AIRSPACE CHANGE PROPOSAL ENVIRONMENTAL ASSESSMENT

Title of Airspace Change Proposal	**Gatwick PRNAV SID Replications**
Change Sponsor	**Gatwick Airport Ltd (GAL), supported by NATS**
DAP Project Leader	[redacted]
Case Study commencement date	**4 December 2012**
Case Study report as at	**18 January 2013**
Report Reference	**DAP/ERCD/AG/Gatwick PRNAV SID Replications ACP**

Instructions

In providing a response for each question, please ensure that the 'Status' column is completed using the following options:

- **Yes**
- **No**
- **Partially**
- **N/A**

To aid the DAP Project Leader's efficient Project Management it may be useful that each question is also highlighted accordingly to illustrate what is resolved (Green), **not resolved** (Amber) or **not compliant** (Red) as part of the DAP Project Leader's efficient project management.

1.	Introduction	

This report describes the environmental considerations relevant to the proposed creation of PRNAV SIDs at Gatwick Airport. The Airspace Change Proposal (ACP) has been submitted by Gatwick Airport Ltd (GAL) with support from NATS.

This assessment is based upon information presented in the proposal document entitled "Airspace Change Proposal - Gatwick PRNAV SID replications (Issue 1.1)" dated 9 January 2013, plus associated consultation material and subsequent information received as the result of queries raised with the sponsor following submission of the ACP.

Scope of the ERCD report

The report considers only the environmental impact of the sponsor attempting to replicate existing SIDs and not the legitimacy of the SIDs themselves.

There are wider policy questions that need to be considered as part of this proposal:

- Can the CAA approve a SID knowing that it will systematically take traffic out of an existing NPR swathe prior to vectoring?
- Can the CAA approve a SID knowing that it does not reflect the NPR centreline?
- If SIDs are approved that do not mirror the NPR centreline, should the NPR centreline be changed to mirror the new SID as a requirement of implementation?

Equally, it does not consider operational aspects such as:

- the speeds used to design and illustrate the conventional SIDs and the PRNAV SIDs;
- why in some cases the SIDs do not reflect the NPR centrelines;
- to what degree the new PRNAV SIDs need to match the conventional SIDS in order to be deemed "replications".

2.	Guidance to the CAA	Status
2.1	**Is the proposal consistent with Government policy and/or guidance from Government to the CAA?**	Yes

Guidance issued to the Civil Aviation Authority[1] sets out a framework within which DAP operates in discharging air navigation functions. This guidance states that changes to airspace arrangements should be made after consultation, only where it is clear that an overall environmental benefit will accrue or where airspace management considerations and the overriding need for safety allow for no practical alternative.

[1] DTLR, Guidance to the Civil Aviation Authority on Environmental Objectives relating to its Air Navigation Functions, January 2002

It confirms that Government policy continues to focus on minimising over-flight of more densely populated areas with aircraft operating below 7,000 feet. However, when it is possible to avoid over-flight of National Parks and Areas of Outstanding Natural Beauty (AONBs) below this altitude without adding to environmental burdens on more densely populated areas, it clearly makes sense to do so. The Government's aim is to give stronger protection to the most valued landscapes in designated National Parks and AONBs. However, Government policy[2] does not preclude over-flight of National Parks or AONBs, as it is often impractical to do so.

3.	Rationale for the Proposed Change	Status
3.1	**Does the rationale for the ACP include environmental reasons?**	Yes

The introduction of PRNAV to replicate existing conventional SIDs is in line with the CAA's Future Airspace Strategy. The use of PRNAV SIDs aids efficiency, expedition and safety.

Equally, due to increased accuracy of aircraft adhering to the SID centreline, traffic dispersion is reduced thereby reducing the populations over flown, all other things being equal. This should reduce the number of people affected by the noise from departing aircraft, but is likely to result in some people being overflown more often.

4.	Nature of the Proposed Change	Status
4.1	**Is it clear how the proposed change will operate, and therefore what the likely environmental impacts will be?**	Yes

The proposal is to replicate current conventional SIDS from the airport's main runway with new PRNAV SIDs; it is not the intention to replicate existing traffic patterns or existing NPR centrelines where these may differ from the conventional SID.

