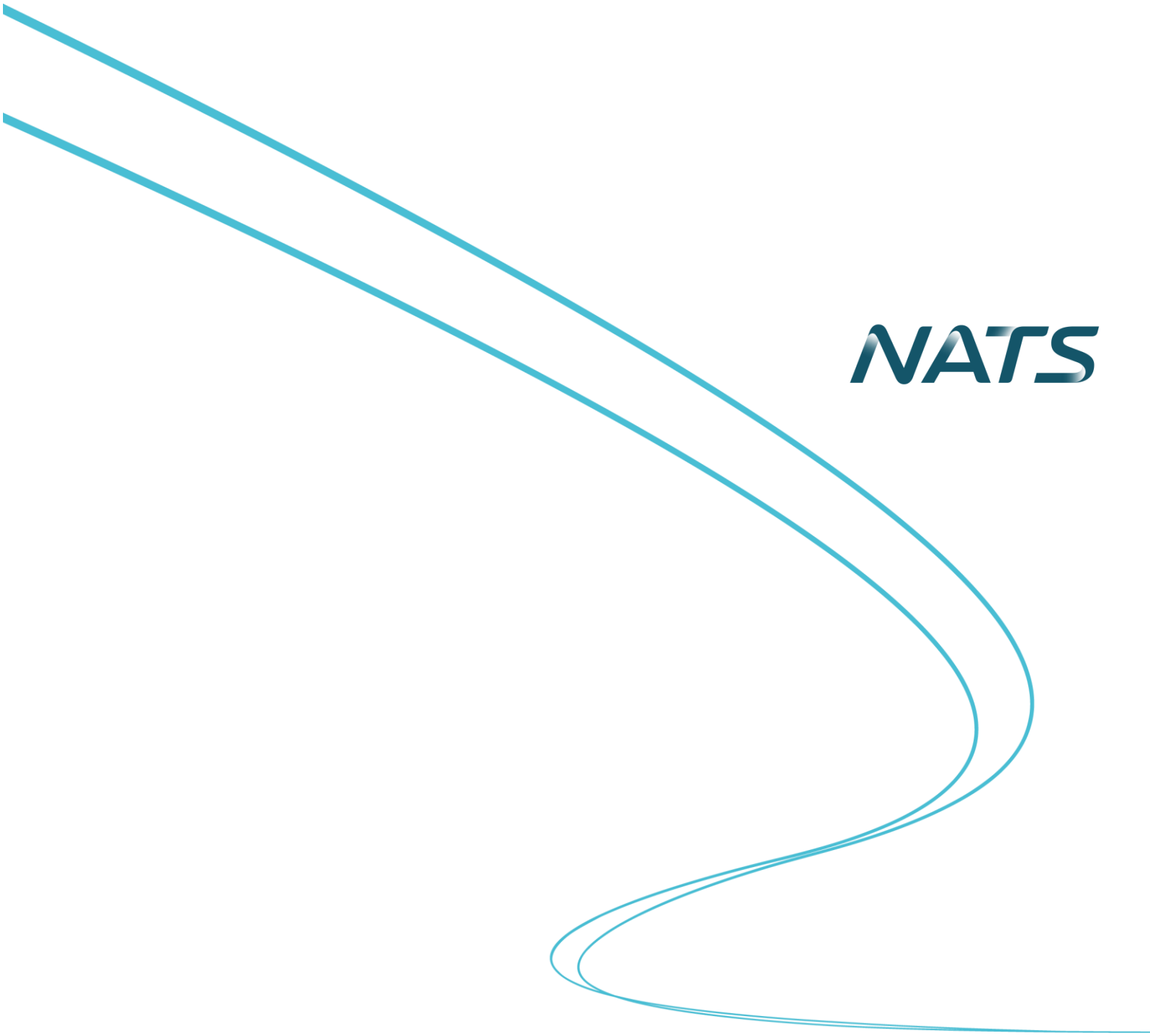
# Future Airspace Strategy Implementation North (FASI-N)

## ScTMA

## Step 4A Update Design



NATS Uncontrolled

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| Produced | Airspace Change Assurance, NATS Future Airspace & ATM | 01/09/2018 |
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| Issue 1.0 | Sept 2018 | Submitted to CAA for publication |

