Operational Service Enhancements Project:-

New Amsterdam/London UIR Crossing Point

Gateway documentation:
Stage 3 Consult

Full Options Appraisal

Including Safety Assessment

V1.2

Roles

Action	Role	Date
Produced	Airspace Change Specialist NATS Airspace Change Compliance & Delivery	February 2022
Reviewed Approved	ATC Lead NATS	February 2022
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Reviewed Approved	OSEP Project Manager NATS	February 2022

Publication history

Issue	Month/Year	Change Requests in this issue
Issue 1.0	February 2022	Submitted to CAA for Stage 3 gateway.
1.1	March 2022	Following CAA Stage 3 Gateway Feedback the following has been updated: • Quantitative fuel and CO_2 analysis has been removed and replaced with a qualitative assessment based on track milage savings • Traffic assumptions updated to reflect only Option 6
1.2	March 2022	The indicative track milage savings have been updated

References

Ref No	Description	Hyperlinks
1	OSEP:- New Amsterdam/London UIR Crossing Point – 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 and Evaluation	Link
6	Stage 2 Initial Options Appraisal including Safety Appraisal	Link
7	Stage 3 Consultation Strategy	Link

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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, Step 3A Full Options Appraisal.

1.3 Its purpose is to provide a more detailed quantitative assessment on the defined shortlist of design options which have progressed through the Step 2B Initial Options Appraisal, which was based around a qualitative assessment. This document will include a quantitative assessment of all reasonable costs and benefits of the design options, other costs and benefits described qualitatively and reasons why they could not be quantified. A preferred design option will also be provided, including reasons for the preference.

2. Change Level

2.1 The changes in this ACP will only impact flights over the sea above FL245 and will be contained within existing airspace. Hence, in accordance with the levels as defined in CAP1616, the CAA has categorised this ACP as a Scaled Level 2B change .

2.2 In line with the requirements of a Level 2 change which does not offer a dis-benefit, the environmental impact assessment has been conducted qualitatively and based on a net reduction in track milage over the entire flight. The option described within this ACP provides additional connectivity options at the London/ Amsterdam UIR interface. As there will be no fuel or CO_2 disbenefit a WebTAG analysis of this change will not be provided in line with CAP1616 requirements. There will be no impacts to stakeholders on the surface, since this change only impacts airspace above FL245 and over the sea; hence no noise analysis has been undertaken

3. Options Appraisal (Phase 2- Full)

3.1 This ACP proposes to improve connectivity between the London and Amsterdam Upper Information Regions (UIR) in the southern North Sea following the introduction of Free Route Airspace (FRA) within the Amsterdam UIR. This will be achieved by introducing connectivity from a new COP (introduced by Maastricht Upper Area Control (MUAC)), situated on the interface between the London and Amsterdam UIRs, to the UK ATS route network through the addition of new Conditional routes (CDRs) as well as a review of the existing connectivity in this region. This will allow more efficient routings, providing fuel savings and reducing CO_2 emissions.

3.2 The baseline (do nothing) option does not address the Statement of Need and is therefore not considered a viable option. It is included within this Full Options Appraisal as the benchmark against which the benefits of the proposed change can be measured.

3.3 There is a single design option considered within this document. This option uses the design concept of CDRs to improve the connectivity between the London and Amsterdam UIRs in the Southern North Sea when compared against the baseline do-nothing scenario. The option selected to be progressed and compared to the baseline do-nothing scenario is:

- Option 6: Combined Options 1 – 5 (Connectivity to UK ATS Network provided through the introduction/amendment of new/extant CDRs).

3.4 Nine other options were considered and discounted during the design principle evaluation are described in the Stage 2 Airspace Change Design Options and Evaluation documentation (Ref 5). It is recommended that this document is read in conjunction with the Stage 2 Airspace Change Design Options and Evaluation documentation, which provides descriptions of the discounted options and evaluates all options against the Design Principles agreed during Step 1B.

3.5 Option 6- Combined Options 1 – 5 (Connectivity to UK ATS Network provided through the introduction/amendment of new/extant CDRs) is considered by NATS to be the preferred option.

Baseline (Do Nothing) Option – Option 0

3.6 The do-nothing option assumes the changes proposed in the ACP are not implemented. Table 1: Options Appraisal – Do Nothing Option below summarises the effects on communities and stakeholders should this be the case.

