

Airspace Modernisation - Gatwick Airport

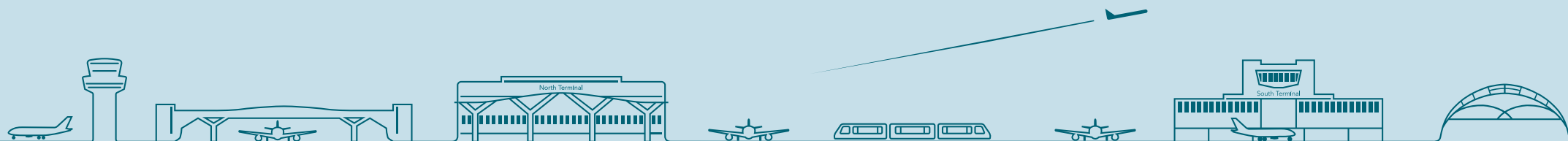
An Introduction to
Design Principle Development



18 March 2019
DP Version [0-1] For Public Release
CAA Reference ACP 2018-60

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Purpose of this Document

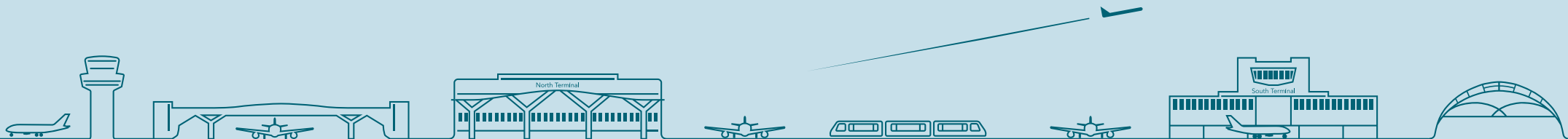
The purpose of this document is to introduce the process and material Gatwick will use to develop the design principles that will shape changes linked to the modernisation of airspace. Your responses to the questions we pose will help us to craft principles that we hope will unlock a wide range of benefits.

It is the Government's vision that our future airspace will **'deliver quicker, quieter and cleaner journeys and offer more capacity for the benefit of those who use and are affected by UK airspace'**. *

The redesign of the airspace above London and the South East will be complex. To ensure there is a common approach the 17 airports and NATS, the UK's central air traffic management provider, will all follow the CAA's airspace change process.

For Gatwick, the fundamental redesign of the airspace above 7000 feet necessitates the design of new arrival and departure routes using satellite-based navigation standards. This document introduces how the collective endeavours of all stakeholders will be guided with the intent of delivering on this ambition by 2025.

* Airspace Modernisation Strategy, CAA, CAP1711, pg 23



Foreword

The airspace above Southern England is some of the busiest in the world. The Department for Transport predicts that it will become busier still as more UK passengers look to travel abroad and we welcome even more visitors to our country.

As a result, the Government has said that the existing UK airspace design is approaching the limit of its capacity. Without a complete redesign of airspace above Southern England, coupled with extensive redesign of airport airspace and procedures, the UK will see increasing passenger disruption, personal and commercial costs and unnecessary environmental impacts.

The Government and Civil Aviation Authority (CAA) are co-sponsoring the programme to modernise UK airspace and we at Gatwick Airport are fully engaged in this process.

NATS will have responsibility for redesigning the airspace above 7000 feet and Gatwick, along with 16 other airports in the Southern half of the UK, will need to re-design our departure and arrival routes and procedures below 7000 feet to match up with their designs.

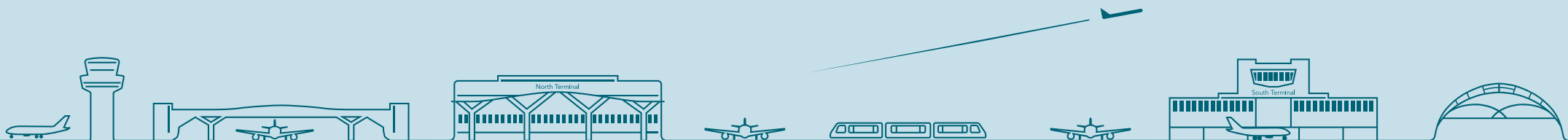
Over the course of the next two years we will be engaging with NATS, the CAA, the Department for Transport and other airports to help shape an airspace design upon which we will then formally consult, most likely in 2021. Final implementation of new airspace designs is not likely until the winter of 2024/25 at the earliest.

Initially, as outlined in this document, we are asking organisations and groups with an interest in the airspace around Gatwick to provide feedback on principles that Gatwick will then use to guide the redesign of its airspace, as part of the overall programme.

We recognise that this is a complex topic and I hope that you find this document useful in terms of explaining both the process and also the benefits of airspace modernisation for local communities, airlines and other airspace users.



Stewart Wingate
Chief Executive Officer



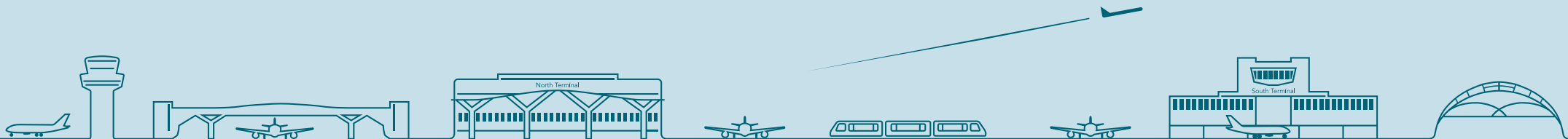
How to use this material

The Civil Aviation Authority (CAA) requires that airports undertaking an airspace change to develop a suite of design principles which are then used to shape and refine design options. The sections that follow introduce the programme of Airspace Modernisation, explain the stages of the CAA's Airspace Change Process (ACP), introduce some potential design principles and explain how and by when we would like your views. If you are already familiar with the context and/or the process of airspace change you can jump to a specific section by following the links.

We recognise that redesigning airspace is a complex topic and one that is not readily understood by the majority of people, so this booklet aims to introduce different aspects in a way that we hope is easy to understand. We have added a glossary, and our intended timeline of activity, as annexes should you need to refer to these. If you require clarification on any topic, please get in touch via email so we can provide further explanation.

It is important that we receive your feedback before the end of the day on **5 April 2019**.

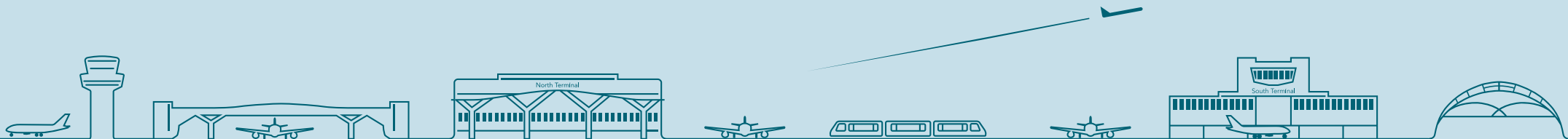
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Section 1 - Airspace Modernisation

In this section we will introduce the drivers and scope of Airspace Modernisation, specifically:

- 1.1 Why modernisation is important for the South East 2
- 1.2 Changing aircraft and air traffic control capabilities 3
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1.1 Why Airspace Modernisation is Important for the South East



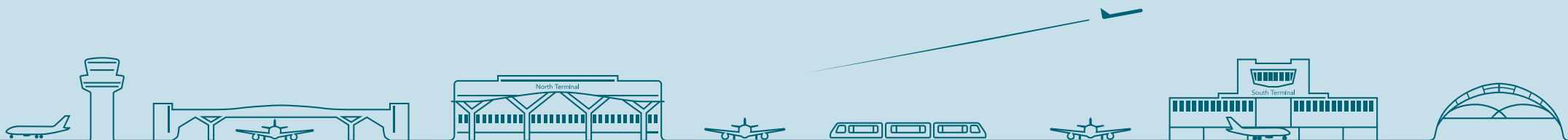
1.1.1 The airspace above and around London is, and will remain, some of the busiest in the world. However, the existing UK airspace design, specifically above Southern England, is approaching the limit of its design capacity. In addition, it contains outdated design features which have adverse operational, financial and environmental consequences and the interwoven architecture hampers improvements.

1.1.2 Department for Transport analysis¹ predicted that there will be a sustained and significant increase in air traffic movements at all Southern England airports, driven by increasing passenger demand. This additional traffic will place further pressures on existing airspace capacity. Without a complete redesign of the airspace above London and Southern England, coupled with extensive redesign of airport airspace and procedures, there will be increasing passenger disruption, personal and commercial costs and unnecessary environmental impacts.

1.1.3 As part of a wider review of aviation strategy, the Government directed the CAA to develop a strategy to modernise UK airspace, an invisible yet critical piece of our national transport

infrastructure. The CAA developed and consulted on an initial draft in 2018 and the final version of the Airspace Modernisation Strategy was published in December 2018.

¹ Upgrading UK Airspace – Strategic Rationale, DfT, 2017.