References

| Ref No | Description | Hyperlink |
|---|---|---|
| 1 | FASIN ScTMA CAA web page – progress through CAP1616 | Link |
| 2 | Stage 1 Assessment Meeting Presentation | See ref 1 link |
| 3 | Stage 1 Assessment Meeting Minutes | See ref 1 link |
| 4 | Stage 1 Design Principles | See ref 1 link |
| 5 | Stage 2 Design Options | See ref 1 link |
| 6 | Stage 2 Design Principle Evaluation | See ref 1 link |
| 7 | Stage 2 Initial Options Safety Appraisal | See ref 1 link |
| 8 | Stage 3 Consultation Strategy | See ref 1 link |
| 9 | Stage 3 Options Appraisal | See ref 1 link |
| 10 | Stage 3 Consultation Website and Document | Link |
| 11 | Stage 3 Collate and Review Responses | See ref 1 link |

Contents

## 1. Introduction

1.1 This document forms part of the document set required in accordance with CAP1616's guidance on the airspace change process.

1.2 This document aims to provide adequate evidence to satisfy Stage 4, Step 4A Update Design

1.3 This approach complies with the CAP1616 "we asked, you said, we did" consultation approach.
The previous Step 3D document details "we asked, you said".
This Step 4A document details "you said, we did".

## 2. Consultation Responses

2.1 Full details of the consultation strategy and document can be found at Ref 8 and Ref 10. We received fifteen responses. A summary and theming of those responses can be found in Step 3d Collate and Review Responses document (Ref 11), in which five consultation response elements were identified as having a potential impact on the final proposed design.

2.2 Analysis of the consultation response elements which may impact the final design:

| Response ID | Relevance to consultation | NATS original response and Element Number | NATS final response |
|---|---|---|---|
| **Rockwell Collins**<br>NATS ref **ScTMA-07**<br>Consultation website ref ANON-267C-1V1B-V | Reminder from the coding houses that this issue has occurred in the past & can cause FMS discontinuities (DISCO) errors. (relevant) | **Element 1.** PDG have performed checking of continuity of altitudes between all procedures. | **Progressed** PDG have performed checking of continuity of altitudes between all procedures. This has ensured there are no anomalies/ discontinuities in the flight profiles. . (Note for the STARs terminating at RULUR there are no subsequent arrival transitions from the hold. Arrivals are given radar vectors to join the IAPs.) |
| **Glasgow Airport (ATC unit)**<br>NATS ref **ScTMA-09**<br>Consultation website ref ANON-267C-1V11-B | Not strictly relevant to this consultation, but a reminder that as Glasgow develops its future ACP under CAP1616 the network interfaces and interactions will need to be considered. | **Element 2.** The Glasgow related aspects of this ACP were developed to help address the complexity of interactions in the current day operation between Glasgow and Edinburgh traffic. The proposed design was developed in full cognisance of Glasgow's aspirations for airspace change to modernise and improve its arrivals and departures. | **Rejected.** The future Glasgow proposals are outside the scope of this consultation and will be subject to separate consultation in due course. |
| **Dalkeith and District Community Council**<br>NATS ref **ScTMA-13**<br>Consultation website ref ANON-267C-1V1E-Y | Questioning whether related consultations can take place concurrently. (relevant) | **Element 3.** There are interdependencies with the Edinburgh proposals. During consultation for *this* ACP Edinburgh's designs were at a mature stage. Edinburgh was engaging in a period of supplementary consultation on some aspects concurrently. However these aspects (considerations regarding the Cramond-offset and RWY06 departures) were in a separate area and hence not likely to have an impact on the Network changes proposed by this ACP. | **Rejected.** Edinburgh's consultation has now closed and their ACP has been submitted to the CAA. There have been no changes resulting from the Edinburgh supplementary consultation relevant to this ACP. |
| | Support for rejected options (relevant):<br>Proposal 2 the St. Abbs CTA and Proposal 3, the Lamma triangle. | **Element 4**. Proposals 2 & 3 have not been progressed as part of this ACP since the airspace capacity in the ScTMA is currently adequate. | **Rejected.** Currently, justification to introduce the additional CAS required for these changes is not sufficient. This also would contravene the design principle "Minimise the volume of CAS".<br>However as traffic numbers increase it is possible that these proposals may be revisited in the future. |

| Response ID | Relevance to consultation | NATS original response and Element Number | NATS final response |
|---|---|---|---|
| **Glasgow Airport Ltd**<br>NATS ref **ScTMA-14**<br>Consultation website ref ANON-267C-1V19-K | Clarification re withdrawal of the LIBBA hold. | **Element 5**. Clarification re the LIBBA hold. The introduction of the RULUR hold, being an RNAV facility, obviates the need for a contingency STAR and hold at LIBBA. Consequently we confirm it is the intent to remove the STAR via LIBBA, and the LIBBA hold. | **Progressed:** It is confirmed that it is the intent to remove the contingency STAR via LIBBA, and the LIBBA hold. This will be explicitly stated in the ACP. |

2.3 Elements 1 and 5 will be incorporated in the final proposal. They will not have an impact, since they do not represent change to the underlying designs.

