CAA CAP 1616 Options Appraisal Assessment (Phase III Final)

Title of Airspace Change Proposal:	LAMP2 D1.1 (West)		
Change Sponsor:	NATS		
ACP Project Ref Number:	ACP-2017-70		
Case study commencement date:	08/06/2022	**Case study report as at**:	04/10/2022

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 Do Nothing (DN) /Do Minimum (DM) scenarios			Status
1.1	**Are the outcomes of DN/DM scenarios clearly outlined in the proposal?**		☒ ☐ ☐ ☐
1.1.1	Has the change sponsor produced an Options Appraisal (Phase III - Final) which consists of the Full appraisal with any refinements or changes made as a result of the Stage 3 formal consultation with stakeholders? [E24]	Yes, the sponsor develops the Final Options appraisal which results in the assessment of Option 6 (NATS preferred option) that has been modified to accommodate stakeholders feedback, including minor technical design amendments.	☒ ☐ ☐ ☐

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				
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 sponsor states that the proposed airspace change will require some initial systems engineering amendments in the initial deployment phase, but it is not expected to change airport or air navigation service provides (ANSP) infrastructure nor the operational costs at the airport or ANSP. Since airlines update flight procedures using AIRAC, there will not be additional costs for commercial airlines, i.e., training costs and other costs. The proposed airspace change will have an impact on the air traffic controllers which will need to undertake some training (i.e., 120-150 controllers, 50 assistants at NATS Swanwick, including extensive use of NATS simulator facility, and support staff to run the simulator), some staff may only require briefings, and the military ANSP might also need a briefing before the deployment. The sponsor acknowledges that					

	when controllers are in the conversion training the operational rostering becomes a factor during continuous service delivery. In addition also MoD may require some briefing prior to deployment.				
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	X	N/A
2.2.3	Reduced complexity / risk		X	X	N/A
2.2.4	Other (provide details)	X			
2.2.5	**Comments:** The sponsor stated that providing an efficient deconflicted network with added connectivity to UK FIR exit areas yielding capacity benefits and a reduction in ATC complexity. This will increase the resilience of the ATC network by 13.4% on average across the affected sectors.				
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?** Yes. The sponsor states that this ACP is not expected to change airport or air navigation service provider (ANSP) infrastructure, however some engineering amendments are expected in the initial deployment phase.				☒ ☐ ☐ ☐

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	N/A	N/A

3.1.3	Distance travelled		X	N/A	N/A
3.1.4	Area flown over / affected	X			
3.1.5	Other impacts	X			
3.1.6	**Comments:** The proposed airspace change aims to increase flight planning flexibility, which could allow aircraft operators to flight plan more efficiently and avoid restricted areas, which as a result would reduce the likelihood of delay and would improve the resilience of the wider network.				

3.2 **Has the forecasting of traffic done reasonably using best available guidance (e.g. DfT WebTAG, the Green Book, Academic sources…etc?)**

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Yes, the sponsor uses the DfT WebTAG tables to estimate and monetise the environmental impacts. The WebTAG traffic inputs are obtained by using the most-recent NATS October 21 STATFOR extended forecast with year-on-year traffic growth. To estimate the fuel costs, the sponsor uses the IATA jet fuel price of 2 September 2022 and NATS October 21 STATFOR extended forecast. The methodology used is clearly explained and follows DfT WebTAG guidance and is consistent with CAP1616 requirements.

The appendix section includes a clear explanation of the following:

i. assumptions;
ii. methodology;
iii. datasets (i.e. fuel burn was calculated using NATS NEMO tool which uses BADA 4.2 and BADA 3.14 data for aircraft types not in BADA); and
iv. software (i.e. AirTOP ATC computer simulation software)

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

The sponsor undertakes the assessment of both fuel burn and CO_2 emissions for Option 6 to implement LD1.1 which is NATS' preferred design. The Final Options Appraisal comprises the findings for FRA D2 and LD1.1 final options alongside the combined impact of these which is called West. The report for the findings are available for CO_2 savings, fuel savings and their monetised benefits (NPV).