1.2 Changing Aircraft & Air Traffic Control Capabilities



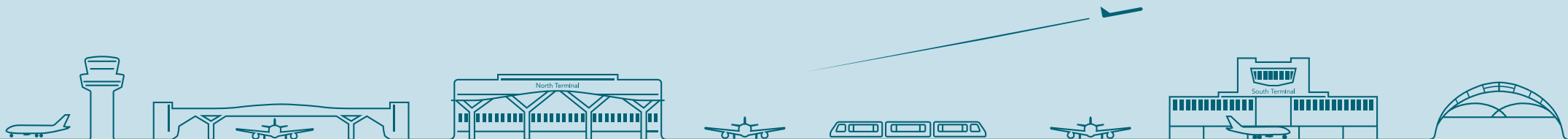
1.2.1 The designers of UK airspace in the 1950/60s could never have imagined how popular and accessible commercial aviation would become, nor could they have envisaged the technological advances that are built into modern airliners and air traffic management systems.

1.2.2 Today's commercial airliners have navigation systems which use Global Navigation Satellite Systems as their primary means to determine their position over the ground. Whilst some ground based navigation aids still exist, many of these are being decommissioned. Enhanced navigation accuracy offers a catalogue of opportunities for how we can design the pathways and vertical profiles that aircraft fly. The UK has agreed to comply with European legal directives that require satellite navigation to be the basis for airspace design in complex, high density traffic areas, such as above London and South East England.

1.2.3 Aided by technology changes, air traffic control (ATC) capabilities have evolved significantly. In both Europe and North America, there are long term, multi-billion pound programmes to coordinate measures to further improve safety and maintain access for a broadening range of airspace users.

1.2.4 Aircraft and engine design have also evolved to the extent that new variant aircraft are up to 75% quieter on departure than the equivalent types they are replacing.

1.2.5 There are global endeavours to further improve the safe management of aircraft and to reduce delays both in the air and on the ground. Future airspace design needs to consider how it should make preparations to accommodate these changes.



1.3 Integrated Programme of Change - FASI-South



Area of significant airspace change and the key airports involved – Source OpenStreet.

1.3.1 The modernisation of our airspace will be a collaborative endeavour. The changes an airport may wish to introduce could potentially impact other airports, airspace users and communities. At the other end of the spectrum, high level airspace design must integrate with the designs of neighbouring countries and flight regions.

1.3.2 NATS will act as the coordinator of the airspace change and integrate the designs of the 17 airports involved. Collectively, many stakeholders at a national and local level will be involved. Inevitably, there will be a number of consultations over the proposed changes.

1.3.3 The programme of airspace change across southern England and parts of Wales is known as Future Airspace Strategy Implementation – South, abbreviated to FASI-South. The map shows the area of significant change and the airports involved.



1.4 Our Desired Outcomes

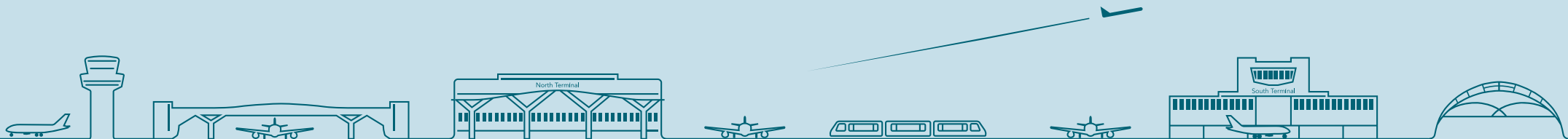


1.4.1 To initiate this airspace change Gatwick submitted a Statement of Need² to the CAA to define the outcomes we wished to secure from our part in a wider FASI-South programme of airspace modernisation. These were to:

- **Develop and implement systemised departure and arrival procedures that improve safety and resilience, increase capacity and offer improved operational agility in line with the Government's policy on making best use of existing runways and infrastructure.**
- **Efficiently integrate with LAMP³ airspace design and make best use of enhanced network system capabilities.**
- **Limit, and seek to reduce environmental impacts on, and provide predictability for, local communities.**

² Version 1 of our Statement of Need was submitted to the CAA on 13 Sept 2018 Ref 2018-60. It was approved without amendment at an assessment meeting with the CAA on 22 Jan 2019.

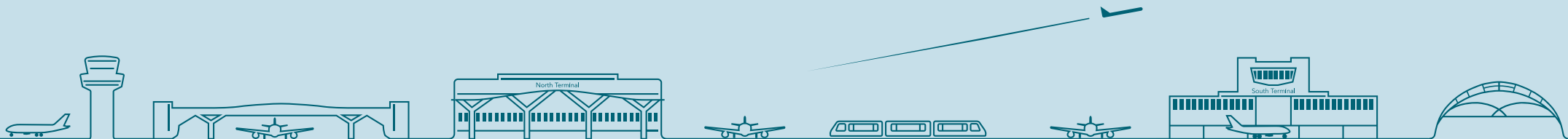
³ LAMP is the London Airspace Modernisation Project, which is redesigning the London and the South East airspace above 7000 feet.



Section 2 - Airspace Change Process

In this section we will introduce the CAA's airspace change process and how we intend to engage with key stakeholders:

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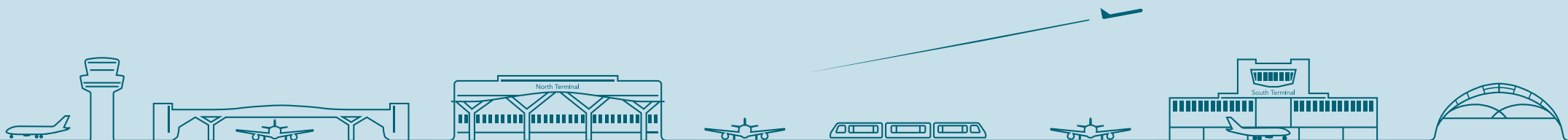
2.1 Regulation & Governance of Change



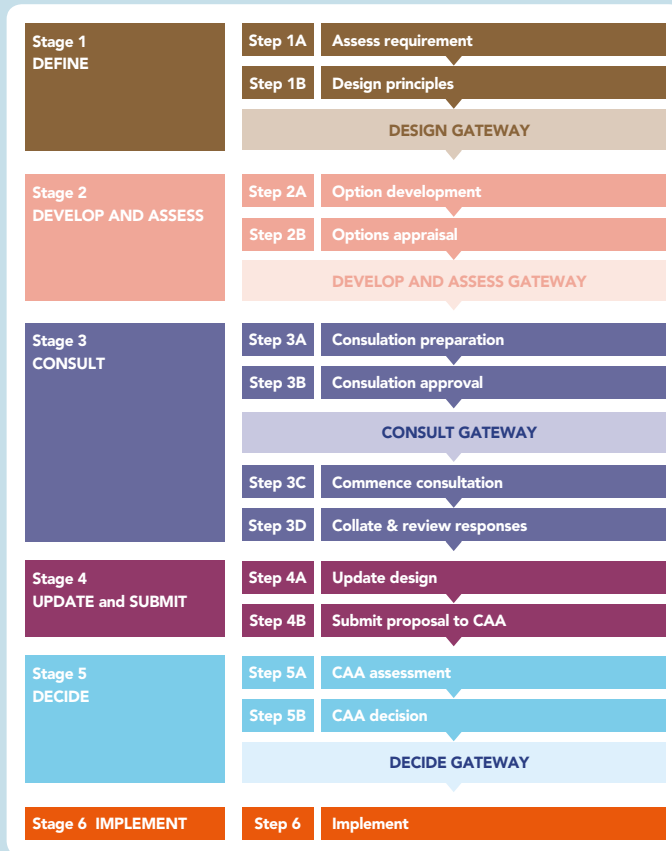
2.1.1 In October 2017, the Government tasked the CAA with the key oversight role for airspace modernisation. The CAA as part of its statutory responsibilities, framed by Section 66 of the Transport Act 2000, is required to prepare and maintain a coordinated strategy and plan for the continued use of UK airspace out to 2040; this includes the modernisation of airspace. The CAA must conduct its responsibilities with regard to Section 70 of the Transport Act 2000 and take account of specific guidance on environmental objectives contained within the Air Navigation Guidance 2017.

2.1.2 In response, the CAA developed and then consulted on an Airspace Modernisation Strategy, the final version of which was published in December 2018. In preparation for a programme of modernisation the CAA commissioned a review of the airspace change process and published a fully revised process in January 2018. This new process breaks the development of a change down into a series of stages and places higher levels of obligation on airspace change sponsors to ensure transparency and effective stakeholder engagement. For this airspace change Gatwick Airport is the sponsor.

2.1.3 Responsibility for the review of stage outputs and the final arbiters of sponsor proposals rests with the Airspace Regulation team within the CAA. Full details of the requirements on sponsors, how the CAA maintains transparency in its decisions and the criteria for additional oversight by Government are laid out in [CAP 1616](#), the CAA's Airspace Design Guidance.