## 3. Design Change Log

3.1 Element 1 – progressed. PDG have performed checking of continuity of altitudes between all procedures. This has ensured there are no anomalies/ discontinuities in the flight profiles. No change to consulted-upon airspace structures due to this element.

3.2 Element 5 – progressed. The introduction of the RULUR hold, being an RNAV facility, obviates the need for a contingency STAR and hold at LIBBA. It is confirmed that it is the intent to remove the contingency STAR via LIBBA, and the LIBBA hold. This will be explicitly stated in the ACP.

This represents a change to AIP published procedures, however there will be no impact on the airspace structures as consulted upon (or proposed flight profiles).

## 4. Revised Design

The design being progressed is as consulted upon. There are no changes proposed which impact the airspace structures which were consulted upon (or proposed flight profiles).

## 5. Final 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 |
| Communities | Air quality | N/A | N/A – airspace changes are above 7,000ft. |
| Wider society | Greenhouse gas impact | Monetise and quantify | The proposed changes (solely contained in this ACP) are forecast to result in a total annual reduction in $CO_2$ emissions (2019 traffic level) of 454 tonnes p.a. rising to 515 tonnes by 2029.<br>WebTAG was used to monetise the impact of the change in $CO_2$ emissions due to these proposed changes. The proportion of traffic intra-EU is 72.1% with 27.9% originating/destined for non-EU countries. Hence these proportions are used for the traded/non-traded split. This yields an overall emissions net benefit for carbon dioxide of £59,408 NPV.<br>Sensitivity analysis states a possible range of the benefit from £89,112 - £29,704. This benefit is due to routes being shorter and having more efficient climb profiles (which yield significant savings in $CO_2$ emissions).<br>Appendix A includes the above greenhouse gas WebTAG analysis output. |
| Wider society | Capacity/ resilience | Qualitative | The proposals in this ACP seek to integrate the airports' changes into the enroute network. As such the overall airspace infrastructure will be enhanced; however no claims of increased capacity to the network or greater resilience of the network are made. |
| General Aviation | Access | N/A | Not applicable – there would be no change in impact to General Aviation airspace users. There are no changes in classification or extent of controlled airspace proposed. |
| General Aviation/ commercial airlines | Economic impact from increased effective capacity | Quantify: Sector monitoring values (planned)<br><br>Delay reduction per flight (predicted) | Not applicable – this concept was not designed with the intention of increasing the capacity of this region of airspace. |
| General Aviation/ commercial airlines | Fuel burn | Monetise | The projected annual fuel burn saving are:<br>**Year** **Amount** **Value (NPV)**<br>2019 143 tonnes £66,756<br>2029 161 tonnes £75,752<br>10 year Total 1,677 tonnes £783,360<br><br>This was based on the IATA jet fuel price (April 2018).<br><br>Additionally the Net Present Value of traded sector carbon dioxide equivalent emissions of the proposal is £71,083. This represents the saving that airlines would make due to a reduction in the amount of carbon off-set credits required to be purchased. |
| Commercial airlines | Training cost | N/A | Beyond familiarisation there are no training costs to the airlines associated with the proposed changes. |
| Commercial airlines | Other costs | N/A | Not applicable – there are no other costs known which would be incurred by commercial aviation. |
| Airport/ Air navigation service provider | Infrastructure costs | N/A | Not applicable – there will be no costs attributable to infrastructure such as equipment or construction costs. |
| Airport/ Air navigation service provider | Operational costs | N/A | Not applicable – this proposal would not lead to a change in operational costs. |
| Airport/ Air navigation service provider | Deployment costs | Qualitative and quantitative | Training Costs: £100 - £250k NPV<br><br>Delivery of change under AIRAC process: £100k NPV |

## 6. Safety Assessment

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

6.2 Ensuring the safety of the proposed changes is a priority for NATS and a dedicated safety manager has been assigned for the FASIN 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 evidence directly to the CAA's en-route safety regulator, to clearly demonstrate the airspace change is acceptably safe for implementation, and the right assurances are in place.

