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# Summary of NMB Reduced Night Noise Trial Workshop

## Technical Workshop on 29 March 2018

**Date:** 5 April 2018

**Attendees:** Helios, GAL, ANS, EasyJet, Virgin Atlantic, Trax International, BALPA.

**Apologies:** NATS

### Introduction

Following the Reduced Night Noise (RNN) Industry workshop on 28 February and the RNN Community workshop on 14 March, a Technical workshop was held to discuss possible concepts of operation, providing input to the Instrument Flight Procedure (IFP) design process, and also to consider questions raised at the previous workshops.

This information paper summarises the output of the workshop, which was held on the morning of 29 March 2018.

This summary is a technical document to facilitate industry dialogue. Technical terms are not explained here.

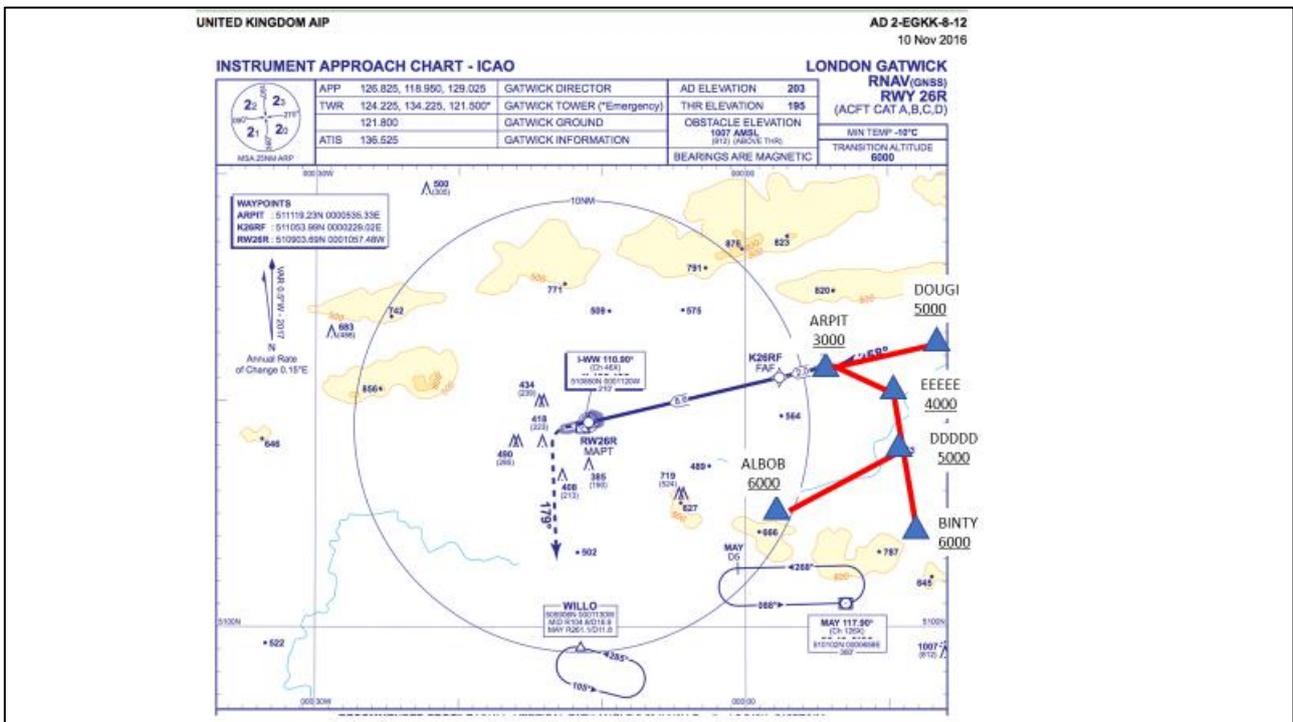
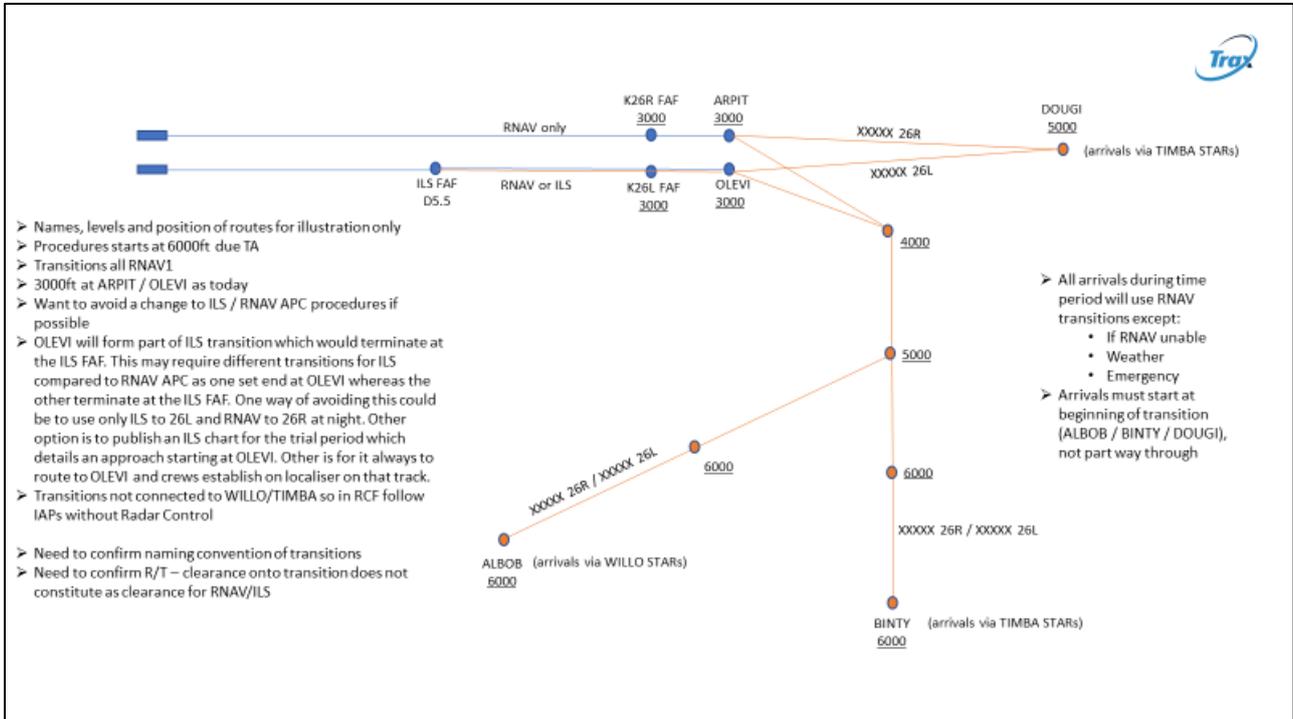
### Concepts of operation