Four of the nine SID routes have been trialled as PRNAV SID replications since 2007. Cessation of the PRNAV trial will happen on 20 April 2013 and the sponsor has decided to implement PRNAV SIDs on all nine routes based on the evidence collected on the four trialled SIDs. The proposal states that the trialled SIDs provide assurance that the untrialled SIDs can be "similarly replicated". Whilst "assurance" is perhaps too strong, it seems reasonable to assume that the traffic dispersions seen on the four types of trialled routes will be similarly repeated on the equivalent untrialled routes. The expected traffic dispersion for aircraft flying on a PRNAV SID on the untrialled routes is not illustrated in the consultation or proposal.

Of the 125,000 departures in 2011, 2,552 (2%) of them were via one of the trialled PRNAV SIDs.

[2] National Parks and Access to the Countryside Act 1949, Planning Policy Guidance (PPG) 7 – The Countryside and the Economy and PPG 24 – Planning and Noise

The dispersion of traffic will change on some of these Routes even though that dispersion may be contained within the NPR swathe. For example, some of the Routes (particularly those with turns after departure) will experience a more concentrated dispersion once PRNAV is implemented.

Conventional SIDs will be retained for the minority of aircraft at the airport that are not equipped to fly the PRNAV SIDs, until equipage is close to 100%.

The proposal explains that "The improved track-keeping ability of PRNAV will result in less dispersal of flights across the NPR swathes. Thus the noise impact of the over-flying aircraft will affect less people. However those who are directly beneath the flight path will experience a greater number of over-flights." This is true up to a point, but may not be true in all circumstances. The statement assumes that the reduced dispersal remains along the current route. If the route is actually moving because the SID cannot be replicated exactly, it may not necessarily be true that less people will be affected.

The sponsor has provided a set of diagrams ("heat plots") that show the density of aircraft tracks as drawn from radar data. For the four routes that were trialled, each route has two diagrams for comparison – one showing the dispersion of traffic on the conventional SID, the other showing the dispersion of traffic on the PRNAV SID. For the five non-trialled routes, there is only one diagram each which shows the dispersion of the conventional SID. These heat plot diagrams have been used to gauge the potential environmental impact.

The conventional heat plots are taken from one day's data (a peak summer's day in 2011), the PRNAV heat plots are taken from one year's data (2011). The illustrated tracks stop at a height of 4,000ft, at which point aircraft can be vectored off the SID by ATC staff.

Table 2 in the proposal includes the following details of each new SID:

- Whether the SID is within the existing NPR swathe;
- The maximum distance of the new SID from the NPR centreline, below 4,000ft;
- The maximum distance of the new SID from the existing conventional SID, below 4,000ft.

The proposal advises that "Above 4,000ft aircraft would be tactically vectored exactly as they are today, therefore there will be no change to the environmental performance from aircraft above 4,000ft." Whilst aircraft will still be vectored after implementation, this statement is only true if aircraft are vectored from similar points as occurs currently. If the new SIDs result in aircraft being at a different location when they achieve 4,000ft then there could be a change in the environmental impact. For example, the diagrams that illustrate Route 2 show that the distribution up to 4,000ft is noticeably different for traffic on the conventional SID and traffic on the PRNAV SID.

A summary table of the nine Routes is at Appendix 1 of this report.

Of the four trialled Routes, two have aspects that are worth noting as detailed below:

Route 2
Despite the maximum distance between the two SIDs being 308m, the concentration of the current traffic does not follow the conventional SID around the first turn of the procedure. In contrast the PRNAV traffic does follow the new SID around the same turn. This means that the concentration of traffic around that turn is likely to shift from its current path (west of the NPR centreline) to a visibly different path (east of the NPR centreline). In terms of impact, this would mean that below 4,000ft the population to the west of the NPR centreline would be overflown less whilst the population to the east of the NPR centreline would be overflown more frequently.

Route 4
The proposal explains that it was not possible to come up with a design that enabled the SID to safely be contained within the NPR swathe for Route 4 (Section 12 of the proposal).

Traffic below 4,000ft on the PRNAV SID is shown to exceed the limit of the NPR swathe (to the north of the first turn) with a greater frequency (1%-5% of traffic) than the current traffic on the conventional SID does. This would suggest that populations in that area, outside the NPR swathe, are more likely to be overflown by aircraft as a result of the proposal.

