

GATWICK ROUTE 5 MODIFIED RNAV-1 SID TRACK ANALYSIS

INTRODUCTION

1. The original Post Implementation Review (PIR) Track analysis for the Gatwick RNAV-1 SIDs Airspace Change Proposal (ACP) in 2013 is published on the CAA website as: [Annex 1 Route 5](#) to CAP 1346. In the Annex 1, the CAA provided a guide to interpret PIR track data. That guide is still valid for the purposes of this document and to avoid repetition, interested parties should click on the above link to refresh themselves on how to interpret the diagrams which have been provided by GAL for this modified RNAV-1 SID PIR. However, we have copied essential track data descriptions from the CAP 1346 Annex 1 into Table 1 below to ease comparison with the modified RNAV-1 SID PIR data (at Columns (a) – (f)), and then added appropriate descriptions of the modified RNAV-1 SID traffic patterns for the period of May 2017 which is representative of the 6 months data from April to September 2017.

NOTES RELATING TO THE DATA IN THE TABLES

Col (a)	Is the traffic sample.
Col (b)	Note 1. Reference to Consultation Document (Con Doc) and ACP diagrams. Month of PIR review period and number of conventional SIDs flown is inserted. Comments provided on conventional SID track dispersion.
Col (c)	Note 2. Reference to Consultation Document (Con Doc) and ACP diagrams. Month of PIR review period and number of RNAV SIDs flown inserted. Comments provided on RNAV SID track dispersion.
Col (d)	Note 3. Comments provided on impact of the 2013 change compared with that portrayed in GAL consultation and ACP submission.
Col (e)	Note 4. Observations on any discernible variance with tactical radar vectoring by ATC post RNAV SID replication implementation. The altitude when vectoring is permitted by Air Traffic Control is illustrated at the top of the column. It is important to note that as notified by the Secretary of State for Transport in the UK Aeronautical Information Package¹ (AIP), that aircraft which have attained the altitudes specified in the UK AIP Note 8, (either 3000ft or 4000ft AMSL) may be directed by air traffic controllers onto a different heading and commanders complying with any such direction will not by reason of so complying be deemed to have departed from the Noise Preferential Routeing. This information was included in the consultation document.: The altitude of 4000ft applies to: - All routes during the night - period 2330-0600 local time; - Rwy 26 Routes 4,7,8,9 during the day period 0600-2330 local time. - Rwy 08 Route 2 during the day period 0600-2330 local time. The altitude of 3000ft applies during the day period 0600-2330 local time to: - Rwy 26 Route 1 and to Rwy 08 Routes 3, 5 and 6.
Col (f)	Note 5. Any remarks.
Col (g)	Shows the CAA comparison of and impact of the modified Route 5 2017 RNAV-1 SID design. Note 6. Altitude Slice Bands show a different traffic sample (one week) in the original PIR comparison period, however, for the modified RNAV-1 SID May 2017 sample, the number of departures is approximately 5 times greater than the 2014 sample as it is for the complete month.

Table 1 - ROUTE 5 – RWY 08 CLN / DVR / BIG – Comparison Jul 13 (Conv) v Jun 14 (RNAV) v Modified RNAV May 17

¹ The UK AIP is the methodology for publishing all aeronautical information, e.g. airways route alignment, Standard Instrument Departure procedures, aerodrome procedures and noise abatement procedures, to mention just a few.

