Appendix A: Arrival and Approach Procedure: Consultation Document (March 2017)

Arrival and Approach Procedure
Consultation Document

March 2017

Newcastle International
Your Airport

Contents

OSPREY
CONSULTING SERVICES

1 Introduction

1.1 Welcome

Newcastle International Airport (NIA) is the 10th largest airport in the UK and the North East's major airport, handling over 4.8 million passengers per year through over 65,000 aircraft movements. From our inception 80 years ago, NIA has placed the local communities we serve at the heart of our business, seeking to ensure that our growth is sustainable. We are therefore mindful of our ongoing commitment to protect the amenity of our surrounding communities. Investment in new technology, such as our recent acquisition of a new Noise and Track Keeping (NTK) system demonstrates our commitment to monitoring and reducing noise impact.

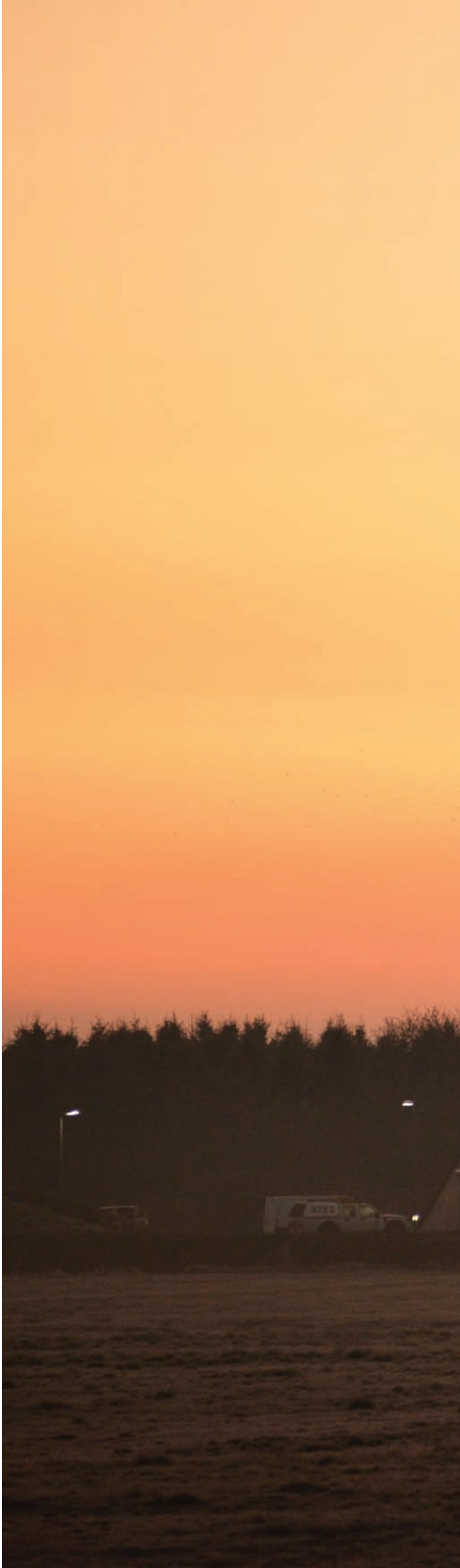
This document covers our proposal to implement Area Navigation (RNAV) Global Navigation Satellite System (GNSS) Approaches and Standard Terminal Arrival Routes (STARS). In implementing RNAV (GNSS) approaches and STARS, we are looking to utilise the latest technology such as satellite-based navigation systems to ensure more accurate and predictable flight paths. The routes will duplicate current operations. This will deliver greater fuel savings, reduced emissions and will further improve the noise environment for people on the ground.

Responsibility for the design, consultation, application and implementation of a STAR is normally the responsibility of the Air Traffic Control en-Route agency operated by National Air Traffic Services (NATS). In this instance, because of the close working relationship between NATS and NIA, and the link between the proposed RNAV procedures and STARS, this responsibility has been delegated to NIA.

If approved, our implementation of RNAV (GNSS) approaches and STARS will keep NIA at the forefront of aviation environmental impact reduction.

We want to continue to engage with our stakeholders and look forward to hearing your thoughts, as your feedback is very important to us and I strongly encourage you to let us have your views on this proposal.

Richard Knight
Operations Director



2 What's the purpose of this consultation?

Newcastle International Airport intends to modernise the flight procedures used by aircraft arriving at the Airport. This section provides an overview of the changes that are planned.

2.1 Overview

Most airports have standard arrival and departure routes that aircraft use; these provide predictability for crews and Air Traffic Control (ATC), allows robust planning and management of safety of operations, and effectively manages environmental impacts of aircraft operations. These routes can be flown using a variety of navigational equipment and techniques, depending on the infrastructure at the airport and the equipment in the aircraft cockpit. NIA already publish and operate final approach procedures[1] and standard routes for aircraft inbound from the Airways System[2], but wish to embrace new technology and utilise satellite navigation. This document details a proposal to introduce state-of-the-art RNAV (GNSS) approaches and STARs at NIA.

2.2 What is RNAV?

Traditionally, navigation of aircraft is achieved through location, direction and bearing information transmitted from ground-based stations or beacons into the cockpit. Instead of using data from these beacons, RNAV-equipped aircraft draw their information from satellites, in much the same way a car SatNav determines its location and plans a route. However, there are significantly more safety checks of the processes, procedures and integrity of the data for use in aircraft navigation. Furthermore, GNSS provides data in three dimensions and on-board computers allow suitably equipped aircraft to automatically fly the procedures. Up to 90% of airlines using NIA have the capability to follow the procedures.

RNAV allows aircraft to follow routes that are no longer restricted to ground-based beacons, providing additional flexibility, which can be used to reduce the miles flown and release environmental benefits.

Further, more detailed information about RNAV can be found in the CAA's Flight Operations Division Communication 04/2008, Area Navigation (RNAV) – CAA Guidance Material, available at http://publicapps.caa.co.uk/docs/33/FOD200804.pdf or CAP 773 Flying RNAV (GNSS) Approaches in Private and General Aviation Aircraft available at https://publicapps.caa.co.uk/docs/33/CAP773FINAL.pdf.

1 CAP 032 Integrated Aeronautical Information Package AD 2-EGNT-8-1 to 8-8
2 Ibid EGNT AD 2.22, para 1.

2.3 RNAV (GNSS) Approach Procedures

NIA would like to introduce RNAV (GNSS) final approaches for runway 07 and 25 at the Airport, lining aircraft up with the runway and glide path safely from approximately 10 Nautical Miles (NM) away. These RNAV (GNSS) approaches are intended to replicate the current Instrument Landing System (ILS) approaches as a contingency or alternate navigation procedure.

The RNAV (GNSS) approaches provide a stable, straight track to fly and a steady descent rate for the last 10 NM of the approach to facilitate a safe landing. However, the introduction of GNSS procedures will allow suitably equipped aircraft to plan a continuous decent from as far away as 50nm from touchdown, producing significantly improved fuel efficiency.

NIA is a participant in the Future Airspace Strategy (FAS), an industry strategy group looking at development of airspace and navigation within the UK up to 2020. RNAV implementation is a key aim of the group as it gives capacity, environmental and safety benefits across the network. The ILS will be retained for the foreseeable future to enable carriers who are not RNAV equipped to continue to operate to the Airport.

2.4 Standard Arrival Routes (STARs)

NIA do not currently have any published STARs. A STAR is a designated instrument flight procedure arrival route linking a significant point, normally on an Air Traffic Service (ATS) route, with a point from which a published instrument approach procedure (i.e. an ILS or RNAV(GNSS) approach) can be commenced. NIA currently publishes recommended routes for inbound aircraft; whilst these routes can be used for planning purposes for inbound crews, in reality aircraft will be provided radar vectors by ATC in order to maintain sequencing and separation from other aircraft, and to position for the approach procedure.

As detailed in the Airport Masterplan 2030 [Reference 1], NIA would like to "formalise" the current procedures for inbound aircraft by publishing them as STARs; thereby providing greater predictability of aircraft route and the opportunity for efficiencies by reducing fuel burn, resulting in lower monetary cost and CO2 emissions. The introduction of STARs at NIA accords with UK and EU policies on Performance Based Navigation (PBN) as it is:

> "an essential component of delivering objectives underpinning the Future Airspace Strategy and consequential modernisation of the UK airspace system…laying the foundations for the airspace system not just of tomorrow, but for years to come…" (CAA – Performance Based Navigation) [Reference 2]

The environmental benefits presented by the introduction of STARs will also contribute towards one of the government priorities for aviation and a CAA Strategic Objective by:

> "Improving the environmental performance through more efficient use of airspace and (to) make an efficient contribution to reducing the aviation industry's environmental impacts." (CAP 1163 The CAA's Environmental Programme 2014-2016) [Reference 3].

3 Why amend procedures?

The key driver to amend procedures is to modernise operating practices. In doing so, arrival routes will mirror current flight paths as much as possible with a greater degree of accuracy.

3.1 Overview

The intention to implement RNAV (GNSS) approaches and STARs was announced in the Airport Masterplan 2030. They will enhance existing arrival procedures at NIA and be available for those aircraft fitted with the appropriate equipment.

3.2 Drivers for Change

3.2.1 Equipment Reliability

When the new ATC tower was built in 2007, approaches using some of the traditional ground-based equipment at NIA were withdrawn due to infrastructure restrictions and the age of the Airport's equipment. Another approach procedure, the Surveillance Radar Approach (SRA) to 1 NM, has recently been withdrawn as it is very rarely used by commercial aircraft and air traffic control officers were unable to maintain adequate currency in providing this service. This leaves aircraft with the option to use the ILS, the Non-Directional Beacon (NDB) or a SRA to 2 NM from the runway, to make their approach. However, the NDB is old and unreliable, with spare parts difficult to source, and it has to be switched off during thunderstorm activity, further reducing the options available for pilots to make an approach to NIA.

RNAV procedures do not need ground based equipment and therefore are not subject to equipment maintenance schedules. They are designed to use information from satellites for accurate navigation.

3.2.2 Modernisation

This consultation follows on from the consultation on Standard Instrument Departures (SIDs) which are now in the final stages of implementation, and demonstrates a clear commitment from NIA to embrace technological advances to put us at the leading edge of modern flight procedures and efficiency. We are determined to become a centre of excellence for aircraft navigation making NIA more sustainable, more cost-efficient and more attractive to operational partners.