6.3 NATS Analytics estimates a net reduction in interactions as a result of the proposed changes as shown below. This indicates a net reduction in complexity, which is likely to yield an improvement in safety.

| Sector | Baseline Model | | | Proposed Model | | | Change between baseline & proposed | |
|---|---|---|---|---|---|---|---|---|
| | Min | Max | Avg | Min | Max | Avg | 5 day total | Daily |
| Galloway North | 42 | 85 | 57 | 30 | 69 | 51 | -6 | -1 |
| Galloway South | 45 | 79 | 56 | 28 | 56 | 40 | -16 | -3 |
| Talla North | 171 | 279 | 226 | 175 | 242 | 205 | -21 | -4 |
| Talla South | 28 | 58 | 41 | 27 | 85 | 60 | +19 | +4 |

Table 1 Traffic interations by sector (totals over five days)

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

6.5 NATS Safety Manager for FASIN ScTMA will produce a formal HAZID report in accordance with the CAA-approved NATS safety management protocols.

6.6 NATS ATC lead and Safety Manager for FASIN SCTMA have produced a Route Design Analysis Report (RDAR, Ref 17 not for publication). This report demonstrates how routes have been spaced, when flights can use them on their own navigation under radar monitoring conditions, and when flights will be tactically managed.

6.7 The NATS Safety Manager will liaise directly with the CAA's Safety and Airspace Regulation Group (SARG) for this proposal.

6.8 Qualitatively there would be a positive impact on safety. By repositioning the Glasgow hold and introducing the link routes, due to the rebalancing of the flows, more traffic could be handled safely with fewer controller interactions. This can be achieved without changing the CAS volume or classification.

## 7. DVOR Rationalisation

7.1 Changes related to DVOR rationalisation are outside the scope and independent of this ACP. For full details of what DVOR rationalisation is, please search the CAA website for ACP-2017-62 which provides an introduction to the concept along with some examples in progress at time of writing.

# 8. Appendix A – 10 year greenhouse gas WebTAG

## Greenhouse Gases Workbook - Worksheet 1

**Scheme Name:** NATS FASIN PLAS ScTMA

| | |
|---|---|
| **Present Value Base Year** | 2010 |
| **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 (£):** | £59,408 |

*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):** (between 'with scheme' and 'without scheme' scenarios) | -5,332 |
| **Of which Traded** | -3845 |
| **Change in carbon dioxide equivalent emissions in opening year (tonnes):** (between 'with scheme' and 'without scheme' scenarios) | -454 |
| **Net Present Value of traded sector carbon dioxide equivalent emissions of proposal (£):** (N.B. this is not additional to the appraisal value in cell I17, as the cost of traded sector emissions is assumed to be internalised into market prices. See TAG Unit A3 for further details) | £71,083 |

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

**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 | -1336.88 | -1769.40 |
| Non-traded sector | 0 | 0 | -517.32 | -684.69 |

**Qualitative Comments:**

The results in this sheet relate only to the routes which are contained 100% within the NATS ACP.
Proportion Traded - 72.1% (intra-EU)
Proportion Non-traded 27.9% (outside EU)

**Sensitivity Analysis:**

| | |
|---|---|
| Upper Estimate Net Present Value of Carbon dioxide Emissions of Proposal (£): | £89,112 |
| Lower Estimate Net Present Value of Carbon dioxide Emissions of Proposal (£): | £29,704 |

**Data Sources:**

Computer simulation using AirTOP modelling tool, with BADA performance data.
Traffic data extracted using Eurocontrol's Network Strategic Tool (NEST).
Traffic growth rates as per NATS base case traffic forecasting

## 9. Environmental Assessment – Summary

9.1 There were two consultation response elements which had the potential to impact the final design: Elements 1 and 5, detailed in the table in section 2.2 on page 4.

9.2 Neither of these Elements resulted in modification to the airspace design. Hence there was no variation to the environmental impacts as consulted upon.

9.3 Element 5 related to the removal of the contingency STAR via LIBBA, and the contingency LIBBA hold. These were previously necessary as part of the conventional navigational infrastructure, for contingency use only when the GOW VOR was inoperative/out of service. However with the introduction RNAV PBN procedures there is no longer a requirement for these contingency procedures. There is no environmental impact related to the withdrawal of these procedures since they are used extremely rarely.

End of document