



Perth Noise Improvements Proposals

Airservices has considered 21 proposed noise improvement changes to flight paths and air traffic management procedures at Perth between 2010 and 2014 as listed in Table 1 below.

Whilst eight of these changes will have been implemented by 5 March 2015, it has been the ongoing intent to find the best noise outcomes for the entire Perth community and a review of those changes implemented to date determined that there were areas in Perth where there could be further opportunities for noise improvement.

In early 2015 Airservices analysed a further 12 proposals as listed in Table 2 below. Those considered suitable to progress are outlined in the Perth Aircraft Noise Improvements 2015 booklet.

Table 1: Summary of proposals 2010 to 2014

Summary of Proposals 2010 to 2014

East of Perth

Proposals considered

1. Can direct tracking of aircraft arriving over the Perth Hills to the northeast of the airport be limited?

This was a recommendation of the Western Australia Route Review Post Implementation Review. Air Traffic Control changed local practice to limit direct tracking arrivals over Stoneville and Parkerville unless there was an operational imperative.

2. Can jet and turbo prop departures to the east be kept on Standard Instrument Departure tracking until leaving 8,000 feet to avoid track shortening over built up areas?

A trial was conducted from December 2013 to March 2014 with successful application by Air Traffic Control. A Post Implementation Review concluded that the change should be implemented permanently in Noise Abatement Procedures – this is due to occur in 2015.

3. ****Can the GOSNL FOUR STAR be amended to accommodate minimal engine power?**

This proposal was not considered feasible initially, however further consideration of this proposal will occur in 2015. The proposed introduction of a Smart Tracking (satellite assisted navigation) approach over the Perth Hills to the east of the airport and an associated new STAR for visual approaches will provide minimal engine power - the descent profile on the STAR has been specifically designed to provide less than 3 degree descent. The existing GOSNEL FOUR STAR has a descent profile which is greater than 3 degrees and consequently requires pilots to regularly increase their in rate of descent and use increased thrust i.e. stepped approach where the aircraft repeatedly descends then levels out. The other benefits provided by introducing Smart Tracking and the new STAR include less overflight of populated areas over the Perth Hills.

4. Can the departure altitude for the PERTH RADAR SID and AMANA SID be raised?

This is considered to be not feasible due to crossovers between departing and arriving aircraft to the northeast of the Perth Airport. There will be opportunities for improvement in climb profiles for departing aircraft with airspace redesign associated with the proposed new parallel runway.

5. Can the arrival flight path be directed further east away from Roleystone?

A 12-month trial commenced 20 August 2013 and a Post Implementation Review is currently underway. Feedback from community was almost completely positive and there is a strong community expectation this change will be permanently implemented.

6. Is it possible to keep arriving aircraft as high as possible over areas such as Chidlow, Stoneville and Glen Forrest, with the aim of keeping aircraft above 5,000 feet above ground level.

This is not feasible due to the crossover of arrivals and departures to the northeast of Perth Airport. Inbound aircraft are held to 7,000 feet to provide separation with aircraft departing off Runway 06 up to 6,000ft.

7. Can flights over Chidlow maintain higher altitude; can turboprop aircraft fly further south; can the intersection of departures and arrivals be moved further to the east?

This is not feasible as the amount of airspace available to civilian aircraft to the east of Perth is limited due to the inability to utilise RAAF Pearce airspace to the north. As a result, there are multiple crossovers of arrivals and departures on the eastern side of Perth Airport which have been designed for minimum level flight segments for aircraft to reduce fuel burn and provide separation assurance for Air Traffic Control. A redesign will only occur with the proposed new parallel runway.

8. Can the intersection of eastern Standard Terminal Arrival Routes at the MESAM waypoint (near Bedfordale) be moved further to the east of Perth?

This is feasible and will be implemented on 5 March 2015. The new intersection waypoint will be located over non-residential land which is expected to result in fewer aircraft overflying residential areas to the southeast of Perth.

9. Can departures to the east from Runways 03 and 06 be tracked further to the north, approximately following Toodyay Road, to avoid the residential area of Stoneville?

This is not feasible due to crossovers of arrivals and departures to the northeast of Perth Airport.

10. **Can Runway 24 arrivals and Runway 06 departures use curved paths to reduce their noise impact?