Performance-Based Navigation (PBN) is being adopted worldwide through a United Nations[4], European Community and UK policy objective. The UK intends to meet the aims of this objective through its Future Airspace Strategy (FAS)[5]. One of the key aims of FAS is to make airspace more efficient by improving the accuracy of where aircraft fly by using satellite-based navigation instead of ground-based navigation aids, i.e. PBN. Although not currently mandated in the UK, NIA is forward-thinking and intends to adopt the advantages PBN can offer therefore proactively preparing for probable national policy changes.

3.2.3 Environmental Concerns

RNAV procedures offer the opportunity for more efficient flights, saving fuel costs and reducing CO2 emissions. This ties in with government priorities for aviation and is one of the CAA's Strategic Objectives.

A long-standing aim of our Noise Action Plan is to reduce 'scattering' of aircraft on approach to the Airport; RNAV (GNSS) approach procedures will produce highly repeatable, more predictable routes. Whilst NIA already supports a policy of improving the implementation of Continuous Descent Operations (CDO), a CAA objective within the CAA Policy CAP 1165 Managing Aviation Noise, CDO will be more readily achieved using RNAV arrival and approach procedures, further reducing noise and emissions.

4 The UN International Civil Aviation Organisation (ICAO) has an action plan to roll out PBN and to promote more sustainable aviation through its Committee on Aviation Environment Protection. ICAO member states (including the UK) are expected to adopt PBN at the fastest practicable rate.

5 Future Airspace Strategy for the United Kingdom 2011 to 2030, available at: http://www.caa.co.uk/WorkArea/DownloadAsset.aspx?id=4294078317

3.2.4 Safety

Safety of operations is always of paramount concern to NIA. Many safety systems are in place to ensure that air traffic procedures have built-in redundancy and are repeatable and predictable. A national programme to remove some ground-based navigational beacons has had a direct impact on NIA flight procedures and reduced the options available. We intend to future-proof operational flight procedures and re-introduce a higher level of redundancy of procedures by implementing RNAV (GNSS) approach procedures. The STARs will provide a greater level of predictability in routing and will reduce the amount of ATC and/or aircrew input required to fly the procedures. Any reduction in workload, especially during busy traffic periods, is beneficial in allowing controllers to maintain a safe and expeditious flow of air traffic.

3.2.5 Economic Drivers

The environmental and economic case for RNAV is clearly evident and NIA believes that voluntary early compliance with PBN implementation policy will prove to be the most cost effective and sustainable approach. This method is fully supported by our airlines, who want this new technology to be implemented as soon as possible. RNAV procedures can be introduced with no financial outlay on ground-based equipment and there are no associated maintenance costs to the Airport. By implementing the RNAV programme now NIA is not only seen to be optimising operations for its customers' airlines, but future-proofing the business by positioning itself to take advantage of future cost saving opportunities providing benefits to all the Airport's user community, including passengers.

4 Options considered

Several options were developed by the Airport to consider how to meet the requirements in a proportional manner, minimising the impact on other airspace users and local residents. This section outlines the potential solutions.

4.1 Overview

The initial list of options considered the potential to:

- Do nothing;
- Change procedures and airspace;
- Introduce a STAR for each runway; or
- Replicate current route.

4.2 Option 1: Do nothing

Under the UK's FAS, PBN is due to be introduced and potentially mandated in the near future. It is an aim under the European Aviation Safety Agency (EASA), as published in their Performance-based navigation implementation in the European air traffic management network [Reference 4], for PBN SIDs and STARs to be introduced by December 2018 and PBN approach procedures with vertical guidance by January 2020. The economic and environmental advantages that can be gained from the introduction of RNAV procedures, combined with the potential minimal effects to other stakeholders led NIA to determine that to "Do Nothing" is not a viable option.

4.3 Option 2: Design new procedure routes

NIA considered how changing the current routes might provide additional efficiencies and/or allow the Airport to mitigate the effects on the local population by designing routes for respite. Careful assessment was made of the contents of CAP 1378 Performance-based Navigation, Airspace Design Guidance: Noise mitigation considerations when designing PBN departure and arrival procedures [Reference 5]. The document provides guidance on a range of design options for PBN procedures with the intention of offering options for different kinds of noise mitigation guidance, including varying degrees of relief and dispersal.

The majority of options for PBN arrivals outlined in CAP 1378, other than direct replication of current, conventional procedures, would require additional controlled airspace (CAS) to be established around NIA to contain the new procedures. In broad terms, CAS requires pilots to speak to the controlling ATC unit before entering and to fly in accordance with the clearance provided. This allows ATC to maintain full situational awareness of the intentions of air traffic within their airspace, thereby permitting early planning and the maintenance of safety of all aircraft. Outside CAS, there is no obligation for pilots to be in contact with ATC and the air traffic services provided are more reactive.

A STAR should be contained by CAS; Newcastle is the controlling authority for some CAS, which is joined to the UK's en-route structure by Airway[6] P18. The current NIA airspace was designed to contain our current procedures; to widen procedures to provide an alternate route for noise respite would result in the procedures no longer being fully contained. This would require NIA to seek approval for an extension to our CAS and we would need to demonstrate that the airspace requested is proportional to the benefits delivered, as CAS is seen as restrictive to the General Aviation (GA) community. The justification to a change to the airspace will be assessed in terms of safety, efficiency, providing environmental benefits or mitigating its environmental impact to the greatest extent possible. However, in achieving any of these objectives at the Airport, we may produce an adverse effect on these aspects for other airspace users.

It is NIA's view that to develop and implement additional routes that will require additional airspace is not a proportional response to the Airport's need to introduce RNAV arrival and approach procedures. The current number of aircraft movements does not merit the potential impacts on other airspace users that additional airspace could bring. The next stage of airspace development will be to investigate the viability of increasing NIA controlled airspace. This is likely to be needed in the near term to protect projected growth.

6 An airway is defined "corridor" in the air for aircraft, usually of CAS.

4.4 Option 3: Introduce a STAR for each runway

On an average summer day in 2016 NIA handled 70 arrivals. In 2014, P18 was used by 58% of NIA arrivals. The Airway P18 is controlled by NATS at the Prestwick Air Traffic Control Centre, who are responsible for integrating aircraft that are arriving to and departing from many UK airports with those that fly through UK airspace to other international locations. Aircraft flying to and from Northern European and East Scottish airports route through the overhead of NIA, navigating via a reporting point called NATEB (located directly above NIA). NATS implement a Traffic Orientation Scheme, shown at Figure 1, to provide effective integration of the busy air traffic environment on Airway P18.

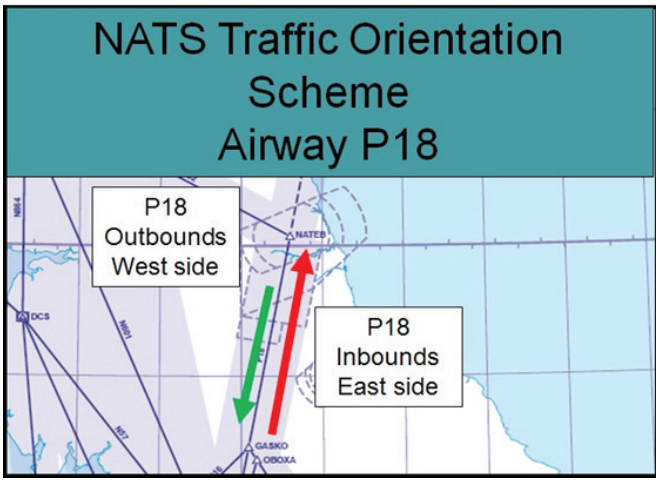


Figure 1

The Traffic Orientation Scheme requires aircraft inbound to Newcastle (red arrow) to route up the east side of Airway P18, and aircraft departing from the Airport (green arrow) down the west side of the Airway. When Runway 25 is in use and aircraft make their approach from the east of the Airport and depart facing west, an easy circular flow is possible. However, when using the opposite orientation of the Runway, departures get airborne in an easterly direction and must cross to the west side of Airway P18 for their onward journey, requiring deconfliction from the inbound aircraft routing up the east side of the Airway.

A proposal was made for two STARs to be introduced- one for each runway. However, insurmountable difficulties were identified with this proposal. A two-STAR solution that complied with the Traffic Orientation Scheme could not be devised and the second STAR would adversely impact on an airspace usage agreement with the operators of a gliding site, 9 NM southwest of the Airport. Furthermore, separation against the Runway 07 Standard Instrument Departure (SID) at NIA would be difficult to achieve.

These factors, combined with the restrictions on the volume and dimensions of current CAS, showed an option for two STARs was not viable.

4.5 Option 4: Replicate current route (preferred option)

NIA believe the option to replicate the current route, which will result in little or no change for the majority of residents is the preferred option. The following factors have driven this decision:

- The restrictions placed upon NIA by the P18 Traffic Orientation Scheme
- desire to avoid adverse impacts on other airspace users by resisting expansion of our CAS
- need to maintain safe separation from other procedures and operations
- our wish to minimise the number of residents overflown have driven the need to replicate the routes currently flown by aircraft arriving at the Airport.

The RNAV (GNSS) approaches have been designed with this in mind.

5 The RNAV (GNSS) proposal

This section outlines what the new RNAV (GNSS) approach procedure will look like.

5.1 Overview

The new RNAV (GNSS) approach procedure will replicate the route and descent rate currently flown by aircraft landing at NIA that are using conventional, ground-based equipment.

5.2 The RNAV (GNSS) procedure

The draft aviation chart for the RNAV (GNSS) procedures are provided at Figures 2 - 5.

The following charts are aimed at the aviation audience.

