Swanwick Airspace Improvement Programme
Airspace Development 3
LAC S21/ Jersey/ Brest Interface

SAIP AD3
Gateway documentation:
Stage 3 Consult

Steps 3A and 3B Full Options Appraisal

NATS Uncontrolled

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Issue 1	April 2018	Published

References

Ref No	Description	Hyperlinks
1	SAIP AD3 CAA web page – progress through CAP1616	Link
2	Stage 1 Assessment Meeting Presentation	Link
3	Stage 1 Assessment Meeting Minutes	Link
4	Stage 1 Design Principles	Link
5	Stage 2 Design Options	Link
6	Stage 2 Design Principle Evaluation	Link
7	Stage 2 Initial Options Safety Appraisal	Link
8	Stage 3 Consultation Strategy	Link

Contents

1. Introduction

1.1 This document forms part of the document set required in accordance with the requirements of the CAP1616 airspace change process.

1.2 This document aims to provide adequate evidence to satisfy
Stage 3 Consult Gateway, Steps 3A and 3B Options Appraisal (Full)

1.3 See Stage 1 Gateway Design Principles for full details of the eleven proposed design principles (Ref 4).

1.4 The three options (baseline, Option 1 and Option 2) were assessed against each of the design principles; described in the Stage 2 Develop and Assess Options Assessment (Ref 7).

1.5 Previous documents (Refs 5, 6, 7) and stakeholder engagement described in the consultation strategy (Ref 8) have reduced the number of design concepts to one, known as Option 2. This preferred option is the single shortlist option we are consulting on. This document describes the differences between the do nothing baseline and the Option 2 concept. Option 2 is considered by NATS to be the 'do minimum' option because 'do nothing' is not feasible given the route alignment change at the Jersey/Brest FIR boundary.

1.6 The proposed Option 2 would deliver a concept of partial systemisation and align the UK airspace with the planned extension of the Channel Islands Control Zone (CICZ). This change will alter the traffic flows in both directions through existing waypoints which sit on the FIR boundary.

2. Options Appraisal

The following table is based on key analyses described in CAP1616 Table E2 on pages 160-162

Group	Impact	Level of Analysis	Evidence
Communities	Noise impact on health and quality of life	N/A	N/A – airspace changes are above 7,000ft and over the sea
Communities	Air quality	N/A	N/A – airspace changes are above 7,000ft and over the sea.
Wider society	Greenhouse gas impact	Monetise and quantify	The proposed change would increase overall fuel burn by 28.8T in 2019 rising to 33.1T in 2029. Forecast flows between particular city pairs may change to a greater or lesser extent. The forecast used is NATS December 2017 Base Forecast. WebTAG was used to assess the greenhouse gas impact over time from the proposed changes, for the traded sector. This concept would yield a neutral Net Present Value. However there would be an increase in CO_2 in the opening year (2019) of 92T which would rise to 977T over a 60 year appraisal period. WebTAG has also been used to show the Net Present Value of CO_2 for the non-traded sector; this was calculated at -£51,910. The worksheet outputs for both of these are shown in Appendix A. These disbenefits are due to some routes becoming longer from partially systemising the airspace. Appendix A shows the overall WebTAG greenhouse gas analysis for this proposal. Appendix B shows the WebTAG greenhouse gas analysis for each of the relevant traffic flows.
Wider society	Capacity/ resilience	Qualitative	The resulting partial systemisation of this region would improve predictability and capacity as a result of this. This partial systemisation would yield an overall benefit in terms of conflict/complexity reduction; thus improving the airspace resilience. The proposed changes would also yield a benefit (reduction) in the number of conflicts, and hence complexity, from the systemised flows. The proposed changes offer the best compromise between supporting the planned changes to the CICZ, whilst minimising the amount of UK airspace change. This concept does not require any changes to UK airspace infrastructure.
General Aviation	Access	N/A	N/A – there would be no change in impact to General Aviation airspace users.

