



HEATHROW COMMUNITY NOISE FORUM

Sunninghill flight path analysis report

February 2016

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EXECUTIVE SUMMARY

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Executive summary

As part of the engagement between Heathrow Airport Limited and the Community Noise Forum, flight paths through a series of penetration gates around the airport are being analysed. One of the gates that has been analysed was centred on Sunningdale extending approximately 12km from Chavey Down to just north west of Ottershaw with Sunningdale at its centre. Following on from the publication and discussion of a draft report describing this gate, local residents requested a more detailed analysis of the north western half of the gate extending approximately 3km near to Cheapside. On construction, it became clear that the gate was centred on Sunninghill so it has been called the Sunninghill gate. The analysis cover the years 2005, and 2010 to 2015 inclusive and addresses departures and arrivals on easterly and westerly operations. This report describes the analysis and associated conclusions relating to this Sunninghill gate.

During the analysis period, for departures the gate operated in the westerly direction on average for between 70% and 80% of days and operated in the easterly direction on between 20% and 30% of days. For arrivals, the gate operated in the westerly direction for approximately 5% of the time and on easterlies between 30% and 40% of days. Westerly arrivals did not cross the gate on between 60% and 70% of days.

For **easterly departures**, the Sunninghill gate is crossed by traffic using the easterly Compton (CPT) standard instrument departure route (SID) beyond the end of the CPT noise preferential route. The average daily volume of easterly departure traffic peaked at 26 flights per easterly day in 2013 and subsequently reduced to 23 flights per easterly day in 2013 and 2014, reducing further to 21 flights per easterly day in 2015. The lateral centre of gravity (mean position) of the easterly departure traffic has remained at the centre of the gate over Sunninghill. The average vertical centre of gravity (mean height) appears to have increased over the period from approximately 6000 feet in 2005 to approximately 7000 feet in 2015. There is, however, considerable day-to-day variation on this height, from circa 5000 feet and lower to approximately 8000 feet and higher. The minimum height for easterly departures shows an upwards trend from 2005 to 2015 from 5000 feet to just below 6000 feet albeit with large day-to-day fluctuations from 4000 feet to 9000 feet.

Executive summary

The **easterly departure** traffic crossing the gate is made up of large aircraft (77%) of which 2% are A380s, and 23% medium aircraft. The proportion of ultra long and long-haul destinations served by these easterly departure traffic is consistent with the proportion of large aircraft in the mix, at around 75%.

Easterly departures are distributed evenly across the day from around 08:00 to 18:00 hours with lower levels operating outside of these hours.

For **westerly departures**, the Sunninghill gate is crossed by the westerly part of the Midhurst (MID) SID. This traffic is distributed across the gate with the highest intensity from the centre to the left hand edge. Other than during the trial period, the lateral centre of gravity (average position) of the westerly departures crossing the gate has remained consistent at approximately 200m to the south east of the gate centre. There is considerable day-to-day variation in this lateral centre of gravity. There is a downward trend on the vertical centre of gravity from approximately 6000 feet in 2005 to approximately 5400 in 2015 with wide daily variation. There is a cyclical pattern in the vertical centre of gravity indicating westerly departures are generally lower in summer than in winter. The minimum height for westerly departures shows a slight downward trend for 2005 to 2015 from 3800 feet to 3200 feet.

The 2015 average daily departure traffic through the gate on westerly days is approximately 59 flights per day, similar to 2103, slightly higher than 2012 and higher than 2010. There are peaks in 2011 and 2014, likely associated with the operational freedoms trials and departure trials that took place in those years and redistributed traffic on the MID SID. During the departure trials period from December 2013 to November 2014, the traffic was concentrated into four swaths across the gate and a fifth swath at the right hand edge of the gate. The traffic intensity in these concentrated swaths was four to six times the intensity of the normal traffic density with reduced levels, compared to other years, in the levels of traffic outside of these swaths. Traffic returned to pre-trial structures and levels after the trial.

Executive summary

Except during the trial period, the **westerly departure** traffic mix has remained consistent at approximately 83% medium aircraft and 17% large aircraft, a few of which (1%) are A380s. During the trial period in 2014, the proportion of medium aircraft decreased by approximately 3% to be replaced by heavy aircraft, reverting to the normal pattern after the trials ended. The destination mix for westerly departures comprises approximately 15% long-haul destinations except during the trial period, when the proportion of long-haul traffic in the mix increased to 18%.

Across the day, the main traffic peak for departures is in the morning between 06:00 and 10:00 and comprises mainly medium sized aircraft. The majority of heavy aircraft cross the gate at night, after around 20:00 hours. During the trials the evening peak increased in size compared to non-trial periods and the proportion of heavy aircraft departing late at night, after 21:00, increased compared to the non-trial periods. Patterns reverted to pre-trial structures after the end of the trials.

For **easterly arrivals** traffic crosses the gate flowing west from the Ockham and Biggin stacks to loop round to approach the easterly runways. The daily volume of this traffic crossing the gate shows a general downward trend from four flights per easterly day in 2011 to 3 flights per easterly day in 2015. The majority of **westerly arrivals** miss the gate, passing to its south as they fly in an easterly direction to the Ockham stack. Currently an average of one westerly arrival crosses the gate per westerly day. Due to the low levels of traffic, arrivals have not been analysed in detail.