Figure 2 Draft aviation charts for proposed NIA RNAV (GNSS) procedure to runway 07

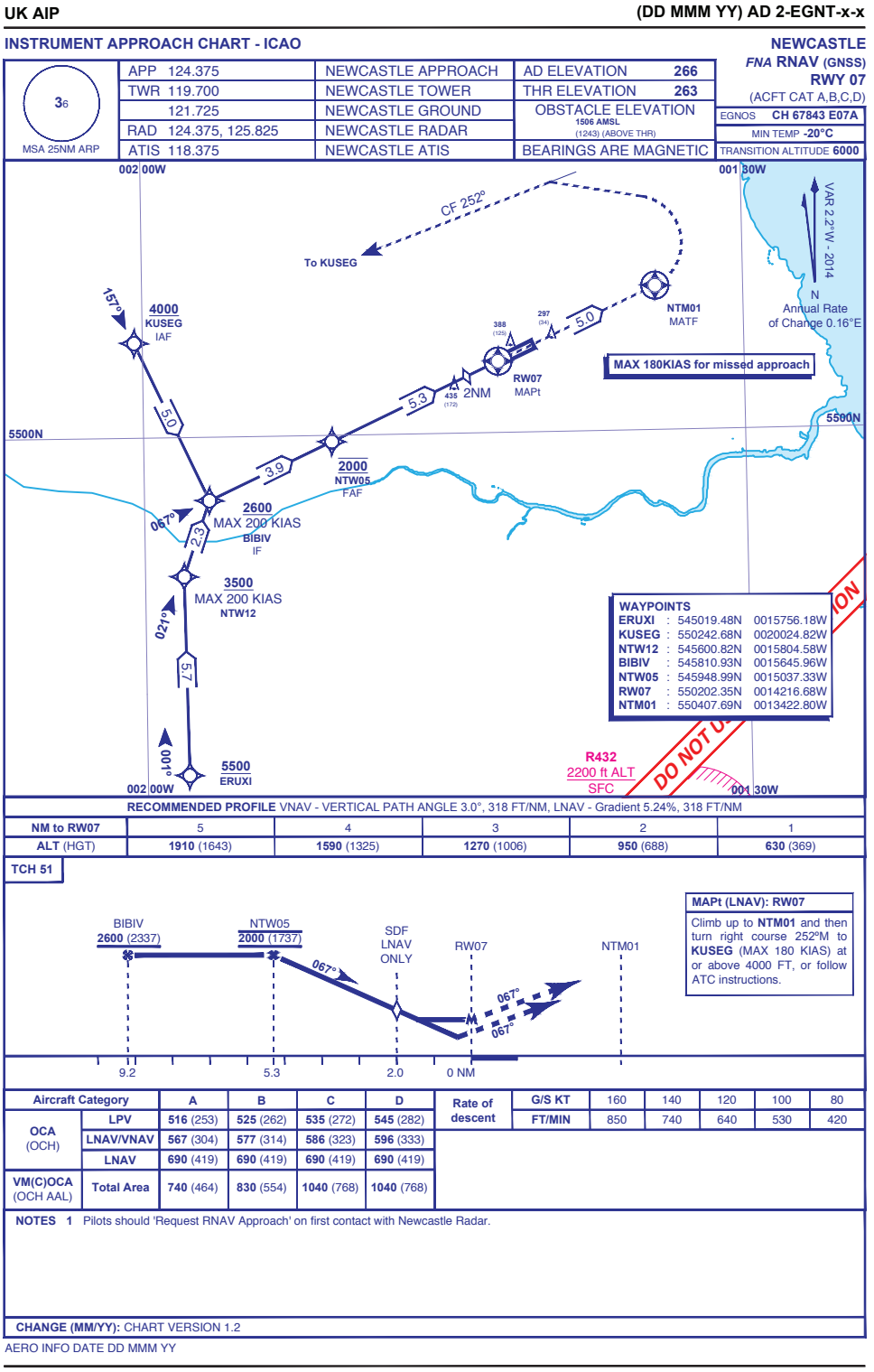


Figure 3 Draft aviation charts for proposed NIA RNAV (GNSS) procedure to runway 07

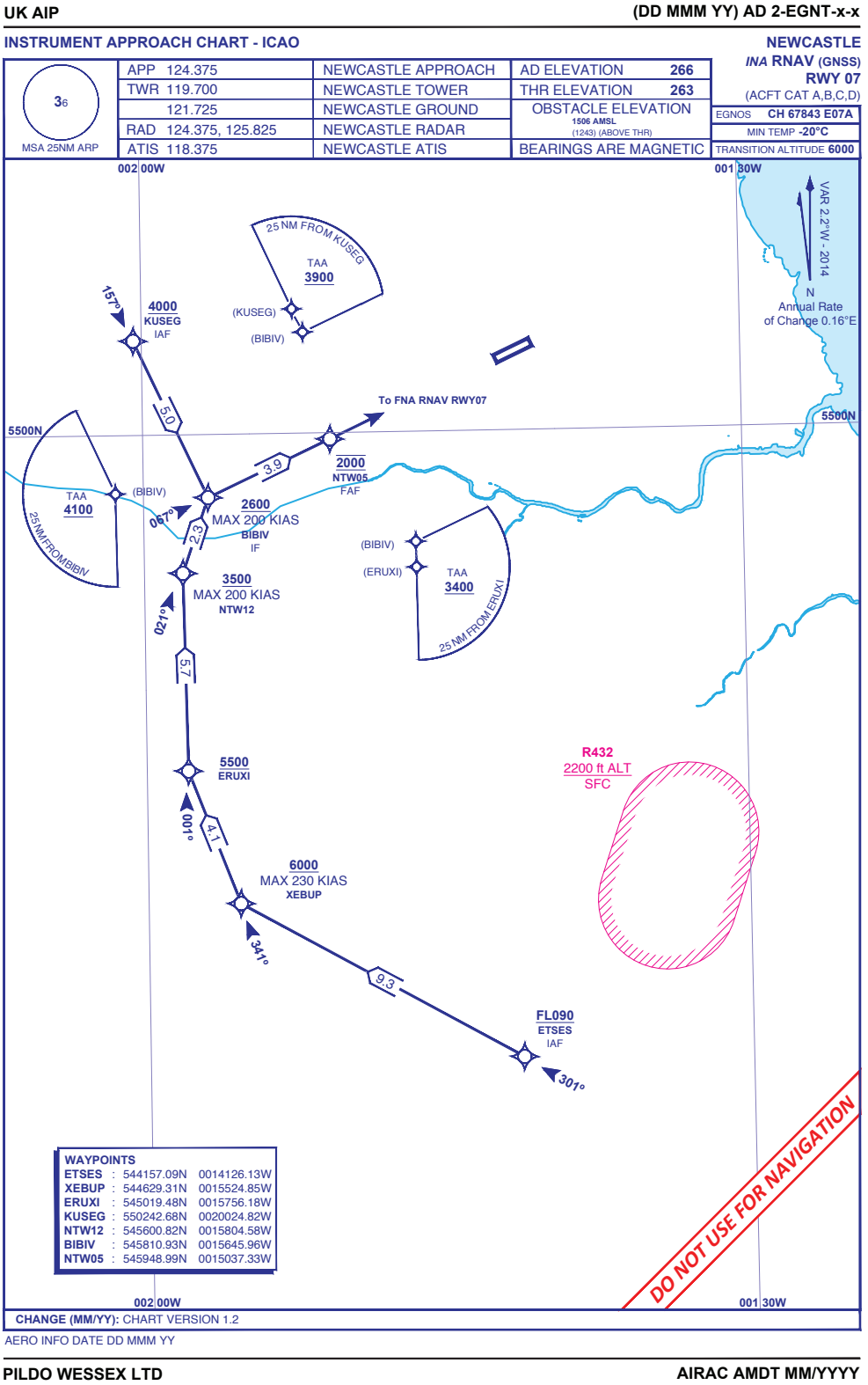


Figure 4 Draft aviation charts for proposed NIA RNAV (GNSS) procedure to runway 25