This is currently not feasible with existing airspace constrictions (i.e. RAAF Pearce airspace to the north of Perth), however there may be opportunity with the new parallel runway airspace design and use of Smart Tracking approaches.

Noise improvement outcomes delivered

- a. Addressed the practice of direct tracking arrivals to Runways 21 and 24 over the Stoneville and Parkerville northeast of the airport.
- b. Eastern departures from all runways to maintain 8,000 feet before being taken off their standard instrument departure procedure tracking (trial with permanent implementation in 2015).
- c. Modified an arrival flight path from the north to Runway 03 to avoid several residential areas including Roleystone (Roleystone trial).
- d. Moved the converging point for southeastern arrivals to Runway 03 and 06 to a point further east of Bedfordale.

Northwest of Perth

Proposals considered

11. Can aircraft track further north of Beechboro?

A change has been implemented for aircraft departing Runway 03 to the northwest of Perth. Aircraft now use RAAF Pearce airspace at all times it is not active which provides residential areas respite at night and on weekends.

Noise improvement outcomes delivered

- a. Aircraft departing Runway 03 use RAAF airspace northwest of the airport during all available hours when Pearce is not active (weekends and weekday nights).

South and West of Jandakot

Proposals considered

12. Is there an opportunity for a noise improvement for coastal areas south of Perth within the danger areas used for training?

Jandakot Airport Fly Neighbourly procedures for operators in the Danger Areas were amended to ensure best practice and visibility to the community.

13. Can the western boundary of D104C be moved east to Kwinana Freeway?

Only the Civil Aviation Safety Authority can modify airspace. Moving the boundary of a Danger Area does not stop aircraft activity and reducing the size of a Danger Areas may decrease safety due to potentially reduced pilot awareness.

14. What can be done about acrobatic flying over Rockingham (outside controlled airspace)?

The major operator provided evidence that most activity is over water or unpopulated areas when over land. In conjunction with the Jandakot Airport Community Aviation Consultation Group, a working group comprised of Airservices, Jandakot Airport, Aircraft Noise Ombudsman and aircraft operators revised the airport's Fly Neighbourly procedures to reflect best practice.

15. Can procedures for practicing engine failures at Jandakot Airport be changed so that they do not take place over residences?

Operating procedures have been amended to require practice engine failures to be carried out over the runway within the airport boundary.

16. Review of training activities at Perth Airport

The review concluded that training activities at Perth Airport are subject to Air Traffic Control priorities for regular public transport aircraft and there is little flexibility to provide standardised flight paths for these aircraft. Many are below or outside controlled airspace.

17. Can alternative circuit paths for Jandakot Airport be considered?

Investigation is in progress.

Noise improvement outcomes delivered

- a. Amendment to Jandakot Airport Fly Neighbourly procedures (with airport, operators and Aircraft Noise Ombudsman) to ensure greater consistency of application and improved visibility for the community.
- b. Amendment to Jandakot Airport Fly Neighbourly procedures (with airport, operators and Aircraft Noise Ombudsman) to include reference to aerobic flying.
- c. Simulated engine failure training at Jandakot Airport is limited to within the aerodrome boundaries and not over adjacent residential areas.

Southwest of Perth

Proposals considered

18. Can northbound Runway 21 departures continue on their westward heading until over the Ocean?

This is not feasible due to the need for Air Traffic Control to segregate turboprop and jet departures for runway throughput during busy departure periods in particular. The current practice of turning jets north leaving 5,000 feet provides an element of noise sharing and is considered a better noise outcome than concentrating noise over a narrow corridor between the airport and the coastline.

19. Can aircraft after midnight take off with increased power to climb more steeply?

This is not feasible due to the greater thrust being used increasing noise levels when the aircraft is in take off configuration. In addition to more engine noise, there is additional noise from the airframe when the flaps are extended and landing gear down causing a much worse noise outcome during the initial take-off phase.

20. Can full length runway departures (Runway 21) be put in place? If not possible 24 hours a day perhaps 9.00 pm to 7.00 am)?

A study of this proposal at a similar Australian airport concluded there is no

perceptible change in noise impact.

21. Can night departures from Runway 21 be changed to reduce noise?

This is potentially feasible in the form of a night-time respite procedure and has been held for further review in 2015.

Noise improvement outcomes delivered

Nil.