Year	No. of Movements	Simulated CO_2e (T) saving
2023	476,048	5,208
2033	566,904	6,201

Year	No. of Movements	Simulated Fuel (T) saving
2023	476,048	1,637
2033	566,904	1,950

		Not applicable	Qualitative	Quantified	Monetised
3.3.1	Noise	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		
3.3.5	Number of air passengers / cargo	X			
3.3.6	Flight time savings / Delays		X	N/A	N/A
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?)**

Yes, the sponsor has provided an accurate assessment of the impacts, following CAP1616 requirement for a level 2A ACP. The sponsor uses the NATS October 21 STATFOR extended forecast to develop the ten-year traffic forecast. It should however be noted the sponsor did not provide a baseline and therefore there is no context to the CO_2 savings.

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3.5 **What is the total monetised impact of 3.3? (Provide comments)**

Due to the interdependency of this ACP with FRA D2 ACP, the sponsor monetised the CO2e and fuel savings separately for LD1.1 and FRA D2 and combine these options to show the total impact as referred to by NATS as West Airspace Deployment (West).

The tables below, which were included by the sponsor in the Final Options Appraisal, summarises the monetised impact for the final FRA D2 option, final LD1.1 option and combined option (West).

Impact Type	2023 CO2e (T)	2033 CO2e (T)	2023-2033 CO2e (£) (traded)	2023-2033 CO2e (£) (non-traded)
LD1.1	-5,208	-6,201	£1,821,478	£5,674,157
FRA D2	-6903	-8,221	£2,414,337	£7,521,591
Combined	-12,111	-14,422	£4,235,816	£13,195,749

Impact Type	2023	2033	2023 Fuel	2033 Fuel
	Fuel saving (T)	Fuel saving (T)	Fuel saving (£)	Fuel saving (T)
LD1.1	-1,637	-1,950	£1,581,549	£1,883,946
FRA D2	-2,171	-2,585	£2,097,460	£2,497,436
Combined	-3,808	-4,535	£3,679,009	£4,381,383

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	N/A	N/A
4.1.5	Airports	X			
4.1.6	Local communities	X			
4.1.7	Wider Public / Economy		X	X	X
4.1.8	**Comments:** The proposed LAMP D1.1 would not increase air passenger numbers or air cargo users. However, the proposed change is expected to increase the effective capacity of the airspace. The sponsor doesn't expect any change to GA access to the extant Controlled Airspace (CAS) but stated the change will require an increase in CAS in some areas and a reduction in others, with a reduction in CAS overall. The sponsor states that the implementation of LD1.1 will enable a reduction in fuel burn and CO_2 emissions that have been quantified and monetised (see Q.3.5).				
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	Providing an efficient deconflicted network with added connectivity to UK FIR exit areas yielding capacity benefits and a reduction in ATC complexity. This will increase the resilience of the ATC network as the modelling of operational performance predicts 13.4% increase in controller enabled capacity on average across the affected sectors.
4.2.5	Other impacts	N/A
4.2.6	**Comments:** Please see the answers to Question 4.1.8.	

4.3 **What is the overall monetised impacts associated with 4.1 and 4.2 the above?**

The sponsor provides the cost benefit analysis table for the final option of FRA D2 and LD1.1 and for West that combines FRA D2 and LD1.1. The net present value (NPV) over the 10-year period is summarised below:

CAP1616 cost-benefit example - FRA D2 Final Option, LD1.1 Final Option and Combined West Benefits