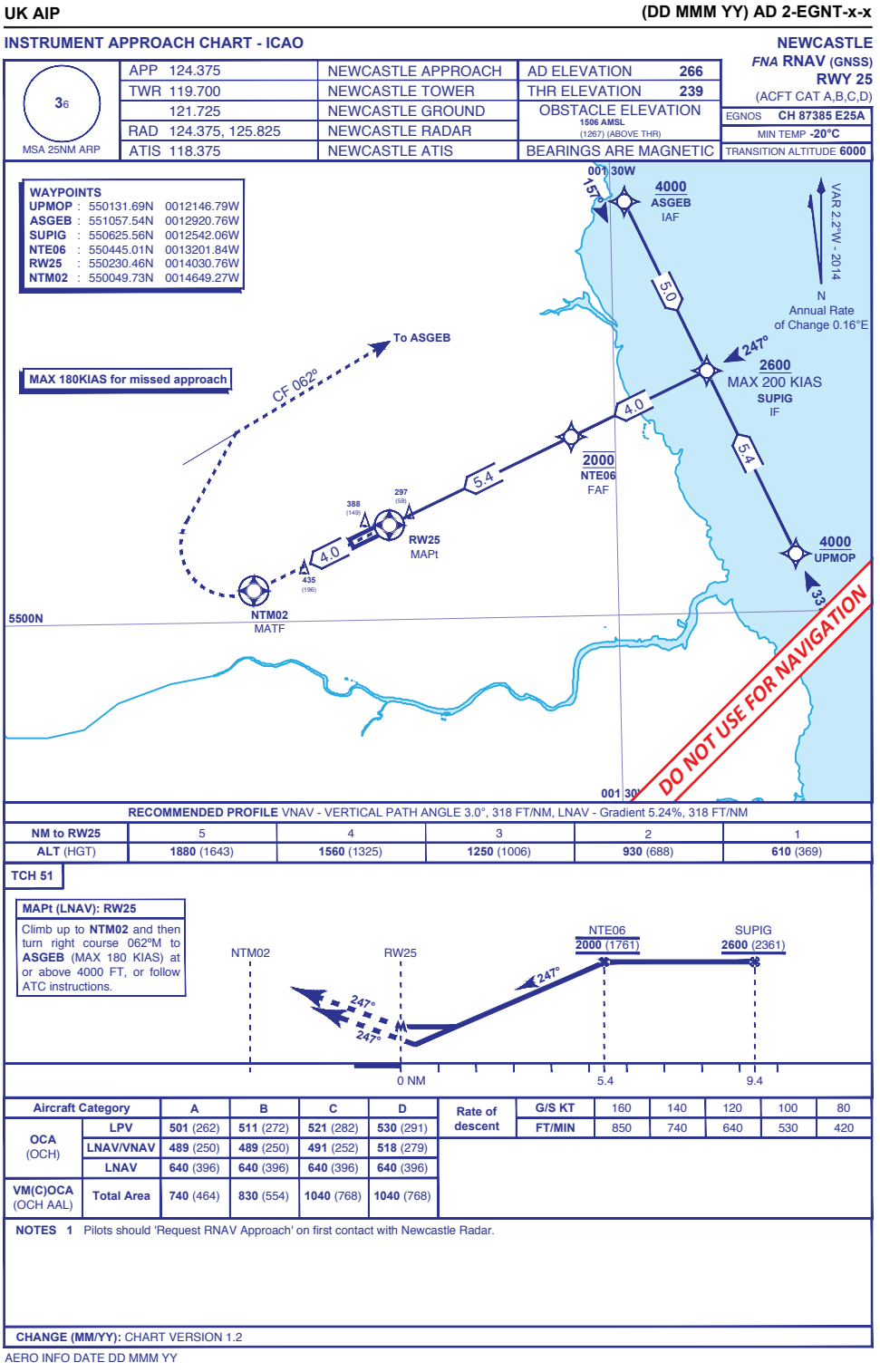
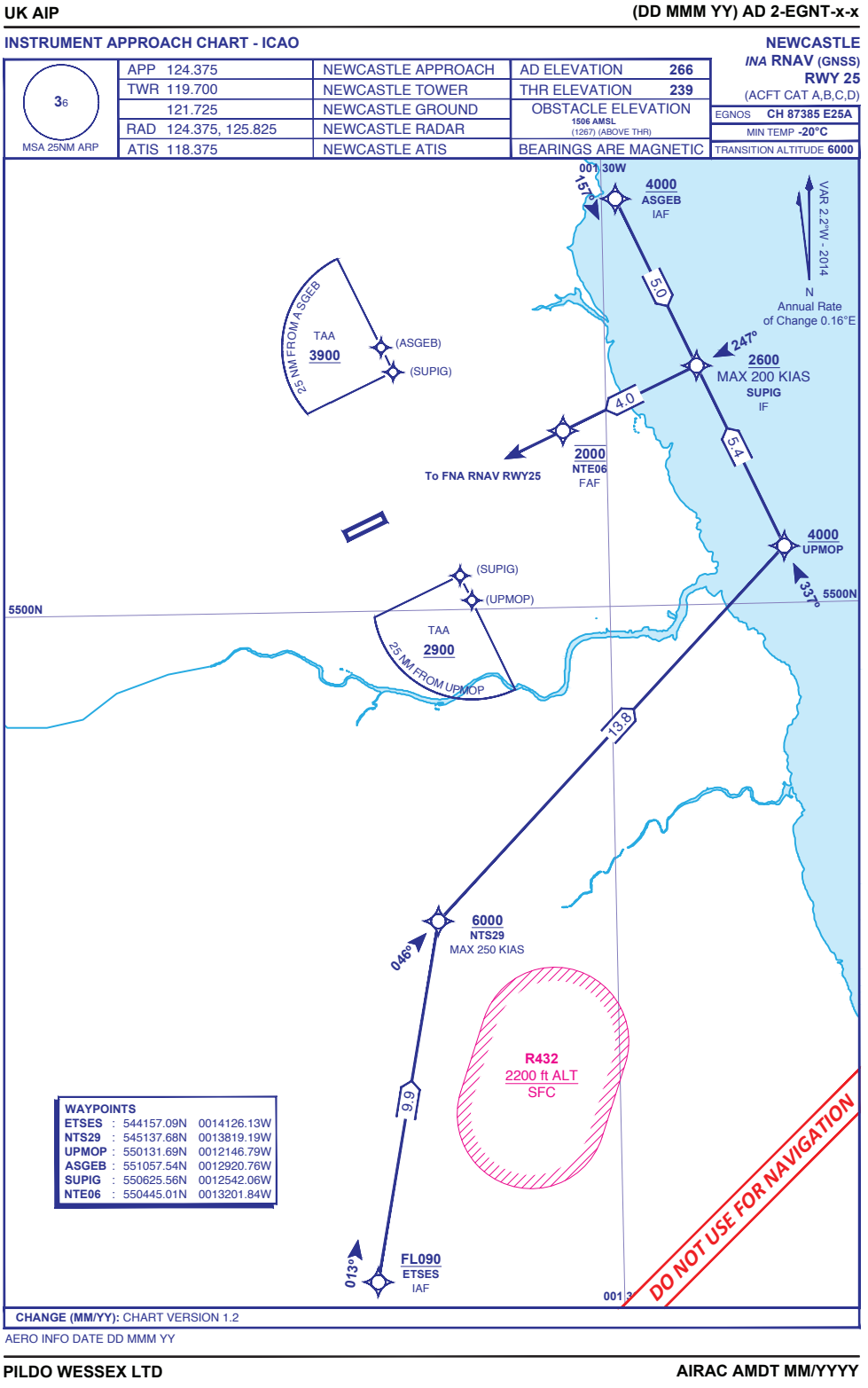


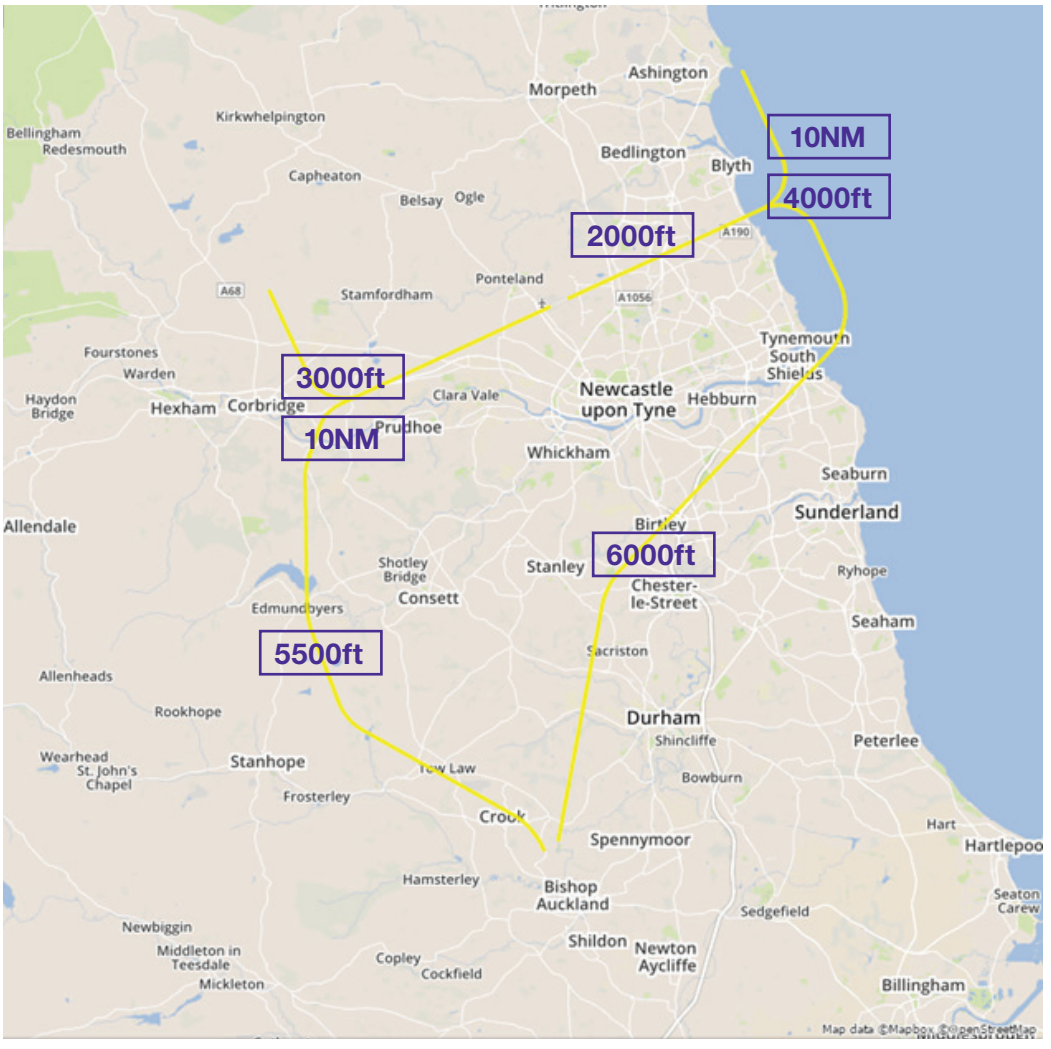
Figure 5 Draft aviation charts for proposed NIA RNAV (GNSS) procedure to runway 25



5.3 RNAV (GNSS) procedure in relation to surrounding area

Figure 6 shows the route that aircraft will fly from the end of the proposed STAR (see Section 8) to the runway using the proposed RNAV (GNSS) procedure. The map also displays indicative altitude heights and distances from the runway in nautical miles (NM).

Figure 6 Track over the ground of the proposed NIA RNAV (GNSS) procedure



6 The STAR proposal

This section outlines what the new STAR procedure will look like.

6.1 Overview

The proposed STAR adopts a similar route as that already published in the UK Integrated Aviation Information Package (UKIAIP) as a route for aircraft inbound from the airways system.
It is offset to the East of the airway (P18 Centre line).

6.2 The STAR

A chart showing the new STAR in relation to the surrounding airspace is provided at Figure 7.

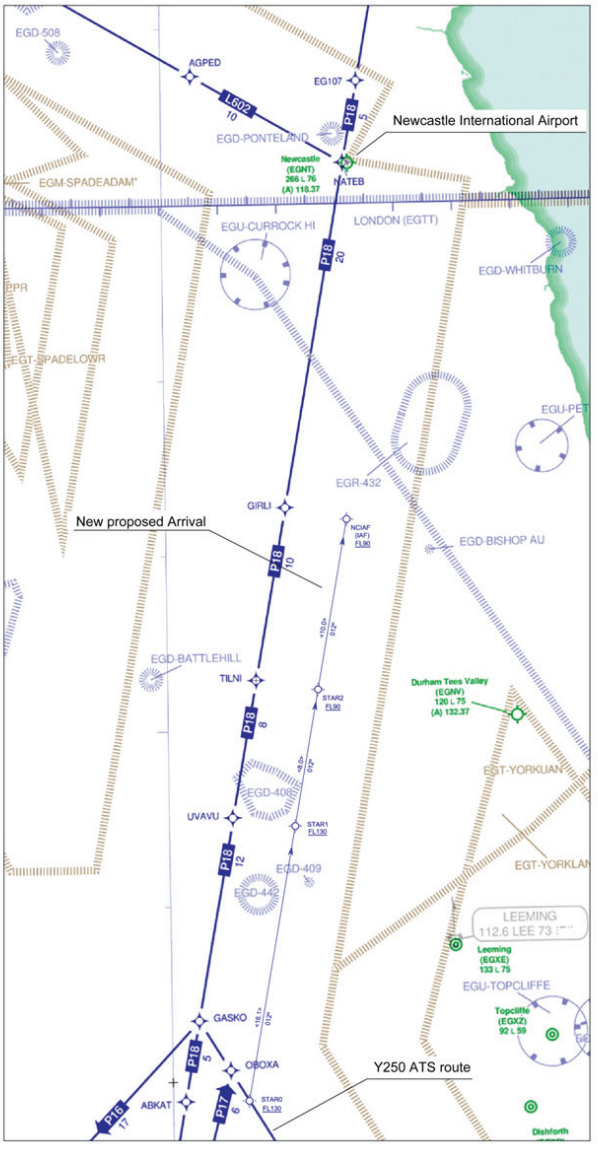


Figure 7 Chart showing proposed NIA RNAV STAR in relation to surrounding airspace

7 CAP 032 IAIP EGNT AD 2.22 paragraph 1(a).

6.3 Other Maps and Charts showing the relative position of the STAR

Figure 8 shows the track of the proposed STAR in relation to the geographical background and local centres of population.