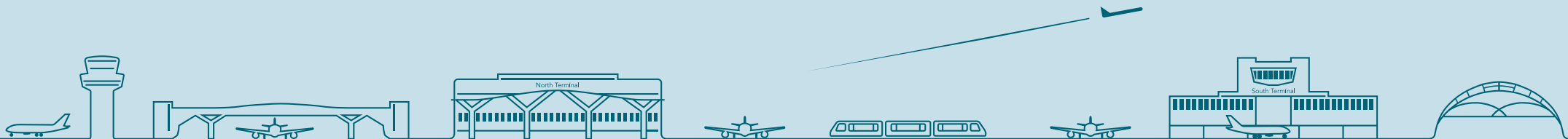
2.2 Introduction to Airspace Change Process



2.2.1 The CAA's airspace change process consists of 7 stages. This requires a sponsor to make a series of proposals to the CAA for their consideration. If the CAA determine that these are of appropriate quality the sponsor is authorised to continue. The CAA makes a decision on a final proposal at Stage 5. The latter stages involve the implementation and a post implementation review. As all airspace changes are different the process is designed to be flexible depending on the size, nature and complexity of the change. The first 6 stages are outlined in the table.

2.2.2 For each airspace change the sponsor is required to submit a proposal and supporting evidence to demonstrate that it is safe and has been developed with due regard for government environmental policies. The sponsor must also demonstrate throughout the process that they are being transparent about the potential change and engage appropriately with those that may be impacted by changes. This engagement can take a number of forms, but must include a statutory consultation at Stage 3. The sponsor must, through a process of engagement in Stages 1 and 2, demonstrate to the CAA that it has taken into consideration the perspectives of others.

2.2.3 For the FASI-South Programme Gatwick will be investigating how it should redesign its arrival and departure routes using satellite-based navigation standards. In January 2019 we outlined our targeted engagement strategy for Stage 1B to the CAA and Gatwick's consultative committee.



2.3 Division of Responsibility for Airspace Change

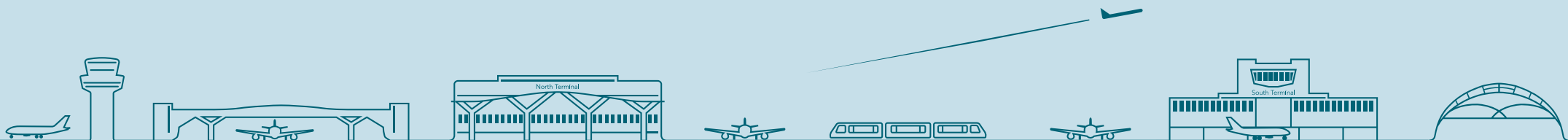


2.3.1 Across the FASI-South Airspace Modernisation programme division of responsibility for change is defined both horizontally and vertically.

2.3.2 Airports will be responsible for the redesign of their departure and arrival routes from the surface to 7000 feet. Each airport will need to engage with neighbouring airports, aerodromes and other airspace users on the deconfliction of airport route options. Airports will make proposals as to where departure routes will end and arrival routes start.

2.3.3 Teams within NATS will be responsible for developing designs above 7000 feet to safely accommodate the traffic outbound from, and in-bound to, each airport. It will be NATS' responsibility to develop an airspace design and air traffic management procedures that make best use of the airspace.

2.3.4 When each airport begins to consider its options it will engage closely with NATS and other airports on design deconfliction and integration.



2.4 Our Engagement with Identified Stakeholder Groups

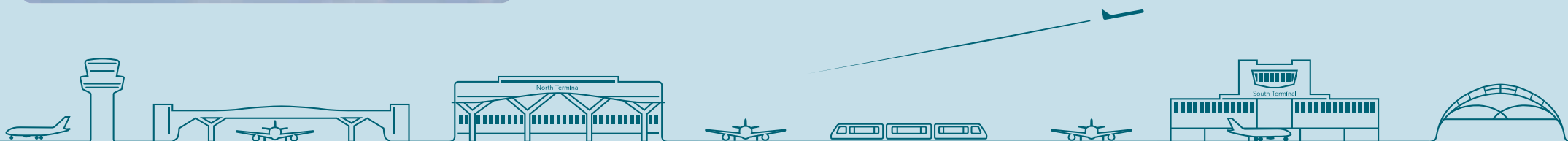


2.4.1 Gatwick has decided that it will focus its engagement with key organisations and groups early to help to develop its design principles and assist with consideration of the design options. In addition, we will be posting all the material we use to engage these stakeholders on the CAA's Airspace Change portal. Anyone can register an interest in Gatwick's component of the FASI-South Programme and will receive alerts whenever new material is added or updated.

2.4.2 For this airspace change Gatwick will engage with the following groups:

- Airlines, neighbouring airports and aerodromes, aviation advisory groups & NATS
- MPs, locally elected officials, borough, district and town council officials & business groups
- National parks, Areas of Outstanding Natural Beauty, community groups with whom we already work and Independent Commission on Civil Aviation Noise (ICCAN)

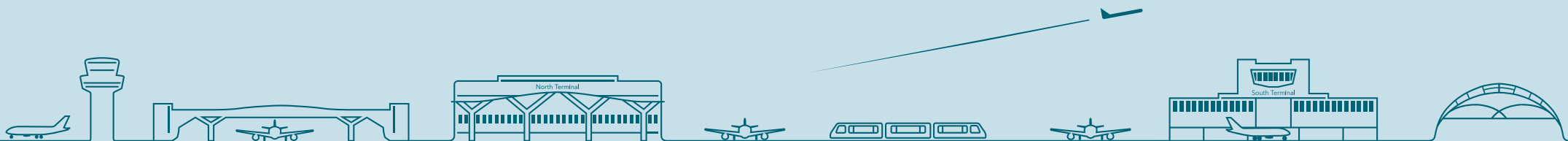
2.4.3 Prior to a public consultation Gatwick is required to submit our proposals and a consultation strategy to the CAA for approval. Given the scale and complexity of the design development we currently believe it is practical to plan for a public consultation in the first half of 2021.



Section 3 – Design Principle Development

In this section we will propose a range of potential principles for adoption and consideration:

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3.1 Definition & Use of Design Principles



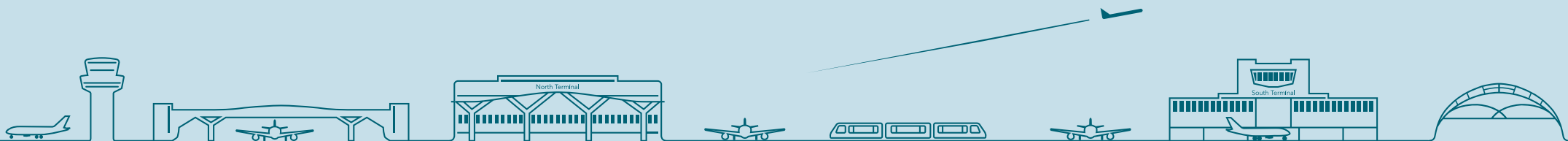
3.1.1 Based on the CAA guidance on airspace change⁴, Design Principles (DPs) form a qualitative framework which can be used to assess the suitability of airspace design options against the desired strategic outcomes.

3.1.2 They encompass the safety, regulatory, environmental and operational criteria and strategic policy objectives. They are not in themselves the criteria that will be used to determine whether the final proposal is acceptable.

3.1.3 Design principles can be prioritised individually or as a sub-group. They inform the development of options to be considered at Stage 2 of the airspace change process.

3.1.4 This document presents several potential design principles in areas that we believe will influence our airspace design options. We would like feedback from stakeholders to challenge and refine these principles. The document also sets out some 'areas for consideration' that illustrate some of the difficult choices we will need to make when designing the airspace. Feedback from stakeholders on the areas for consideration may help us to develop additional design principles that guide our decision making when these kinds of choices are made.

⁴ CAP1616 paras 108, 116, D1 & D6.



3.2 Categories of Design Principles

Step 1B Design principles

Sponsor engages with relevant stakeholders to develop airspace design principles

Sponsor publishes design principles and how they were influenced by engagement on the [CAA's portal](#)

CAA reviews the process and approach used to develop the design principles

DEFINE GATEWAY ASSESSMENT

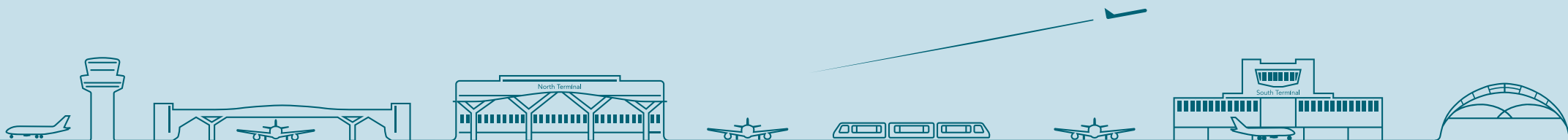
3.2.1 In developing a suite of design principles the CAA recommends that airports use a range of categories to help consider the perspectives of all stakeholders. For Gatwick's component of the FASI-South Airspace Modernisation programme we will use the following categories:

- Safety – help to enhance the safety of the system
- Regulatory – define the standards that we must meet
- Operational – these influence how aircraft will be flown
- Environmental – how, when and where the impact of aviation could be managed
- Strategic – how sponsor and programme objectives are integrated

3.2.2 Design principles must take account of Government policy, such as the Air Navigation Guidance, and any local criteria, such as Section 106 planning agreements or other planning conditions. This includes Noise Preferential Routes or other noise abatement procedures imposed on the airport by the Secretary of State under section 78 of the Civil Aviation Act 1982 or by the Local Planning Authority.