Group	Impact	Level of Analysis	Evidence
Communities	Noise impact on health and quality of life	Qualitative	This change will only impact flights above FL245. Government guidance says that 7,000ft is the maximum height at which noise is a priority for consideration[1]. As these changes are contained within airspace above FL245 and over the sea there would be no change in noise impact from today.
Communities	Air quality	Qualitative	This change will only impact flights above FL245. Government guidance says that aircraft flying higher than 1,000 ft are unlikely to have a significant impact on air quality[1]. As there will be no changes in aircraft trajectories below 1,000ft because of this ACP, there will be No change in air quality from today.
Wider society	Greenhouse gas impact	Qualitative	There would be no change in greenhouse gas emissions resulting from this option as aircraft will continue to fly via existing COPs and the available ATS route network as per today's operation. The track milage for three example popular city pairs impacted by this change are shown below and will be used to compare the option against, CO_2 emissions are proportional to distance flown:
Wider society	Capacity/ resilience	Qualitative	No change. Aircraft flight plan to enter exit the London UIR from the Amsterdam UIR at designated Entry and Exit COPS along the UIR boundary. As traffic numbers grow in line with the forecast, effective sector capacity will become constrained, partially due to increasing controller workload. This could in turn lead to a reduction in resilience.
General Aviation	Access	Qualitative	There is no impact on GA access to this airspace. There would be no change to that impact if this do-nothing option was progressed as there are no alterations to airspace dimensions or airspace classification being proposed to be introduced.
General Aviation/ commercial airlines	Economic impact from increased effective capacity	Qualitative	There would be no change in the economic impact from increased capacity from today's operation as aircraft will continue to fly via existing COPs and the available ATS route network. However, as traffic numbers grow in line with the forecast, the effective sector capacity will become constrained limiting continued economic growth.

Route	Example track milage (NM)
EGLL to ESSA	832.1
EGCH to EGCC	571.5
KORD to EDDF	3779.7

[1] See Air Navigation Guidance 2017

<table>
<tr><td>General Aviation/ commercial airlines</td><td>Fuel burn</td><td>Qualitative</td><td>There would be no change in fuel burn from today's operation as aircraft will continue to fly via existing COPs and the available ATS route network. The track milage for three example popular city pairs impacted by this change are shown below and used to compare the option against, fuel burn is proportional to track milage flown:<table><tr><td>Route</td><td>Example track milage (NM)</td></tr><tr><td>EGLL to ESSA</td><td>832.1</td></tr><tr><td>EGCH to EGCC</td><td>571.5</td></tr><tr><td>KORD to EDDF</td><td>3779.7</td></tr></table></td></tr>
<tr><td>Commercial airlines</td><td>Training cost</td><td>Qualitative</td><td>There would be no additional training required as there will be no change to the extant airspace or procedures.</td></tr>
<tr><td>Commercial airlines</td><td>Other costs</td><td>Qualitative</td><td>There would be no additional associated costs for airlines as there will be no change to the extant airspace.</td></tr>
<tr><td>Airport/ Air navigation service provider</td><td>Infrastructure costs</td><td>Qualitative</td><td>There would be no additional associated infrastructure costs as there will be no change to the extant airspace.</td></tr>
<tr><td>Airport/ Air navigation service provider</td><td>Operational costs</td><td>Qualitative</td><td>There would be no additional associated operational costs as there will be no change to the extant airspace.</td></tr>
<tr><td>Airport/ Air navigation service provider</td><td>Deployment costs</td><td>Qualitative</td><td>There would be no additional associated deployment costs as there will be no change to the extant airspace.</td></tr>
</table>

Table 1: Options Appraisal – Do Nothing Option.

Conclusion

3.7 The baseline (do nothing) option does not address the Statement of Need and is therefore not considered a viable option. It is included within this Full Options Appraisal as the benchmark against which the benefits of the proposed change can be measured.

Design Options 6 – Combined Options 1-5 (Connectivity to UK ATS Network provided through the introduction/amendment of new/extant CDRs).

3.8 This design proposal is to introduce new CDRs within the southern North Sea to provide connectivity to a new COP, RENEQ, implemented by MUAC following the introduction of FRA within the Amsterdam UIR. Existing connectivity between the London and Amsterdam UIRs is also amended to further improve this interface.