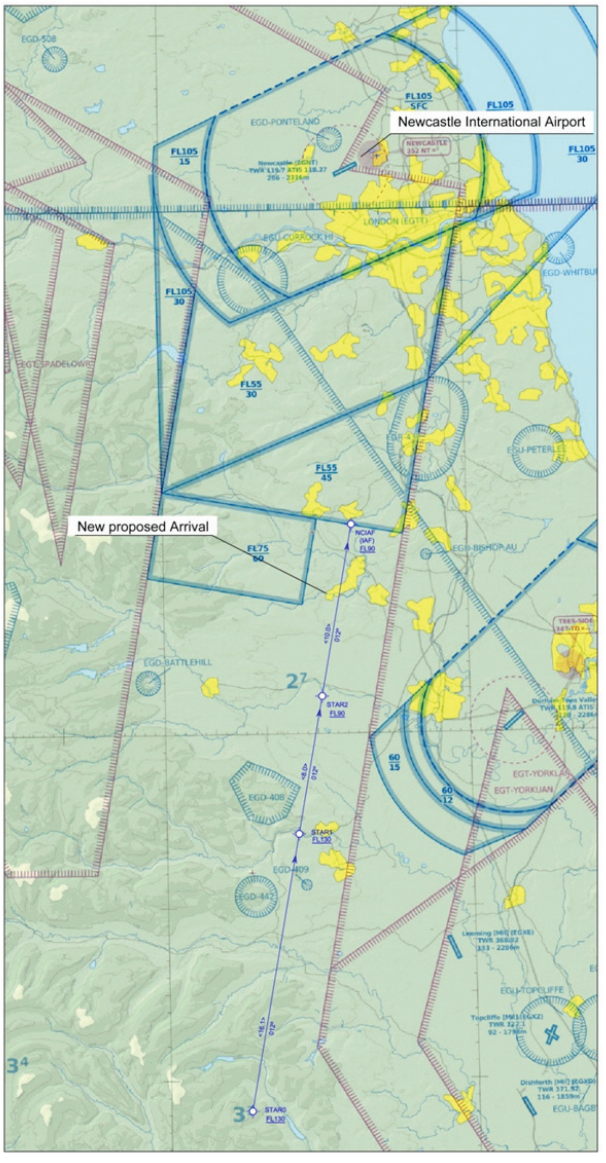


Figure 8 Proposed STAR in relation to local centres of population (in yellow)

7 How could this proposal affect me?

Any change to operations at an airport will be likely to produce an effect on those surrounding the airport. NIA have assessed the proposal to minimise any impacts and manage any residual effects.

7.1 Overview

The effects resulting from the proposed changes to arrival and approach procedures at NIA have been assessed in terms of safety, efficiency and environmental impacts in relation to the two main groups of aviation and non-aviation stakeholders.

7.2 Safety

There are not considered to be any adverse impacts to aviation stakeholders from the introduction of RNAV arrival and approach procedures at NIA; no adaptations to the existing CAS structure are being proposed, there will be no changes to airspace crossing for GA or military aircraft and existing Letters of Agreement with aviation organisations will not need to be changed. Conventional procedures will remain available for aircraft to use that are not RNAV-equipped.

Safety benefits will be provided to NIA aircraft operators and ATC including: Reduced controller and pilot workload.

7.3 Efficiency

7.3.1 Aviation Stakeholders

For flights utilising the new RNAV routes, fuel and maintenance costs will reduce through:

- Reduced track miles flown;
- Reduced engine thrust;
- Reduced fuel used through reducing the contingency fuel requirements:
- The amount of fuel currently loaded onto an aircraft caters for a much less direct route than can be achieved through RNAV. As RNAV routes can be pre-planned and are more direct, the aircraft captain can reduce how much fuel must be carried. This improves the fuel efficiency of the whole flight by reducing the aircraft weight at take-off[8];
- Reduced operating hours and wear and tear on aircraft, resulting in reduced maintenance costs.

EUROCONTROL studies and other trials have demonstrated fuel savings of up to 40% can be achieved through the use of CDOs during the approach phase of flights. This equates to between 50 and 150 kg of fuel savings, depending on the level at which the CDO is commenced and the aircraft type.

7.3.2 Non-aviation Stakeholders

NIA is a key economic asset and important driver for the North East economy. NIA facilitates economic benefits including business links, inbound tourism and employment not only at the airport, but for all the businesses that rely on us. It also offers a gateway to the world for local people. Operations that can help us to grow in a more sustainable way or to reduce our environmental impact are good for the regional and national economy. One of the key benefits from RNAV is to significantly reduce the operating costs of airlines using NIA through fuel savings and shorter flying times. This has the potential to attract more airlines.

7.4 Environmental impacts

7.4.1 Noise

In terms of assessing the effects of new procedures, consideration is given to the impact of noise from aircraft below 7,000 ft. There will be no noise impact from the STAR itself as it terminates at 9000 ft. Whilst guidance states that noise is only considered below is only considered below 7,000 ft, a qualitative assessment has been carried out on the noise impact of RNAV.

Department for Transport Guidance to the CAA on environmental objectives, relating to exercise of its Air Navigation Functions (Jan 14'), acknowledges that PBN results in fewer people being exposed to noise than occurs with conventional procedures. NIA believe the environmental benefits overall will be positive.

One of the advantages of RNAV is that those aircraft using RNAV procedures will fly a more predicable route, reducing the present 'scatter' of aircraft on approach. This will slightly reduce the number of overflight events for the majority of people that are presently overflown by aircraft on approach due to aircraft following a more defined route.

8 A reasonable approximation requires 3% extra fuel to be carried for each hour of flight. On a 5 hour flight, 15kg of fuel is typically used unnecessarily for every 100kg of unused and un-needed fuel carried to landing

