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

SAIP AD3 Documentation: Stage 4 Update and Submit Step 4B

Jersey Interface Airspace Change Proposal

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## Publication history

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## Airline Glossary

Airline Callsign Abbreviation	Name	Airline Callsign Abbreviation	Name
AUR	Aurigny Air Services	EZY	easyJet
BAW	British Airways	RYR	Ryanair
BCI	Blue Islands	SSZ	Specsavers Aviation
BEE	Flybe	SWN	West Atlantic Cargo

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# 2. Introduction

NATS' Swanwick Airspace Improvement Programme (SAIP) is undertaking a number of modular airspace changes within the London Flight Information Region (FIR), an area managed by NATS Swanwick. Airspace Deployments (AD) are being used to deliver discreet sets of changes in order to modernise separate regions of airspace.

Through SAIP AD3, we propose to introduce changes to existing RNAV routes at the southern FIR boundary in order to improve connectivity between Solent Airports and the Channel Islands Control Zone (CICZ). The proposed changes will alter five traffic flows in both directions, by realigning traffic through existing waypoints.

The timeline to implement this proposal is fixed as it is aligned with a simultaneous, coordinated change to the CICZ which will introduce new SIDs and facilitate new STARs, serving Jersey and Guernsey Airports. If the proposal is approved by the CAA, implementation of the proposed design would be implemented on the 6<sup>th</sup> December 2018.

## 3. Executive Summary

NATS is proposing a partial re-alignment of some ATS routes within existing Controlled Airspace in the London FIR, over the English Channel. Prior to engagement and consultation, NATS completed a full options assessment on the design concepts. The three design options <sup>(Ref 5)</sup> were assessed against a number of design principles <sup>(Ref 4)</sup>; which are summarised fully in the Design Principle Evaluation Options Assessment document <sup>(Ref 6)</sup>. This process reduced the three concepts down to one known as Option 2; which proposes to use existing airspace structures and introduce a partial systemisation of the airspace. This is the preferred concept option presented here.

Relevant stakeholders who could be affected by the changes were identified; including airlines who accounted for the majority of the flights within the region, and the MoD as a mandatory stakeholder. These are all listed in the Consultation Strategy document <sup>(Ref 8)</sup> which includes rationale on how and why these stakeholders were identified. Stakeholders were each fully briefed on the preferred concept option and how it would impact them. They were also informed of the upcoming consultation and any relevant constraints, such as the reduced consultation period.

NATS completed a focussed consultation on the changes presented here; involving the targeted set of stakeholders who would be affected by the changes. As mentioned above, the stakeholders had all already been fully engaged on the proposed airspace changes prior to consultation. The consultation was open for four weeks and allowed NATS to gather views and information on the proposed changes. Stakeholders were given the opportunity to leave feedback via the online portal, which included a summary of the changes and the Consultation document <sup>(Ref 10)</sup> attached online. The consultation document provided included a description of the current airspace, the proposed changes and impacts of the proposal; such as fuel and  $CO_2$  differences.

As covered in the Response Categorisation document <sup>(Ref 11)</sup>, there was just one response from the seven received which was identified as impacting the proposed design. The suggestion made was to increase the proposed Flight Level cap on a number of routes in order to reduce the fuel burn impact for airlines. NATS is responding to this feedback by increasing the Flight Level caps, with conditions on the traffic flows impacted; thus enabling the environmental and commercial benefits for airlines.

## 4. Current Airspace Description

## 4.1 Structures and Routes

This region of airspace is used for traffic flows between the Solent and CICZ. There is data transfer and transfer of control between the UK NATS (London Area Control), the Channel Islands Jersey Port Authority (PoJ) and France's DSNA (Brest). The PoJ manage traffic within the CICZ on behalf of DSNA. The UK, via NATS, feeds traffic to and receives traffic from the CICZ via the PoJ.



The following five traffic flows have been identified as being the most relevant to this proposal:

- Southbound Solent Airport<sup>1</sup> departures to Channel Islands<sup>2</sup> Airports
- Southbound Solent Airport departures to non-Channel Islands Airports (transferred to the control of Brest centre)
- Southbound non-Solent Airport departures to Channel Islands Airports
- Northbound Channel Islands departures to Solent Airports
- Northbound Channel Islands departures to non-Solent Airports within UK airspace (transferred to the control of Swanwick centre)

The traffic flows are defined by route, direction and where a transfer of control occurs. Further details on the traffic flows can be found in Section 3 of the Consultation Document <sup>(Ref 10)</sup>.

A visual representation of the above flows can be seen in Figure 1 below; this contains further information on the current flight levels and the relevant route segments, such as route identifier and waypoints.

#### 4.2 Airspace usage and proposed effect

Figure 2 and Figure 3 below illustrate the current day flight paths of aircraft in the region of interest, using a traffic density plot of all flights. These plots were generated using radar data from the month of June 2017; and show the density of the flight paths. The purple areas indicate the highest concentration of aircraft as shown on the key.

Figure 2 shows all traffic flows in the region; these are primarily made up of the five traffic flows covered in Section 4.1 above. Two large swathes of traffic can be seen between THRED – LELNA and THRED – ORTAC; showing clearly where ATC typically direct aircraft. It is worth mentioning there are traffic flows captured within this density plot which will not change from the proposed changes.

Figure 3 is a filtered version of Figure 2, only showing traffic which flew between the Solent Airports and Channel Islands Airports; this is a two-way flow covering both directions of traffic. Another clear swathe of traffic can be seen between THRED – ORTAC which is used for these routes.