By approving Route 4, the CAA would be approving a SID that it knows is not contained within the existing NPR swathe and is likely to result in some traffic leaving the NPR swathe below 4,000ft. Whilst there will be potentially fewer people overflown due to a much narrower dispersion of traffic on the PRNAV SID. (The existing conventional SID as presented in the proposal also extends beyond the existing NPR swathe but the heat plot shows that almost all of the current conventional traffic remains within the NPR swathe below 4,000ft.)

Of the five untrialled Routes, one is worth highlighting (below):

Route 8
The heat plot for Route 8 (traffic on the conventional SID below 4,000ft) shows that instead of following the left-hand turn of the SID and NPR the traffic travels straight ahead, to the extent that it shows a proportion of traffic (1%-5%) travelling beyond the limit of the NPR swathe. The sponsor has explained that “traffic is routinely given a standard radar heading to run it further west on the SFD route from 26L” and that this will continue to happen once the PRNAV SID (which closely matches the conventional SID) is implemented. Therefore, in the instance of this Route, despite the new SID replicating the current SID and the two traffic dispersions expected to be similar, it is still expected that traffic will be directed to travel further west such that a small proportion will still exceed the NPR swathe.

4.2	**Have alternative options been considered, and have the environmental impact of each alternative been assessed?**	No

Alternative options were considered for Route 4, in order to move the track back more into the NPR swathe. However, these were discounted for both safety reasons and because they still resulted in some traffic travelling outside the NPR swathe. As the alternatives were discounted for safety reasons, it would not have been relevant to consider the environmental impact of the alternatives.

5.	Noise	Status
5.1	**Has the noise impact been adequately assessed?**	Yes

In terms of the requirements of CAP725, the noise impact has been adequately assessed.

Prior to consultation, the CAA reviewed the latest L_{eq} contours and SEL footprints for Gatwick Airport (at that time 2010 contours were the most recent) to determine if the implementation of PRNAV SIDs would be likely to have an impact on the contours. Based on the evidence presented at the Framework Briefings and subsequently, we were content to conclude that the changes would be unlikely to have an impact on the contours or the 90dBA SEL footprint. This was either because:
The expected traffic dispersion resulting from the new PRNAV SID was comparable to the existing traffic dispersion; or
Any difference in dispersion occurs beyond the 57dBA contour and the 90dBA SEL footprint;

Accepting that neither L_{eq} contours nor SEL footprints were required for this proposal, there are no other noise metrics that are deemed essential by CAP725.

Introducing PRNAV SIDs is not expected to increase traffic numbers or to change vertical profiles, so to a large extent the noise impact represents a redistribution of noise. Generally this will mean some people experiencing an increase in overflights due to the nature of PRNAV and its improved track-keeping, and others that are currently beneath the wider dispersion experiencing less overflights. However, on two of the Routes (2 & 4, as commented upon in 4.1 above) there appears to be a likely shift in concentration that is not entirely due to traffic becoming more concentrated around the existing traffic pattern.

5.2	**Has the noise impact been adequately presented in the consultation and the submitted proposal?**	Yes

In terms of the requirements of CAP725, the noise impact has been adequately presented.

The track diagrams used to portray traffic dispersion, SID centrelines and NPR swathes in the original consultation document are poor quality (they are blurred OS maps). This made it difficult to see locations, plus the population density information that the sponsor has also portrayed on the diagrams. More detailed diagrams were published online on 1 October 2012.

The consultation does advise that “P-RNAV SIDs will mean that the dispersion of departing aircraft will become more concentrated than before (until aircraft are subsequently ‘vectored’ by Air Traffic Control once above the vertical limits of the NPR, as per current operational practice) with the result that some residents will be over flown less, while others will be over flown more and therefore noise impact will be

redistributed." This is true but only if all other things are equal – namely that the traffic using the new PRNAV SID is expected to fly along the same path as the traffic using the conventional SID. If the two paths are different, then it may not necessarily be true that less residents will be overflown as a result of implementing PRNAV SIDs.

Accepting that L_{eq} contours and SEL footprints were not required for this proposal and no other metrics required under CAP725, the sponsor has not chosen to illustrate the noise impact (e.g. as indicative L_{max} noise levels).

The consultation explained that the proposed changes would not impact upon noise contours, and notes that PRNAV will mean that "some residents will be over flown less, while others will be over flown more and therefore noise impact will be redistributed."