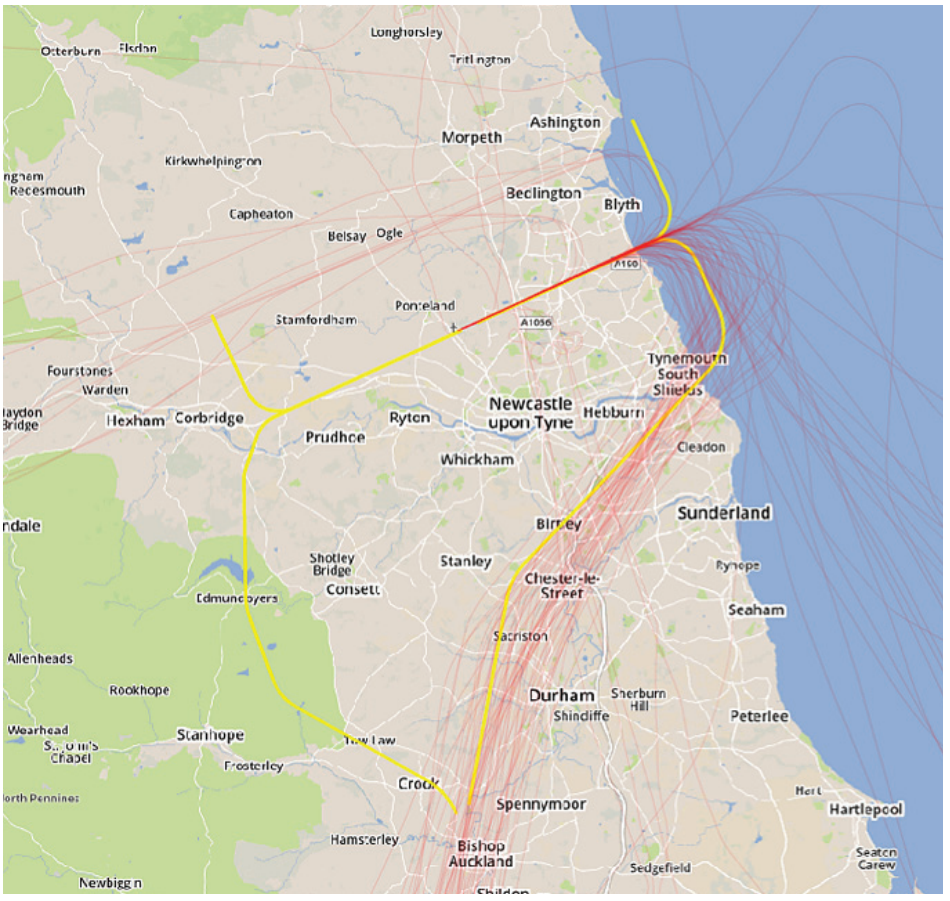


Figure 9 Runway 25 arrivals 26th August 2016

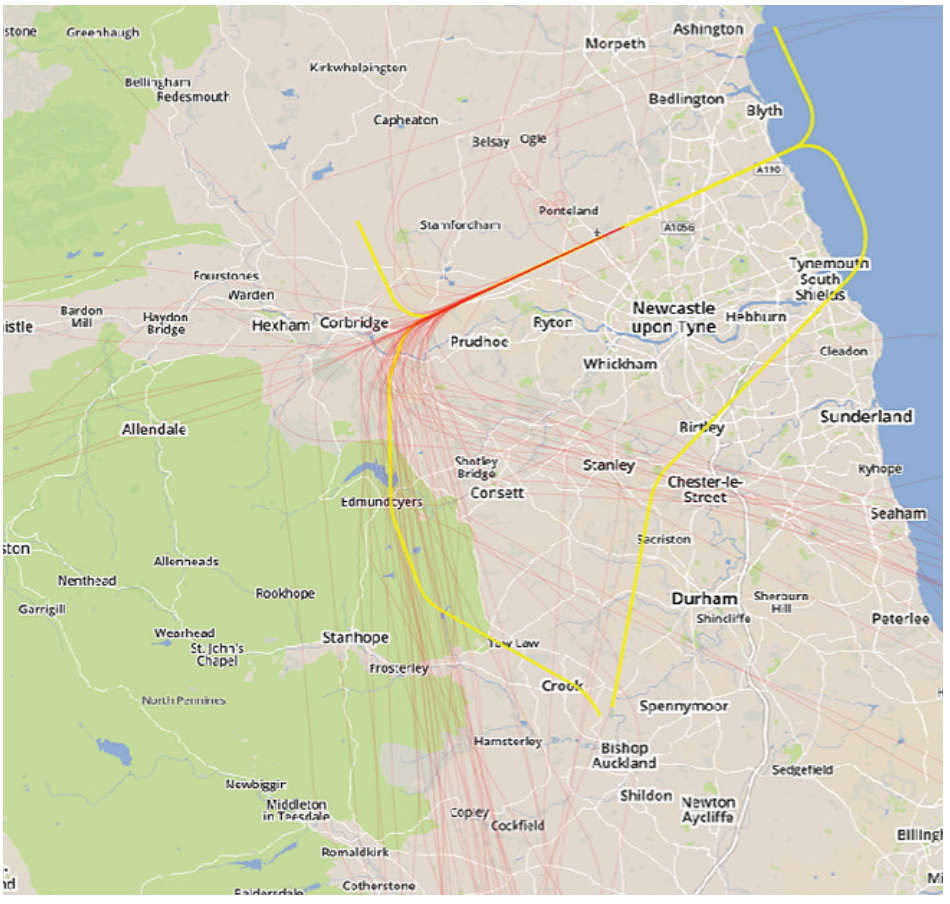


Figure 10 Runway 07 arrivals 19th August 2016

Those people living directly under the RNAV procedures will see some additional aircraft that are more directly overhead. The aircraft following the RNAV procedures however, will be flying higher because they will follow a CDO profile with reduced power settings, thus making less noise than if they had overflown using present techniques.

Figure 9 and 10 show the spread of routes to each runway, taken by aircraft arriving at NIA on a typical summer's day using the current conventional arrival procedures. Using RNAV approach procedures, the aircraft tracks will be concentrated to those shown in yellow and at Figure 6. Greater detail can be viewed on the specific area information sheets.

The overall change to average noise impact experienced on the ground is likely to be less than 1dBA at some distance from the runway; this is too small to be modelled accurately. Changes of this magnitude (<1dB) to average noise are not normally perceived as noticeable by most people (less than the noise of chuckling water or rustling leaves at 10 meters). National studies undertaken by the UK CAA[9] have shown that the noise levels from aircraft on approach at this distance from the airport generally plays little role in sleep disturbance for the majority of people. All RNAV approaches will facilitate Continuous Descent Operations (CDO) where an aircraft descends following an optimised vertical profile using minimum engine thrust. The use of RNAV will optimise this technique to the maximum extent possible using on-board flight systems. CDO will also keep aircraft higher above the ground than currently used conventional approaches, which typically reduce aircraft descent rates and/or require aircraft to level-off periodically, to allow separation and sequencing for landing. Figure 9 shows the ideal descent profile for an aircraft on a 3 degree approach angle (dashed black line, descending approximately 300 feet (ft) per NM), along with the profile to be expected from an RNAV arrival (blue line) and that likely to be achieved under conventional radar vectors (red line). It demonstrates that a continuous descent is more achievable from 14,000 ft for an aircraft conducting a RNAV arrival (maintaining height as long as possible), than one using conventional techniques. The additional height and the reduced engine thrust from more optimised CDO will reduce the noise perceived on the ground under the RNAV procedures to a small degree.Controllers at NIA already facilitate a form of CDO for as many flights as possible using standard controlling techniques. Controllers inform the aircraft how far they are from touchdown and where possible allow the aircraft to calculate its own best descent profile. This is constrained slightly where there is other conflicting traffic, or where CAS may limit the descent profile.

It should be understood, however, that the benefits that RNAV can deliver in reducing the impacts of noise will be for those communities outside the NIA significant noise contours. RNAV will not directly change aircraft noise or flight patterns closer than approximately 10 NM from the runway threshold, inside the areas where aircraft noise is considered most significant. However, RNAV may eventually help to facilitate 'Low Power/Low Drag' techniques such as delayed landing gear deployment. Currently aircraft are given headings and levels from Air Traffic Control guiding the aircraft to a 7-mile final, at which point the aircraft are required to fly a period of level flight before descending on this ILS. PRNAV will help the aircraft fly an ideal descent profile, allowing the aircraft to establish it's descent on the ILS with no period of Level flight. This allows the aircraft to continue to descend using LPLD (Low Power Low Drag), resulting in environmental benefits as well as a reduction in noise pollution. There may, therefore, be a slight improvement in noise levels under the flight path close to the Airport, but this will be a matter for further development once RNAV is fully established.

As part of NIA's on-going commitment to noise management, a new Noise Action Plan will be published in 2017. The plan will include 2016 noise contours and a series of actions to minimise noise levels. Also in 2017, the Airport Masterplan will be reviewed and updated, this will include revised forecast noise contours to 2035.

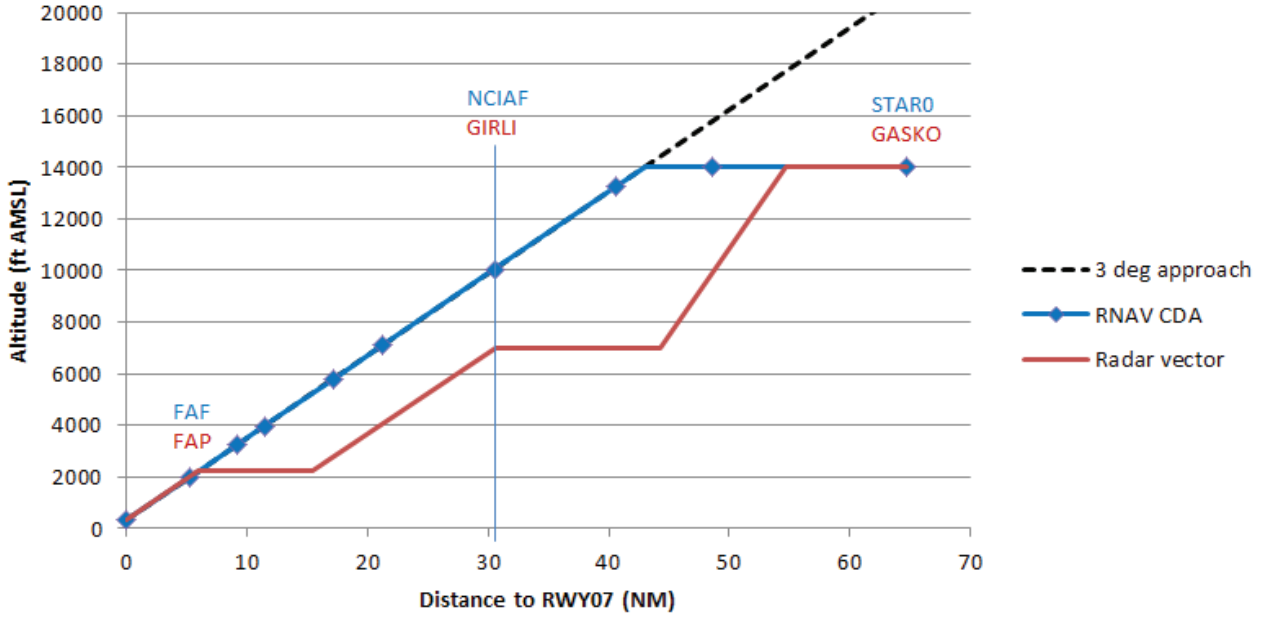


Figure 11 Descent profiles for conventional and RNAV arrivals to NIA Runway 07

9 Many reports on this have been published by the CAA Environmental Research and Consultancy Department (formely known as Directorate research and Analysis E.g. CAA-ERCD report 0905 (2009).

7.4.2 Air Quality / Emissions

Climate change is a global concern. Carbon dioxide (CO2) is the principle aircraft emission species that affects climate change as it has a half-life in our atmosphere of hundreds of years, and any avoidance of man-made contributions to atmospheric CO2 is to be welcomed. Aircraft CO2 emissions will be reduced if RNAV arrival and approach procedures are implemented at NIA through greater achievement of CDO, thereby reducing the amount of fuel burnt by aircraft on the arrival, producing a corresponding reduction in aircraft emissions of both carbon dioxide and nitrogen oxides. The reduction in fuel use is typically around 50-100 kilogrammes (kg) of fuel per flight, which reduces emission of the greenhouse gas CO2 by around 150-300 kg per flight. Although the introduction of RNAV will improve the ability to facilitate CDO, we are not able to quantify the proportion of arrivals that will take up CDO, but this will be monitored through our Noise and Track Keeping (NTK) system. This planned reduction in emissions is fully in-line with UK policy and international commitments on Climate Change as well as NIA's plan to work towards accreditation to Airport Council International's[10] Carbon Accreditation scheme. Aviation is coming under increasing pressure to demonstrate real action on reducing its carbon emissions as evidenced by the recent inclusion of aviation into the European Emissions Trading Scheme.

The International Civil Aviation Organisation[11] have found that air quality emissions emitted at 3,000 ft above the ground or more play no significant part in local or regional air quality, although the UK CAA requires an assessment of changes to Local Air Quality for the portion of procedures below 4,000 ft as part of the Airspace Change Process [Reference 3]. Particulate Matter (PM) and Oxides of Nitrogen (NOx) are the principle aircraft related emissions that can affect Local Air Quality.

In terms of the STAR, it is unlikely there will be any associated Local Air Quality impacts as there are no proposed changes to flight paths below 4,000 ft. However, RNAV will facilitate CDO and thus more efficient aircraft routing, which will reduce these atmospheric aircraft emissions. Aircraft will be able to use less engine thrust, which can drastically reduce NOx generation. For PM it is a little more complex, since the amount of particulates per kilo of fuel burnt actually increases as thrust reduces. Nevertheless, the overall effect of fuel reduction is far more significant and an overall (marginal) reduction of PM can be expected. The main reduction in these types of emissions is expected to occur above 4,000 ft, beyond 10 NM from the Airport.

The flight profile achieved for RNAV (GNSS) approach procedures will replicate that for current ILS approaches, also resulting in no change to current Local Air Quality in close proximity to the Airport.

Thus, the benefit to air quality can be considered negligible; however, NIA believes that the principle of reducing pollution whenever and wherever possible is worthwhile at any altitude.