SID Sample (a)	Conventional SID Comments (Note 1) (b)	RNAV 1 SID Comments (Note 2) (c)	Impact of RNAV SID Replication (as shown in original PIR traffic sample (Note 3) (d)	Observations on Vectoring (Note 4) (e)	Remarks (Note 5) (f)	Comparison of and impact of Modified Route 5 RNAV SID based on May 2017 traffic sample (g)
	Con Doc Fig 5 ACP Fig 10	Con Doc Fig 6 ACP Fig 3	The forecast impact for this route was based on the impact shown in Con Doc Fig 6 and ACP Fig 3 which was predicated on the results of the Trial of Route 1. As the RNAV SID replicated the con SID it was forecast by GAL and the CAA that the mean track of the RNAV deps over the ground would be unchanged other than a more concentrated dispersion similar to that demonstrated during the RNAV Trial for Route 1. The RNAV SID CL was designed so that it would be directly aligned with the Conv SID CL. As shown in Con Doc Fig 7 the RNAV CL was co-located with the Conv SID CL. It was however recognised that there was also potential for RNAV departures to be slightly south of the conv SID departures, but until the RNAV SID was introduced, this could not be determined. The Environmental analysis of the impact was at CAP 1346 Annex 2.	For all Route 5 SIDs, aircraft may be vectored off the SID when reaching 3000ft amsl daytime, or 4000ft night time		
Diagram CLN1Z	Month Jul 13 Number 2076	Month Jun 14 Number 1903				Month May 17 Number 1991
At 4000 ft	See 01 CLACTON 4000 ft comparison SLIDE 8 Deps spread evenly across the NPR CL occupying approx 30% of the width of the NPR swathe. After passing the A22, the concentrated departure dispersion splits into 2 parts; vectoring appears to be evident for either the DVR or CLN routing, although ac may be following the DVR SID alignment. The majority of deps are reaching 4000ft before Dormansland.	See 01 CLACTON 4000 ft comparison SLIDE 9 In the main, the dispersion of deps is spread evenly across the NPR CL occupying approx 20% of the width of the NPR swathe. After passing the A22, the concentrated departure dispersion splits into 2 parts - vectoring evident for either the DVR or CLN routing although ac may be following the DVR SID alignment. DVR SIDs appear to be slightly further south towards/ over Dormansland. The majority of deps are reaching 4000ft before Dormansland. In this traffic sample, there appear to be fewer deps over Lingfield using these SIDs compared with the conv SID. Note: in sample 2 with approx 50% less deps, this is not as evident.	The RNAV SID dispersion has slightly reduced compared with the width of the conv SID departure track dispersion, but shortly after passing the A22, there are 2 evident flight paths for the DVR and Clacton routes. Whilst ac are probably being vectored for the CLN routing, traffic on the DVR SID would either be following the SID procedure or being vectored by ATC. It was recognised as part of the ACP analysis, that there was a possibility that RNAV deps could be slightly south of the conv SID departures. This now appears evident from these traffic samples with the result that RNAV deps using the DVR SIDs are slightly further south towards / over Dormansland. The deps are slightly more concentrated than the conventional SID dispersion which was the aim of the RNAV SID replication, although the impacts of this are short in duration given the splitting of deps onto 2 routes, and the amount of vectoring by ATC to position the RNAV deps routing via Clacton.	There is a slight reduction in the spread of deps arising from vectoring.	RNAV track concentration as expected. RNAV sample is - 173 deps less.	See 01 CLACTON 4000 ft comparison SLIDE 10 The traffic sample is almost a like for like comparison with the 2014 samples. The traffic pattern is similar up to the A22, however, the slight turn to the right towards Dormansland and Mark Beech is later. After the A22, some departure are turning right overflying the northern part of Lingfield racecourse and passing north of the cross-roads at Dormansland (the Dormans High Street/ Plough Road/Dormans Road junction). Other departures appear to continue to fly straight ahead whilst some vectoring is evident by ATC when aircraft are taken off the SID for ATC tactical reasons. A wide spread traffic pattern is apparent and is similar to the traffic pattern of the conventional SID. In Slide 10, the modified 2017 RNAV SID design delayed the turn which was previously at KKE 02 (not shown here) and introduced a new waypoint at KKE 04 as shown. With the introduction of KKE04, in the May 2017 RNAV SID traffic pattern, the radar tracks can be seen to better reflect the conventional radar track distribution as they pass between Lingfield and Dormansland as seen on the 2013 data plot (Slide 8). Conclusion: As aircraft pass between Lingfield and Dormansland, we believe the modified 2017 SID produces a traffic pattern which is more aligned to that of the 2013 conventional SID traffic pattern, and is closer to the NPR; thus, we consider that a better replication of the 2013 SID traffic pattern has been achieved up to 4000ft.