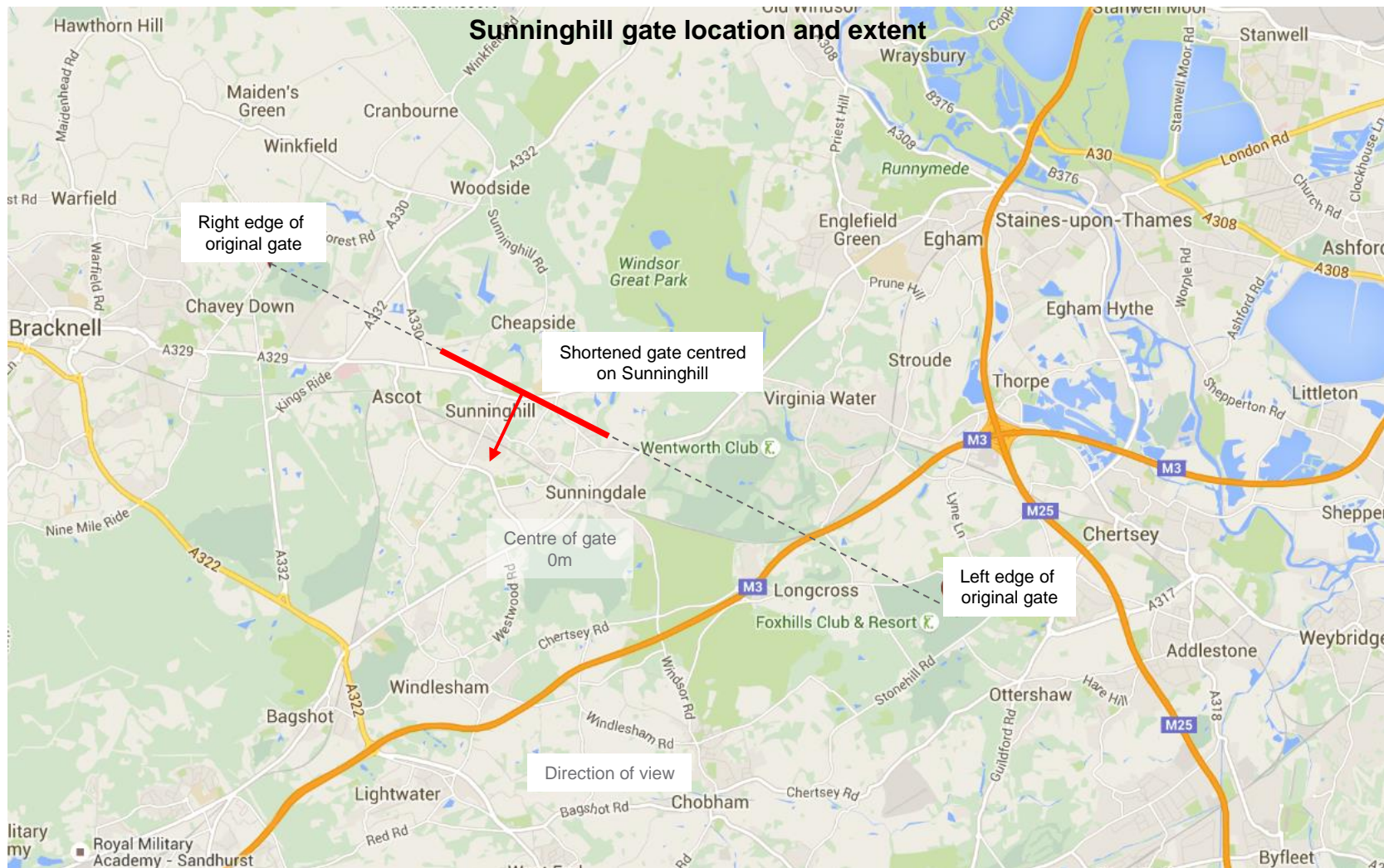
A number of individual flights - BA43, BA45, BA55, BA57, BA59, BA75, BA81, BA83, SA237, VS601, VS651 and W3102 - have been investigated in terms of the evolution from 2010 to 2015 of the position relative to gate centre, height and time at which they cross the gate. The main general observations concerning these flights is that the departure trials in 2014 concentrated the point at which the flights cross the gate compared to the normal wide distribution across the gate. This concentration was sometimes into multiple SIDs, into a single SID or in or out of the gate altogether. The height at which some flights cross the gate also reduced in the second half of 2014: sometimes this was at the same as the trials, in which case the dip was temporary; or in others it was associated with a change in aircraft type on the route and was permanent.



INTRODUCTION

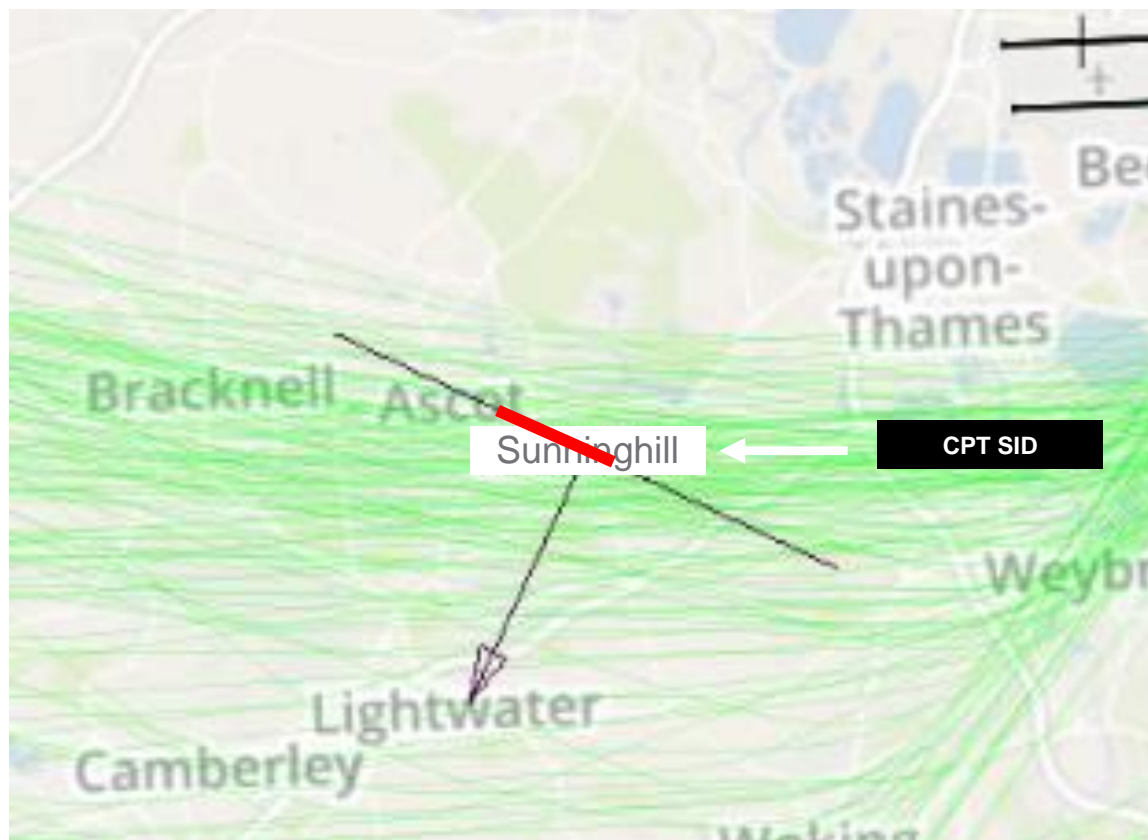
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The shortened Sunninghill gate is centred on Sunninghill, is 3km wide and runs roughly north-west to south-east