7.4.3 Tranquillity

The routes proposed for RNAV arrival and approach procedures replicate those of the current procedures and, as such, aircraft will not be operating in new areas. The NTK system will monitor aircraft flying the new procedures to verify that no new areas become overflown and this information will be shared with the Airline Technical Committee, the key liaison group between NIA and the airlines. The area that will be overflown by the new procedures has been checked for sites where tranquillity is important, such as tourist attractions, hospitals, schools, open-air venues, etc., which has been discussed with local councils through the NIA Consultative Committee. The new procedures will reduce the number of people overflown and aircraft will be higher for longer, but aircraft will be concentrated on the same track, rather than scattered over a wider area as is currently the case.

7.5 Benefits of RNAV

Overall, NIA considers this proposal will provide possible benefits, not only to the aircraft operators at the Airport, but also to the surrounding area in the following ways:

- Reduction in aircraft and fuel used;
- Potential reduction in passenger costs;
- Reduction in the effects of noise and volume of emissions produced by aircraft;
- Maintenance of increased height above the ground for longer, thus further reducing noise to the ground environment;
- Reduced airspace congestion through improved procedures and management of aircraft sequencing;
- Reduced aircraft maintenance costs by introducing predictable flight paths, which will reduce the amount of change thrust and less power. This may ultimately aid aircraft maintenance;
- Reduction in controller and pilot workload, thereby enhancing safety;
- Reduced reliance on ground-based navigation systems will increase redundancy.

10 The main global association for civil airports.
11 ICAO Doc 9889 Airport Air Quality Manual. Available at http://www.icao.int/publications/Documents/9889_cons_en.pdf

8 Why consult?

Whilst NIA needs to adapt their procedures, our plans must be balanced by the needs of other airspace users and those affected by aircraft operations. To strike that balance, we need to know your views.

8.1 Overview

As outlined in the NIA Master Plan 2030 [Reference 1], sustainable growth can only be achieved in partnership with its regional stakeholders. Benefits delivered in support of the Airport should minimise detrimental effects on stakeholders. Whilst every care has been taken to balance the needs of all parties during this proposal development, we are realistic in that there may be aspects that we are not aware of. We are therefore actively seeking the views of those that might be effected to ensure we have a full understanding of the implications of the proposed changes and can minimise any adverse impacts, should there be any.

The decision whether or not to implement the proposed RNAV (GNSS) approach procedures and STAR procedures will be taken by the Civil Aviation Authority (CAA), which is the UK civil aviation regulator. NIA will be required to justify the proposal sufficiently to the CAA to gain permission to implement the new procedures, after the period of consultation and a review of the proposed designs.

This document seeks the views of interested parties including the general public, local authorities with an interest in NIA and operational stakeholders such as airlines; see Annex A1 for a list of those individual organisations being connected directly. This list will not be exhaustive, the consultation will extend beyond those listed in Annex A1. The ways in which you can let us know your views on this proposal are given in the "Who is being Consulted and How Do I Participate?" section (Section 9).

This proposal will undergo full public consultation and we would like to know your views. All responses will be logged and where appropriate actions will be taken. The responses will then be reported to the NIA Consultative Committee, which is the main public body that represents NIA internal and public stakeholders. Your views will also be available to the CAA and a summary and analysis of any views expressed as part of this consultation will also be reported to them.

8.2 Consultation Requirements

In developing this Airspace Change Proposal, NIA are following a detailed process laid down by the CAA within CAP 725 CAA Guidance on the Application of the Airspace Change Process [Reference 3]. Stage 4 of that process requires the Airport to consult widely, allowing a minimum of 12 weeks for written consultation. Feedback from this consultation will inform the final designs that will be submitted to the CAA for approval.

In determining whether the proposal should be approved, the CAA must also follow legislation and guidance set by the Government, through the Department for Transport. Its principal functions and duties are set out in primary legislation within the Civil Aviation Act 1982, the Airports Act 1986, the Transport Act 2000 and the Civil Aviation Act 2012[3]. In exercising its air navigation functions, the CAA must give priority to maintaining a high standard of safety in the provision of air traffic services in accordance with those statutory duties, particularly in regard to Section 70(1) of the Transport Act 2000. This requires the CAA to:

- Secure the most efficient use of airspace consistent with the safe operation of aircraft and the expeditious flow of air traffic;
- Satisfy the requirements of operators and owners of all classes of aircraft;
- Take account of any guidance on environmental objectives;
- Facilitate the integrated operation of air traffic services provided by or on behalf of the armed forces of the Crown.

In addition, the CAA will also consider Government policies on the future development of air transport.

In order for the CAA to make an informed decision on how equitable and viable the NIA proposal is by assessing its benefits and impacts, the views of those affected must be presented.

3 https://www.caa.co.uk/Our-work/Corporate-reports/Strategic-Plan/Our-statutory-duties/ (Accessed 4 October 2016)

8.3 Consultation Process Concerns

The CAA's Safety and Airspace Regulation Group will oversee this consultation to ensure NIA follows government guidelines and the process detailed within CAP 725. Should you have any complaints regarding our adherence to the consultation process, they should be referred to:

Airspace Regulator (Coordination)
Airspace, ATM and Aerodromes
Safety and Airspace Regulation Group
CAA House
45-59 Kingsway
London
WC2B 6TE
Email: airspace.policy@caa.co.uk

Please note that these contact details should only be used to submit a complaint about non-adherence to the consultation process. Responses to the consultation content (the proposed procedures) should be sent to NIA; details of how to do so are provided within Section 9.

9 Who is being consulted and how do I participate?

Our aim in this consultation is to reach as many people that may be affected by our proposals and to make it as simple as possible to provide their views and opinions of any potential impacts.

9.1 Who is Being Consulted?

It is the Airport's aim to consult with as many affected stakeholders as possible. This includes both those that use the airspace around NIA and those that live in the surrounding area. A full list of the individual organisations being contacted directly is provided at Annex A1. We intend to make the consultation document available to all stakeholders through the Airport website (advertised through local media and social media), public meetings and hard copies available at local libraries and on request.

9.2 How do I Submit my Response?

There are several ways to submit your response:

- Through a questionnaire accessed through the website;
- Through a dedicated email address (also available through the website and detailed below);
- By post;
- During public meetings.

9.2.1 Website and Email

This consultation document will be made available through a dedicated section of the NIA website, which can be accessed via the front page at:

http://www.newcastleairport.com

A link will be available to a Survey Monkey questionnaire, which will provide guided questions for the consultee. A dedicated email address for responses has also been created, as follows:

star@newcastleinternational.co.uk

Please entitle your email 'NIA Consultation Response'.

9.2.2 Post

Please send your response to:

NIA ACP Consultation Response
Administration Offices
Newcastle International Airport Ltd
Woolsington
Newcastle upon Tyne
NE13 8BZ

9.2.3 Public Meetings

Informal public meetings will be held at the Airport on two dates, if requested, members of the Airport team will attend meetings within the local communities. Representatives from Air Traffic and Environmental Department will be available on 20th April and 10th May between 3 – 6pm, to answer any questions you might have. Please contact the team if you would like to attend.

9.3 What do I Include in my Response?

We would welcome any comments you have to make on the proposals, both positive and negative. We would also like to know if you have read the consultation material, but have no comments to make; we need to be sure we have reached a representative proportion of consultees.

9.4 What will happen to my Response?

All responses will be treated confidentially and details of respondents will be passed only to the CAA, which requires a full report on the consultation process and its results, together with copies of responses from all key stakeholders as part of the formal Airspace Change Proposal submission.

If you do not wish your personal details to be passed to the CAA, you should let us know. An assessment will be made to determine if the proposal can be modified to take these issues into account.

9.5 How will I know the Result of the Consultation?

The results of the Consultation will be collated in a feedback report, which will be published on the Airport website within a month of the closure date of the Consultation Period.

9.6 Deadline for Responses

This consultation commences on Friday 10th March 2017 for a period of 12 weeks, closing on 2nd June 2017. A full report is then submitted to the CAA, for a 16 week consultation.

10 What happens next?

Once the consultation period has concluded, NIA will publish a report that details the results and submit our proposal (incorporating any amendments identified through the consultation feedback) to the CAA.

10.1 Overview

Once the consultation process closes we will produce a report that will analyse the results, and necessary changes will be made to the proposal to reflect solutions to themes and issues that have arisen, as practicable. Although unlikely, should the issues identified require major changes, a further consultation on the revisions will be required. The Consultation Report will be made available for public viewing through the Airport website.

The proposal; incorporating any appropriate amendment will then be submitted to the CAA.

- including the full procedure and airspace designs;
- safety assessments to demonstrate that the changes will be safe;
- results of the consultation to demonstrate that the proposal is balanced in meeting all stakeholder requirements;
- and a qualitative environmental assessment of the impact (both positive and negative) of the changes.

10.2 CAA Actions

The CAA will use a team of experts to scrutinise the documentation that NIA submits throughout a period likely to last at least 16 weeks. We will remain responsive throughout this period in submitting further supporting documentation, should it be requested, to provide a picture that is as accurate as possible. Once the CAA has made their decision on whether the submission is appropriate and proportional, they will inform us and publish the results on their website.