The proposed route changes, covered fully in Section 6 below, have been designed in order to better distribute and segregate traffic. Traffic between the Solent Airports and Channel Islands Airports (both ways) will continue to route between THRED – ORTAC, but at different flight levels. Other traffic flows in this area would follow a different route segment in order to allow a better distribution of traffic. A future density plot of traffic in this area would demonstrate this change.

## 4.2.1 Airlines and Aircraft Types

The proportion of airline stakeholders in this region of airspace has previously been described in the Consultation Strategy document <sup>(Ref 8)</sup>. This was used to identify and target the major airspace users and therefore stakeholders, for the consultation. As described in the strategy document, the airlines Aurigny, Blue Islands and Flybe were our primary stakeholder targets. The reason for this was that combined, these three airlines accounted for 80% of all Solent – Channel Islands flights; therefore the most likely to be impacted by the proposed changes. As detailed in the strategy document, a further five airlines were also engaged prior to the consultation, as they regularly use this airspace albeit to a lesser extent.

<sup>&</sup>lt;sup>1</sup> Solent Airports encompass EGHH (Bournemouth) and EGHI (Southampton) Airports for this proposal

<sup>&</sup>lt;sup>2</sup> Channel Island Airports encompass EGJA (Alderney), EGJB (Guernsey) and EGJJ (Jersey) for this proposal



The proportion of airlines is not expected to change as a consequence of this airspace change.

Table 1 below shows the aircraft types in the 95<sup>th</sup> percentile which flew between the Solent (Bournemouth and Southampton) and Channel Island Airports (Alderney, Guernsey and Jersey). There were a total of 10,400 flights which matched these criteria, using historic flight plan data for 2017.

АС Туре	Generic AC Type	Total	Proportion
AT75	Heavy Turboprop	4,344	41.77%
D228	Medium Turboprop	2,039	19.61%
DH8D	Heavy Turboprop	1,426	13.71%
DA42	Piston	597	5.74%
B350	Small Turboprop	473	4.55%
PA31	Piston	248	2.38%
AT45	Medium Turboprop	236	2.27%
AT43	Medium Turboprop	158	1.52%
C510	Small Jets	141	1.36%
C25C	Small Jets	118	1.13%
BE20	Small Turboprop	109	1.05%

Table 1: Top Solent - Channel Island Specific Aircraft Types, 2017

Table 2 below shows all of the 10,400 flights categorised by a generic aircraft type; of which turboprops made up over 85% of all flights. The proportion of aircraft types is not expected to change as a consequence of this airspace change.

Generic Aircraft Type	Total	Proportion
Heavy Turboprop	5,771	55.49%
Medium Turboprop	2,433	23.39%
Piston	1,044	10.04%
Small Turboprop	686	6.60%
Small Jets	426	4.10%
3 Engine Small	31	0.30%
2 Engine Small Jet	6	0.06%
Medium Airbus	2	0.02%
Medium Boeing	1	0.01%
Total	10, 400	

Table 2: Top Solent - Channel Island Generic Aircraft Types, 2017





Figure 1: Current routes and current flows of traffic relevant to this proposal





Figure 2: Density plot of all traffic flows





Figure 3: Density plot showing traffic routing between the Solent and Channel Island Airports



#### 4.3 Operational efficiency, complexity, delays and choke points

The current UK ATS route structure within S21 does not currently align with the planned extension to the CICZ, hence why these proposed changes are required.

This proposal has also been used as an opportunity to improve upon the current traffic flows, whilst minimising the required changes and still aligning with Jersey ATC's planned route changes. The proposed re-alignment of ATS routes would partially systemise traffic flows at the ORTAC and ORIST interfaces. These traffic flows are currently often manually tactically vectored by controllers.

The conflict analysis indicates that the proposed changes would yield an overall benefit in confliction reduction which in turn would lead to a reduction in complexity within S21 <sup>(Ref 20)</sup>. This has been calculated at a confliction reduction of 43% by 2024. However, the reduction in conflictions and complexity is not expected to result in a reduction, nor any change, in NATS delay. This is due to S21 being a very minor sector and is rarely, by itself, operated at maximum capacity. It is combined with other sectors and so the reduction in complexity will still have a tangible benefit.

#### 4.4 Safety issues

There are no specific safety issues within this area of airspace, in the current operation, to be solved by this proposal. Ensuring the safety of proposed changes is a priority for NATS. NATS has a dedicated safety manager for the SAIP project who ensures that the safety representatives from SARG have oversight of the safety assurance process.

NATS is not claiming a quantifiable capacity benefit from the proposed changes as the partial systemisation is a consequence of the changes NATS was required to make in order to align with the planned changes within the CICZ.

However there would be a positive impact on safety within this area of airspace from realigning some of the flows such that more traffic can be safely handled with fewer controller interactions; and without the need to change the airspace size or type.

NATS Analytics also completed an impact assessment <sup>(Ref 20)</sup> which included a conflict analysis on the proposed changes. This estimates a reduction in conflictions of 43% by 2024 in Sector 21 as a result of the change, indicating a benefit for complexity and capacity.

Paragraph 10 contains further details on the safety assessment for this proposal.

#### 4.5 Environmental issues

There are no specific environmental issues within this area of airspace, in the current operation.

The predominant environmental matter relating to this specific proposal is a small annual increase of fuel and  $CO_2$  that the proposed changes would cause for airlines. This is caused by a small increase in track mileage from realigning the Y110 and Z171 route segments. There were a few further changes to the design following consultation feedback which have raised the level cap limits on some routes. This has helped to reduce the forecast fuel burn and  $CO_2$  emissions from the original design.