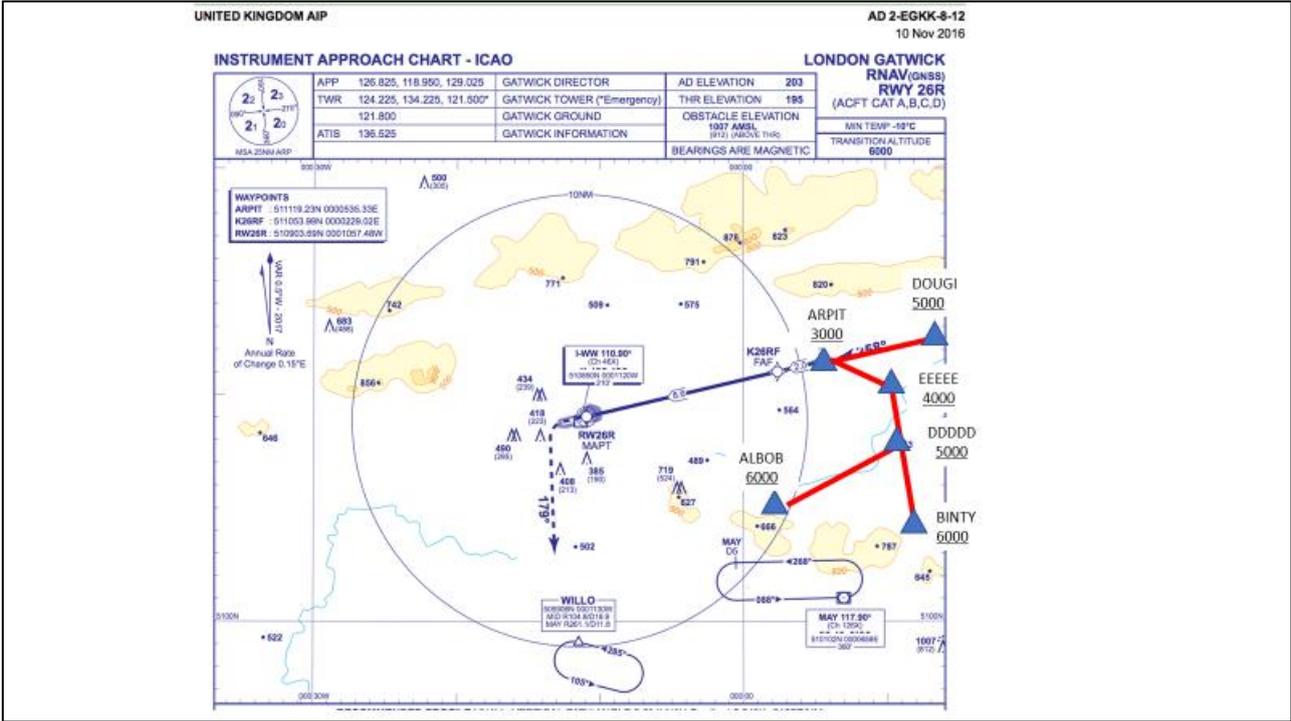
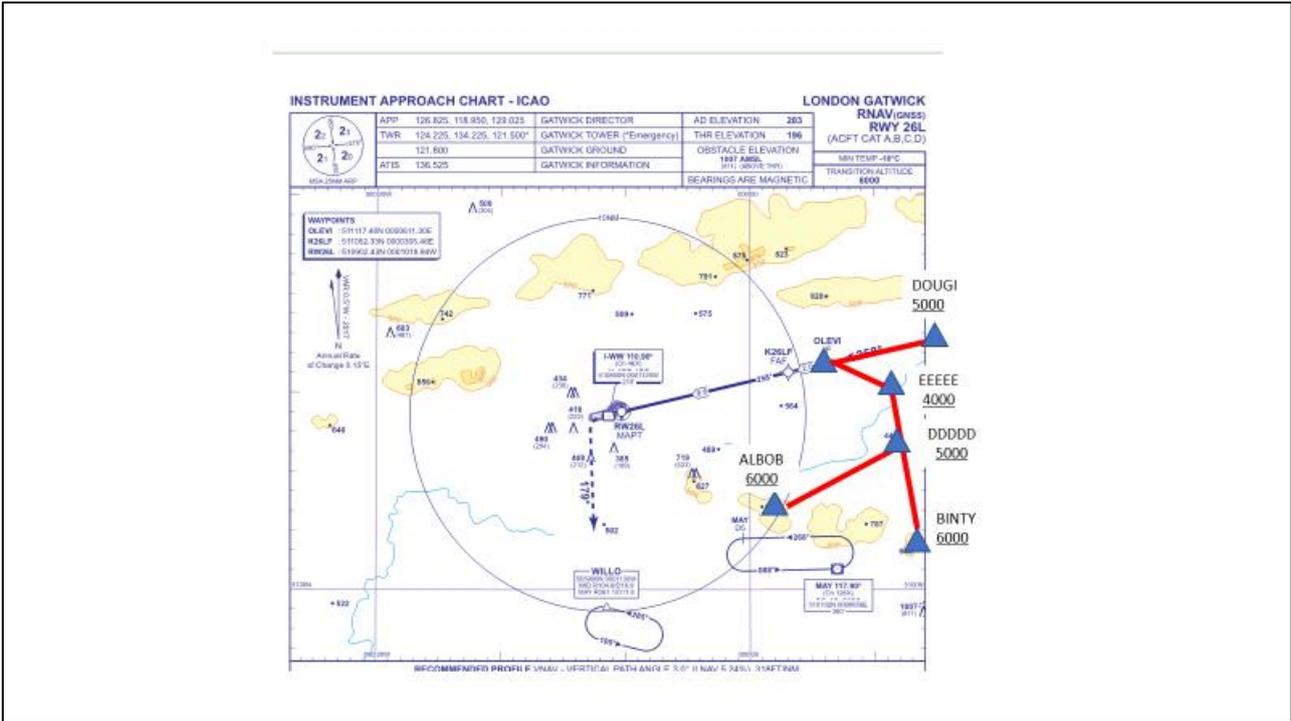
The meeting considered the design of the RNAV routes but it did not discuss their exact location.