*** incorporated into other investigations (not counted in total 31 investigations)*

Table 2: Summary of proposals 2015

OPTIONS FOR CHANGE

Proposals that have come forward from the community for consideration are discussed below. Note that the level of assessment of each proposal undertaken to date is limited to an initial low-level consideration of safety and efficiency factors only i.e. further technically and environmental assessment is required which may rule out any or all of the proposals noted below as being feasible.

1. Can more aircraft depart from Runway 24?

Description

The southern end of the cross runway (06/24) is the least used with just one per cent of aircraft departing from or arriving to Perth Airport over the area. There have been times when the main runway (03/21) has been closed for extended periods to undertake maintenance and the cross runway been required to manage all aircraft e.g. several weeks each in 2010 and 2011. Note the nearest houses are located less than 600 metres from the southern runway end and this is one of the reasons departure from Runway 24 is the least preferred option in the Noise Abatement Procedures.

Discussion

Runway 24 is currently used for departures, generally when the main runway is not available. The taxiway system from both terminals to the end of this runway does not provide easy or quick access. There is no direct taxiway to the Runway 24 threshold from Terminal 1 and Terminal 2 (international side of the aerodrome) and aircraft must cross the runway while it is active to access the threshold for departure. From Terminal 3 and Terminal 4 (domestic side of the aerodrome) aircraft must cross Runway 21 which is often not available when the traffic demand is high (see attached aerodrome diagram). It therefore takes longer to taxi aircraft departing Runway 24 from all terminals, particularly during busy periods, and the required runway crossings increase complexity and risk. It is also more difficult for air traffic controllers to judge the required spacing of departing aircraft with other aircraft (arrival and/or departure) when using different runways.

The taxiway constraints mean the use of Runway 24 during peak traffic periods negatively impacts on airport capacity, creating delay to aircraft arriving and departing. The additional complexity would also be unacceptable under Airservices Safety Management System.

However, using Runway 24 for departures does not present major safety or efficiency risks during off-peak periods at times when traffic levels are low. Increasing use at these times may be possible but not desirable due to the noise impact for residents nearest the airport.

Feasibility

The increased use of Runway 24 is operationally possible at some times of the day but not desirable due to increasing aircraft taxi distance and the increased noise impact for residents under the flight path close to the airport. Airservices does not consider this option feasible.

2. Can the GURAK / KEELS flight path be split into five separate rotating flight paths?

Description

These departure procedures provide for aircraft to track a short distance to the south and then to make a right turn towards the coast. Aircraft using the GURAK SID will then turn northwards, whereas aircraft using the KEELS SID will then turn to the south-west. Note that some aircraft may be directed by Air Traffic Control to make an early turn to the north in accordance with the Noise Abatement Procedures.

This proposal would establish four new flight paths of approximately equal distance apart, one to the north of the existing flight path corridor and three to the south. To create a noise benefit, the flight paths would need to be at least three km distance from each other.

Discussion

The suggestion of an earlier turn to the west than the GURAK and KEELS SIDs is only feasible for a very small number of aircraft that have the turn capability (i.e. piston and some turbo prop aircraft) and would be unlikely to provide sufficient numbers to have a positive effect on noise sharing. As such, this flight path would be considered a manual departure procedure (i.e. RADAR Departure) which would provide an increased level of safety risk if used as proposed in rotation with other adjacent automated departure flight paths. A further consideration is the height requirement (16,000 feet) to cross over the top of restricted RAAF airspace (when active) near Pearce Airport – these smaller aircraft that could make the early turn are likely to have difficulty climbing to the required altitude in the shorter distance available to them.

If a number of flight paths were created to progressively turn west at spaced distances south of Perth airport, some of them would be located over the top of Jandakot Airport. The existing flight paths for aircraft departing Runway 21 to northern or western destinations are designed to turn prior to the Jandakot control zone in order to maintain safe separation distances between aircraft. Each of the southern SIDS, therefore, has an altitude requirement of 2,500 feet at the NAVAY waypoint which is located over Cannington. Aircraft that cannot meet this requirement are managed by Air Traffic Control with a RADAR Departure procedure which adds a level of complexity into the airspace i.e. some aircraft in a busy departure sequence are being managed differently from others.

Safe management of aircraft at busy airports relies heavily on simplicity to minimise error. Using different flight paths for each subsequent aircraft increases the potential for human error for controllers and pilots as it increases the chance of issuing or flying the wrong procedure.