3.2.3 As Gatwick's airspace change is part of a wider programme, we also need to consider the programme's aims as well as our airport specific outcomes, but not all of these programme aims may be relevant or carry equal weighting.

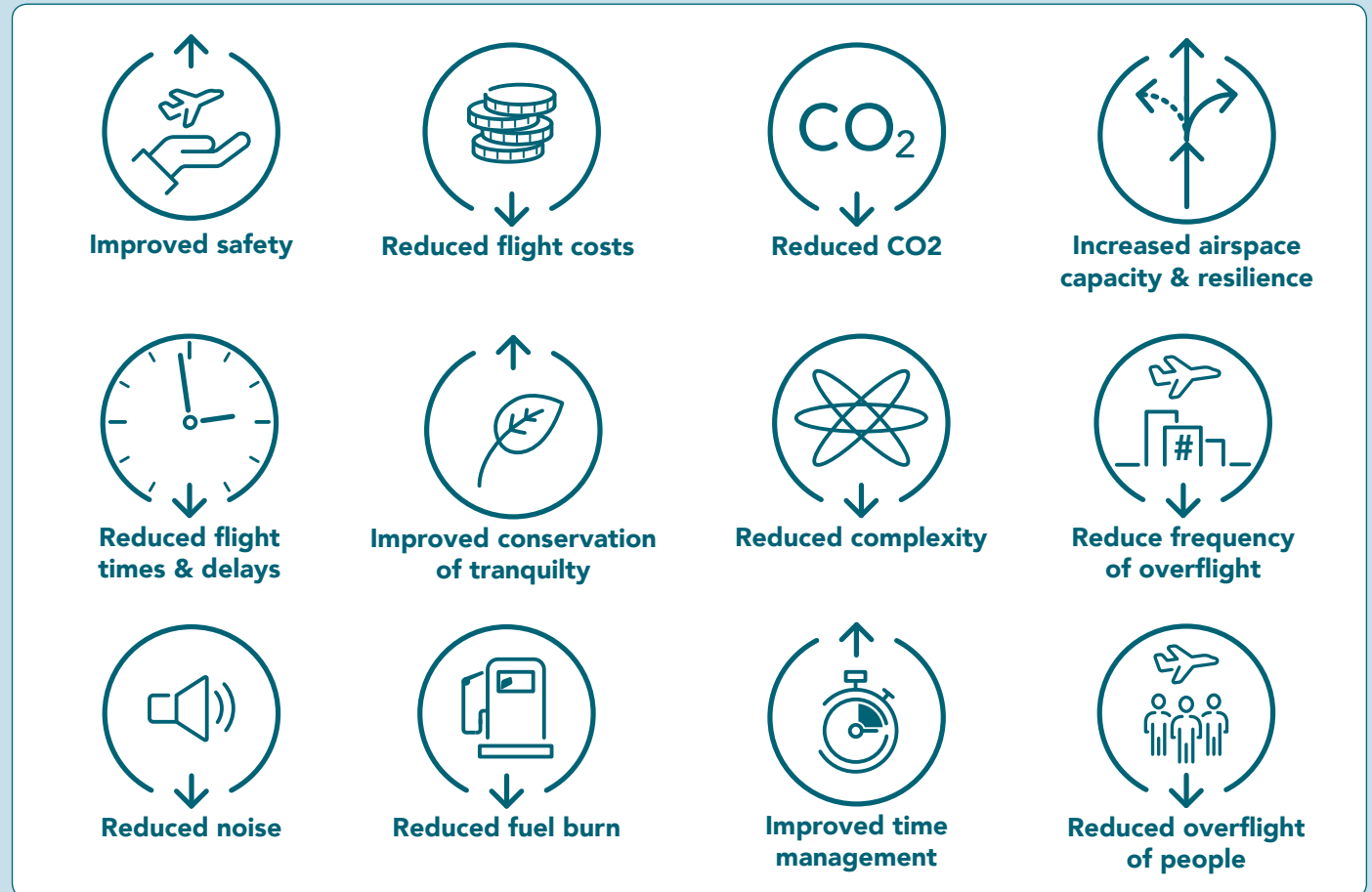
3.2.4 Over the following pages we introduce a number of potential principles and areas of consideration and ask you to feedback on their appropriateness to the [outcomes](#) stated at 1.4. We also ask you to consider what other design principles you believe we should consider and why?



3.3 Potential Impacts of Airspace Modernisation

3.3.1 We believe that this Airspace Modernisation programme has the potential to offer a wide range of positive impacts in many areas. They could be unlocked through the application of design principles; we use icons to introduce these impacts when we discuss potential principles.

3.3.2 The delivery of some benefits might come at the expense of other impacts and design principles should help us to make these trade off decisions with clear inputs/preferences from stakeholders.



3.4 Core Principle - Safety



Adoption of this principle will support the following:



Improved safety



Reduced complexity

3.4.1 The aviation industry promotes and expects all airspace users to make safety their number one priority. To support this safety culture there is a strong national and international regulatory framework which airports and airspace users must adhere to.

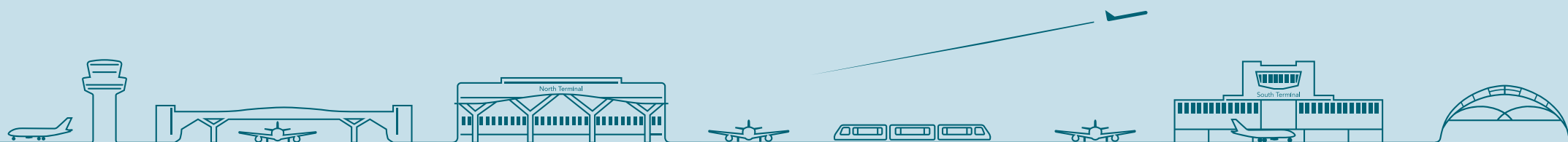
3.4.2 For Gatwick, maintaining and enhancing aviation safety is our top priority. Gatwick wishes to perpetuate, and if possible further strengthen, this safety culture. We therefore propose a core principle to be:

'Airspace design must at least maintain, and ideally enhance, aviation safety, by reducing or removing safety risk factors'

Qu 1a Do you agree that airspace design must be safe and further promote safety management systems?

Qu 1b Should 'Safer by Design' attract the highest design principle priority?

A full set of questions is at Section 3.15



3.5 Core Principle - Design Standards

Enhanced Navigation Standards

Adoption of this principle will support the following:



Improved safety



Reduced complexity



Reduced overflight of people



Reduced fuel burn



Reduced noise

3.5.1 The requirement for Gatwick to upgrade its arrival and departure routes to satellite navigation standards is driven by EU Regulation 2018/1048 on performance-based navigation (PBN) published in July 2018⁵. Gatwick already uses a variety of these PBN standards to define its departure routes. These enhanced navigation standards are now being widely adopted to assist with air traffic management in congested airspace, offer noise reduction and respite to communities and provide opportunities for airlines to save fuel and reduce their CO² emissions.

3.5.2 Gatwick believes it is in the interests of all stakeholders to extend beyond the minimum legal requirement, the application of enhanced navigation standards to all aspects of our departure and arrival procedures. This will remove much of the variation airlines and communities experience and reduce the variability of the flight paths over the ground, some of which do not take into consideration their proximity to communities or sensitive areas. Therefore, we propose a core principle to be:

'Airspace design should adopt the most beneficial form of enhanced navigation standards⁶ for arrivals and departure routes'

Qu 2 Should Gatwick adopt the most beneficial form of enhanced navigation standards as the foundation of its designs?

⁵ CAP 1711 Para 4.30.

⁶ For this airspace change our definition of enhanced navigation standards encompasses the use of GPS and the adoption of a number of PBN standards including RNAV1, Advanced RNP & RNP APCH.



3.6 Potential Principle - Long Term Predictability

Adaptable & Predictable Routes

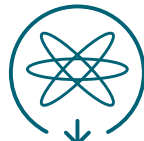
Adoption of this principle will support the following:



Reduce frequency of overflight



Improved time management



Reduced complexity



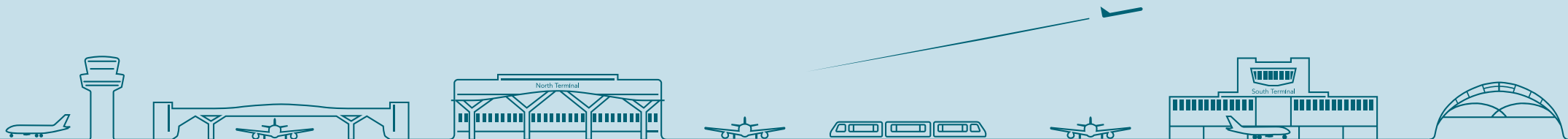
Reduced fuel burn

3.6.1 The FASI-South Airspace Modernisation Programme offers a once in a generation opportunity to develop a design that will withstand the demands of the next 30 years. We believe that a central principle should be that airspace design should offer flight path predictability, coupled with the ability to improve the time management of air traffic. All of these features require enhancements to air traffic systems, some of which are already planned.