Route 4
Whilst the updated heat plots in the consultation are clearer, the document does not make an explicit statement explaining that whilst the traffic on the conventional SID is within the NPR swathe below 4,000ft, a proportion of traffic (1%-5%) on the new PRNAV SID are expected to travel beyond the NPR swathe (to the north of the first turn).

6.	Emissions	Status
6.1	**Has the impact on CO_2 emissions been adequately assessed?**	Yes

Prior to consultation, the CAA considered the need for undertaking an emissions assessment on the assumption that PRNAV SIDs would replicate the existing conventional SIDs, with no changes to fleet mix, traffic volumes or vertical profiles. It was concluded that a CO_2 assessment would not be required as any increase or decrease would be minimal, and that the likelihood would be no change overall.

A copy of the ERCD conclusions about the need for a CO_2 assessment are at Appendix 2.

6.2	**Has the impact on CO_2 emissions impact been adequately presented in the consultation and the submitted proposal?**	Yes

The consultation states that "as the P-RNAV SID designs included in this implementation proposal are replications of conventional SID routes, **there is no increase in airport runway capacity, nor is there likely to be a measurable change in emissions from aircraft flying these routes.**"

The proposal states that "The proposed PRNAV SIDs have been designed to match the extant conventional SIDs as closely as possible, hence there is no claimed benefit and no expected change in terms of emissions."

7.	Local Air Quality	Status
7.1	**Has the impact on Local Air Quality been adequately assessed?**	Yes

Prior to consultation, the CAA considered the need for undertaking an LAQ assessment on the assumption that PRNAV SIDs would replicate the existing conventional SIDs, with no changes to fleet mix, traffic volumes or vertical profiles. It was concluded that a LAQ assessment would not be required as there would be no impact on LAQ as a result of this proposal.

A copy of the ERCD conclusions about LAQ, and specific reference to the Air Quality Management Area at Horley Gardens, are at Appendix 2.

7.2	**Has the impact on Local Air Quality been adequately presented in the consultation and the submitted proposal?**	Yes

The consultation makes no reference to LAQ specifically, only that there is unlikely to be a measurable change in emissions.

The proposal recognises the proximity of the AQMA at Horley Gardens, and concludes that "The design requirement to match the existing conventional SIDs as closely as possible, means that the changes suggested by this proposal would not have an effect on the local air quality at ground level."

8.	**Tranquility**	**Status**
8.1	**Has the impact on tranquility been adequately considered?**	Yes

Yes, considering the extent of the likely impact and the areas overflown below 4,000ft, tranquillity has been adequately considered.

8.2	**Has the impact on tranquility been adequately presented in the consultation and the submitted proposal?**	Yes

Tranquillity and visual intrusion are both subjective qualities, and there is no accepted metric for gauging the impact that aviation has on either.

The consultation makes no reference to tranquillity.

The proposal states "The local environmental impacts capture Noise, Tranquillity, Visual Intrusion, Local Air Quality and Biodiversity. The PRNAV replication of SIDs should have a very small impact on the local environment since the changes to the flight paths are very small."

9.	**Visual Intrusion**	**Status**
9.1	**Has the impact of visual intrusion been adequately considered?**	Yes

Yes, considering the extent of the likely impact and the areas overflown below 4,000ft, visual intrusion has been adequately considered.

9.2	Has the impact of visual intrusion been adequately presented in the consultation and the submitted proposal?	Yes

The consultation makes no reference to visual intrusion.

The proposal states "The local environmental impacts capture Noise, Tranquillity, Visual Intrusion, Local Air Quality and Biodiversity. The PRNAV replication of SIDs should have a very small impact on the local environment since the changes to the flight paths are very small."

10.	Biodiversity	Status
10.1	Has the impact upon biodiversity been adequately considered?	Yes

Yes.

10.2	Has the impact upon biodiversity been adequately presented in the consultation and the submitted proposal?	Yes

There are no statements in the consultation about biodiversity, but this is acceptable for this proposal as it is very unlikely to have any such impact.

The proposal document makes a brief reference to biodiversity – see section 8.2 above.

11.	Continuous Descent Approaches	Status
11.1	Has the implementation of, or greater use of, CDAs been considered?	No

No - CDAs are not relevant for this proposal.