11 References

Reference	Name	Origin
1.	Newcastle International Airport Limited Airport Master Plan 2030 http://www.newcastleairport.com/masterplan	NIA
2.	Policy for the Application of Performance-based Navigation in UK/ Irish Airspace 11 October 2011 https://publicapps.caa.co.uk/docs/33/Policy%20for%20the%20Application%20of%20Performance-based%20Navigation%20in%20UK_Irish%20Airspace%20-%20Signed%20111013.pdf	CAA/IAA
3.	CAP 1163 The CAA's Environmental Programme 2014-2016 http://publicapps.caa.co.uk/docs/33/CAP1163_Environment_Programme_2014.pdf	CAA
3.	CAP 725 CAA Guidance on the Application of the Airspace Change Process Fourth edition 15 March 2016 http://publicapps.caa.co.uk/docs/33/CAP%20725%20update%20March%202016%20amend.pdf	SARG, CAA
4.	EASA Opinion 10/2016 Performance-based navigation implementation in the European air traffic management network http://www.easa.europa.eu/document-library/opinions/opinion-102016 [Accessed 3 November 2016].	EASA
5.	CAP 1378 Airspace Design Guidance: Noise mitigation considerations when designing PBN departure and arrival procedures April 2016 http://publicapps.caa.co.uk/docs/33/CAP%201378%20APR16.pdf	SARG, CAA

12 Glossary

Abbreviations and Acronyms - Airspace Change Proposal Newcastle International Airport

ACC	**Area Control Centre** – An Air Traffic control Centre that manages aircraft between their departure and arrival airport
ACP	**Airspace Change Proposal** – A proposal presented to the Civil Aviation Authority by an airport or an air traffic service provider eg NATS (see below), to change/introduce controlled airspace or published aircraft procedures
AIP	**UK Integrated Aeronautical Information Package** – Information updated every 28 days that is essential to air navigation.
AIRAC	**Aeronautical information regulation and control** – A set of published dates that new or changed aeronautical procedures can be published on.
ATC	**Air Traffic Control** – Provides safe and expeditious controlling service to aircraft
ATS	**Air Traffic Service** – Received by an aircraft when communicating with Air Traffic Control
CAA	**Civil Aviation Authority** – The governing body of Aviation in the UK
CAP	**Civil Aviation Publication** – Publications produced by the Civil Aviation Authority
CDA	**Continuous Descent Approach** – An aircraft can descend from cruising altitude to touchdown without having to intermittently level off
CDO	**Continuous Descent Operations** – Operations of continuous descent approaches
DTVA	**Durham Tees Valley Airport** – Formerly known as Teesside Airport.
EASA	**European Aviation Safety Agency** – Safety agency for European airspace
FAS	**Future Airspace Strategy** – Plans for the future make up of UK airspace
GA	**General Aviation** – Flights not involved in commercial air transport
GNSS	**Global Navigation Satellite System** – Aircraft can navigate by the use of satellites (much the same as a satnav on your phone or car)
IAF	**Initial Approach Fix** – The position in the sky that an aircraft will start its approach to land
ILS	**Instrument Landing System** – Ground based radio signals that create a
LOA	**Letter of Agreement** – An agreement on procedures between two or more parties
NATS	**National Air Traffic Services Ltd** – the primary UK Air Traffic Service provider
NIA	**Newcastle International Airport**
NDB	**Non Directional Beacon** – A radio transmitter at a known published position used an aviation navigational aid
NM	**Nautical Miles** – Nautical mile = 1.15 statute miles and is used in aeronautical and marine navigation
NTK	**Noise and Track Keeping** – Monitoring of aircrafts routings
PBN	**Performance-based Navigation** – Navigation of aircraft using navigation satellites and computerised on-board systems
RNAV	**Area Navigation** – Aircraft can fly any course without having to route over a beacon on the ground
RNP	**Required Navigation Performance** – very similar to RNAV and allows aircraft to fly a specific path between two 3D defined points in the air
SARG	**Safety and Airspace Regulation Group** – The regulators for UK airspace
SID	**Standard Instrument Departure** – A published departure route from an airport
STAR	**Standard Arrival Route** – A published arrival route to an airport

13 Frequently Asked Questions (FAQ's)

What are you doing?

We are going through an Airspace Change Programme in order to make proposed changes to the arrival routes from Newcastle Airport.

Why are you doing an Airspace Change Programme?

We believe that airspace modernisation is the best way to achieve the increased capacity that the airport needs. It will allow us to grow in the future, it will modernise our flight paths and we think it will benefit the economy of the north east. Changes to legislation also mean that we need to upgrade to newer technology which allows aircraft to follow more accurate flight paths, you can read more about RNAV technology further down this page.

How will the Airspace Change Programme affect me?

You can see our route design options, as well as operational and noise information in the consultation material section of our website.

Will this mean more flights overhead?
Will I see/hear more aircraft?

The current trend at NIA as well as aviation as a whole is an increase in aircraft movements. A long standing aim of our Noise Action Plan is to reduce 'scattering' of aircraft on approach to the airport; RNAV (GNSS) approach procedures will produce highly repeatable, more predictable routes. While this will result in more aircraft flying over the same area, the net effect of these proposals will be less noise - aircraft will remain higher, for longer using less power.

Why does the consultation not include flights over 7,000ft?

Government guidelines stipulate that consultation with stakeholders on the ground is not required for routes changes above 7000ft above ground level (AGL). Flights above 7000ft (AGL) are high enough so that the impact of overflights is less severe for those on the ground below.

Will new communities be affected by air traffic activity?

Geographically the proposed RNAV (GNSS) routes are in the same position aircraft are currently routed. The main result will be a reduction in the 'scattering', meaning aircraft will fly precise routes over the same areas, rather than current more varied routes which aircraft may fly.

What is a STAR?

A Standard Instrument Arrival (STAR) is a standard by which an aircraft travels from the en-route phase to the final approach (10 mile final).

What is RNAV?

Area Navigation (RNAV) is a method of navigation that allows an aircraft to fly a precise route using satellite based navigation systems (GNSS or GPS).

What are RNAV routes?

When RNAV equipped aircraft fly known routes, the on-board flight management computers can assist the pilots by predicting accurate arrival times, and create optimised descent profiles from the top of the descent to the runway. Predictable aircraft behaviour benefits both pilots and air traffic control, and helps deliver improved operational and environmental efficiency, safety, and resilience through the systemisation of operations. Our RNAV routes are designed to mimic the current routes.

Why do aircraft vary which runway to land/take off?

An increase in airflow over the wings (flying into wind) gives the aircraft an increase in Indicated airspeed, which ultimately makes it easier to land or take off. Other factors determining the runway in use consist of 2,000ft wind, approach aids available, traffic pattern and any significant weather in the area i.e. Thunderstorms.

Due to the law of physics aircraft must land/ take off into wind. This increases the airflow over the wings, making it easier.

Can we trust you?

The process for airspace change is regulated by the CAA who will only approve an airspace change if we can evidence that we have followed the correct procedures. Newcastle International Airport has worked closely with the Civil Aviation Authority (CAA), to ensure that we are adhering to the consultation process.

The CAA is engaged with developing a Future Airspace Strategy or FAS. This is a major collection of projects looking at everything from the routes aircraft fly to flight performance information. How does the Newcastle Airport project relate to the FAS?

The FAS requires improvement of navigation standards and recommends that routes are upgraded to RNAV1.

How do I respond to the consultation?

There are several ways to submit your response:

- Through a questionnaire accessed through the website; www.newcastleairport.com
- Through a dedicated email address (also available through the website); star@newcastleinternational.co.uk
- By post; Please send your response to:
  NIA ACP Consultation Response,
  Administration Offices
  Newcastle International Airport Ltd
  Woolsington
  Newcastle upon Tyne
  NE13 8BZ

• During public meetings.

Will you respond to my feedback?

We will produce a report at the end of the consultation to show what feedback has been received and how each piece of feedback has been considered in the decision making process. If you would like to make a noise complaint about current operations, please follow our noise complaints process.

How can I make a complaint about noise I am currently experiencing?

Complaints regarding aircraft noise can be made by:

- Phone – 0191 214 3569
- Email – noise@newcastleinternational.co.uk

All complaints are registered and investigated. To allow us to fully investigate your complaint, please include your name, address including postcode, contact details and specific details of your complaint, with dates and times of the disturbance. Names and addresses will never be made public or used for any other purpose.

We aim to respond to complaints within five working days. However, when a more detailed investigation is required we will send an acknowledgment email advising when you can expect a full response.

How do I know that you have considered my response and that of others?

All responses are taken into consideration. The consultation responses, analysis and subsequent design process will all be made visible to the CAA as part of any submission we make to them. They will only approve an airspace change if they have evidence to show that we have followed the correct processes. A feedback report providing analysis of the issues raised and numbers of consultation responses will be published on our website. We believe that there is a good case for change based around the combined benefits to the network, to operators and, on balance, to local communities as it would further the DfT objective of reducing the number of people regularly exposed to noise from aircraft below 4000ft.

What will you do with my response? Will you be giving feedback on the results of the consultation?

A feedback report detailing the results of the consultation will be published on this website. Responses will be made available to the CAA as part of any Airspace Change Proposals submitted to them for changes covered by this proposal. This will allow the CAA to assess whether we have taken relevant information into account.

How long does the process take?

Our estimate is that the process will take approximately 10 months from the commencement of consultation to the CAA decision.

A1 Indicative list of key Consultees

A1.1 Airport Related

Airport Users and Airlines

Aer Lingus
Air France
Air Malta
Balkan Air
BMI Regional
British Airways
Citywing Aviation Services
Eastern Airways
easyJet
Emirates
Flybe
Jet2.com
KLM
Northumbria Flying School
Northumbria Helicopters
Ryanair
SAS
Thomas Cook
Thomson
Vuelling

Airspace Users and National Air Traffic Management Advisory Committee (NATMAC)

Airport Operators Association (AOA)
Aircraft Owners and Pilots Association (AOPA)
Aviation Environment Federation
BAE Systems
British Airline Pilots Association (BALPA)
British Air Transport Association (BATA)
British Balloon and Airship Club (BBAC)
British Gliding Association (BGA)
British Hang Gliding and Paragliding Association (BHPA)
British Helicopter Association
British Microlight Aircraft Association (BMAA)
British Model Flying Association (BMFA)
British Parachute Association (BPA)
Civil Aviation Authority Safety and Airspace Regulation Group (CAA SARG)
Durham Tees Valley Airport (DVTA)
General Aviation Safety Council (GASCo)
Guild of Air Traffic Controllers (GATCO)
Light Aircraft Association (LAA)
Military Aviation Authority (MAA)

National Air Traffic Services (NATS)
Northumbria Gliding Club
Peterlee Parachute Centre
Unmanned Aerial Vehicle Systems Association (UAVS)

A1.2 National Bodies

National Park
North East Chamber of Commerce
North East Local Economic Partership
English Heritage
Friends of the Earth
Natural England
Environment Agency
Department for Environment, Food and Rural Affairs (DEFRA)
Department for Transport (DfT)
Ministry of Defence (MOD

A1.3 Local Authorities

Durham County Council
Gateshead Council
Newcastle City Council
North Tyneside Council
Northumberland County Council
South Tyneside Council
Sunderland City Council

A1.4 Parish Councils, Resident Associations and Airport Consultative Committee

Brunswick Parish Council
Darras Hall Estate Committee
Dinnington Parish Council
Hazlerigg Parish Council
Heddon on the Wall Parish Council
Ponteland Town Council
Prestwick Residents Association
Woodlands Park Residents Association
Woolsington Parish Council
Woolsington Residents' Association
Airport Consultative Committee

A1.5 Members of Parliament and Members of European Parliament

Elected members

www.newcastleairport.com

Newcastle International
Your Airport