3.6.2 Not all system capabilities are likely to be fully available to coincide with the first phase of implementation, however, international programmes are already investigating how they can be integrated. Therefore, we believe a principle should be that:

'Airspace design should offer long term predictability of flight path routes and enable benefits from new air traffic management systems'

Qu 3 Should Gatwick adopt a design principle that offers long term predictability of flight paths and enables beneficial system adaptations?



3.7 Potential Principle - Promote Enhanced Aircraft Capabilities

Promotes Enhanced Aircraft Capabilities

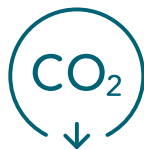
Adoption of this principle will support the following benefits:



Reduced flight times & delays



Reduced noise



Reduced CO₂



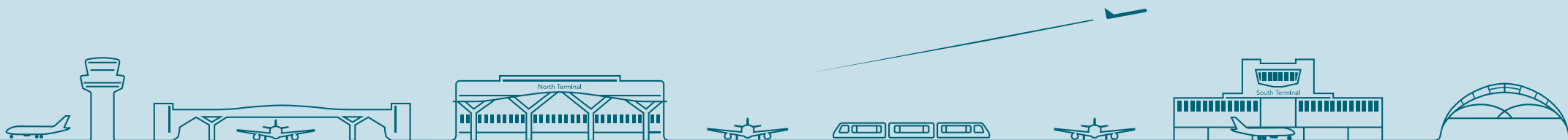
Reduced fuel burn

3.7.1 Not all commercial aircraft are equipped to the same standard and the impact of airframe design engine type and avionics can make a big difference to the impact they have on communities and efficient airport operations. We believe that a future airspace design should offer the greatest benefits to those airlines that have made investments to adopt efficient operational procedures and minimise their impact on local communities.

3.7.2 We believe it is important to develop designs that encourage airlines to adopt enhanced capabilities that enable efficient airline and airport operations. Therefore, we believe a principle should be that:

'Airspace design should promote the adoption of aircraft capabilities that benefit communities and the more efficient management of air traffic'

Qu 4 Should Gatwick adopt a design principle that seeks, through its airspace design, to promote the adoption of enhanced aircraft capabilities that benefit communities and the more efficient management of air traffic?



3.8 Potential Principle - Deconfliction by Design

Deconfliction by Design

Adoption of this principle will support the following:



Improved safety



Reduced noise



Reduce frequency
of overflight



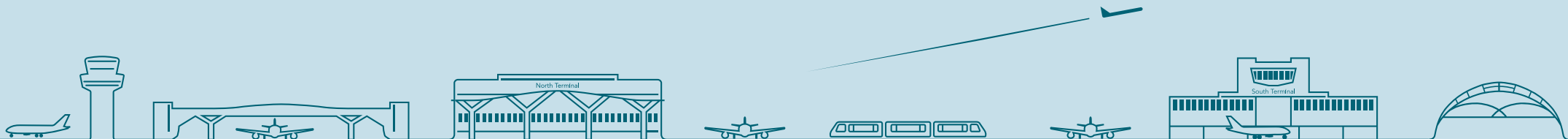
Increased airspace
capacity & resilience

3.8.1 The FASI-South Programme offers the opportunity to seek to deconflict neighbouring airport airspace designs. This would help to reduce frequency with which communities in close proximity to airports are overflowed below 7000 feet by traffic from more than one airport.

3.8.2 Whilst there will always be a need to deconflict aircraft in the vertical dimension, the adoption of enhanced navigation standards makes it much easier to safely deconflict the flight paths of aircraft laterally. As a result it should be possible to reduce or perhaps eliminate the overflight of communities by traffic from different airports. This principle can also be applied to reduce the overflight of communities who may experience both arriving and departing traffic regardless of which runway is in use. Therefore, we propose that an important environmental principle should be that:

'Wherever possible Gatwick should deconflict by design flight paths below 7000 feet to reduce the prevalence of overflight of a community by airport traffic on different routes and/or by neighbouring airport traffic'

Qu 5 Should Gatwick adopt a design principle that seeks to deconflict by design all Gatwick arrival and departure routes below 7000 feet to reduce the prevalence of overflight of a community by airport traffic on different routes and/or by neighbouring airport traffic?



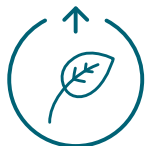
3.9 Potential Principle - Time Based Arrival Operations

Time Based Arrival Operations

Adoption of this principle will support the following:



Reduced flight times & delays



Improved conservation of tranquility



Improved time management



Reduced fuel burn



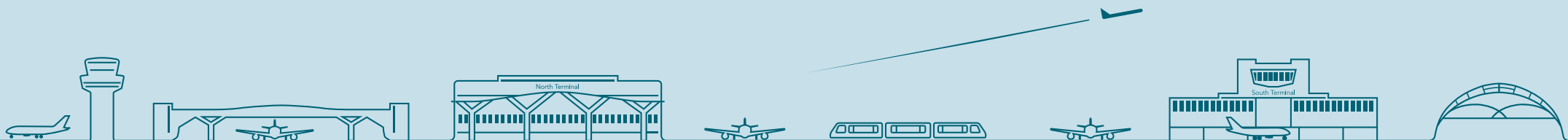
Reduced flight costs

3.9.1 The use of holding and delay techniques close to airports, often at relatively low altitudes, can sometimes be a frustration for passengers, flight crews, communities and airport operators. Aircraft and air traffic management capabilities are on the verge of being able to use 'time' as an additional deconfliction feature.

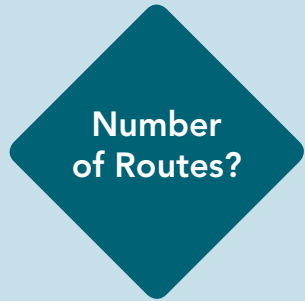
3.9.2 Time based operations also have the potential to improve the management of respite. It also creates opportunities to reduce fuel burn, reduce delays and can lead to overall reductions in flight costs. It is expected that before 2030 it will be routinely possible to eliminate the need for delay techniques close to an airport. Gatwick wishes to be in a position to adopt time based management techniques as soon as practically possible. Therefore, we propose that an environmental and operational principle should be that:

'Route design below 7000 feet should be compatible with the adoption of time based arrival operations'

Qu 6 Should Gatwick adopt a design principle that seeks to create an arrival route design compatible with time based operations?



3.10 Area of Consideration - Multiple v Single Pathways



3.10.1 We are contemplating including a design principle that focuses on the potential adoption of multiple pathways and would value feedback on some of the important considerations.

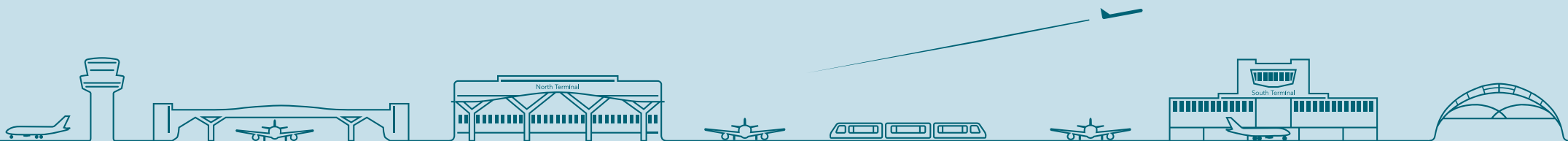
3.10.2 Gatwick already uses enhanced navigation design standards to precisely define its nine departure routes; each has a single pathway. Current arrival procedures, however, use traditional radar vectoring which creates multiple pathways spreading the impact of descending traffic across a broad swathe over ground. This technique creates varied flight paths which may not be able to consider who is being overflown and how frequently.

3.10.3 We proposed the widespread adoption of enhanced navigation standards to address the impact of radar vectoring. Adoption of enhanced navigation standards would allow us to consider the merits of multiple pathways on departures and arrivals.

3.10.4 This is a complex topic so to gauge an initial view please see the table below setting out some of the benefits and drawbacks of different strategies in different scenarios.

Qu 7 To what extent should Gatwick consider multiple pathways on: (a) departures and (b) arrival procedures?