Overall, there is a still a small annual forecasted increase of 4 tonnes of fuel burn and 12.7 tonnes of  $CO_2$  emissions, in 2019. However these numbers have greatly reduced down from the 28.8 tonnes of fuel and 91.6 tonnes of  $CO_2$  increase from the original design which was consulted upon.

As such, and outlined in the design principles <sup>(Ref 4)</sup>, the primary environmental design principle for this proposal has been to minimise fuel disbenefit as much as possible, which these final revised changes have supported.

A detailed analysis of the environmental impact of the proposed changes is given in Section 7.6. This includes analysis on the current vs proposed routes for the impact on fuel burn and  $CO_2$  emissions.



As the proposed changes are all above 7,000ft and over the sea, priority has not been given to local environmental impacts such as noise, visual intrusion, tranquillity or local air quality; as there will not be any change in impact.

# 5. Statement of Need

The following text is taken from the DAP1916 Statement of Need submitted in January 2018 for this airspace change proposal.

*Current Situation*: Jersey Port Authority are the ANSP for the Channel Islands Control Zone (CICZ) managing all traffic in that region on behalf of France's DSNA (Brest). The UK, via NATS, feeds traffic to and receives traffic from the CICZ via Jersey ATC.

*Issue or opportunity to be addressed:* Jersey ATC have requested an extension to the CICZ to facilitate new SIDs and STARs serving Jersey and Guernsey Airports. They have set a target implementation date of the 6<sup>th</sup> December 2018. This will change the way traffic flows through existing waypoints ORIST and LELNA. The ATS route structure and utilisation on the UK side of the FIR does not currently align with the requirements of the Jersey side.

*Desired Outcome*: Efficient alignment and connectivity of UK routes with Jersey ATC's planned routes, in time for their planned implementation date.

*Specific challenges to overcome*: Any solution must be agreed between all three ANSPs. Limited time is available to align implementation dates.

NATS believes that these proposed changes offer the best compromise between supporting the planned introduction of new SIDs and STARs in the CICZ; offering an improved distribution of traffic within this region; whilst minimising the impact due to airspace change within the UK, such as across different stakeholders.

## 6. Proposed Airspace Description

## 6.1 Objectives for Proposed Design

The primary objective for the proposed design presented herein is to enable an efficient alignment and connectivity of UK routes with the agreed new SIDs and, in due course, STARs serving Jersey and Guernsey Airports; in time for their planned implementation date.

The additional objective is to enable a partial systemisation of this area of UK airspace by better segregating and distributing the traffic flows; whilst still minimising the required changes to existing airspace structures, and the impact on other airspace users.

## 6.2 Proposed New Airspace/ Route Definition and Usage

The proposed changes will alter traffic flows which exist in the airspace between the Solent Group Airports and the Channel Islands; including routes between these Airports. The changes affect traffic flows in both directions through existing waypoints LELNA, ORIST and ORTAC which are positioned on the FIR boundary. As such, no new waypoints are being created.

The proposed traffic flow realignments presented in the consultation, and summarised in the consultation document <sup>(Ref 10)</sup> all remain the same. The new alignment of Z171 would route southbound RNAV1 departures and Channel Islands arrivals via LELNA, rather than ORTAC as today. Similarly, the proposed realignment of Y110 would route northbound RNAV1 departures via ORIST, instead of ORTAC as today. Other traffic flows would continue to flightplan as today. These proposed changes would better segregate and distribute traffic in this area of airspace.



Currently, of the flows under consideration for this proposal, there is one traffic flow southbound through LELNA; six southbound through ORTAC; six northbound through ORTAC; and none through ORIST. The proposed changes would alter the distribution to three flows southbound through LELNA; three southbound through ORTAC; two northbound through ORTAC; and three northbound through ORIST, thus better distributing the traffic.

Following the consultation, NATS have decided to make a number of additional changes to the final proposed design; as summarised in the Consultation Response document <sup>(Ref 12)</sup>. A full summary of the consultation responses can be found in the Categorisation of Responses document <sup>(Ref 11)</sup>. These are also covered in Section 7 below.

NATS is responding to the consultation by raising some of the level limits on routes. The ORTAC bidirectional interface will now be available up to FL135 which has been raised from FL95. Traffic will switch from Z171 to Q41 at FL105 (previously FL95). However Q41 will be published up to FL135 in order to be RAD restricted for flights between the Solent Group and Channel Islands, which can flightplan via ORTAC up to this Flight Level.

Table 3 below summarises the proposed changes by traffic flows, with changes highlighted in bold italics. Figure 4 below also provides a visual schematic of the affected traffic flows alongside the proposed changes. Figure 1 above can be used to compare the proposed changes against what is flown today. This can also be found in the consultation document <sup>(Ref 10)</sup>.

From	Direction	То	Flight Level (proposed)	RNAV spec	Relevant Route Segment (proposed)
				(prop.)	
EGH#	South	EGJ#	FL110-FL130	RNAV5	THRED Q41 ORTAC
EGH#	South	Non-EGJ#	Up to FL130	RNAV5	THRED Q41 ORTAC
		(Brest centre)	FL140+	RNAV1	THRED new Z171 alignment LELNA
Non-	South	EGJ#	Up to FL130	RNAV5	THRED Q41 ORTAC
EGH#			FL110+	RNAV1	THRED new Z171 alignment LELNA
EGJ#	North	EGH#	FL110-FL130	RNAV5	ORTAC Q41 THRED
			FL140-FL190	RNAV1	ORIST new Y110 alignment THRED
EGJ#	North	Non-EGH#	Up to FL130	RNAV5	ORTAC Q41 THRED
		(London	FL120-FL190	RNAV1	ORIST new Y110 VEXEN L980 etc.*
		centre)	FL120-FL190	RNAV1	ORIST L982 ROXOG etc.*
					(* dependent on L982 availability)

Table 3: Proposed changes across relevant route segments

Based on the same data used for the environmental assessment (Section 7.6 below), we have analysed the current traffic within Sector 21 and anticipate the following forecast route usage, shown in Table 4 below. This describes the same traffic flows as shown elsewhere in this document.