An alternative where minimal options which were well defined (e.g. fewer flight paths and their respective use triggered by something that is easy to remember such as one procedure at night and another during the day) could reduce the risk reduce once pilots and air traffic controllers become familiar with when to use which procedure. Nonetheless, Airservices does not currently manage air traffic like this anywhere in Australia and the aviation industry is unfamiliar with this level of added complexity.

Feasibility

The proposal as presented and in alternate form is not considered by Airservices to be feasible.

3. Can the GURAK / KEELS flight path be made wider (cross NAVAY then vector)?

Description

The majority of aircraft track towards the coast in a fairly narrow flight path corridor which varies in width by about 750 metres and in altitude by about 3,000 feet. This corridor has narrowed over time due to the ongoing development of the GURAK and KEELS SIDs in order to more safely manage the growing number of aircraft using these procedures, and through the increased use by airlines of satellite-assisted navigation (RNAV) technology.

Discussion

Causing the flight path to become wider would require aircraft to be issued a RADAR Departure i.e. each aircraft would be managed manually with pilots individually given a radar vector (compass heading) to follow.

Issuing all aircraft with a radar vector would require disconnection of the auto-pilot; the workload for air traffic controllers and pilots would therefore increase significantly, and there would be increased complexity and reduced predictability in the air traffic management system. Modern aircraft rely on the use of the auto-pilot system which is linked with published flight path procedures, increasing safety by ensuring the opportunity for human error is minimised.

Air traffic controllers at Perth would be unable to safely manage the high levels of traffic they now experience if they had to issue and remember radar headings for all aircraft. Radar headings also do not allow the use of auto-release procedures which are designed to increase safety by reducing coordination between air traffic controllers in the tower and Terminal Control Unit. These procedures are accepted throughout the world as best practice for the safe and efficient processing of departing aircraft.

Feasibility

Airservices does not consider this proposal to be feasible due to the level of increased risk.

4. Can a non-jet SID be established to the south-west and the GURAK / KEELS flight path be used for jets only?

Description

In 2008, separate departure flight paths were established on the eastern side of the airport for jet and non-jets to address identified safety issues. However, due to much lower traffic numbers and a lower level of complexity this was not done on the western side of the airport.

Discussion

RAAF Base Pearce Air Traffic Control has been working for some time to establish separate non-jet and jet flight paths on the western side of Perth Airport in order to improve the efficiency of military airspace to the north and west of the airport. The current design which is being progressed is to split the current GURAK procedure into two flight paths (jet and non-jet) once aircraft departing Runway 03 or 21 are established west of the coast.

A potential alternative option for non-jets departing Runway 21 would be to maintain runway heading over Jandakot Airport before making a right turn towards the coast. While there are no efficiency benefits, the change is potentially feasible from an air traffic control perspective and could be considered for noise improvement as aircraft would be flying over residential areas to the west of Jandakot Airport at higher altitudes than they when using the existing south-west corridor. This alternate option could provide a different flight path for approximately 15 per cent of departing flights.

As noted in Option 2, aircraft using this flight path while the Jandakot control zone was active would be required to reach the minimum altitude requirements. While many aircraft would reach that height requirement, there may be some that cannot and a further risk analysis would be required to ensure that this does not provide safety or complexity risks for the pilots or air traffic controllers.

Feasibility

An alternative to the RAAF proposal noted above is potentially feasible, however Airservices will not consider progressing this until the RAAF design and implementation process is finalised. Medium-term implementation.

5. Can the non-jets using the GURAK / KEELS flight path be transferred to the RAVON SID?

Description

The RAVON SID is a non-jet flight path located to the eastern side of Perth Airport and is used by 15 per cent of Runway 21 departures. This flight path is of similar length to the GURAK SID. This proposal would essentially transfer up to 15 per cent of flights from the southwestern side of the airport over to the eastern side of the airport.

Discussion

Moving all non-jets to the RAVON flight path would add a high level of complexity as there would be a much larger volume of departing aircraft crossing over those which are on descent inbound to Perth Airport's Runways 21 and 24.

Feasibility

Airservices does not consider this proposal to be feasible due to the level of increased risk.