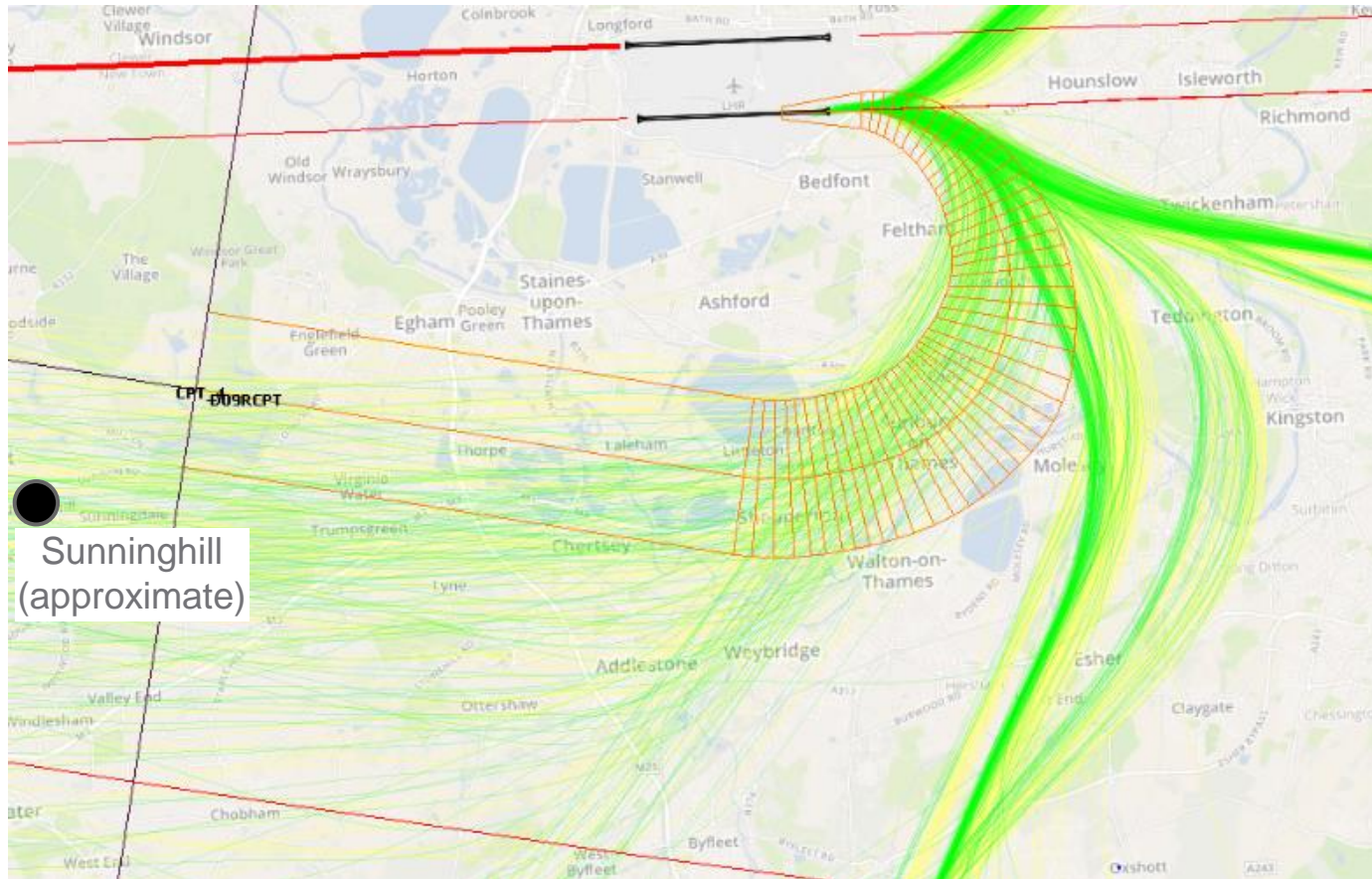
On easterly departures, dispersed CPT traffic crosses the Sunninghill gate

Easterly departure traffic crossing the Sunninghill gate



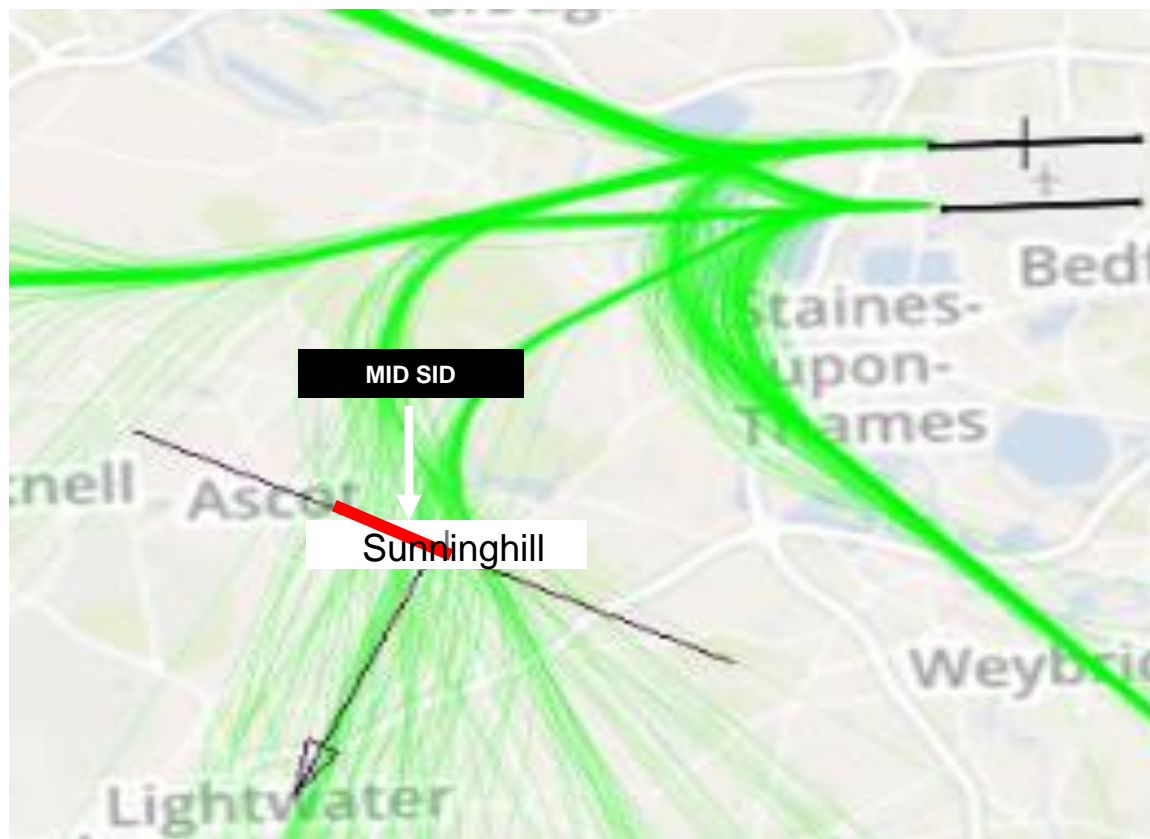
The Sunninghill gate is beyond the end of the easterly CPT noise preferential route (NPR)