12.	Impacts Upon National Parks and/or AONBs	Status
12.1	Does the proposed change have an impact upon any National Parks or Areas of Outstanding Natural Beauty (AONBs)?	No

No.

13.	Traffic Forecasts	Status
13.1	Have traffic forecasts been provided, are they reasonable, and have these been used to reflect the future impact of the proposal?	Yes

Yes, forecasts are in Appendix H of the proposal, but were not included in the consultation. GAL has also subsequently confirmed that it does not expect any change in fleet mix at the airport as a result of this proposed change.

As no noise or CO_2 assessments were undertaken, and no increase in traffic is expected as a direct result of the proposal, the forecasts are adequate and reasonable for this ACP.

14.	Consultation	Status
14.1	**If undertaken, has evidence of non-aviation stakeholder consultation been provided?**	Yes

Yes – a list of non-aviation consultees was reviewed by the CAA prior to the consultation. Evidence of consultation and a feedback report have been provided.

14.2	**Has account been taken of the results of the environmental factors raised by consultees or has evidence been provided to indicate why this has not been possible?**	Yes

The environmental factors raised by consultees have been considered. Pre-consultation feedback led to consideration of alternative options (Route 4) but these options were deemed unsuitable. In all cases the sponsor has attempted to replicate the existing SID (the aim of the proposed change) as closely as possible subject to design criteria and safe operation.

15.	Compliance with CAP 725	Status
15.1	**Have all environmental assessment requirements specified in CAP 725 been met, where applicable?**	Yes

Yes – it was agreed prior to consultation that certain requirements would not be necessary for this proposal. See Appendix 1.

16.	Other Aspects	Status
16.1	**Are there any other aspects of the ACP, that have not already been addressed in this report, that may have a bearing on the environmental impact?**	No

No.

17.	Recommendations	Status
17.1	**Are there any recommendations for the Post-Implementation Review?**	Yes

The sponsor has also proposed a Management Oversight Process, that includes quarterly reports to NATMAG containing a list of specific data on the impact of the PRNAV SIDs. Copies of these reports should be requested as part of the post-implementation review.

18.	Government Approval	Status
18.1	**Is the approval of the Secretary of State for Transport required in respect of the environmental impact of the airspace change proposal?**	No

No – approval is not specifically required in respect of the environmental impact, though as noted with respect to Route 4, the proposed PRNAV SID not only doesn't mirror the existing NPR centreline, it goes beyond the limit of the NPR swathe and the trial data demonstrates that this is likely to mean that a proportion of traffic will fly outside the NPR swathe below 4,000ft. On that basis, consideration of re-aligning the NPR should be made, and any such re-alignment would require approval by the DfT.

19.	Conclusions	
19.1	**Can an overall environmental benefit be demonstrated (or justified/supported)?**	No

No, an overall environmental benefit cannot be demonstrated. Standard noise metrics required under CAP725 (L_{eq} contours, 90 dBA SEL footprint) would be unlikely to show any change as a result of this proposal. Equally, any impact on CO_2 emissions would in all likelihood be negligible, and there is not likely to be any impact upon LAQ.

However, in line with current Government guidance, the introduction of PRNAV will generally result in fewer people being overflown, assuming all other things being equal. Of the four trialled SIDs, the distribution (below 4,000ft) on Routes 1 and 3 show that traffic is concentrated along a path similar to that of traffic on the conventional SID. On Routes 2 and 4, the portrayed distribution (below 4,000ft) of traffic on the PRNAV SID is notably different to the traffic on the conventional SID.

- Route 2 – conventional traffic is on a wider dispersion that is concentrated to the west of the NPR centreline whilst the PRNAV traffic is concentrated on a path to the east of the NPR centreline.
- Route 4 – conventional traffic has a wider dispersion, mostly to the west of the NPR centreline after the right-hand turn but largely within the NPR swathe. The PRNAV traffic is more focused and initially has a similar path to the conventional traffic, but 1%-5% of traffic is shown to exceed the limit of the NPR swathe.

