Cumbernauld Airport
Airspace Change Proposal

Reintroduction of an RNP Instrument Approach Procedure to Runway 25

CAP1616 Part 1c

Stage 2 Outputs

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Approval Level	Authority	Name
Author	[redacted] Ltd	[redacted]
Reviewer		

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Background

1. Cumbernauld Airport is a small General Aviation licensed aerodrome located on the outskirts of the town of Cumbernauld approximately halfway between the cities of Glasgow and Edinburgh. It opened in 1966; a paved 820m runway was laid in 1988. It sits within a standard surface-to-2338' Air Traffic Zone (ATZ) surrounded by Class G airspace. Immediately above is the Glasgow CTA with a base of 3000'. To the east, the CTA base rises to 3500' and 4 miles to the west lies the Glasgow CTR rising from the surface to 6000'. This, combined with the Edinburgh CTR 10 miles to the east, has traditionally funnelled VFR traffic routing north to south into the vicinity of the aerodrome.

2. From the early 1990s, the airport enjoyed the use of an NDB/DME non-precision instrument approach procedure to runway 26 (now 25) until a storm destroyed the ground-based navigation equipment in 2013. Longstanding Letters of Agreement with the ATS Units at Glasgow and Edinburgh proved effective in those days assisting inbound traffic. Since then, operators of Britten-Norman Islander aircraft which fly to remote Scottish Islands and are maintained at Cumbernauld have been hampered in meeting the standards of continuity, regularity and capacity due to inclement weather disrupting essential maintenance-flight arrivals.

Introduction

3. There is an opportunity to reintroduce a Performance Based Navigation (PBN) instrument approach to runway 25 utilising an RNP IAP. Through European funding, a number of the subject aircraft were equipped with suitable receiver equipment and it is now essential that Cumbernauld Airport satisfies the need to provide their client operators and others with an approach to be used when currently delay or diversion results from poor weather. No new controlled airspace is required to enable this.

4. The scale of the change is very small and mainly aims to land booked in maintenance flights for business continuity. Throughout this process evidence will be presented showing that of the six thousand annual aircraft movements currently recorded[1], around 3% may actually use the approach. As a movement is counted as a take-off or a landing (and generally are evenly balanced) a figure of 3000 approaches has been used. In other words, around 1.75 aircraft per week on average will utilise the system though last year the figure dropped to <30. Subject to prior permission other operators such as the Scottish Air Ambulance may be given access to the approaches.

Objectives

[1] 2019 figures

5. Cumbernauld Airport's objective in commencing an Airspace Change Proposal is detailed in the Statement of Need which can be found on the CAA website; - ACP-2020-095

6. However, it should be noted that this follows a first application under CAP725 and a revised ACP following the original version of CAP1616. This progressed to obtaining Design Principles with difficulties due to the lack of responses during the engagement phase and coincided with the introduction of Part 1c for aerodromes without approach control.

7. A Stage 1 Assessment Meeting was held on 15th December 2020 and the minutes for this can be found on the CAA ACP Portal. During that meeting the CAA gave a determination that this proposal could be considered under CAP1616 Part 1c Airspace Change Process for establishing RNP IAPs without an Approach Control Service (WAC). A provisional timeline was agreed and permission to progress to Stage 2 given.

8. This paper sets out the actions taken by the Sponsor under the requirements of Stage 2, details the work done and records outputs from the process. A request to proceed to Stage 3 forms part of the conclusions.

Work accomplished under previous ACP

8. During 2019, progress under the original ACP was slow due to a lack of responses from many of the stakeholders then engaged. Nevertheless, at the point where the restrictions imposed by COVID-19 started to really affect progress a successful exercise to create bespoke Design Principles was accomplished.

9. Using a combination of professional judgement and knowledge gained from similar aerodromes that had already passed through this stage, nine draft Design Principles were drawn up. These were: -

A. The design must be ICAO Doc 8168 PANS OPS compliant, validated and flyable by aircraft types in speed category A and B.

B. The Design must reduce the scattering effect of aircraft arrival tracks resulting from pilot visual navigation and regularise approach paths onto a predetermined, published route to the existing final approach bringing certainty to local residents and other airspace users.

C. The new procedures should not increase the number of people overflown by aircraft participating in the approach.

D. The design should achieve a reduction in visual intrusion.

E. The design should respect existing noise abatement/sensitive areas.

F. The design must accommodate PBN traffic in line with CAA's CAP1711 Airspace Modernisation Strategy.

G. The design should benefit from collaboration with other Scottish airports and NATS to ensure it is compatible with the wider programme of lower altitude and network airspace changes being coordinated by the FASI North programme.