Single v Multiple Pathways	Benefits	Drawbacks
Departures – Single	<ul style="list-style-type: none"> • Potentially minimises number of people affected • Minimises newly affected people (NPR swathe) 	<ul style="list-style-type: none"> • Repeated overfly of the same route & people • Very limited respite options
Departures – Multiple (2-3)	<ul style="list-style-type: none"> • Aggregate noise impacts should be reduced • Possible respite through pathway switching 	<ul style="list-style-type: none"> • Noise and other impacts spread over a broader area • Potential for newly affected people (outside NPR swathe)
Arrivals – Single	<ul style="list-style-type: none"> • Potentially minimises number of people affected • Simpler for airlines & air traffic to use 	<ul style="list-style-type: none"> • Repeated overfly of the same route & people • No route switch respite options
Arrivals – Multiple (3 or more)	<ul style="list-style-type: none"> • Aggregate noise impacts should be reduced • Possible respite through pathway switching 	<ul style="list-style-type: none"> • Noise and other impacts spread over a broader area • Potential for some newly affected people



3.11 Area of Consideration - Managing Overflight



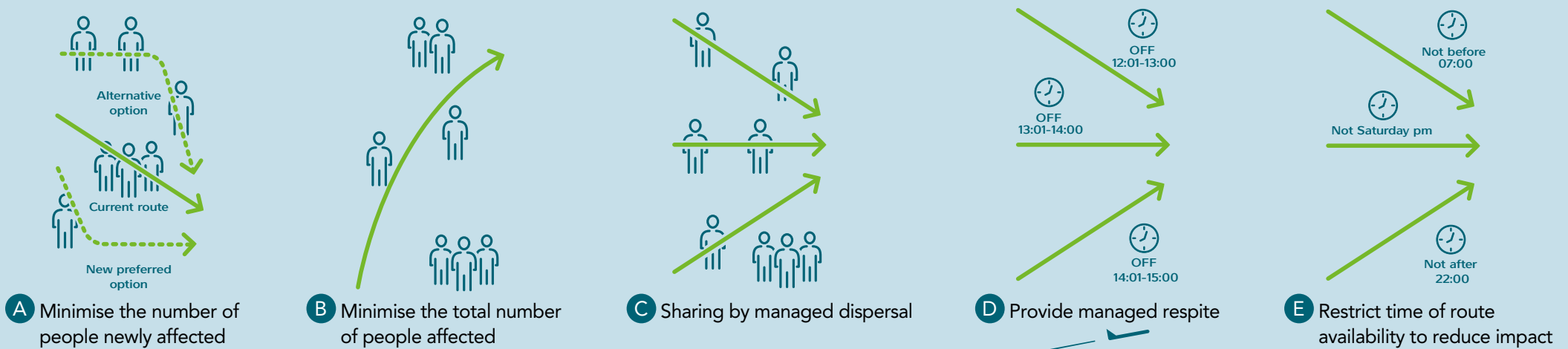
3.11.1 Government priorities for consideration of the environmental impacts arising from airspace change proposals are set out in its Air Navigation Guidance. In the airspace from the ground to below 4,000 feet, the Government’s environmental priority is to limit and, where possible, reduce the total adverse effects on people. Where options for route design from the ground to below 4000 feet are similar in terms of the number of people affected by total adverse noise effects, preference should be given to that option which is most consistent with existing published airspace arrangements. From 4000 to 7000 feet the policy is to minimise the impact of aviation noise unless this would disproportionately increase CO² emissions.

For full details go to B29 [CAP 1616](#).

3.11.2 There are at least 5 options that can be employed to help manage the impact on communities; some examples are shown.

Qu 8 In what order would you prioritise these 5 overflight management options? Either singularly or groups

Qu 9 Are there other options we should consider and how would you prioritise them relative to your response to Qu 8?



3.12 Area of Consideration - Operational Efficiency v Environmental Impact

Operational Efficiency v Impact?

3.12.1 Another area of consideration that could benefit from a design principle could be how we handle the trade-offs between operational efficiency and the environmental impact of different route designs.

3.12.2 Airline operations would prefer airspace designs to minimise fuel burn. Either by facilitating an optimal climb to higher altitudes, reducing distances flown and/or minimising their time at lower altitudes as part of arrival procedures. Communities local to the airport and other stakeholders would prefer that airline operations focused on reducing the impact of noise and other local environmental factors.

3.12.3 These 2 factors are not always in opposition. For example, there are operational and local environmental benefits from aircraft climbing to higher altitudes faster and remaining at higher altitudes for longer on arrival. However, there are points when the two factors are not complementary.

Qu 10 Where on the spectrum of A – E would you wish Gatwick airport to prioritise these factors?

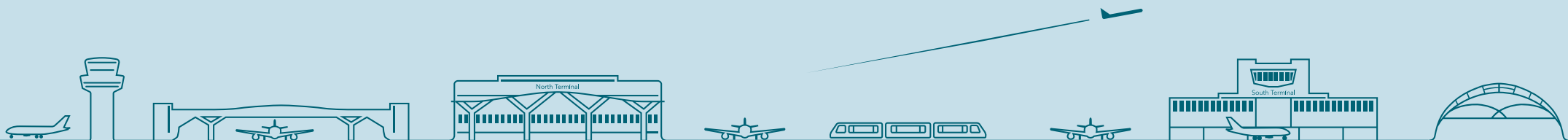
A Maximise operational efficiency, reduced cost and minimise national environmental impact

B Favour operational efficiency

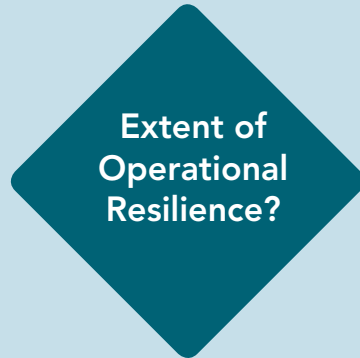
C Maintain a balance between the 2 factors

D Favour local environmental benefits

E Maximise only local environmental benefits



3.13 Area of Consideration - Operational Resilience



3.13.1 Airline and airport operations can be impacted by a wide range of events and airports, such as thunderstorms and short term runway unavailability, the consequences of which can vary in their severity. During this time operational disruptions can have an adverse impact on passengers, airlines and communities. Airspace design can help to limit the impact of events and provide additional options for airlines and air traffic control providers by building in resilience.

3.13.2 However, building in resilience to an airspace design, in the form of alternative pathways or procedures can increase the impact routinely experienced by some people.

Qu 11 Where on the spectrum of A – E would you wish Gatwick Airport to prioritise operational resilience?



A Minimal resilience

- Procedures optimised for minimal impact
- Operational choices limited or nil
- Sustained recovery period with knock on impacts on some people, who might not be routinely overflow

B Some limited operational choices

In the event of an incident, adverse impacts on some could be noticeable

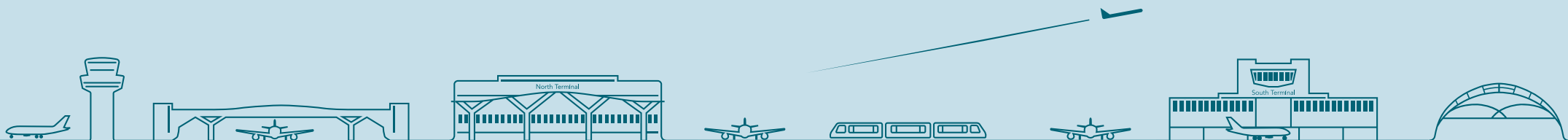
C Balanced consideration of resilience design and day to day impact on the majority

D Multiple choices, (with constraints); impacts may be more limited/ less frequent

Some additional local impacts

E Fully resilient

- Multiple operational choices to limit event impact
- Faster operational recovery
- Some routine local impacts potentially experienced by a wider group of people



3.14 Area of Consideration - Programme Objectives

Programme Objective Priorities?

3.14.1 Listed below are the objectives of the Airspace Modernisation Strategy. We recognise that these will have varying degrees of importance to you and this could have a bearing on the approach London Gatwick takes to its airspace change. We would welcome your views on what you believe the airport should prioritise. If your top priorities are not listed we would be grateful if you would share these as well.

Qu 12 What are your top 5 Airspace Modernisation objectives?

Qu 13 What other Airspace Modernisation objectives do you believe we should consider?

A Enable and facilitate continuous improvements in safety standards through innovation

D Maximise the utilisation of available runway capacity, including the government's policy for a new runway at Heathrow airport

G Improve resilience of the system to bad weather or other forms of disruption

K Implement internationally agreed requirements designed to increase the overall safety, capacity and efficiency of the global air traffic management system, while making commensurate environmental improvements, such as the Single European Sky

M Help the UK to mitigate the impact of disruptions in neighbouring European airspace

B Accommodate growing demand from airspace users, including: commercial airlines providing a key element of the UK's transport infrastructure supporting economic growth, and

E Enable government policies in respect of the reduction and mitigation of noise and how it should be distributed to manage the impact of aviation growth on local communities

H Develop a genuinely sustainable framework to guide the aviation industry in its investment and technological development

N Provide flexibility within the system to enable continuing development and improvement

C Ensuring defence requirements are facilitated through access to appropriate airspace

F Deal with 'hotspots' of congestion within the current system

I Take advantage of those technological developments to improve safety and efficiency