Outstanding Issues		
Serial	**Issue**	**Action Required**

Additional Compliance Requirements (to be satisfied by Change Sponsor)	
Serial	**Requirement**

Environmental Assessment Sign-off/Approvals			
	Name	**Signature**	**Date**
Environmental Assessment completed by (ERCD representative)	[redacted]	[redacted]	18/01/13
Environmental Assessment approved by (Head of ERCD)	[redacted]	[redacted]	31/01/13

Appendix 1 – Summary of Routes

Route	Runway	SIDs	Max distance of PRNAV SID from conventional SID below 4,000ft (m)	Nature of Route (initial part of SID)	Comments	Other than concentrating traffic due to implementing PRNAV, is the expected path of traffic similar to the path of traffic using the current conventional SID?
1 - trialled	26L	KENET 2M SAM 2M	206	Straight-out	None.	Yes
2 - trialled	08R	SFD 9P	308	90 degree turn	Most of the traffic was concentrated to the west of the NPR centreline on the initial right-hand turn, so the expected shift in dispersion such that traffic will be concentrated to the east of the NPR centreline on the same turn is actually greater than the stated 370m?	No
3 - trialled	08R	KENET 3P SAM 3P	355	180 degree turn	None.	Yes
4 - trialled	26L	BIG 7 M CLN 8M DVR 8M LAM 4M	370	Tight 180 degree turn	The new PRNAV SID (like the existing conventional SID) travels outside the NPR swathe. However, whilst current conventional traffic seems to be largely contained within the NPR swathe, the trial shows that a proportion of the PRNAV traffic (1%-5%) exceeds the NPR swathe.	No
5 – not trialled, equivalent to Route 1	08R	BIG 3P CLN 5P DVR 2P	16	Straight-out	The heat plot of the existing traffic shows that it follows the NPR centreline closely – in fact closer than it seems to follow the conventional SID centreline. The conventional SID sits to the south of the NPR centreline (a max distance of 453m from the NPR). The PRNAV is a very good replication of the conventional SID. The sponsor anticipates that the PRNAV traffic will be similar to the current dispersion rather than shifting south (towards Dormansland) to better match the SID.	Unknown but assumed to be a similar path to current conventional SID traffic.
6 – not trialled, equivalent to Route 1	08R	LAM 5P	42	Straight-out	The NPR and SIDS are closely aligned, but the demonstrated conventional traffic pattern shows that aircraft are typically not making the shallow left turn on this Route. This takes traffic close to the eastern	Unknown but assumed to be a similar path to current conventional SID traffic.

Route	Runway	SIDs	Max distance of PRNAV SID from conventional SID below 4,000ft (m)	Nature of Route (initial part of SID)	Comments	Other than concentrating traffic due to implementing PRNAV, is the expected path of traffic similar to the path of traffic using the current conventional SID?
					edge of the NPR swathe though not beyond it (below 4,000ft). The sponsor expects traffic on the PRNAV Sid to demonstrate a similar dispersion, i.e. not making the left turn.	
7 – not trialled, equivalent to Route 2	26L	BOGNA 1M HARDY 5 M	475	90 degree turn	None.	Unknown but assumed to be a similar path to current conventional SID traffic.
8 – not trialled, equivalent to Route 2	26L	SFD 5M	87	90+ degree turn (approx 110 degree)	The heat plot (Fig 13) appears to show traffic not following the left hand turn of the conventional SID. Instead, the traffic appears to ahead straight out from departure, with the 1%-5% of current traffic breaching the boundary of the NPR swathe.	Unknown but assumed to be a similar path to current conventional SID traffic.
9 – not trialled, equivalent to Route 3	26L	DAGGA 1M TIGER 3M WIZAD 4M	372	180 degree turn	There is no illustration of current traffic density or expected traffic density. This is because the SID is used infrequently and there is very little track data to produce meaningful traffic patterns/heat plots.	Unknown but assumed to be a similar path to current conventional SID traffic.

Appendix 2 – Advice to DAP on Environmental Assessment Requirements for Gatwick PRNAV Replication ACP

Gatwick SIDS – Requirement for Analysis of New PRNAV SIDs

The four trialled SIDs have been in place for 4.5 years. The latest noise contours and SEL footprints for Gatwick airport are for 2010. These will have been produced using actual traffic and radar data and therefore reflect the four SIDs that were already being trialled at that time.