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	
Year	0	1	2	3	4	5	6	7	8	9	10	NPV
Discount factor	1	0.966183575	0.9335	0.9019	0.8714	0.8420	0.8135	0.7860	0.7594	0.7337	0.7089	
FRA D2 Final Option												
Net community benefit (CO2)	**£901,757**	**£922,331**	**£917,280**	**£913,566**	**£909,175**	**£905,211**	**£901,184**	**£897,208**	**£893,279**	**£889,393**	**£885,544**	
Net airspace users benefit (Fue	**£2,097,460**	**£2,186,344**	**£2,217,260**	**£2,251,074**	**£2,283,923**	**£2,318,703**	**£2,353,484**	**£2,388,264**	**£2,424,011**	**£2,460,724**	**£2,497,436**	
Net sponsor benefit	**£0**	**£0**	**£0**	**£0**	**£0**	**£0**	**£0**	**£0**	**£0**	**£0**	**£0**	
Present value	**£2,999,217**	**£3,034,740**	**£2,987,116**	**£2,943,906**	**£2,899,482**	**£2,857,497**	**£2,815,744**	**£2,774,362**	**£2,734,101**	**£2,694,902**	**£2,656,024**	**£31,397,092**
LD1.1 Final Option												
Net community benefit (CO2)	£680,334	£695,784	£691,920	£689,181	£685,932	£682,793	£679,873	£676,929	£673,962	£670,971	£667,955	£7,495,636
Net airspace users benefit (Fuel)	£1,581,549	£1,650,144	£1,672,365	£1,698,450	£1,723,569	£1,748,689	£1,774,774	£1,801,826	£1,828,877	£1,855,929	£1,883,946	
Net sponsor benefit	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
Present value	£2,261,883	£2,290,126	£2,253,090	£2,221,086	£2,187,924	£2,155,142	£2,123,653	£2,093,148	£2,062,832	£2,032,723	£2,003,520	£23,685,127
Combined: FRA D2/LD1.1 (West)												
Net community benefit (CO2)	£1,582,091	£1,618,115	£1,609,200	£1,602,747	£1,595,107	£1,588,005	£1,581,057	£1,574,137	£1,567,241	£1,560,363	£1,553,500	
Net airspace users benefit (Fuel)	£3,679,009	£3,836,488	£3,889,624	£3,949,524	£4,007,492	£4,067,392	£4,128,258	£4,190,090	£4,252,888	£4,316,652	£4,381,383	
Net sponsor benefit	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
Present value	£5,261,100	£5,324,866	£5,240,206	£5,164,992	£5,087,405	£5,012,639	£4,939,397	£4,867,510	£4,796,933	£4,727,625	£4,659,544	£55,082,219

These results show that combined FRA D2/LD1.1 (West) would enable CO2e and fuel burn savings that generates benefits not only to airlines but also to wider society and other airspace. In conclusion, the cumulative impact of West would generate a higher significant NPV that is equal

	to £55,082,219.	
4.4	**What are the non-monetised but quantified impacts of the above? (Insert details of description)** The only quantified but non-monetised impact if ATC capacity impact which is cumulatively determined as 13.4% increase in controller enabled capacity on average across the affected sectors.	
4.5	**What are the qualitative / strategic impacts described above?** The main objective of the proposed airspace change is to introduce new systemised routes. These routes are expected to provide an efficient deconflicted network with added connectivity to UK FIR exit areas yielding capacity benefits and a reduction in ATC complexity	
4.6	**What is the overall monetised benefits-costs ratio (BCR) of the policy? Is it more than 1?** BCR > 1 as the NPV calculated for LAMP D1.1 airspace change proposal impact on fuel burn and greenhouse gas savings are calculated in total £23,685,127 without any costs emphasised for this change.	
4.7	**Have the sponsors provided reasonable justification for the proportionality of analysis above?** Yes, the sponsor has conducted a proportionate analysis for the level assigned to this ACP – Level 2A, in line with CAP1616 requirements including the quantification for the fuel burn and greenhouse gas impacts along with the cost benefit analysis.	☒ ☐ ☐ ☐
4.8	**If the BCR is less than 1, are the quantitative and qualitative strategic impacts proportional to the costs of the ACP?** BCR > 1 as the NPV calculated for LD1.1 airspace change proposal is calculated as £23,685,127. So, this question is not applicable for this ACP.	

5. Other aspects	
5.1	N/A

6. Summary of Assessment of Economic Impacts & Conclusions	
6.1	The proposed airspace change affects the flights below 20,000ft but above 7,000ft. The Final Options Appraisal (FOA) fulfils the minimum requirements for a Level 2A ACP, as per CAP1616. The sponsor provides a qualitative and quantitative/monetised assessment of the environmental impacts, i.e., CO_2 and fuel burn and the cost benefit analysis tables. Since there are significant design efficiencies and costs/benefits for implementing the FRA D2 and LD1.1 at the same time, the sponsor estimates the impacts and costs/benefits for each separate airspace change proposal and develops a combined assessment, highlighting the

	benefits of implementing LD1.1 in combination with FRA D2. The environmental assessments show that the cumulative impact of West Airspace Deployment (West) would contribute to a reduction in per flight fuel burn and CO_2 emissions.

Outstanding issues?		
Serial	Issue	Action required
1	-	-
2		

CAA Final Options Appraisal Completed by	**Name**	**Signature**	**Date**
Airspace Regulator (Economist)	[redacted]	[redacted]	04/10/2022