Group	Impact	Level of Analysis	Evidence
General Aviation/ commercial airlines	Economic impact from increased effective capacity	N/A	N/A – this concept was not designed with the intention of increasing the capacity of this region of airspace, any economic impact from a capacity increase is not specifically claimed, it is a side-benefit of the reduction in controller interactions due to the partial systemisation brought on by alignment with the changes in Jersey airspace. As previously noted, some city pair routes may be longer under this proposal, potentially changing the travel times for those routes.
General Aviation/ commercial airlines	Fuel burn	Monetise	There would be an increase in fuel usage and burn, at a cost of £13,465 per year in 2019 rising to £15,475 per year by 2029. These both refer to the Net Present Value. This was based on the IATA jet fuel price of 30 Mar 18, 658.50 USD per tonne converted to GBP at 0.71$/£ and presumes a constant fuel price and exchange rate. As mentioned above, this is due to some routes becoming longer from partial systemisation of the airspace.
Commercial airlines	Training cost	N/A	N/A – it is not proportionate to attempt to quantify airline training costs.
Commercial airlines	Other costs	N/A	N/A – there are no other known costs which would be imposed on commercial aviation.
Airport/ Air navigation service provider	Infrastructure costs	N/A	N/A – there would be no costs attributable to infrastructure.
Airport/ Air navigation service provider	Operational costs	N/A	N/A – this proposal would not lead to changes in operational costs.
Airport/ Air navigation service provider	Deployment costs	Qualitative and quantitative	There would be c.75 LAC Sector 21 controllers (15 ATCOs x 5 watches) requiring training. This would be completed using CBT whilst other controllers/ support staff would simply require face to face briefings and notifications. Staff at the Solent Airports would also receive briefings. There would be no requirement to use a simulation facility. It is unlikely there would be an appreciable impact on service delivery due to the deployment of this change.

3. Safety Assessment

3.1 NATS and SARG verbally discussed the safety assessment submitted for Stage 2 (Ref 7) and agreed that it also satisfies the requirements of Stage 3.

3.2 NATS has a dedicated safety manager for the SAIP project. Their role is to assess the scale of each airspace change, to ensure the CAA-accepted; CAP670-compliant NATS Safety Management System is followed. Also their role is to submit safety arguments with supporting evidence to the CAA's en-route safety regulator, to clearly demonstrate each airspace change is acceptably safe for implementation and the right assurances are in place.

3.3 The NATS safety manager has assessed SAIP AD3 as having a low safety impact, primarily procedural in nature. This assessment led to the qualitative deployment costs (training needs description) in the final row of the Options Appraisal table (above).

3.4 NATS is not claiming a specifically-quantifiable capacity benefit because the partial systemisation is a by-product of the NATS requirement to align with Jersey's CICZ airspace reorganisation.

3.5 However, regarding the relevant traffic flows for this proposed change, today's arrangement sends:
one flow southbound through LELNA
six flows southbound through ORTAC
six flows northbound also through ORTAC
nothing through ORIST.

3.6 This proposal would change that balance as follows:
three flows southbound through LELNA
three flows southbound through ORTAC
two flows northbound also through ORTAC
three flows northbound through ORIST

3.7 The flows would, by design, be simpler to manage in the vicinity of THRED due to the proposal.

3.8 Qualitatively there would be a positive impact on safety whilst also increasing the capacity of the sector group, because the rebalancing of the flows means more traffic could be safely handled with fewer controller interactions, and without changing CAS size or type.

4. Appendix A – 10 year greenhouse gas WebTAG for all traffic flows combined

4.1 WebTAG for Traded Sector

Greenhouse Gases Workbook - Worksheet 1

Scheme Name: SAIP AD3

Present Value Base Year 2018

Current Year 2018

Proposal Opening year: 2019

Project (Road/Rail or Road and Rail): road

Overall Assessment Score:

Net Present Value of carbon dioxide equivalent emissions of proposal (£): £0

*positive value reflects a **net benefit** (i.e. CO2E emissions reduction)

Quantitative Assessment:

Change in carbon dioxide equivalent emissions over 60 year appraisal period (tonnes): 977
(between 'with scheme' and 'without scheme' scenarios)

Of which Traded 977.373

Change in carbon dioxide equivalent emissions in opening year (tonnes): 92
(between 'with scheme' and 'without scheme' scenarios)

Change in carbon dioxide equivalent emissions by carbon budget period:

	Carbon Budget 1	Carbon Budget 2	Carbon Budget 3	Carbon Budget 4
Traded sector	0	0	374.5404	498.942
Non-traded sector	0	0	0	0

Qualitative Comments:

Sensitivity Analysis:

Upper Estimate Net Present Value of Carbon dioxide Emissions of Proposal (£): £0

Lower Estimate Net Present Value of Carbon dioxide Emissions of Proposal (£): £0

Data Sources:

4.2 WebTAG for Non-Traded Sector

Greenhouse Gases Workbook - Worksheet 1

Scheme Name: NATS SAIP AD3

Present Value Base Year 2018

Current Year 2018

Proposal Opening year: 2019

Project (Road/Rail or Road and Rail): road/rail

Overall Assessment Score:

Net Present Value of carbon dioxide equivalent emissions of proposal (£): -£51,910

*positive value reflects a **net benefit** (i.e. CO2E emissions reduction)

Quantitative Assessment:

Change in carbon dioxide equivalent emissions over 60 year appraisal period (tonnes): 977
(between 'with scheme' and 'without scheme' scenarios)

Of which Traded 0

Change in carbon dioxide equivalent emissions in opening year (tonnes): 92
(between 'with scheme' and 'without scheme' scenarios)

Change in carbon dioxide equivalent emissions by carbon budget period:

	Carbon Budget 1	Carbon Budget 2	Carbon Budget 3	Carbon Budget 4
Traded sector	0	0	0	0
Non-traded sector	0	0	374.5404	498.942

Qualitative Comments:

Sensitivity Analysis:

Upper Estimate Net Present Value of Carbon dioxide Emissions of Proposal (£): -£77,865

Lower Estimate Net Present Value of Carbon dioxide Emissions of Proposal (£): -£25,955

Data Sources:

5. Appendix B – Greenhouse gas WebTAG summary for each traffic flow

Traffic Flow (SAIP AD3)	Net Present Value of CO_2 equivalent emissions of proposal (£) Traded Sector	Net Present Value of CO_2 equivalent emissions of proposal (£) Non-Traded Sector	Change in CO_2 equivalent emissions over 60 year appraisal period (T)	Change in CO_2 equivalent emissions in opening year (T)
EGHH/HI to EGJJ/JB	N/A	-£14,909	+281	+26
EGJJ/JB to EGHH/HI	N/A	-£29,480	+555	+52
EGHH/HI Deps not EGJJ/JB	N/A	-£23,439	+441	+43
EGJJ/JB Deps not HH/HI	N/A	£4,621	-87	-8
EGJJ/JB Arrs not HH/HI	N/A	£11,296	-212	-21
All Routes	N/A	-£51,910	+977	+92

The total value for all routes is not identical to the sum of the individual traffic flows due to rounding within the analysis.

6. Appendix C – Analysis assumptions

Fuel and CO_2 assumptions

- This airspace change has been modelled using the fast-time simulation software AirTOp.
- The traffic sample used was the 6th July 2016 grown to 2019 traffic levels. Annualised traffic figures are based on the 2017 NATS base case forecast.
- The traffic sample contained all aircraft which routed via at least one of the following waypoints: LELNA, ORTAC and ORIST.
- The AirTOp Model was run once for easterly and westerly operations.
- Fuel burn modelling has been undertaken using the KERMIT emissions model. The KERMIT model uses Base of Aircraft Data (BADA) data which has been made available by the European Organisation for the Safety of Air Navigation (EUROCONTROL). All rights reserved. The AirTOp simulation model also uses BADA aircraft performance data.
- As the routing change was en-route only, the fuel benefit is not split into Easterly/Westerly operations (weighted 30%/70%). Fuel uplift is included in the assessment.

AirTOp Assumptions

- AirTOp version 2.3.28 was used.
- The Baseline traffic data was based on flight plan data and not actual flown data. This ensured that network constraints associated with excessive demand did not mask underlying demand requirements on the airspace.
- When undertaking comparative analysis between the scenarios, the traffic samples remained the same as that in the Baseline scenario. This was to ensure any observed differences were due to the airspace design, not due to changes in the traffic sample.
- A “blue sky” weather picture with no wind was assumed.
- Unconstrained demand was modelled thereby excluding the naturally occurring influence of flow restrictions, minimum departure intervals or departure slot compliance.
- No conflict resolution was applied.
- In each conflict run, if the same pair of aircraft had more than one conflict, only one conflict was counted.
- Controller tasks were completed instantaneously with each controller able to control multiple aircraft simultaneously (no workload constraints or response limitations applied).
- For the fuel burn analysis, the models were run once only, using the scheduled aircraft departure times as per the flight plan.
- Holding and arrival separation was not turned on within the baseline and scenario.
- The average fuel burn benefit per aircraft is calculated using only the traffic and aircraft types observed on the particular traffic flows relevant to the scenario.

End of document