From	Direction	То	Flights (2019)	Flights (2029)
EGH#	EGH# South EGJ#		3,827	4,478
EGH#	South	Non-EGJ# (Brest centre)	3,508	3,725
Non-EGH#	South	EGJ#	3,855	4,519
EGJ#	North	EGH#	6,763	7,219
EGJ#	North	Non-EGH# (London centre)	11,221	12,553
· · · · · ·		Total	29,174	32,494

Table 4: Forecast route usage, 2019 and 2029

The following technical documents provide further information on the proposed designs

- A technical definition document which contains the WGS84 data in excel format. This contains information on ATS routes such as levels, route designators and significant waypoint names. It is awaiting approval by the CAA mapping team. Reference 19.
- A document summarising the draft AIP changes. This lists the changes alongside the AIP pages where these changes need to occur. Reference 22.
- Airspace Design Definition (ADD) document. This is the main repository of ATC design information relating to network connectivity, how it impacts specific sectors and other items required to make changes to the ATC work environment. This is to be redacted for publication. Reference 18.





Figure 4: Proposed routes and proposed flows of traffic relevant to this proposal

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## 7. Impacts and Consultation

NATS completed engagement activities with stakeholders identified as those being most likely to be affected by the proposed design. These targeted airline stakeholders are listed in Appendix section 15.2 below. NATS briefed all of the stakeholders individually on the planned changes alongside briefing wider groups and forums such as the Flight Efficiency Partnership (FEP) meeting. The Consultation Strategy Document <sup>(Ref 8)</sup> details all of the engagement activities completed prior to the consultation going live.

NATS commenced a focussed consultation on the proposed airspace changes presented herein on Wednesday  $2^{nd}$  May 2018. The consultation was conducted via an online portal where users could submit a formal response alongside viewing the consultation document <sub>(Ref 10)</sub>. The consultation document provides an overview into how the consultation was administered; an overview into the current airspace; the proposed changes and impacts of the proposed changes.

The consultation was open for four weeks; closing on Wednesday 30<sup>th</sup> May 2018. A total of seven responses were received during this period; which are covered in the following sections. A full summary of how the consultation was run and a theming of all responses can be found in the Categorisation Report <sup>(Ref 11)</sup>.

Category	Impact	Evidence
Safety/Complexity	Increased predictability of flight paths and reduction in complexity of ATC task due to systemisation	See Paragraph 4.4 and Section 10
Capacity/Delay	No impact on delay	See Paragraph 4.3
Fuel Efficiency/CO <sub>2</sub>	Total annual change: +4 tonnes fuel / +12.7 tonnes CO <sub>2</sub> (2019) +5 tonnes fuel / +14.3 tonnes CO <sub>2</sub> (2024)	See Paragraph 7.6
Noise – Leq/SEL	No impact, this is a Level 2A change	See Paragraph 7.7
Tranquillity, visual intrusion (AONBs & National Parks)	No impact, this is a Level 2A change	See Paragraph 7.7
Local Air Quality	No impact, this is a Level 2A change	See Paragraph 7.7
Other Airspace Users	Minimal impact, no changes to volume or classification of CAS	See Paragraphs 7.3 to 7.4

#### 7.1 Net impacts summary for proposed route

## 7.2 Units affected by the proposal

There were no units or airport operators identified as being impacted by the proposed changes as this is an enroute proposal with no proposed changes in impact to airport operations.

As such, NATS did not target any units or airport operators prior to the consultation. Although they were still welcome to respond, there were no consultation responses received from any units.

#### 7.3 Military impact and consultation



During Stage 1 of this process, eleven Design Principles were created which were used to evaluate early design options against. These can be found in the Step 1B Design Principles document <sup>(Ref 4)</sup>. Design Principle Six (DP6) stated that the proposed changes should have no impact on UK military operations which the proposed option meets.

The MoD was consulted as a mandatory stakeholder via DAATM, as per standard airspace consultations. The MoD responded to the consultation stating that they have no objections to the proposal and specifically welcomed the inclusion of DP6.

#### 7.4 General Aviation airspace users impact and consultation

One of the eleven Design Principles created in Step 1B stated that the proposed changes should have no impact on GA operations (DP5) which the proposed option meets.

As there was no identified impact on GA operations, NATS did not target GA airspace users prior to the consultation; such as helicopter and parachuting operations. Although all airspace users were welcome to respond to the consultation, there were no responses received.

#### 7.5 Commercial air transport impact and consultation

NATS has engaged and consulted directly with major airline operators who were identified as being major carriers within the associated area of airspace between the Solent and Channel Islands. Aurigny Air Services, Blue Islands and Flybe were identified as the major stakeholders, making up 80% of all flights between the Solent and Channel Islands Airports. An additional five airlines were also identified as stakeholders from additional wider engagement activities, described in the Consultation Strategy document <sup>(Ref 8)</sup>. A list of all of the targeted stakeholders can be found in Appendix section 15.2 below.