<table>
<tr><th>Group</th><th>Impact</th><th>Level of Analysis</th><th>Evidence</th></tr>
<tr><td>Communities</td><td>Noise impact on health and quality of life</td><td>Qualitative</td><td>The change will only impact flights above FL245. Government guidance says that below 7000ft is the maximum height at which noise is a priority for consideration.[1] As these changes are contained within airspace above FL245 and over the sea there would be no change in noise impact as a result of this change</td></tr>
<tr><td>Communities</td><td>Air quality</td><td>Qualitative</td><td>Government guidance states that aircraft flying higher than 1,000 ft are unlikely to have significant impact on local air quality[1]. This airspace change only affects airspace above 7,000 ft and is therefore unlikely to have a significant impact on local air quality.</td></tr>
<tr><td>Wider society</td><td>Greenhouse gas impact</td><td>Qualitative</td><td>The changes within this option will provide additional connectivity between the London and Amsterdam UIRs through the introduction of a new COP and associated connectivity. This new connectivity will provide additional flight planning options for operators, allowing them to choose the most direct, and therefore shortest routes subject to upper wind direction and speed and thus provide them with the maximum CO_2 benefits. Considering this fact, this change will have no negative impact of CO_2 emissions. Therefore, in line with CAP 1616 guidance on proportionality, this has been assessed qualitatively by comparing the track milage saving of this option to the baseline. CO_2 savings are directly related to track milage and therefore a reduction in track milage will have a corresponding reduction in CO_2 emissions. The anticipated track mileages for three example popular city pairs impacted by this change when the new routes are available are shown below:
<table>
<tr><th>Route</th><th>Estimated Tack milage (NM)</th><th>Estimated reduction in Track milage (NM) from baseline</th></tr>
<tr><td>EGLL to ESSA</td><td>831.5</td><td>0.6</td></tr>
<tr><td>EGCH to EGCC</td><td>566.2</td><td>5.3</td></tr>
<tr><td>KORD to EDDF</td><td>3777.2</td><td>2.5</td></tr>
</table></td></tr>
<tr><td>Wider society</td><td>Capacity/ resilience</td><td>Qualitative</td><td>The changes within this option will provide additional connectivity between the London and Amsterdam UIRs through the introduction of a new COP and associated connectivity. This additional route connectivity will lead to an increased capacity by providing additional flight planning options and reducing traffic conflictions. Improved FRA trajectory planning will benefit ATC and Aircraft operators by increasing the resilience of the ATC Network.</td></tr>
<tr><td>General Aviation</td><td>Access</td><td>Qualitative</td><td>There is no impact on GA access to this airspace. There would be no change to that impact if this option was progressed as there are no alterations to airspace dimensions or airspace classification are proposed to be introduced.</td></tr>
<tr><td>General Aviation/ commercial airlines</td><td>Economic impact from increased effective capacity</td><td>Qualitative</td><td>Whilst this option would lead to an increase in effective capacity, which in turn would lead to a positive economic impact, this change is not driven by the need to increase capacity and therefore this has not been quantified. This change is driven by enabling environmental savings through more efficient routings. This will be realised through the enhancement of the FRA benefits within the Amsterdam UIR this change enables.</td></tr>
</table>

<table>
<tr><td>General Aviation/ commercial airlines</td><td>Fuel burn</td><td>Qualitative</td><td>The changes within this option will provide additional connectivity between the London and Amsterdam UIRs through the introduction of a new COP and associated connectivity. This new connectivity will provide additional flight planning options for operators, allowing them to choose the most direct, and therefore shortest routes subject to upper wind direction and speed and thus provide them with the maximum fuel burn benefit. Considering this fact, this change will have no negative impact on fuel burn. Therefore, in line with CAP 1616 guidance on proportionality, this has been assessed qualitatively by comparing the track milage saving of this option to the baseline. Fuel burn is directly related to track milage and therefore a reduction in track milage will have a corresponding reduction in fuel burn. The anticipated track mileages for three example popular city pairs impacted by this change when the new routes are available are shown below:
<table>
<tr><th>Route</th><th>Estimated Tack milage (NM)</th><th>Estimated reduction in Track milage (NM) from baseline</th></tr>
<tr><td>EGLL to ESSA</td><td>831.5</td><td>0.6</td></tr>
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</table></td></tr>
<tr><td>Commercial airlines</td><td>Training cost</td><td>Qualitative</td><td>No Impact. This option would not lead to any additional training costs for airlines.</td></tr>
<tr><td>Commercial airlines</td><td>Other costs</td><td>Qualitative</td><td>This change will require an FMS update in accordance with AIRAC changes which is a routine occurrence. There are no other foreseen airline costs.</td></tr>
<tr><td>Airport/ Air navigation service provider</td><td>Infrastructure costs</td><td>Qualitative</td><td>No Impact. This option would not lead to any additional infrastructure costs to the ANSP.</td></tr>
<tr><td>Airport/ Air navigation service provider</td><td>Operational costs</td><td>Qualitative</td><td>No Impact. This option would not lead to any additional associated operational costs.</td></tr>
<tr><td>Airport/ Air navigation service provider</td><td>Deployment costs</td><td>Qualitative</td><td>This proposal is expected to require air traffic controller familiarisation training, in the order of 70 controllers at NATS, including the use of the NATS simulator facility. Support staff are required to run the simulator – planning, training staff, data preparation and testing, pseudo pilots, safety analysts, outputs to be recorded and reported etc. Some staff may only require briefings. There may be occasions where the reduced availability of operational controllers during their conversion training could mean operational rostering becomes a factor when considering continuous service delivery. The Military ANSP may also require briefing prior to deployment. This requirement will be clarified as designs mature through on-going engagement.</td></tr>
</table>

Table 2: Options Appraisal – Option 6.