Scope:

As confirmed by DAP, this assessment does not consider whether or not an ACP and assessment is required to permanently introduce the four trialled PRNAV SIDs at Gatwick. This assessment solely considers whether the four trialled SIDs can act as fair representations for the remaining non-trialled SIDs and on that basis, whether or not introducing PRNAV procedures on the non-trialled SIDs would require any sort of assessment of the environmental impact.

The four trialled SIDs were only available to selected operators – they were not available to all PRNAV compliant aircraft. Therefore, once the four trialled SIDs are introduced permanently, there is likely to be a further changes in the dispersion pattern of aircraft using those four SIDs – most likely a greater concentration of traffic, notably on those SIDs that incorporate a turn. This possible impact is excluded from this assessment.

This assessment does not consider any impact beyond the Leq contours or SEL footprints. However, it should be noted that if PRNAV procedures in general result in a concentration of traffic, then implementing new PRNAV SIDs are likely to result in some residents being overflown more frequently than currently, whilst others are likely to be overflown less frequently.

Comments on traffic dispersion are based upon the slides presented in the Framework Briefing dated 8 November 2011.

Assumptions:

This approach and any conclusions assume that each PRNAV SID matches the conventional SID that it replaces.

Above 4,000ft, aircraft can be vectored off of the SID.

Assessment Approach

1. Qualitatively describe the difference between the track dispersion for conventional SIDs and PRNAV SIDs for the four trialled routes.
2. List and describe the SIDs that are to be converted to PRNAV, and will be based upon the four trialled SIDs.
3. Consider if it is reasonable to use the four trialled SIDs as a reasonable representation of what the other SIDs will be like, if converted to PRNAV.
4. Check if there are any SIDs not addressed by this assessment, and the reasons for excluding them.
5. Based upon the likely impact of PRNAV (i.e. concentration, changes to the average track) does the sponsor have to undertake L_{eq} contours and/or SEL footprints, and who should be consulted?
6. Can the CAA be reasonably satisfied that analysis is not required because all of the changes to concentration and track occur beyond the 57 dBA L_{eq} contour and the 90 SEL footprint?
7. Also consider if there is likely to be any impact upon either CO_2 or LAQ that will require analysis by the sponsor.

The four trialled SIDS are:

1. SAM 26 – straight out
2. SFD 08 – right-angled turn
3. SAM 08 – 180 degree turn
4. CLN 26 – 180 degree turn

The SIDs that are currently conventional but are expected by the sponsor to show a similar impact to the one of the four trialled SIDs are:

- Equivalent to Trial 1 = LAM 08 & BIG/CLN/DVR 08 & KEN26
- Equivalent to Trial 2 = HAR/BOG 26 & SFD 26
- Equivalent to Trial 3 = TIG/WIZ 26 & KEN 08
- Equivalent to Trial 4 = to be decided by sponsor

All SIDs are accounted for.

Trial SID 1

Traffic departs the runway on a "straight out" route. Track diagrams illustrating the dispersion of aircraft on a conventional SID compared with a PRNAV SID show a similar degree of concentration. Traffic above 4,000ft can be vectored off the SID, and the track diagrams show this occurring. Therefore it is reasonable to conclude that any similar "straight out" conventional SIDs at Gatwick will not show a material change in traffic dispersion once converted to PRNAV.

Noise – there is unlikely to be any impact upon the L_{eq} contours or SEL footprints as a result of implementing PRNAV SIDs for LAM 08 & BIG/CLN/DVR 08 & KEN26

CO_2 emissions – there is unlikely to be any change in mean/average departure track or profile as a result of implementing PRNAV SIDs for LAM 08 & BIG/CLN/DVR 08 & KEN26.

Trial SID 2

Existing traffic that flies on the trialled PRNAV SID appears to be more focused around the turn than traffic on the conventional SID. The trial shows that:

- Most traffic is on the outside of the NPR centreline, but within the NPR swathe;
- Most traffic is at 4,000ft by the time the turn finishes and the NPR centreline straightens again.

The right-hand, right-angled turn begins at 2.5nm along the SID (SFD 08), approximately at Burstow. This compares with a left-handed, right-angled turn that starts at 6.8nm along two non-trialled SIDs (HAR/BOG 26 & SFD 26), approximately at Okewood Hill. Until reaching that turn at Okewood Hill, the SID is effectively "straight out" matching SAM26 (Trial 1). Okewood Hill is beyond the 57dBA L_{eq} 2010 noise contour, and also beyond the 90 dBA SEL footprints (departure).