6. Can some or all of the aircraft using the GURAK / KEELS flight path continue over Jandakot to an established point (distance from Perth Airport and/or altitude requirement) and then be vectored to turn towards the coast?

Description

This new flight path would maximise the use of non residential and low-density residential areas in order to minimise noise impacts.

Discussion

As noted in Option 2, aircraft using this flight path would be required to reach minimum altitude requirements when the Jandakot control zone was active.

The potential impact this proposal would have on runway capacity is a major consideration. The longer aircraft travel in a in a straight line one behind the other,

the slower the departure rate becomes; faster aircraft soon catch up with slower ones in sequence which can eventually lead to a Loss of Separation. For this reason, departure flight paths at busy airports seek to incorporate a turn at an early stage and give the opportunity for aircraft to spread out from each other – either as directed by Air Traffic Control or naturally according to each aircraft's performance capability.

Under this proposal, aircraft would be travelling in a straight line for about 10 nautical miles before turning. This would slow the departure rate considerably during peak periods, impacting both aircraft on-time performance and extending the departure peak period.

An alternative would be to use this option at off-peak times, either making the turn at a minimum distance point from Perth Airport or at a minimum altitude (either separate requirements or in combination). Designing this procedure to maximise the use of industrial areas around Jandakot Airport would provide additional time for aircraft to increase their altitude before flying over residential areas thus reducing their noise impact.

Feasibility

Airservices considers the alternate form of this proposal is feasible and potentially most suitable as a night-time respite measure for residents under the existing south-west departure corridor. Short-term implementation.

7. Can the Noise Abatement Procedures be changed so departures from Runway 21 and Runway 03 are equally preferred?

Description

Noise Abatement Procedures have been developed for each Australian airport on a case by case basis in response to the local conditions including the demographic profile of the area in which each airport is situated. The requirement to follow Noise Abatement Procedures is subject to ensuring that safety and efficiency of the airport are not compromised. Adherence can therefore be affected by adverse weather, traffic complexity, or the specific operating requirements of individual aircraft.

Current Noise Abatement Procedures include which runways and flight paths are preferred for use. Runways 21 and 24 are equally preferred for landing whereas Runway 21 is preferred for departure – this applies to the entire day with no distinction between day and night periods. Airservices recent review of these procedures is at [Attachment 3](#).

When the Noise Abatement Procedures were first established, preference for departing aircraft to use Runway 21 reflected the history and proximity of housing development surrounding the airport. It also recognised the reality of the prevailing wind direction (southerly component) which facilitates departures from this runway. However, over time the reason Runway 21 is preferred for departures has increasingly included the operational requirements of Air Traffic Control during peak traffic periods. The airport's taxiway system and the location of aircraft hangars and the domestic and international terminals hinders the smooth flow of aircraft while they are on the ground. This became more of an issue as flight schedules increased and the runways became capacity constrained. Departing aircraft from Runway 21 is the most efficient method of getting aircraft from their hangar or parking bay to the passenger gate and then into the air.

Discussion

Airservices review of the Noise Abatement Procedures found that incorporating the operational requirements of Air Traffic Control to the system of runway preference would assist clarity.

The removal of preferred runways for departures at Perth Airport does not present any reduction in safety or efficiency. Air Traffic Control would nominate the runway with the best level of wind strength (into the wind) and/or the runway that provides the best efficiency for traffic management whilst complying with wind requirements for safe operations. Consistent with Option 1, due to its proximity to residential areas the use of the southern end of the cross runway would remain the least preferred option.

Feasibility

Airservices considers this proposal to be feasible providing any change is consistent with the findings of the Noise Abatement Procedures review. Short-term implementation.

8. Can a new south-west RNAV SID be established to the south-west that avoids Jandakot airspace?

Description

This proposal would design a new flight path located between the existing GURAK SID and Jandakot Airport.

Discussion

In order to maintain runway capacity, such a procedure would need to be used very similarly to GURAK i.e. aircraft could be turned to the north as directed by Air Traffic Control after reaching a specified altitude (currently 5,000 feet for jets and 3,000 feet for non-jets).

While it would be technically feasible to design the proposed flight path, Airservices would not consider it to be a noise improvement option. Any design would still fly over areas which are among the most heavily impacted by the GURAK SID plus other areas which currently receive only a small amount of traffic.