Extent of the CPT NPR

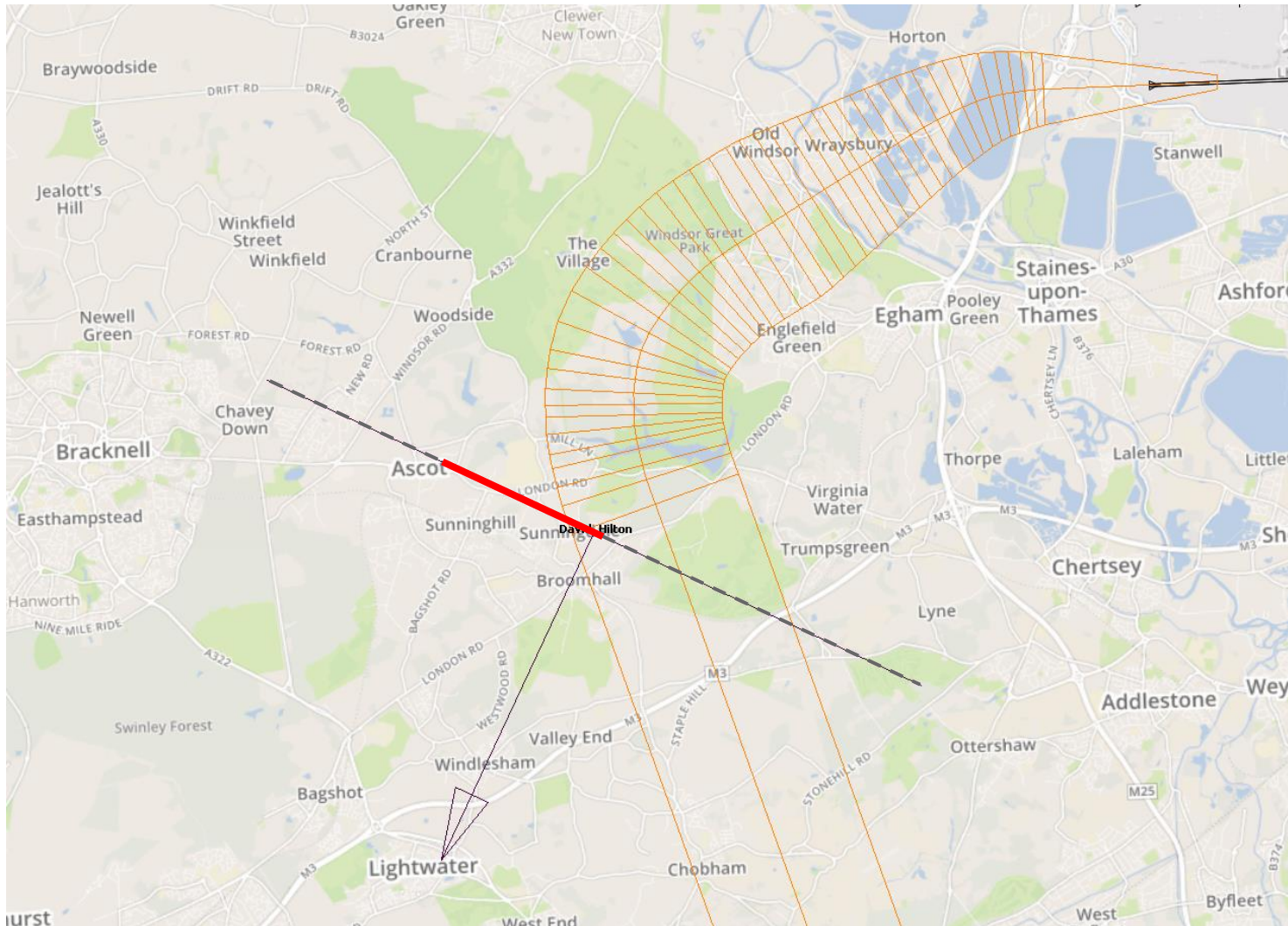


For westerly departures, the Sunninghill gate is traversed by MID SID traffic

Westerly departure traffic crossing the Sunninghill gate

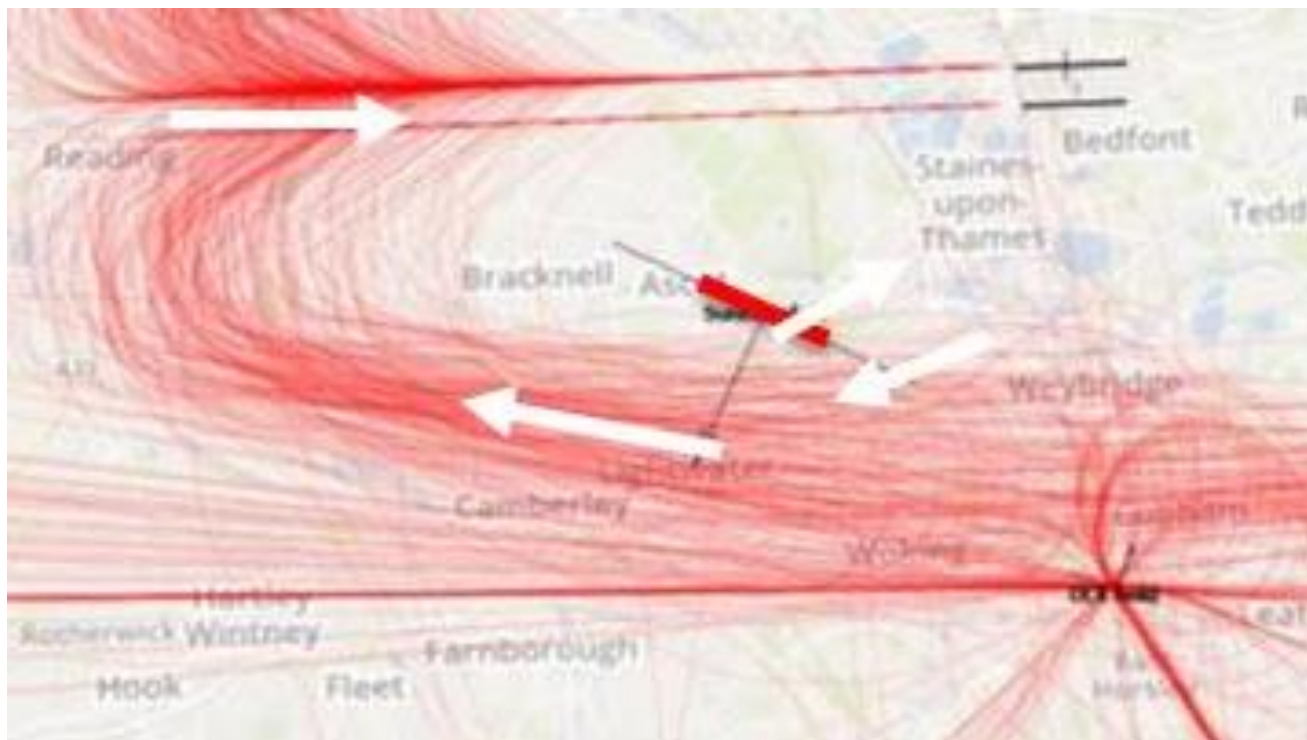


The Sunninghill gate is crossed by the western part of the westerly MID NPR



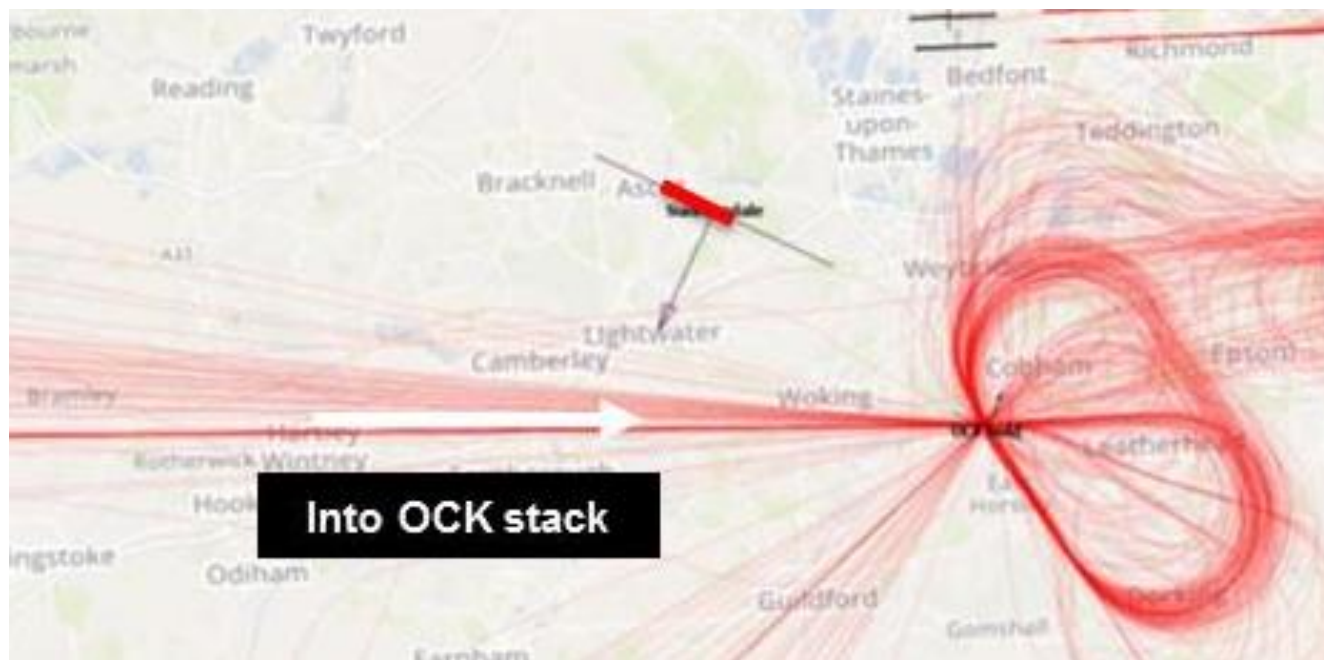
The few easterly arrivals that cross the gate mainly flow west from the Ockham and Biggin stacks to loop round to approach the easterly runways

Easterly arrival traffic crossing the Sunninghill gate



Virtually no westerly arrival traffic crosses the gate because the arrival traffic entering the Ockham stack flows to the south of Sunninghill

Westerly arrival traffic crossing the 3Villages gate



The analysis has investigated different characteristics of the departure traffic traversing the gate for the years 2005, and 2010 to 2015 inclusive