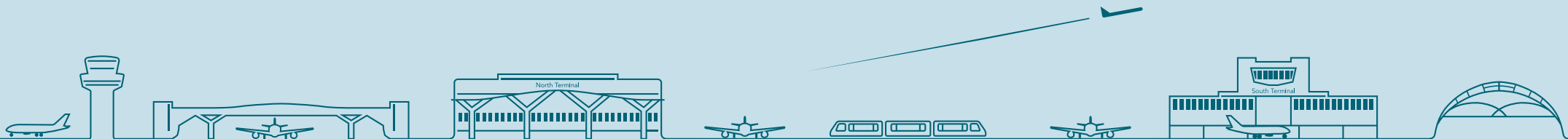
L Further enable greater access to airspace for non-commercial users

J Safely and efficiently accommodate new technologies that change the types of aerial craft and how they operate



3.15 Summary of Questions

1a	Do you agree that airspace design must be safe and further promote safety management systems? Additional comments: _____ _____	YES <input type="checkbox"/> / NO <input type="checkbox"/>
1b	Should 'Safer by Design' attract the highest design principle priority? Additional comments: _____ _____	YES <input type="checkbox"/> / NO <input type="checkbox"/>
2	Should Gatwick adopt the most beneficial form of enhanced navigation standards as the foundation of its designs? Additional comments: _____ _____	YES <input type="checkbox"/> / NO <input type="checkbox"/>
3	Should Gatwick adopt a design principle that offers long term predictability of flight paths and enables beneficial system adaptations? Additional comments: _____ _____	YES <input type="checkbox"/> / NO <input type="checkbox"/>



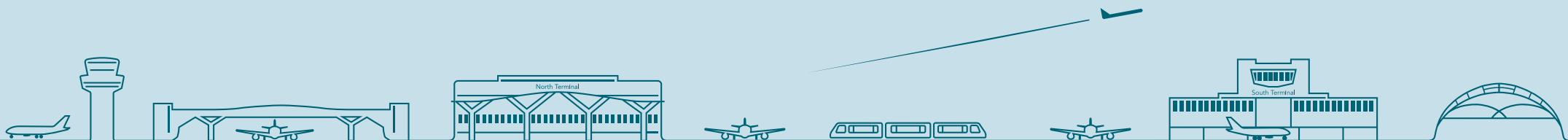
3.15 Summary of Questions continued

4	<p>Should Gatwick adopt a design principle that seeks, through its airspace design, to promote the adoption of enhanced aircraft capabilities that benefit communities and the more efficient management of air traffic? YES <input type="checkbox"/> / NO <input type="checkbox"/></p> <p>Additional comments: _____ _____</p>
5	<p>Should Gatwick adopt a design principle that seeks to deconflict by design all Gatwick arrival and departure routes below 7000 feet to reduce the prevalence of overflight of a community by airport traffic on different routes and/or by neighbouring airport traffic? YES <input type="checkbox"/> / NO <input type="checkbox"/></p> <p>Additional comments: _____ _____</p>
6	<p>Should Gatwick adopt a design principle that seeks to create an arrival route design compatible with time based operations? YES <input type="checkbox"/> / NO <input type="checkbox"/></p> <p>Additional comments: _____ _____</p>
7	<p>To what extent should London Gatwick consider multiple pathways on:</p> <p>(a) Departures procedures _____ _____</p> <p>(b) Arrival procedures _____ _____</p>



3.15 Summary of Questions continued

8	In what order would you prioritise these 5 overflight management options?	A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/>
9	<p>Are there other options we should consider and how would you prioritise them relative to your response to Qu 8?</p> <hr/> <hr/> <hr/>	
10	Where on the spectrum of A – E would you wish Gatwick airport to prioritise these factors?	A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/>
11	Where on the spectrum of A – E would you wish Gatwick airport to prioritise operational resilience?	A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/>
12	<p>What are your top 5 Airspace Modernisation objectives?</p> <p>1 _____</p> <p>2 _____</p> <p>3 _____</p> <p>4 _____</p> <p>5 _____</p>	



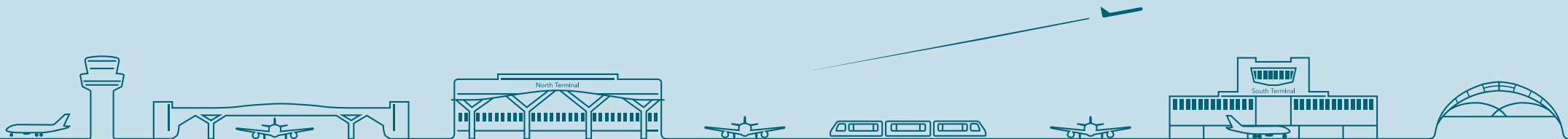
3.15 Summary of Questions continued

13

What other Airspace Modernisation objectives do you believe we should consider?

14

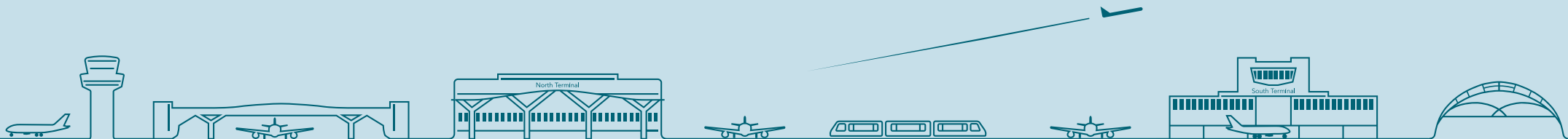
What other design principles do you believe we should consider and why?



Section 4 - How to Share Your Views

In this section we will explain how and by when to provide your perspectives.

- 4.1 How, by when and where to send your feedback 31
- 4.2 What to do if you are not a stakeholder designated for engagement at Stage 1 32



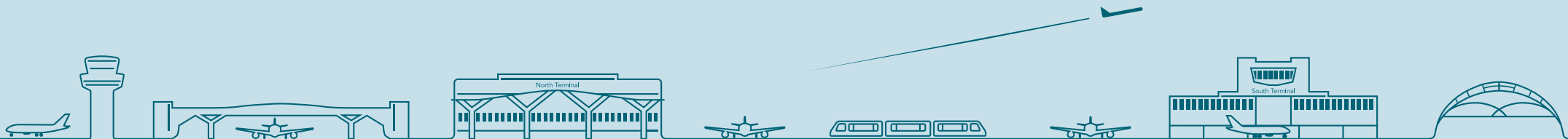
4.1 How, by when and where to send your feedback



4.1.1 Please email your feedback to: LGWairspace.FASIS@gatwickairport.com by the end of the day on **5 April 2019**.

4.1.2 The questions are summarised from [page 26](#). In addition, please feel free to offer any other comments or suggest other design principles you feel we should consider.

4.1.3 We hope that this document provides all the information you need to offer your perspective but should any aspect require further clarification please email us using the email address above and we'll endeavour to respond within 48 hours.



4.2 What to do if you are not a stakeholder identified for engagement at Stage 1 feedback

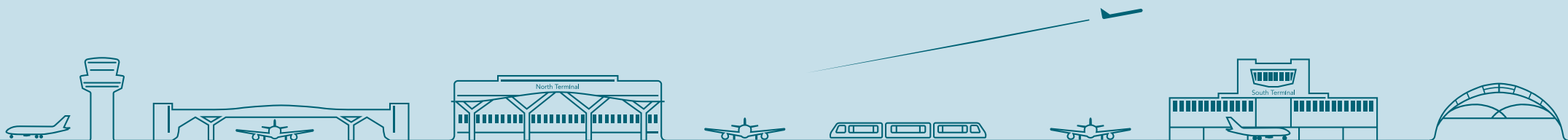


4.2.1 If you are part of or work for an organisation that we have not identified to be part of our engagement in Stage 1 please use the email below to explain why you believe that your organisation should be considered a key stakeholder.

Email: LGWairspace.FASIS@gatwickairport.com

4.2.2 If you are a member of the public and wish to comment on the development of our design principles you may email us using the email above and it will be reviewed. However, please be aware that we may not provide a personalised response to your points or questions you raise.

4.2.3 The general public will be afforded an opportunity to respond to a statutory consultation, which we expect to be scheduled in 2021.

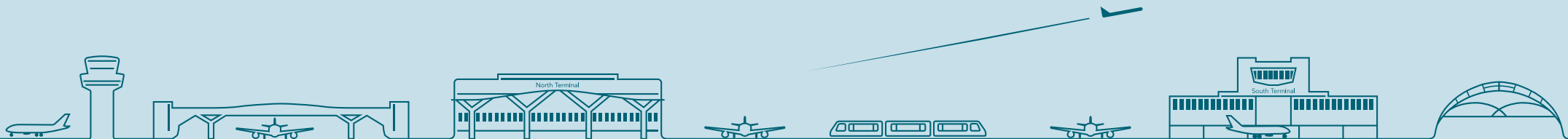


Section 5 - What Next

In this section we will explain what we will do next and where to find further information:

5.1 Development of Design Principle Proposal 34

5.2 Further Information 35



5.1 Development of Design Principle Proposal

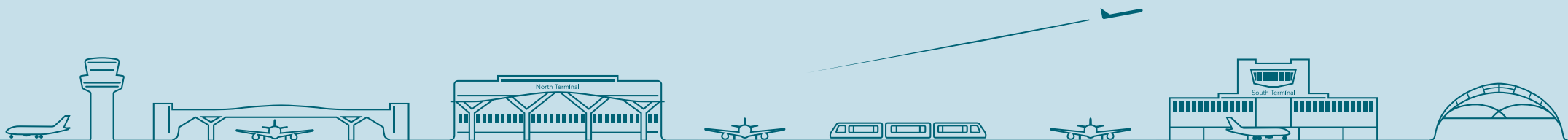


5.1.1. Following receipt and review of your answers to our questions and any other perspectives you may have shared, we will develop a document that conveys common sentiments and where appropriate specific insights and points of view anonymously. Specific comments which we do publish will be anonymised.