The following points were made:

- A minimum set of RNAV transitions to accommodate traffic efficiently would be 3 to each runway – one from south-west, one from south-east and one straight-in for each runway direction.
- For westerly arrivals, the transitions from the south could start from near the LGW holds (TIMBA and WILLO).
- For easterly arrivals, one transition needs to come from WILLO and the other via TEL TU (Goodwood). The workshop did not discuss easterly flights planned via TIMBA, which will need to be considered.
- The 08L/R arrival via TEL TU will require additional co-ordination from NATS if an optimum vertical profile is to be achieved. This will need consideration by NATS.
- The existing airspace infrastructure could constrain options for easterly transitions and the ability to accurately follow the correct vectored swathes accurately may be limited by RNAV1 design criteria.
- The RNAV transitions need not be connected to an arrival route (STAR).
- The transitions from the south should start at 6,000ft. This is preferable to FL070 which is above the transition altitude and is not an ideal design with regards to altimeter settings in the flight deck. The straight-in transition could start lower since it may be closer to the runway.
- The transitions should be designed to RNAV1 rather than RNP1 because of higher availability of RNAV-capable aircraft. Even RNP1 capable aircraft are not necessarily capable of RF-legs (e.g. the B747) so the ground track could not be changed. However, the CAA has pointed out that RNP-1 will be mandated by 2024 and therefore it could be part of a longer-term solution if it delivers noise benefits.
- On the main (southern) runway, separate RNAV procedures may be required for each final approach option (ILS or RNAV). On the northern runway, procedures are only required for the RNAV final approach since ILS is not available.
- This means that for each arrival mode (east/west), 3 procedures are required (south-west, south-east and straight in) for each final approach (main runway ILS and RNAV and northern runway RNAV). A total of 9 procedures for each runway direction, although they largely overlay 3 swathes.
- In total, therefore there are 18 procedures (easterly and westerly), even though many are similar to each other. This is a significant volume of work in the timescales available.
- The angle on which the transitions can merge onto final approach will be limited due to the short distance between IF and FAF on the RNAV approaches.

- There was also discussion on the 2NM level segment required at the start of an RNAV approach. This is required by PANS-OPS (the ICAO procedure design standard), although it could be removed if the CAA agrees. It was proposed to keep this segment to maintain compliance with PANS-OPS, but Trax will talk to the CAA about the options here and the likely future of this segment. It is understood that it has recently been considered in Eurocontrol and decided that it should be maintained.
- The proposed concept for westerly arrivals is shown in the following slides. Note that the diagrams below are not to scale and are for illustration only.