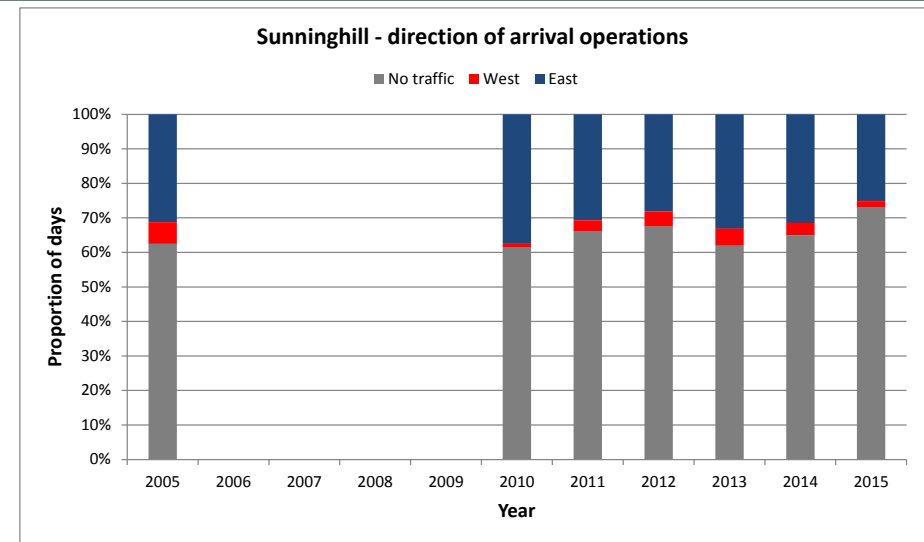
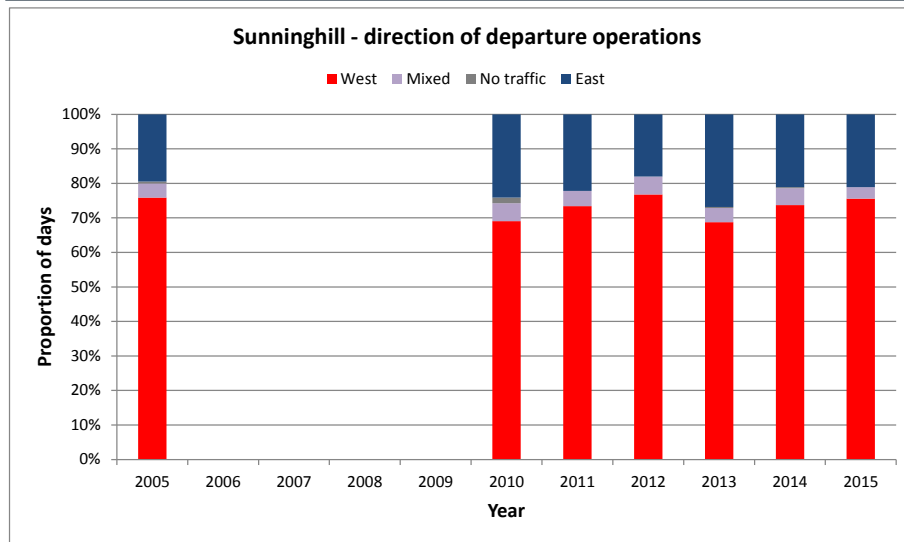
- The proportion of days per year when the gate has westerly, easterly and mixed operations
- Traffic volume (number of flights) crossing the gate per day
 - for each day during 2005, and 2010 to 2015 inclusive
 - the average daily traffic for each year
 - the average distribution of traffic across the day in half-hour intervals by aircraft type
- The lateral and vertical distributions of the traffic crossing the gate for each year, including:
 - The lateral and vertical centres of gravity (average positions) of the traffic swaths
 - The minimum height at which the lowest aircraft crosses the gate each day
 - The number of flights crossing the gate below 1500 feet and between 2000 feet and 2500 feet per day
 - Gate penetration (scatter) plots showing the lateral and vertical position that each flight crosses the gate for each of the years analysed
- Heat maps showing the concentration or density of the traffic crossing the gate
- The aircraft fleet mix:
 - the relative proportions of A380, heavy and medium sized aircraft crossing the gate for each year analysed
 - gate penetration (scatter) plots for A380, heavy and medium sized aircraft showing the lateral and vertical position that each flight crosses the gate for each of the years analysed
- The mix of destinations – short-haul, medium-haul, long-haul and ultra long-haul – for the traffic crossing the gate for each year
- The profiles of a set of specific flights requested by local residents



EVOLUTION OF TRAFFIC FROM 2005 TO 2015

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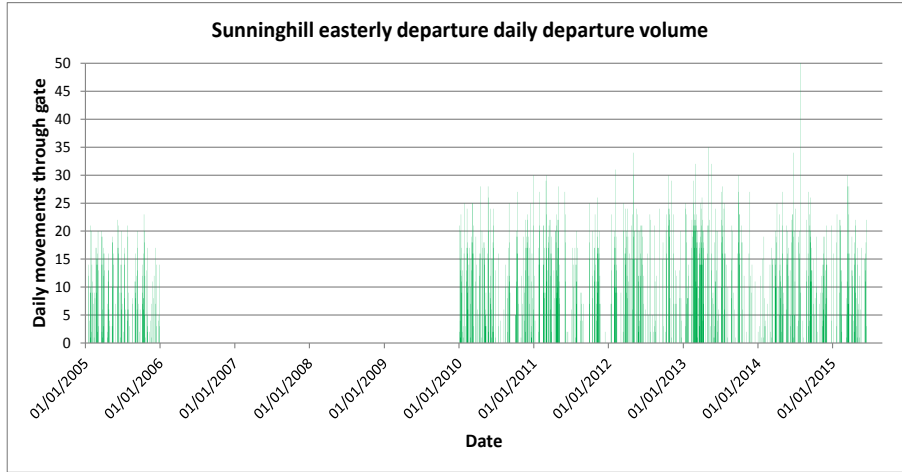
The gate operates on westerlies for between 70% and 80% of days for departures: no arrivals cross the gate on more that 60% of days



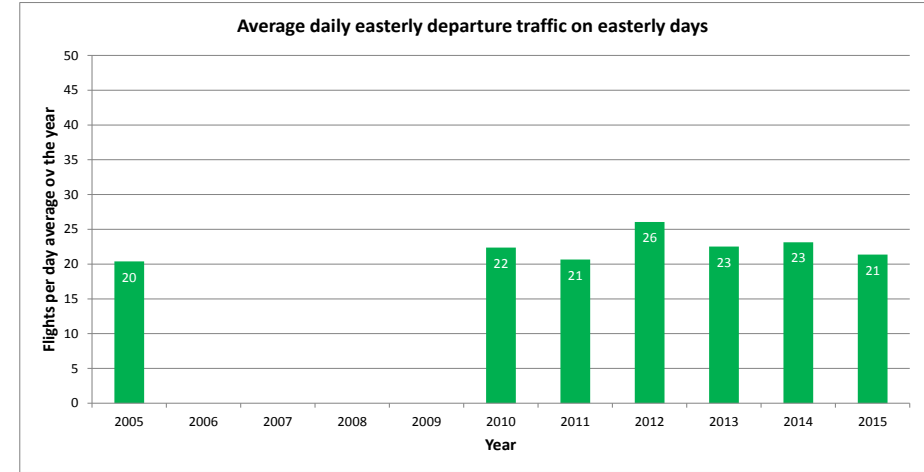
Westerly operations are defined as days when the airport operates solely in the westerly direction; similarly easterly operations are defined as days when the airport operates solely in an easterly direction. Mixed operations are defined as days when there are operations in both directions. No traffic is defined as days when no aircraft cross the gate

The reason for the large proportion of days on which no arrivals cross the gate is that most westerly arrivals pass to the south of the gate and the airport operates on westerlies for typically 70% of the time.