10. As a result of the excellent quality of many of the suggestions received a new set of Design Principles were agreed. Note: Speed Category B was dropped due to runway length.

11. The final DPs were as follows -

1. The design must maintain and, where possible, enhance current levels of safety.

2. The design must not require the introduction of new controlled airspace in order to be implemented.

3. The design must reduce the scattering effect of aircraft arrival tracks resulting from pilot visual navigation and regularise approach paths onto a predetermined, published route to the existing final approach bringing certainty to local residents and other airspace users.

4. The design shall benefit from collaboration with other Scottish airports and NATS to ensure it is compatible with the wider programme of lower altitude and network airspace changes being coordinated by the FASI North programme with adjacent aerodromes.

5. The design should minimise the impact on General Aviation including sporting and recreational aviation activity and not deny continued rights of access to existing airspace nor place restrictions on non-participating traffic.

6. The design should respect Cumbernauld Airport's existing noise abatement/sensitive areas.

7. The design shall not adversely affect designs being developed by Glasgow and Edinburgh Airports in the course of their ACPs.

8. The design must accommodate Performance Based Navigation traffic in line with CAA's CAP1711 Airspace Modernisation Strategy.

9. The design must be ICAO Doc 8168 PANS OPS compliant, validated and flyable by aircraft types in speed category A.

12. As will be shown below the simple straight in approach proposed by the APDO completely respects the principles which were formed from the Stage

13. Following the Assessment Meeting the Sponsor has progressed a number of tasks aimed at satifying the requirements contained in CAP 1616 paragraphs 350 to 361. Set out below are the results using the relevant paragraphs from that document to introduce each output.

Stage 2

350. Stage 2 of CAP 1616 ensures the change sponsor assesses all appropriate options that address the Statement of Need. It is recognised that the options associated with the implementation of an RNP IAP (WAC) are very limited. For this reason, there is no requirement for change sponsors' own Design Principles to be developed at Stage 1. However, change sponsors must produce an assessment of any options considered against the following Design Principles:

• The proposal must maintain a high level of safety
• The proposal should avoid overflight of densely populated areas where possible.

14. As can be seen above the pre-existing DPs includes aspects of these principles in -

1) ... maintain and, where possible, enhance current levels of safety.
3) … published route to the existing final approach bringing certainty to local residents.
6) ... respect Cumbernauld Airport's existing noise abatement/sensitive areas.

All the other DPs are regarded as remaining valid and so have been taken into account when briefing the APDO PildoLabs.

352. The change sponsor should engage with an Approved Procedure Design Organisation (APDO) to understand the potential design options in the context of the circumstances at the aerodrome (for example, obstacles, nearby airspace structures as well as environmental considerations).

14. Pildo Labs has been involved with the Sponsor for many years and successfully tendered for this design work. The APDO had already contributed design ideas under the original ACP and have produced material of sufficient detail to form part of the Engagement Material. The design most likely to be used is the simplest being a straight-in RNP approach with minimum leg lengths from IAF to FAF and MaPt as shown in Fig 2

15. There were never going to be a plethora of options bearing in mind the constraining airspace and the desire to respect the DPs. In the original ACP all ground based options along with 'Do Nothing' were sifted out. The only other idea was to replicate the procedural turn "tear drop" shape of the old NDB let down commencing over the field. (See Fig 1.) To contain the track, the notion of employing a Radius to Fix (RF) turn was contemplated. Although the result was an elegant design which satisfied the sponsor it quickly became velar that adoption of RF in the UK was not yet widespread and representations from PPL/IR Europe pointed to the fact that receiver equipage capable of using RF was not yet universal. Hence, the option was dropped.