**Questions from the industry and community workshops**

**Questions raised at the Industry workshop:**

- *What is an acceptable sample size? Will the trial achieve it?*  
 The workshop was presented with analysis showing the number of trial flights is expected to be over 1000 (rather than the 650 presented at the communities workshop) because of an error found in the data analysis. This

suggests the sample size of flights in the trial (and also in the pre-trial monitoring) will be sufficient for good data analysis. The workshop also agreed that the trial will involve all aircraft unless they are not RNAV capable. Unscheduled flights falling into the night period will operate the trial routes. At present, about 1.5% of departures do not fly RNAV SIDs. This suggests a similar number will not fly RNAV transitions. This number would be small enough to not affect the trial outcome, but aircraft not flying RNAV in the trial must be recorded.

- Are Easterly arrivals limited by airspace restrictions?  
This question could not be answered in the technical workshop. There is a need to discuss easterly arrivals, particularly those via Goodwood, with NATS as noted above.
- *Do ICAO procedure design requirements have an impact on the routes?*  
The most significant procedure design constraints are described in the text above. It is noted that the CAA may give dispensation to deviate from some requirements. However, there was concern that this could lead to routes being designed that might reduce the noise benefits (eg tight turns onto final might cause additional noise). It was therefore agreed to follow the requirements but also discuss this with the CAA.

#### Questions raised at the Communities workshop:

- *Can the trial cover the whole night period or at least be extended?*  
It may be possible to extend the trial hours but it is not known by how much yet. It almost certainly won't be possible to cover the whole night period (23:00 – 07:00). It was proposed to determine a maximum trials arrivals rate and then compare that to the predicted schedule for the trial period to then determine the trial operating hours. This will not be possible until later in 2018. It was noted that Schiphol achieves 24 RNAV arrivals/hour onto one runway, so this gives an indication of likely acceptable trial rates.
- *Is there a way to reduce the effects of concentration with RNAV? (eg more routes, dynamic waypoints)*  
The purpose of the trial is to measure the noise benefits of RNAV. CAA document CAP 1378 describes options for mitigating noise with RNAV, and these include using multiple routes for respite or relief. These could form part of the longer term airspace solution. However, it is not the focus of this trial. More routes would have little benefit for a with/without RNAV comparison because the arrivals are already concentrated in a few arrival directions. The number of RNAV transitions to be designed (18 in the current plan) is already high and there was concern about adding to this number. Dynamic waypoints have a possible use in future arrivals management concepts, but again this is not the purpose of the trial. It would also change the trial in a way that might prevent gathering the necessary noise data about RNAV. Dynamic waypoints could be the subject of a follow-on trial.
- *Are there other ways to achieve the noise benefits of RNAV without concentration?*  
We are not aware of other ways to achieve the noise benefits of RNAV without concentration. As noted above, CAA document CAP 1378 describes options for mitigating noise with RNAV, and these include using multiple routes for respite or relief. These will reduce the impacts of concentration.
- *How should the noise be modelled for the trial?*  
We will discuss with the CAA about the suitability of their model (ANCON) for the trial modelling. If it is not suitable, an alternative model will be used. The workshop felt that this may anyway be an opportunity to trial an alternative model at Gatwick since the CAA model is known to have limitations at low noise levels.
- *How can we conclude that ATC will be able to cope with traffic at higher traffic levels if the trial is at low traffic levels?*  
The RNAV concept used in the trial is not suitable for high traffic levels. However, it may still be valuable to use during the night. Other busy-airport concepts also make use of RNAV, for example the “trombone” concept at Frankfurt. Therefore, the trial will still be valuable to determine the likely noise benefits when RNAV is used in these concepts.
- *What might be the unexpected consequences?*  
If multiple aircraft arrive at the same time, spacing between them may be minimal. A choice would be made by NATS between holding some aircraft or reverting to vectoring for a period, although this would likely happen above 6000ft. The likelihood and consequences of this need to be investigated.

#### Next steps

Output from the Technical workshop will be used as input to NMB/10, where it is proposed that the NMB will discuss the design principles for the trial.