	Airports		X	X	X
4.1.6	Local communities		X	X	X
4.1.7	Wider Public / Economy		X	X	X

4.1.8 Comments

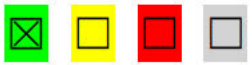
In terms of access impact, the sponsor indicated there would be a potential increased access restriction on GA who fly FL75 and above in the region, compared with the baseline option, but a reduced restriction at lower altitudes near Stansted.

For the impact on commercial airlines and GA, it is reported that the overall fuel cost disbenefit would be c.£2.1m in 2021 and £1.9m in 2031 if the DCO does not progress and £2.2m in 2031 if the DCO does progress.

Average change in fuel cost per flight is also reported with the below chart in the FOA to highlight the changes that would apply to Luton and Stansted arrivals.

Average change in fuel cost per flight (LLA Arrivals)			
Scenario	2022	2032 No DCO	2032 With DCO
Num flights	70,740	70,740	91,500
t fuel total	-6,330	-6,330	-7,302
t fuel per flight	-0.089	-0.089	-0.080
t CO2e per flight	-0.285	-0.285	-0.254
£/flt Opt 1	-£31.92	-£31.92	-£28.47
£/flt Opt 2	-£31.92	-£31.92	-£28.47
Average change in fuel cost per flight (Stansted Arrivals)			
Num flights	101,719	102,410	102,410
t fuel total	489	1,111	1,111
t fuel per flight	0.005	0.011	0.011
t CO2e per flight	0.015	0.034	0.034
£/flt Opt 1	£1.72	£3.87	£3.87
£/flt Opt 2	£1.72	£3.87	£3.87

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	Positively
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	Positive impact from increased effective capacity
4.2.5	Other impacts	Significant negative impact for Option 2 in terms of noise, and negative fuel burn and greenhouse impact for both options
4.2.6	Comments	
4.3	**What is the overall monetised impacts associated with 4.1 and 4.2 the above?** Please see the answer to Q3.5 above.	

4.4	**What are the non-monetised but quantified impacts of the above? (Insert details of description)** Resilience impact was analysed qualitatively and quantitatively. Please see the answer to Question 2.2.5 for detailed information which is available on third paragraph.	
4.5	**What are the qualitative / strategic impacts described above?** Please see the answers to Question 2.2.5.	
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?** Yes, the sponsor has given the justification for why it wouldn't be proportionate for them to monetise the impact from resilience. It is stated that due to the unpredictable nature of the events like runway closure or bad weather plus many other complex factors can influence the level of resilience and therefore it is not proportional to monetise such impacts.	
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 sponsor carried out a detailed quantitative and monetised analysis as outlined in CAP 1616 process, moving from qualitatively defined shortlist options to the selection of the preferred option. Each shortlist option is fully developed, including the 'do nothing' 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

[redacted]

In this second Consult Gateway attempt, the sponsor made it clearer why Option 2 is preferred over Option 1 and calculated the difference of NPV for the next 10 years appraisal period. The sponsor argues that only Option 2 generally aligns with AMS Initiative 8 (Satellite navigation route redesign) because it would introduce useable PBN routes to connect the hold to final approach for the landing runway whereas Option 1 does not provide any such structure. The sponsor also compared NPVs for each scenario and the analysis outcome reveals Option 2 would cause c.£409K more disbenefit than Option 1 if the DCO does not progress; in case the DCO progresses, then Option 2 would cause c.£346K more disbenefit than Option 1. Therefore, the sponsor has concluded that the differences between the cost-benefit analyses of Option 1 and Option 2 are relatively small, given the orders of magnitude of other costs. The sponsor has explained the rationale of their preference with Option 2 in more detail with the paragraphs provided under Summary and Conclusion sections of the Full Options Appraisal.

Outstanding issues?

Serial	Issue	Action required
1	[redacted]	[redacted]

2	[redacted]	[redacted]
3	[redacted]	[redacted]

CAA Full Options Appraisal Assessment Completed by	Name	Signature	Date
Airspace Regulator (Technical)	[redacted]	[redacted]	28/08/2020
Airspace Regulator (Economist)	[redacted]	[redacted]	04/09/2020
Airspace Regulator (Environmental)	[redacted]	[redacted]	28/08/2020
ATM – Inspector ATS (Ops)	[redacted]	[redacted]	02/09/2020