All three of the primary airline stakeholders submitted a consultation response, alongside two of the five additional airline operators. The Categorisation Report <sup>(Ref 11)</sup> summarises all seven responses including identifying any common themes and whether they contain feedback which could potentially impact the final design. There was only one response, from Blue Islands, which was categorised as having the potential to impact on the proposed design. The response from Blue Islands and subsequent changes are summarised in Section 7.5.1 below.

All of the remaining responses expressed support for the proposed changes. These can all be viewed in the Categorisation Report <sup>(Ref 11)</sup>.

NATS has supported the Channel Islands Jersey Port Authority (PoJ) and DSNA (France Brest) ANSPs on their planned airspace changes to the CICZ; alongside involving them as collaborative partners and sponsors throughout the airspace change proposal proposed herein. They were each asked to provide feedback to the consultation. The PoJ were the only ANSP to submit a response which expressed full support for the proposed changes and confirmed that they have been fully involved throughout the development of this proposal.

#### 7.5.1 Consultation Response from Blue Islands

The response from Blue Islands expressed general support for the proposed changes however a concern relating to the increase in fuel burn was raised. Blue Islands made a suggestion to increase the proposed Flight Level cap on a number of the traffic routes in order to reduce the fuel burn impact and associated environmental and commercial impacts for airlines.

NATS has reviewed this feedback carefully and responded positively by amending the final proposed design to reflect an increased Flight Level cap on certain routes, in order to reduce the fuel burn impact. Section 6 above covers all of the proposed changes including the Flight level caps. Some of these changes have been RAD restricted for certain traffic flows; however the changes are still reflective and in support of the response received from Blue Islands.

This response can be viewed in its entirety within the Categorisation Report <sup>(Ref 11)</sup>.



#### 7.6 CO<sub>2</sub> environmental analysis impact and consultation

Table 5 below shows the forecast fuel burn and  $CO_2$  emission differences for the final proposed changes in the first full year of implementation (2019) and ten years afterwards (2029). This has been completed by the NATS Analytics department in support of this Airspace Change Proposal.

It describes the same flows as seen in Table 3 and Figure 4 previously in this document.

From	Direction	То	Annual Fuel Change 2019 (T)	Annual CO <sub>2</sub> Change 2019 (T)	Annual Fuel Change 2029 (T)	Annual CO <sub>2</sub> Change 2029 (T)
EGH#	South	EGJ#	-1.7	-5.4	-2	-6.4
EGH#	South	Non-EGJ# (Brest centre)	-6.7	-21.2	-7.7	-24.5
Non-EGH#	South	EGJ#	+11	+35	+13.1	+41.5
EGJ#	North	EGH#	+2.5	+7.9	+2.9	+9.2
EGJ#	North	Non-EGH# (London centre)	-1.1	-3.6	-1.3	-4
		Total	+4	+12.7	+5	+15.9

## Table 5: Fuel burn and $CO_2$ forecast changes

This analysis concluded there would be a small annual increase of 4 tonnes in fuel burn and 12.7 tonnes in  $CO_2$  emissions in 2019, due to the design and forecast route usage. The further increase of fuel and  $CO_2$  by 2029 is due to a forecast increase in flights, as described in Section 6.2 above.

The increase in fuel usage and  $CO_2$  emissions from the proposed route changes is a result of an increase in track mileage from realigning the Y110 and Z171 route segments. Whilst changes to the LAC S21 route segments are necessary in order to support the introduction of new SIDs and facilitating new STARs in the CICZ; minimising the track mileage and extent of these changes has still been prioritised. This was one of the key drivers behind the design principle evaluation options appraisal <sup>(Ref 6)</sup>.

NATS has revised the final design based on feedback received in the consultation, as covered in Section 6.2 above. This raised the level limit on a number of routes in order to reduce the environmental and commercial impact on airlines. Since making these revisions there has been a significant reduction in fuel burn and  $CO_2$  emissions compared to the design which was consulted on. Three of the traffic flows are now forecast to achieve a small annual decrease in fuel and  $CO_2$  as a result of the level cap changes. These include the two southern flows from the Solent Airports alongside Channel Island departures routing into the LTMA.

The design which was consulted on showed an annual increase of 28.8 tonnes in fuel burn and 91.6 in  $CO_2$  emissions in 2019. Although there is still a small increase, it has greatly decreased from this and therefore supports our environmental design principle <sup>(Ref 4)</sup> of minimising the overall fuel disbenefit.

A UK government transport analysis, known as 'WebTAG', has been completed in order to quantify the monetary value of the impact on the environment due to greenhouse gas emissions (specifically using  $CO_2$  as the measure). WebTAG was used to show the increase in  $CO_2$  in the opening year (2019) increasing to 142 tonnes over a 60 year appraisal period. It also demonstrated a  $CO_2$  Net Present Value disbenefit of -£7,506 for the non-



traded sector. As mentioned above, the disbenefit is due to some routes becoming longer from partially systemising the airspace.

Further details of the updated WebTAG results are given in the Updated Design document <sup>(Ref 12)</sup>, including a copy of the summary spreadsheets for the traded and non-traded sector analysis.

#### 7.7 Local environmental impacts and consultation

The proposed re-alignment of some ATS routes would occur at a high level within existing Controlled Airspace over the English Channel. This proposal has therefore been captured as a Level 2A Airspace Change Proposal (ACP). As such, there will be no change in impact to the local environment, which is not currently affected. NATS did not target organisations whose primary interest is environmental impacts such as noise, visual intrusion, tranquillity or local air quality.