5.1.2 This outline design principle document will begin to outline what we may offer to the CAA as a proposal. We will show how we have used your feedback to shape the design principles. We may also offer explanation as to why some suggestions may not be appropriate and how others might be aligned with principles already proposed, either by us or other organisations.

5.1.3 We expect to circulate the outline design principle document around the middle of April and may ask key stakeholders to respond to a few additional questions and/or offer their views on the relative priority each of the emerging suite of principles should attract.

5.1.4 We will aim to draw our engagement on design principles to close before the middle of May, after which we will prepare our proposal for the CAA's review. This will be submitted with the supporting evidence to demonstrate how this has been influenced through our targeted engagement of stakeholders. We expect the CAA to review this proposal at the end of June 2019.



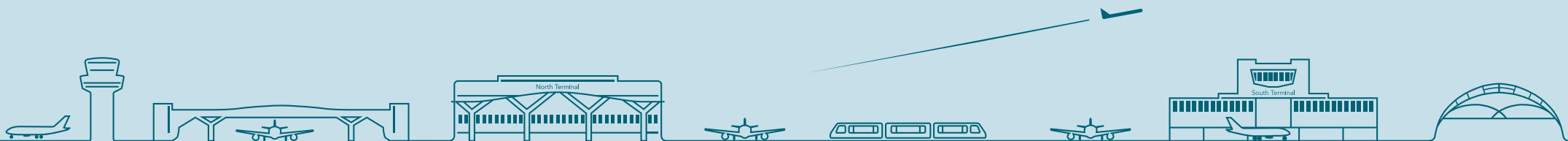
5.2 Further Information

5.2.1 The links below will take you to the documents we refer to.

[CAA Airspace Modernisation Strategy](#) – Full details of the Strategy’s objectives and 15 initiatives

[CAA Airspace Change Process](#) – Full details about the process and guidance on its application

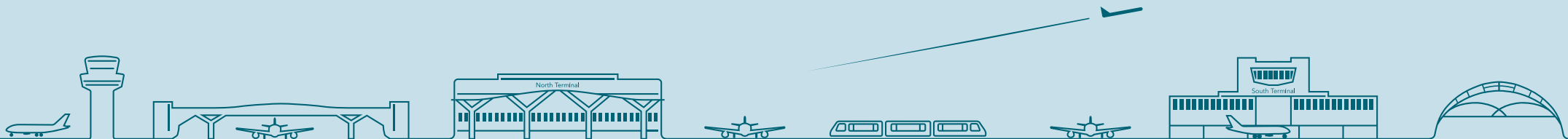
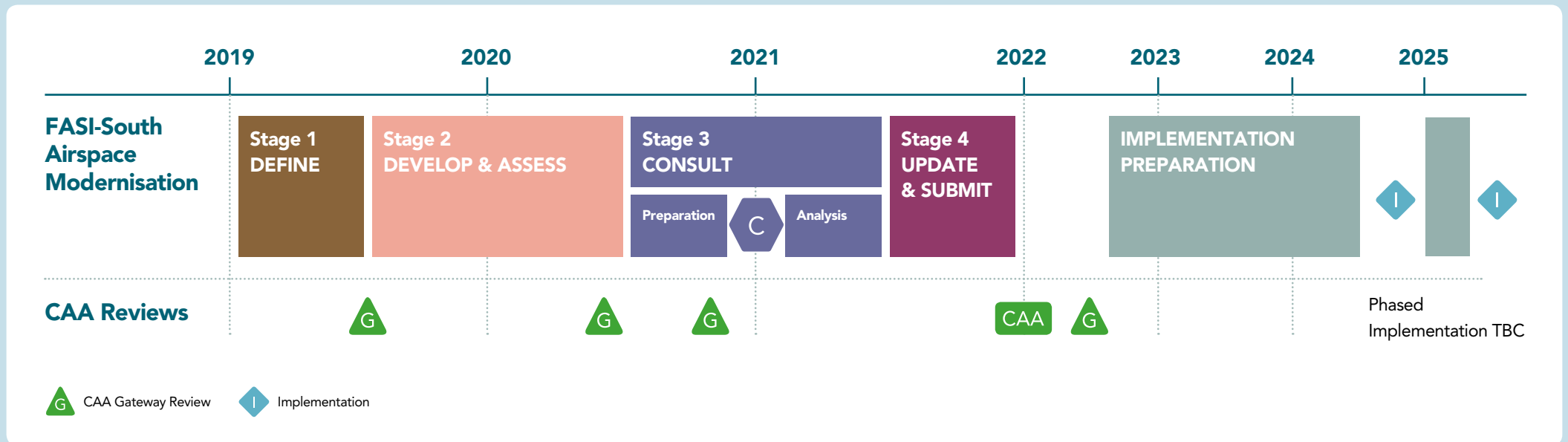
[CAA Airspace Change Portal](#) – From here you can register your interest in any airspace changes, including London Gatwick’s



Annex A - Gatwick's Schedule for Airspace Modernisation

Figure 3 provides an overview of when we currently expect each of the airspace changes stages to take place and when we expect to ask the CAA to conduct a Gateway Review. It is our hope that the CAA will be in position to make a decision on Gatwick's proposal and an overall redesign towards the end of 2022. We have made a commitment to

NATS to make best endeavours to have developed a suite of design options for their consideration by July 2020. NATS require this information to undertake integration testing of individual airport designs within the overall design.



Annex B - Glossary

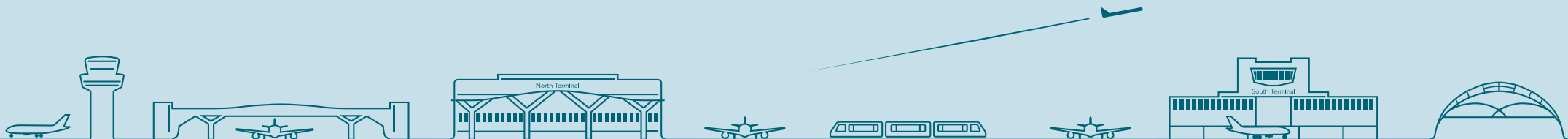
Throughout this document we have tried to use plain English to convey how aircraft navigate and are managed, but we also use common terms which

form part of the lexicon of airspace change; the common abbreviations are explained below:

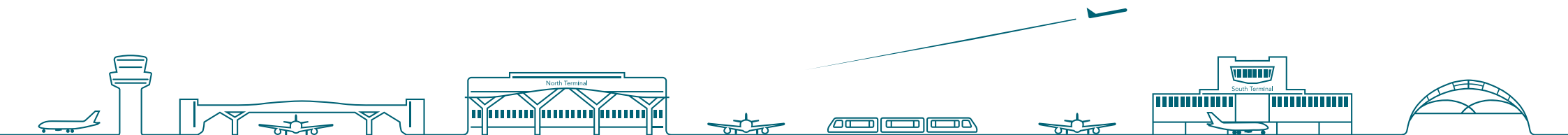
ACP	Airspace Change Process. A 7-stage process explained in the CAA's document CAP 1616 Airspace Design Guidance
APCH	Approach – Sub-set of a navigation standards – See RNP
ATC	Air Traffic Control – Responsible for the safe separation of traffic in controlled airspace
CAA	Civil Aviation Authority – Independent aviation regulator and responsible for the adjudication of airspace change proposals
DfT	Department for Transport. Co-sponsors with the CAA of the Airspace Modernisation Strategy
DP	Design Principle – Developed as part of Stage 1 of the airspace change process
FASI	Future Airspace Strategy Implementation. An integrated programme of change sponsored by the DfT and CAA and coordinated by NATS

GPS	Global Positioning System – Aircraft navigation systems interrogate constellation of navigation satellites to determine their location
GNSS	Global Navigation Satellite System – Term used for all satellite based systems; GPS, Galileo and GLONASS are in use examples
ICCAN	Independent Commission on Civil Aviation Noise – Established by the Government in 2018
LAMP	London Airspace Modernisation Project – redesign of airspace above 7000 feet
NATS	Formerly known as 'National Air Traffic Services' – Provide air traffic services across the UK
NPR	Noise Preferential Route – Established in law to constrain the routing of departing aircraft until they reach a set altitude, often 4000 feet
PBN	Performance Based Navigation – Concept developed to utilise GPS/GNSS and improve navigation accuracy and performance

RNAV	Area Navigation – A method of space based navigation which permits aircraft operations on a desired flight path
RNP	Required Navigation Performance – Type of performance based navigation. Different standards of navigation accuracy can apply



For your notes



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