Conclusion

3.9 The improved interface between the Amsterdam and London UIRs meets MUACs requirements, provides a basis for future UK FRA deployments and provides additional route options to operators to flightplan. When compared to the baseline, Option 6 represents a benefit in terms of CO_2e emissions, fuel burn as well as capacity and resilience. Option 6 is NATS preferred option for his airspace change.

4. Safety Assessment

Note: the safety assessment below is unchanged from the equivalent Stage 2 document.

Safety Assessment – Do nothing

4.1 If there was to be no change to the current connectivity at the London/ Amsterdam UIR interface there would be no foreseeable change to the current safety performance-. This ACP is driven by a desire to reduce routing inefficiencies and improve predictability *based on Flexible Airspace Use principles*, which will enable a reduction in CO_2 emissions and operator fuel costs, not any safety concerns.

4.2 Safety Assessment – Connectivity to UK ATS Network provided through the introduction/amendment of new/extant CDRs.

4.3 A qualitative high-level safety appraisal indicates that nothing is presently foreseen with this proposed option that would negatively impact on the level of safety achieved within the current operation.

4.4 Improving the connectivity at this interface will allow for the greater use of FRA routing options within adjacent States thereby enabling greater utilisation of airspace currently made unavailable by the existing route connections offered in UK airspace. Consequently, reduction in track milage flown as well as the associated reduction in CO_2 emissions is the primary driver for this proposed change.

4.5 NATS' first priority is safety (and transparently demonstrating its commitment to safety). NATS will construct an appropriate safety case in accordance with standard practice during Stage 4.

5. Conclusion and Next Steps

5.1 This proposal has been developed following the submission of a Statement of Need. Its text was:

As part of the introduction of Free Route and Flexible Use Airspace within the Amsterdam Upper Information Region, Maastricht Control have requested the introduction of a new crossing point on the London/Amsterdam boundary to facilitate the transfer of aircraft. This ACP aims to introduce route connectivity to this new reporting point in order to provide improved environmental efficiency. In addition, a review of existing routes between the London/Amsterdam UIR (in the southern North Sea area) will be undertaken to ensure optimal connectivity is provided.

Due to the nature of the request from Maastricht, design options for connection to the new reporting point will be limited; however, all options will be located over the North Sea approximately 150 nm from the UK coast and above 20,000 ft.

5.2 During the Stage 2 submission, 10 design options were proposed and a single option, option 6- Combined Options 1-5 (Connectivity to UK ATS Network provided through the introduction/amendment of new/extant CDRs) was selected and developed to deliver the desired outcome. Stakeholder feedback as well as input from subject matter experts have been incorporated into the design option.

5.3 NATS thanks all these stakeholders and looks forward to their feedback during consultation and continued involvement with the development of this proposal.

5.4 From this full options appraisal the following option is presented for consultation:

- Option 6 - Combined Options 1-5 (Connectivity to UK ATS Network provided through the introduction/amendment of new/extant CDRs).

6. Appendix A – Analysis Assumptions

Growth assumptions.

Following the July 2021 workshop, the European Union Network Manager (EU NM) analysed 2 days of traffic from 2019 for flights which could have elected to flight plan via this new COP if option 6 presented in this document had been available. 1 weekday (5th July 2019) and 1 weekend day (5th May 2019) were selected to demonstrate the potential usage of this option. A weekend day and a weekday were provided to account for the different traffic patterns operating midweek vs the weekend and SUA activations which are prevalent on weekdays. Additionally, these specific days were used as they included a northerly North Atlantic Track flow i.e they captured European to North America flights crossing the area and this could then be used to model usage and ensure the design options were optimised. The EU NM provided NATS with the results of this analysis as well as the traffic sample used. NATS analytics have used this data to forecast the number of flights which could flight plan via this COP in 2022, the year following implementation, and 2032, 10 years post implementation. This forecast makes the following assumptions:

- The days provided represent typical midweek/weekend use
- Traffic has been grown/shrunk using approved forecast models
- Northerly North Atlantic (NAT) Tracks account for approximately 40% of the yearly European to North American flow orientation.
- Aircraft will flight plan the most direct routings available. As aircraft are expected to flight plan via the most efficient route available, either new or extant, there will be no disbenefit attributed to this change.
- SUA activations within the London and Amsterdam UIR will continue to be a feature of weekday operations (However, it is not possible to predict danger area activations in advance i.e over the course of a 10 year period)[2]
- Growth between 2022 and 2032 is assumed to be linear,

End of document

[2] SUAs contained within this region of airspace are typically active during working hours Monday to Friday.