Detailed analysis of the environmental impact of the proposed changes is given in Section 7.6. This includes analysis of the current vs proposed routes for the impact on fuel burn and  $CO_2$  emissions. No analysis relating to noise or local air quality has been completed because the change would occur over the English Channel at high level.

#### 7.8 Economic impacts

The development of this airspace change proposal has not been informed by any economic constraints or opportunities.

As summarised in Section 7.6 above, the WebTAG analysis concluded a Net Present Value disbenefit of -£7,506 for CO<sub>2</sub> emissions.

The likely economic impacts are detailed in the Stage 4 Step 4A Update Design document, Section 5 <sup>(Ref 12)</sup>.



# 8. Analysis of Options

#### 8.1 Airspace Change Design Options

In order to respond to the planned new SIDs and STARs in the CICZ, NATS developed three separate options in how best to adapt the UK airspace and connectivity in support of the changes.

The first considered option was to leave the airspace as it is today and introduce no new changes. Tactical vectoring would continue to be used in order to manually split the traffic flows within S21.

The second and third concept options were based on separating the relevant traffic flows in the route network on the UK side of the FIR boundary, in order to better distribute the traffic. Option three focussed on a major restructure of the S21 airspace and flows in order to achieve full systemisation of the airspace. This included the introduction of new SIDs and STARs for Solent Airports, and a widening of the current controlled airspace boundary.

The final, and preferred, option involves a minimal restructuring of the S21 airspace and flows by splitting existing traffic flows, using existing waypoints and controlled airspace. This is similar to today's traffic flows but more formally aligns the UK route structure with the PoJ routes. These three options are described fully in the Airspace Change Design Options <sup>(Ref 5)</sup> document.

#### 8.2 Design Options Assessment

The three options were assessed against eleven design principles which covered a variety of criteria associated with the change, such as environmental factors. These design principles have been listed in Appendix Section 15.3 below.

Each option was qualitatively assessed against each design principle in order to evaluate whether the principle had been met, partially met or not met at all. The first option, of doing nothing, did not fully meet any of the design principles. It categorically did not achieve ANSP agreement which was considered the most important design principle.

The third option, involving a major airspace restructure, did achieve ANSP agreement however there were another five design principles it did not meet at all. These included high priority design principles relating to airspace impacts such as the change having no impact on GA or MoD operations; which this option would have. The second option, involving a minimal airspace restructure, fully met seven out of the eleven design principles; including all of those ranked as high priority. This option was the only one to avoid impacting upon GA and MoD operations, as well as meeting the environmental impact principles the best. This option also fully met the highest priority design principle of achieving ANSP agreement.

The conclusion of this assessment, alongside the stakeholder engagement continued throughout, was to reduce the number of design concepts to one, known as Option 2 which proposes a minimal airspace restructure. A full summary of this assessment can be found in the Design Principle Evaluation, Options Assessment document <sup>(Ref 6)</sup>. This preferred option was the single shortlist option we consulted upon, as covered in Section 7 above.



# 9. Airspace Description Requirements

	The proposal should provide a full description of the proposed change including the following:	Description for this proposal
а	The type of route or structure; for example, airway, UAR, Conditional Route, Advisory Route, CTR, SIDs/STARs, holding patterns, etc	See Section 6.
b	The hours of operation of the airspace and any seasonal variations	H24
С	Interaction with domestic and international en-route structures, TMAs or CTAs with an explanation of how connectivity is to be achieved. Connectivity to aerodromes not connected to CAS should be covered	See RSAD, Reference 14 and ADD, Reference 18.
d	Airspace buffer requirements (if any). Where applicable describe how the CAA policy statement on 'Special Use Airspace – Safety Buffer Policy for Airspace Design Purposes' has been applied.	N/A
e	Supporting information on traffic data including statistics and forecasts for the various categories of aircraft movements (passenger, freight, test and training, aero club, other) and terminal passenger numbers	See Sections 4.2 and 6.2.
f	Analysis of the impact of the traffic mix on complexity and workload of operations	The design concept is to flow the traffic as described in Section 6.2.
g	Evidence of relevant draft Letters of Agreement, including any arising out of consultation and/or airspace management requirements	See References 15, 16 and 17.
h	Evidence that the airspace design is compliant with ICAO Standards and Recommended Practices (SARPs) and any other UK policy or filed differences, and UK policy on the Flexible Use of Airspace (or evidence of mitigation where it is not)	CAP1385 has been applied. See RSAD, Reference 14.
i	The proposed airspace classification with justification for that classification	No change to existing airspace classification.
j	Demonstration of commitment to provide airspace users equitable access to the airspace as per the classification and where necessary indicate resources to be applied or a commitment to provide them in line with forecast traffic growth. 'Management by exclusion' would not be acceptable	NATS commits to provide the same level of access post- implementation in line with forecast growth.
k	Details of and justification for any delegation of ATS	No change to the delegation of ATS.



# 10. Safety Assessment

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

10.2 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.

10.3 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 <sup>(Ref 9, Section 2)</sup>.

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

10.5 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.
- 10.6 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.

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

10.8 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.