The daily volume of easterly departure traffic crossing the gate peaked in 2013 and is now at a level of approximately 21 flights per easterly day



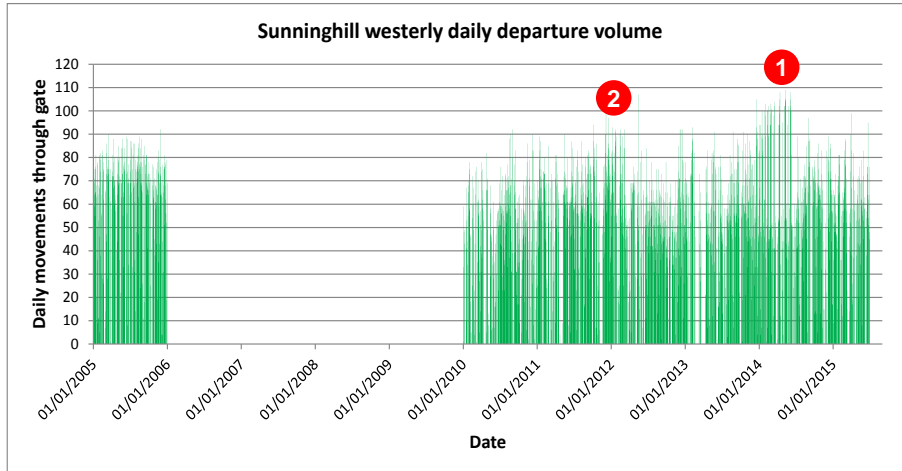
The daily volume of traffic crossing the gate fluctuates from day-to-day around the average values (see right hand chart).



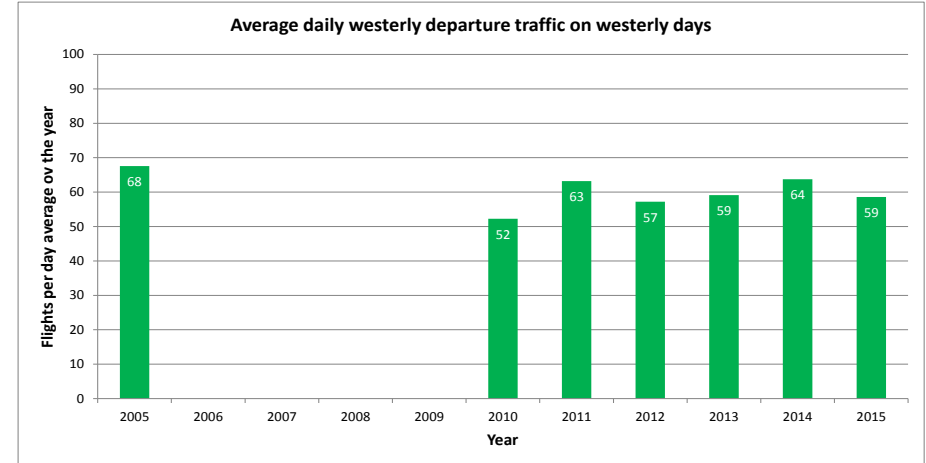
The overall traffic through the gate peaked at 26 flights in 2013 and subsequently reduced to 23 per day in 2013 and 2014 and further to 21 per day in 2015.

Note: easterly daily averages are derived from days when the airport is operating in the easterly direction only, e.g. the annual daily average is the total easterly traffic crossing the gate per year divided by the number of easterly days for that year

Westerly departure traffic shows peaks in 2011 and 2014, probably associated with operational freedoms and departure trials



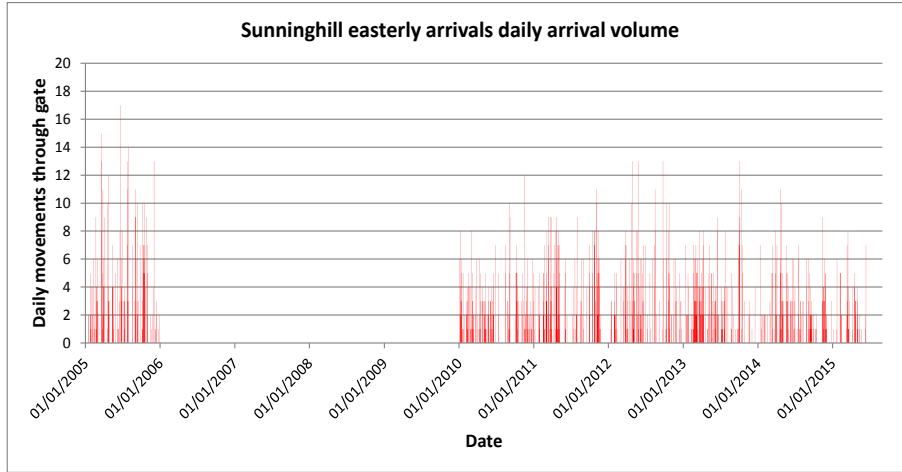
Daily westerly departure traffic shows an increase in early 2014, see (1) above. This increase coincides with the first and second westerly departure trials, which took place from December 2013 to July 2014. There does not appear to be an increase with the second trial from August to November 2014. There also appears to be a peak in traffic at the end of 2011, (2) above. This coincides with Phase 2 of the operational freedoms trial.



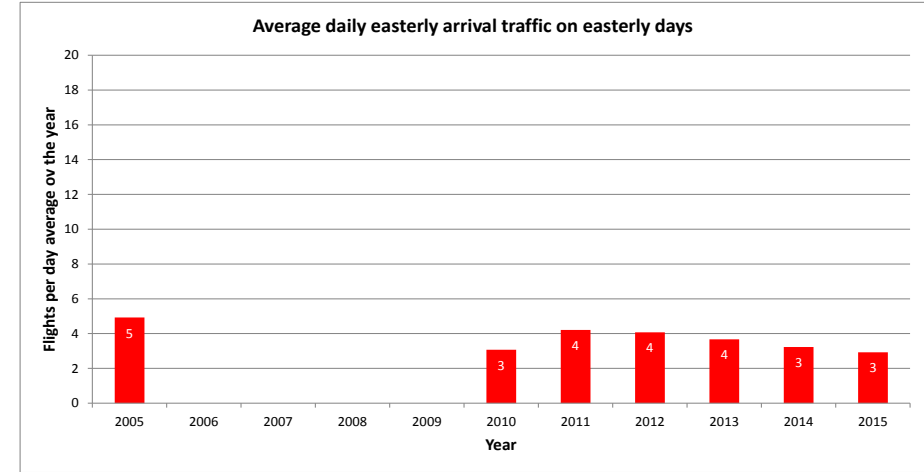
The average daily departure traffic through the gate on westerly days is approximately 59 flights per day, similar to 2013, slightly higher than 2012 and higher than 2010. The average traffic for 2011 and 2014 are elevated, probably due to the first departure trial (2014) and the operational freedoms trial in 2011. Traffic across the past six years is lower than traffic levels experienced in 2005.