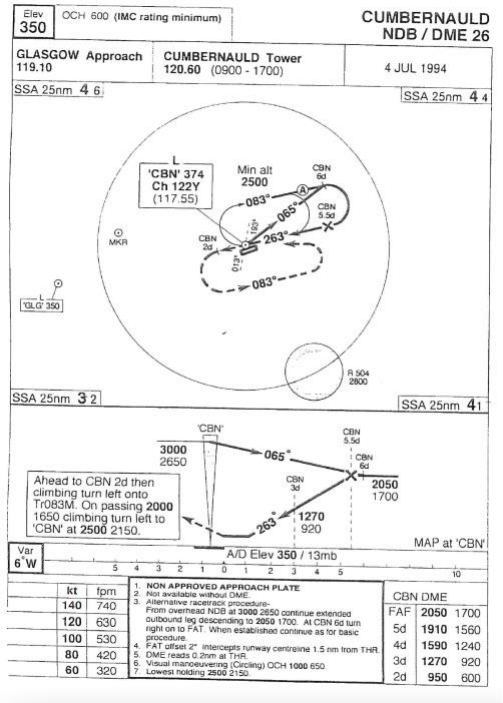

Fig 1. Original IAP

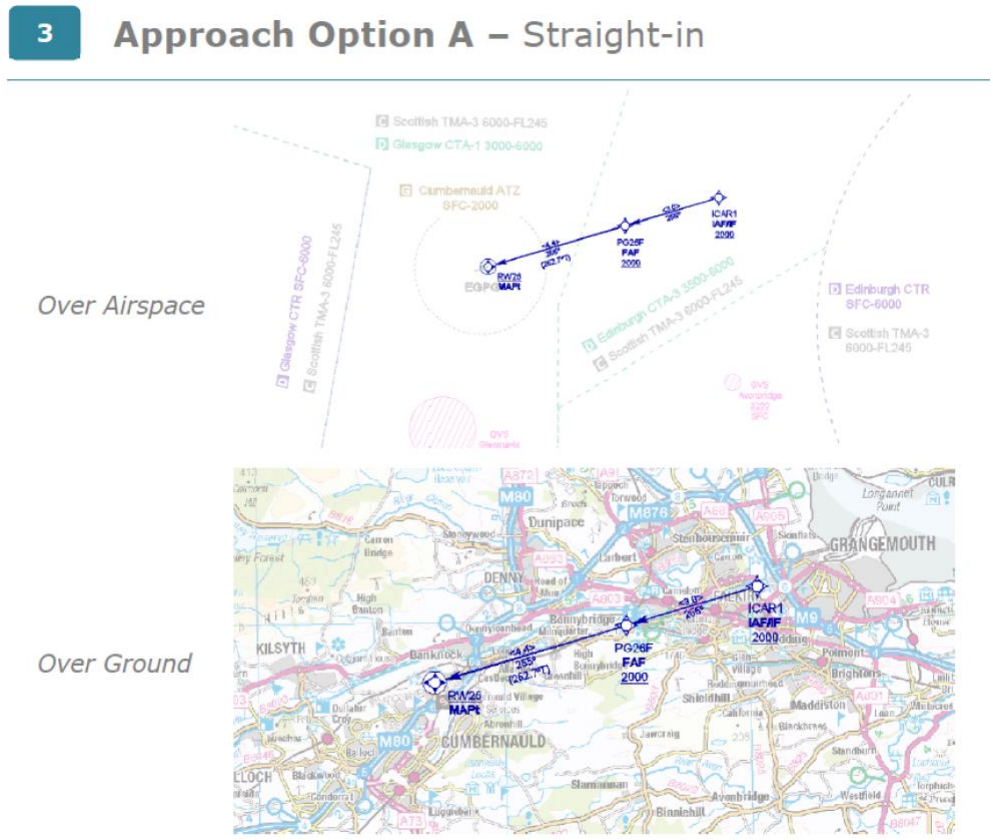

Fig 2. Preferred option

Responses mapped to CAP1616 paragraphs

354. The change sponsor should consider the environmental impact of any potential design option (for example, the design of the track over the ground or restrictions on the number of aircraft that can use the procedure on a given day).

17. Pre-pandemic demand for the approaches was a small percentage of the total movements for the Airport. Out of approximately 6000 mpa (3000 landings) around 100 were anticipated being customers for the IAP. The main user being BN2 Islander aircraft arriving for maintenance. Post Covid-19 lockdown the annual movements have fallen dramatically in line with the rest of industry and in particular due to restriction from the Scottish Government lock downs. At the time of writing (September 2021) traffic has not returned to normal and forecasts remain pessimistic.

18. The low utilisation of the approach means that measuring quantitively the environmental effects of an occasional light aircraft movement is not possible. Furthermore, the short final approach segment is similar to tracks flown now.

355. When considering the impact, the change sponsor should set out the change that is anticipated from the introduction of the proposed IAPs along with any supporting evidence. This should include the anticipated change in the number of aircraft using the aerodrome, the change in the type of aircraft using the aerodrome, changes to the altitude of aircraft using the procedure and the change to areas overflown by the introduction of the IAPs.

19. The business imperative driving the introduction of the IAP is to help ensure BN2 Islander aircraft arrive on time for planned or ad hoc maintenance. The fleet of aircraft are employed *inter alia* in passenger air services and delays in turning airframes around during maintenance impact on the network. Although other aircraft may make use of the approach the numbers anticipated are small. The chosen option has a short straight in approach which is generally the route aircraft landing on runway 25 take now. If anything, they will be slightly higher to start with as the Initial Approach Fix is 2500'. See para 4 for more detail.