# 11. Operational Impact

	An analysis of the impact of the change on all airspace users, airfields and traffic levels must be provided, and include an outline concept of operations describing how operations within the new airspace will be managed. Specifically, consideration should be given to:	Evidence of compliance/ proposed mitigation
а	Impact on IFR general air traffic and operational air traffic or on VFR General Aviation (GA) traffic flow in or through the area	See Section 6.2 for IFR flow schematics. No impact on VFR operations.
b	Impact on VFR operations (including VFR routes where applicable);	No impact on VFR operations. See Reference 8, Section 3.
С	Consequential effects on procedures and capacity, i.e. on SIDs, STARs, and/or holding patterns. Details of existing or planned routes and holds	See Section 4.1 for current, and Section 6.2 for proposed IFR flow schematics.
d	Impact on aerodromes and other specific activities within or adjacent to the proposed airspace	N/A
e	Any flight planning restrictions and/or route requirements	See Section 6.2 for flow schematics and the ADD, Reference 18 for flightplanning and route requirements.



	General requirements	Evidence of compliance/ proposed mitigation
а	Evidence to support RNAV and conventional navigation as appropriate with details of planned availability and contingency procedures	See the DEMETER analysis, Reference 14.
b	Evidence to support primary and secondary surveillance radar (SSR) with details of planned availability and contingency procedures	Traffic uses the same regions as today in a similar manner from a surveillance point of view. Demonstrably adequate for the region.
C	Evidence of communications infrastructure including R/T coverage, with availability and contingency procedures	Traffic uses the same regions as today in a similar manner from a comms infrastructure point of view. Demonstrably adequate for the region.
d	The effects of failure of equipment, procedures and/or personnel with respect to the overall management of the airspace must be considered	Existing contingency procedures continue to apply.
e	Effective responses to the failure modes that will enable the functions associated with airspace to be carried out including details of navigation aid coverage, unit personnel levels, separation standards and the design of the airspace in respect of existing international standards or guidance material	Existing contingency procedures continue to apply.
f	A clear statement on SSR code assignment requirements	No change to SSR code allocation.
g	Evidence of sufficient numbers of suitably qualified staff required to provide air traffic services following the implementation of a change	See Reference 9, Section 2 where it states that there is a training plan in place.

# 12. Supporting Infrastructure/ Resources



# 13. Airspace and Infrastructure

	General requirements	Evidence of compliance/ proposed mitigation
а	The airspace structure must be of sufficient dimensions with regard to expected aircraft navigation performance and manoeuvrability to fully contain horizontal and vertical flight activity in both radar and non-radar environments	There is no change proposed to the controlled airspace. See Section 6.2 for flows.
b	Where an additional airspace structure is required for radar control purposes, the dimensions shall be such that radar control manoeuvres can be contained within the structure, allowing a safety buffer. This safety buffer shall be in accordance with agreed parameters as set down in CAA policy statement 'Safety Buffer Policy for Airspace Design Purposes Segregated Airspace'. Describe how the safety buffer is applied, show how the safety buffer is portrayed to the relevant parties, and provide the required agreements between the relevant ANSPs/ airspace users detailing procedures on how the airspace will be used. This may be in the form of Letters of Agreement with the appropriate level of diagrammatic explanatory detail.	There are no proposed changes to airspace structures or delegation of ATS.
С	The Air Traffic Management system must be adequate to ensure that prescribed separation can be maintained between aircraft within the airspace structure and safe management of interfaces with other airspace structures	The ATM system is currently adequate for tactical vectoring to 2NMS from the edge of CAS. The ATM system is currently adequate for maintaining separation within the airspace and safe management of the interfaces. See Reference 13.
d	Air traffic control procedures are to ensure required separation between traffic inside a new airspace structure and traffic within existing adjacent or other new airspace structures	ATC procedures will ensure this. See Paragraph 6.2 for proposed route flows, and Reference 13 for evidence of CAP1385 compliance.
е	Within the constraints of safety and efficiency, the airspace classification should permit access to as many classes of user as practicable	No change to airspace classification proposed.
f	There must be assurance, as far as practicable, against unauthorised incursions. This is usually done through the classification and promulgation	No change to airspace classification or volume.
g	Pilots shall be notified of any failure of navigational facilities and of any suitable alternative facilities available and the method of identifying failure and notification should be specified	Existing contingency procedures would continue to apply.
h	The notification of the implementation of new airspace structures or withdrawal of redundant airspace structures shall be adequate to allow interested parties sufficient time to comply with user requirements. This is normally done through the AIRAC cycle	This will be promulgated via the AIRAC cycle.



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i	There must be sufficient R/T coverage to support the Air Traffic Management system within the totality of proposed controlled airspace	No change from today's Controlled Airspace. R/T coverage demonstrably adequate as per current day.
j	If the new structure lies close to another airspace structure or overlaps an associated airspace structure, the need for operating agreements shall be considered	See LoAs, References 15-17 for ANSP agreements. Procedures and operating agreements will be implemented as per MATS Part II.
k	Should there be any other aviation activity (low flying, gliding, parachuting, microlight site, etc.) in the vicinity of the new airspace structure and no suitable operating agreements or air traffic control procedures can be devised, the change sponsor shall act to resolve any conflicting interests	There are no known aviation activities requiring additional operating agreements. Should such a conflict occur, the sponsor will act to resolve it.

	ATS route requirements	Evidence of compliance/ proposed mitigation
a	There must be sufficient accurate navigational guidance based on in-line VOR/DME or NDB or by approved RNAV derived sources, to contain the aircraft within the route to the published RNP value in accordance with ICAO/ Eurocontrolstandards	RNAV1 Navaid coverage (DME/DME) is adequate and demonstrated in the coverage plots included as Reference 14. Note most aircraft do not rely on DME/DME for RNAV1.
b	Where ATS routes adjoin terminal airspace there shall be suitable link routes as necessary for the ATM task	N/A
С	All new routes should be designed to accommodate P-RNAV navigational requirements	Realigned routes will be RNAV1.