Feasibility

Airservices considers this option to be technically and operationally possible but not feasible from a noise management perspective.

9. Can flights to South Africa be managed differently?

Description

Aircraft operated by South African Airlines have a reduced climb performance than other aircraft operating at Perth Airport due to their type, engine performance and larger payload. Accordingly, their pilots frequently request, and are issued, a RADAR Departure procedure. These aircraft therefore operate at a lower altitude for a longer period which increases the noise impact to residents.

Discussion

As these departures occur daily around midnight, a noise improvement would be desirable. Given the potentially limited use (one flight a day), designing a new departure procedure just for the Perth-Johannesburg service is currently cost

prohibitive.

A trial flight where the pilot increased engine thrust so this aircraft could potentially gain altitude more quickly and therefore reduce the noise impact to residents did not result in a noise improvement. The increased thrust caused more noise initially, and the overall rate of climb between the airport and the coastline was not largely unchanged – note that an increase in altitude by about 50 per cent would need to be achieved for there to be a noticeable (3 dBA) noise improvement.

The intent of this proposal would be met, however, if the flight path in Option 6 was implemented.

Feasibility

Airservices considers this proposal feasible under the change proposed in Option 6 was implemented. Short-term implementation.

10. Can a system of noise sharing modes be established based on periods of the day (morning, afternoon/evening, night) or days of the week (rotating days or weekdays and weekends)?

Description

Sydney Airport has an established form of noise sharing known as the Long Term Operating Plan (see Attachment 6). This comprises a system of runway combinations which aim to be changed throughout the day subject to traffic numbers and weather restrictions. A runway mode change is highly complex and requires up to 40 minutes advance planning; this means modes cannot be changed during peak traffic periods.

Discussion

The introduction of alternative departure procedures for the same flights introduces the possibility of increased human error for air traffic controllers and pilots i.e. the more options there are, the greater the opportunity for error.

A simple mode system that is clearly defined i.e. between certain hours at night that are considered 'noise abatement hours' and when there are less aircraft movements reduces the level of risk and therefore makes the potential use of noise sharing modes more feasible.

The most operationally acceptable noise sharing modes would be day (between the hours of 5.00 am and 10.00 pm local) and night (between the hours of 10.00 pm and 5.00 am local). Another option would be to nominate a noise sharing mode that currently exists such as Pearce airspace is 'active' or 'deactivated'. Air Traffic Control and pilots are already familiar with using different departure procedures during these periods.

With regard to the south-west departure flight path, the most feasible noise sharing option initially would be to use the existing GURAK SID in conjunction with Options 6 and 7. This would achieve additional respite for areas underneath the GURAK SID every day from 10.00 pm to 5.00 am the following day (i.e. in addition to those full and part days when aircraft are departing to the north).

Feasibility

Airservices considers this option is feasible in an initial form if it incorporates the changes proposed under Options 6 and 7. Short-term option.

11. Can aircraft turn east at NAVEY?

Description

This proposal removes using the GURAK and KEELS SIDs for southern departures.

Discussion

About 55 per cent of aircraft departing from Runway 21 currently turn east at NAVEY and use the RAVON and AMANA SID flight paths; another 40 per cent turn west to use the GURAK and KEELS flight paths. This proposal would more than double the number of aircraft using the RAVON and AMANA SIDs which would not be feasible during peak traffic periods.

This proposal would also require departing aircraft going to the south and south-west of Perth to track on the eastern side of Jandakot airspace on a new flight path before heading towards their destination.

Feasibility

Airservices does not consider the proposal to be feasible.

12. Can the GOSNL FOUR STAR be amended to accommodate minimal engine power?

Description

The existing GOSNEL FOUR STAR has a descent profile which is greater than three degrees and consequently requires pilots to regularly increase their in rate of descent and use increased thrust i.e. stepped approach where the aircraft repeatedly descends then levels out.

Discussion

The proposed introduction of a Smart Tracking (satellite assisted navigation) approach over the Perth Hills to the southeast of the airport and an associated new STAR for visual approaches (see maps at [Attachment 4](#)) will provide for minimal engine power - the descent profile on the STAR has been specifically designed to provide less than three degree descent.

The other benefits provided by introducing Smart Tracking and the new STAR include less overflight of populated areas over the Perth Hills.

Feasibility

Airservices considers this option is feasible. Short-term option.