356. No further environmental assessment will be necessary if:

• the change sponsor can reasonably demonstrate that the introduction of the RNP IAP is not expected to increase the total number of aircraft movements at the aerodrome in the first two years after introduction, by 10% or more (by at least a minimum of 3,650 movements per year), and;

20. The estimated number of approaches is likely to be 100 per year.

• the proposal does not change the final approach path of aircraft to the runway within 1nm from the runway end, and;

21 The proposed design comprises a straight in approach. The Final Approach Fix is 4.8nm from the runway.

• the proposal will not change the environmental impact of aircraft utilising other aerodromes

22. The nearest other airports are GLA 17 miles to the west and EDI 20 miles to the east. The approach and missed approach path do not enter Controlled Airspace for either airport and existing Letters of Agreement covering traffic coordination will be rewritten.

357. Even for the larger GA aerodromes, the population exposed to noise above 51dB LAeq16h seldom exceeds 750 people. Therefore a 10% increase in traffic which may lead to around a 10% increase in the number of people exposed, or a maximum increase of 10 movements per day, is an appropriate threshold below which the overall noise impact is likely to be low. This means that undertaking a full environmental assessment as detailed in CAP 1616 for Level 1 changes, is unnecessary.

23. Apart from the low utilisation the subject a/c are mostly piston engine with a low noise footprint especially on approach. These a/c already operate into Cumbernauld and follow the same final approach path. To date noise has not been an issue with people in the vicinity.

359. In addition to the design of any procedure's track in space, the way in which the change sponsor will operate the procedures will also determine the impact on other airspace users, so the change sponsor will need to develop their operational concept and complete the CAA's ATM Safety Questionnaire. The review and associated feedback of this Questionnaire allows the change sponsor to continue to develop their final Safety Case for the operation of the procedures, which will need to be agreed to enable the CAA to provide an exemption from Article 183(b) of the Air Navigation Order 2016.

24. The ATM Questionnaire has been reviewed by the CAA and found satisfactory. The Safety Case and associated Concept of Operations including a Pilot Brief are in course of preparation.

360. Once the change sponsor has assessed the potential procedure design options and the CAA has reviewed the ATM Safety Questionnaire, the change sponsor then engages with affected stakeholders to gather information and to understand views about the potential impact of their proposals.

25. A comprehensive list of Aviation Stakeholders was drawn up for the last ACP. This will form the basis of the target audience for new Engagement Material and discussions. Some new potential stakeholders have come to light following conversations with GLA and EDI airspace change teams and these will be added to the engagement list.

361. The Stage 2 Gateway Assessment of the full CAP1616 process is not required. Output from Stage 2

• An assessment of each proposed option (a single option is acceptable with supporting justification) with information as to why it is being considered as a potential option. This information should include how the options meet the design principles as well as qualitative statements on the:

• Impact on safety (guidance in para E50 of CAP 1616)

There is but one option considered viable for this RNP approach. It will be designed to ICAO Doc 8168 standards and as it supplements visual approaches is intrinsically safer than existing approaches.

• Environmental impact

The very small number of flights anticipated using the approaches which are for the most part existing customer arrivals is not likely to have any additional detrimental effect on the environment either in terms of noise or exhaust emissions.

• Economic impact (Relevant parts of Table E2 of CAP 1616)

Currently delayed or diverted a/c incur costs to the operators. The maintenance business losses money due to the non-arrival of the a/c. There is often little chance of filling to hangar space with other work at short notice.

Successful approaches will mean the operators not incurring diversion costs and the maintenance company maintaining planned income against targets.

• Impacts (positive and negative) on airspace users

There are no negative impacts of the chosen option on airspace.

The objective of the simple design includes not having to enter GLA/EDI controlled airspace. Achieving this means that controllers there will not have to accommodate traffic which may require vectoring with their own traffic.

For Class G airspace users, the presence of a defined approach signified by Feathered Arrows on charts will bring certainty as to where traffic might be expected during periods of poor weather. Cumbernauld already provides traffic information to a/c on frequency in the vicinity.

• Confirmation that the ATM Safety Questionnaire has been reviewed.

The ATM Questionnaire has been reviewed and accepted at a meeting with CAA on 6th April 2021

• Feedback from APDO on design options that are to be included in engagement materials (the design options do not need to have been formally approved at this stage but should be able to provide stakeholders with enough information on the likely track and altitude to enable meaningful feedback).

• A description of any options that have been considered but are not being proposed and the reasons why they are not being proposed.

See paragraph 15 above.

• Additional environmental assessment, if required

Not required

• Determination from the CAA that the proposal can move to Stage 3

26. The Sponsor requests clearance to proceed to Stage 3.

[Ends]

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