Terminal airspace requirements	Evidence of compliance/ proposed mitigation
There are no proposed changes to terminal airspace structures	

Off-route airspace requirements	Evidence of compliance/ proposed mitigation
There are no proposed changes to off-route airspace structures	



# 14. Environmental Assessment

	Theme	Content	Evidence of compliance/ proposed mitigation
а	WebTAG analysis	Output and conclusions of the analysis (if not already provided elsewhere in the proposal)	See Paragraph 7.8 and Reference 12, Update Design.
b	Assessment of noise impacts (Level 1/M1 proposals only)	Consideration of noise impacts, and where appropriate the related qualitative and/or quantitative analysis If the change sponsor expects that there will be no noise impacts, the rationale must be explained	N/A – this is a Level 2 change
С	Assessment of $CO_2$ emissions	Consideration of the impacts on CO <sub>2</sub> emissions, and where appropriate the related qualitative and/or quantitative analysis If the change sponsor expects that there will be no impact on CO <sub>2</sub> emissions impacts, the rationale must be explained	See Paragraph 7.6 and Reference 12.
d	Assessment of local air quality (Level 1/M1 proposals only)	Consideration of the impacts on local air quality, and where appropriate the related qualitative and/or quantitative analysis If the change sponsor expects that there will be no impact on local air quality, the rationale must be explained	N/A – this is a Level 2 change
e	Assessment of impacts upon tranquillity (Level 1/M1 proposals only)	Consideration of any impact upon tranquillity, notably on Areas of Outstanding Natural Beauty or National Parks, and where appropriate the related qualitative and/or quantitative analysis If the change sponsor expects that there will be no tranquillity impacts, the rationale must be explained	N/A – this is a Level 2 change
f	Operational diagrams	Any operational diagrams that have been used in the consultation to illustrate and aid understanding of environmental impacts must be provided	See Figure 1 and Figure 4
g	Traffic forecasts	10-year traffic forecasts, from the anticipated date of implementation, must be provided (if not already provided elsewhere in the proposal)	See Paragraph 7.6 and Reference 12.
h	Summary of environmental impacts and conclusions	A summary of all of the environmental impacts detailed above plus the change sponsor's conclusions on those impacts	See Paragraph 7.1.



## 15. Appendices

#### 15.1 References

Ref No	Name	Hyperlink
1	SAIP AD3 CAA web page – progress through CAP1616	( <u>link</u> )
2	Stage 1 Assessment Meeting – slide pack	( <u>link</u> )
3	Stage 1 Assessment Meeting Minutes	( <u>link</u> )
4	Stage 1 Define, Step 1B Design Principles	( <u>link</u> )
5	Stage 2 Develop and Assess, Airspace Change Design Options	( <u>link</u> )
6	Stage 2 Develop and Assess, Design Principle Evaluation Options Assessment	( <u>link</u> )
7	Stage 2 Develop and Assess, Options Appraisal Safety Assessment	( <u>link</u> )
8	Stage 3 Consult, Consultation Strategy	( <u>link</u> )
9	Stage 3 Consult, Options Appraisal	( <u>link</u> )
10	Stage 3, Consultation Document	( <u>link</u> )
11	Stage 3, Categorisation of Responses	<u>Link</u>
12	Stage 4, Update Design	Supplied alongside ACP
13	AD3 Route Separation Assurance Document (RSAD), L5250 SAIP	Supplied as part of ACP
14	SAIP AD3 RNAV Coverage - DEMETER Analysis	Supplied as part of ACP
15	LoA – NATS and Brest DRAFT	Supplied as part of ACP
16	LoA – NATS and Jersey	Supplied as part of ACP
17	LoA – NATS and Southampton DRAFT	Supplied as part of ACP
18	SAIP AD3 Airspace Design Definition (ADD)	Supplied as part of ACP
19	SAIP AD3 Technical Definition Document WGS84	Supplied as part of ACP
20	SAIP AD3 Analytics Impact Assessment	Supplied as part of ACP
21	AIP Changes in support of SAIP AD3	Supplied as part of ACP

## 15.2 List of Consultation Stakeholders

The consultation was considered most relevant to the targeted stakeholders listed below, but was not exclusive to this list.

#### Mandatory Stakeholder:

MoD Ministry of Defence via Defence Airspace & Air Traffic Management (DAATM)

#### Primary Target Stakeholders:

These three air operators will be engaged during the consultation and their response actively sought

- AUR Aurigny Air Services
- BCI Blue Islands
- BEE Flybe

#### Additional Stakeholders:

These five air operators will be informed of the consultation and encouraged to respondBAWBritish AirwaysEZYeasyJet



RYRRyanairSSZSpecsavers AviationSWNWest Atlantic Cargo

#### 15.3 List of Design Principles

The following eleven design principles were used to assess the design options against:

- 1) ANSP agreement (highest priority)
- 2) Environmental: minimise fuel dis-benefit (medium priority)
- 3) Environmental: no low-level changes (high priority)
- 4) Airspace: no change to size or type (high priority)
- 5) Airspace: no impact on GA (high priority)
- 6) Airspace: no MoD impact (high priority)
- 7) Modernisation: systemisation unconstrained (low priority)
- 8) Modernisation: systemisation constrained (high priority)
- 9) Operator fleet: use RNAV1 (medium priority)
- 10) Operator fleet: allow RNAV5 (medium priority)
- 11) ATC training: minimise UK impacts (high priority)



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