Judging from the 2010 noise contours, the right-hand turn on SFD 08 does not have an impact on the shape of the contours.

Noise - Based on the above, it is reasonable to conclude that implementing a PRNAV SID on HAR/BOG 26 & SFD 26 will not have an impact upon either L_{eq} contours or 90 dBA SEL footprints.
CO_2 emissions – whilst there appear to be some minor differences between the average/mean tracks of aircraft on the conventional SID and the PRNAV SID, these are unlikely to produce a significant impact if modelled to assess any impact on CO_2 emissions. Therefore, it is reasonable to conclude that there will be no material impact in CO_2 emissions, assuming that there are also no differences in the vertical profiles of the conventional and PRNAV SIDs.

Trial SID 3

The left-hand turn begins at 3nm along the SAM 08 SID (and this is the same turning point for the KEN 08 SID). This compares with the left-hand turn on TIG/WIZ 26 at 2.3nm.
The existing conventional SID shows a wide dispersion of traffic across the NPR swathe, with a noticeable number of departures outside of the NPR swathe despite being below 4,000ft. The trialled PRNAV procedure on the same SID shows much more focused traffic, all within the NPR swathe and travelling just on the outside of the NPR centreline. The PRNAV SID shows a more focused pattern of traffic, even on the initial "straight out" portion before the turn begins.
This would suggest that the introduction of PRNAV on TIG/WIZ 26 and KEN 08 would show a similar concentration of traffic.
However, the volume of traffic on the current conventional TIG/WIZ 26 SID is light (the 2010 noise report shows only 1% of all departures used it). Equally, the volume of traffic on the combined KEN/SAM 08 SID is only 5% of departures.
Noise - Based on the frequency of use of the TIG/WIZ 26 SID and on KEN/SAM 08, converting from a conventional procedure of a PRNAV procedure would have no impact upon noise contours despite a possible concentration of traffic dispersion on that SID.
CO_2 emissions - whilst there appear to be some minor differences between the average/mean tracks of the conventional SID and the PRNAV SID, these are unlikely to produce a significant impact if modelled to assess any impact on CO_2 emissions. [While the average tracks are likely to be similar, the conventional SID does have a much wider spread of tracks.] Therefore, it is reasonable to conclude that there will be no material impact in CO_2 emissions, assuming that there are also no differences in the vertical profiles of the conventional and PRNAV SIDs.

Trial SID 4

Neither the traffic on the conventional SID nor the traffic on the PRNAV SID is able to accurately follow the NPR centreline as it turns right, before straightening up again. The radar tracks of traffic flying a conventional SID are spread across the entire NPR swathe, with a significant number flying outside the outer boundary of the NPR swathe. An average track of this traffic is likely to lie outside the NPR centreline, but within the NPR swathe.
The radar tracks of the traffic flying the trialled PRNAV SID are much more focused than the conventional SID traffic. However, the track diagrams clearly show that traffic is flying a much wider turn than the NPR centreline, and generally flies outside the NPR swathe as it attempts to complete the turn. The average track of the PRNAV traffic seems to be wider than the average track of the conventional traffic.
This particular SID is not being used as a representation for any non-trialled SIDs at Gatwick.
The 2010 57dBA L_{eq} contour clearly reveals the impact of the traffic as it begins the right-handed turn on this SID. However, it only reflects the very initial stage of the turn, when actual traffic is still relatively close to the NPR centreline. Later along the turn, when traffic is much further outside the

NPR centreline, is beyond the 57 dBA L_{eq} contour. Therefore, even if traffic was consistently flying along the NPR centreline, it would not have a significant impact on the noise contours. This is also the case for the 90 dBA SEL departure footprints from 2010.

Local Air Quality

Banstead and Reigate Borough Council have declared an Air Quality Management Area (AQMA) for NO_2 in the south-west of Horley ("Horley Gardens"), next to Gatwick airport.

The dispersion and profile of traffic this close to the airport boundary, using 08 SIDs, will not change as a result of implementing PRNAV procedures, and therefore the dispersion of aircraft emissions is unlikely to change either. On that basis it is reasonable to conclude that the introduction of PRNAV SIDs is unlikely to have an impact on Local Air Quality in this AQMA.

[redacted]
ERCD
30 May 2012