Note: westerly daily averages are derived from days when the airport is operating in the westerly direction only, e.g. the annual daily average is the total westerly traffic crossing the gate per year divided by the number of westerly days for that year

The daily volume of easterly arrival traffic is currently approximately three *per day* – the same as it was 2010 but slightly high in the intervening period



The daily arrivals traffic crossing the gate on easterly days is highest in 2005, has decreased by 2010, increases in 2011 and 2012 and then decreases again in 2015 (see right hand chart for annual averages). However, there is considerable day-to-day variation above and below the average.

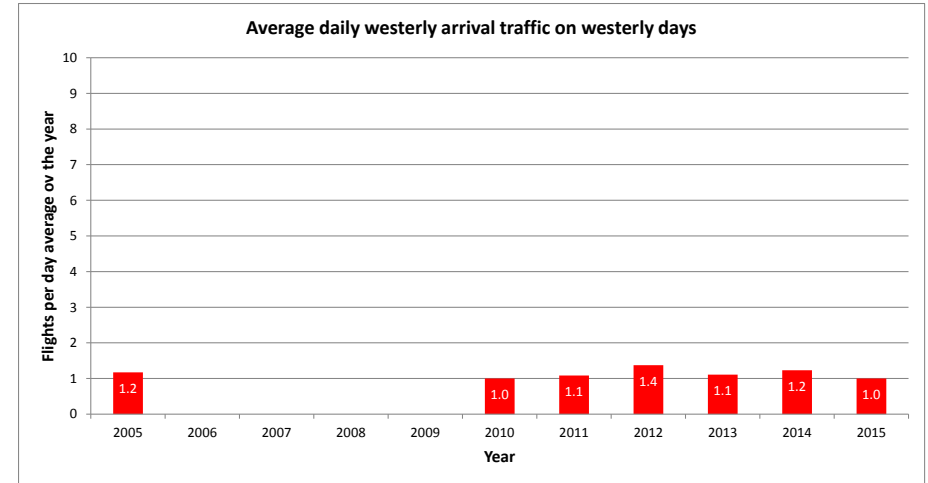
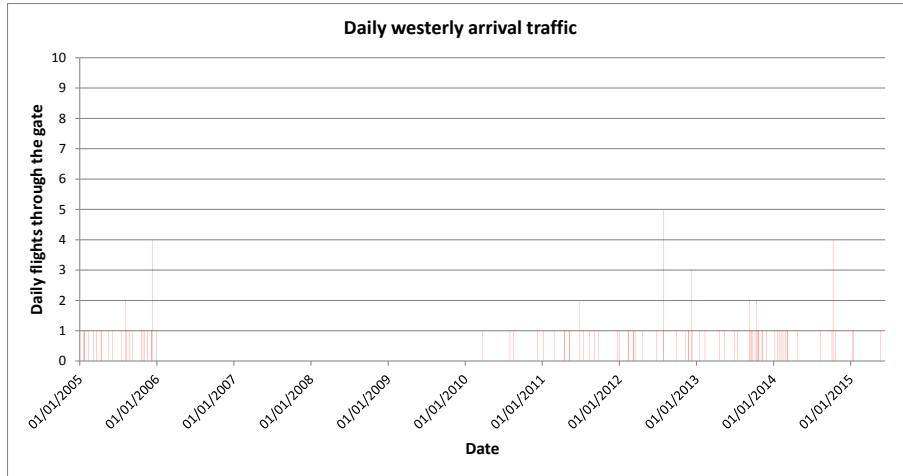


The overall traffic through the gate in the same in 2015, at three per easterly day, as it was in 2010. Levels were slightly higher at four per easterly day in 2011 and 2012 and five in 2005.

Due to these low volumes, no detailed analysis has been performed for easterly arrivals

Note: easterly daily averages are derived from days when the airport is operating in the easterly direction only, e.g. the annual daily average is the total easterly traffic crossing the gate per year divided by the number of easterly days for that year

The daily volume of westerly arrival traffic is on average one flight per westerly day

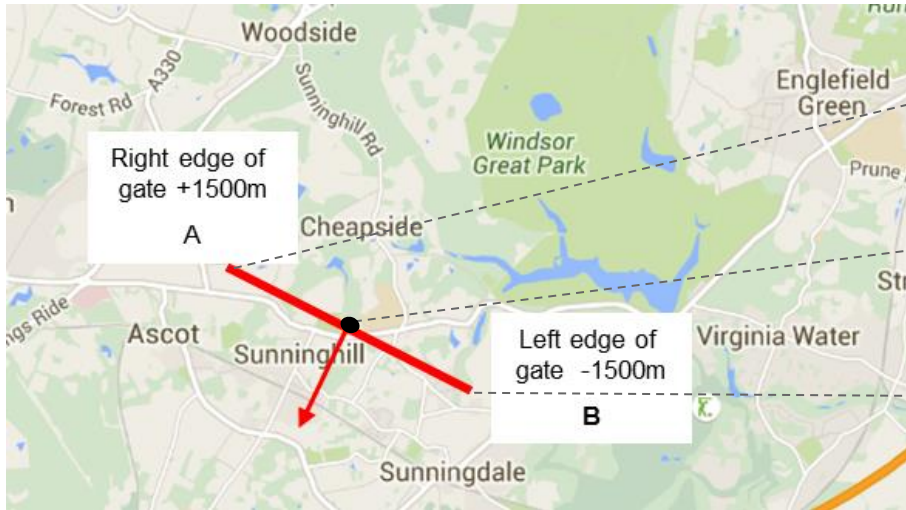


Due to these low volumes, no detailed analysis has been performed for easterly arrivals

Note: westerly daily averages are derived from days when the airport is operating in the westerly direction only, e.g. the annual daily average is the total westerly traffic crossing the gate per year divided by the number of westerly days for that year

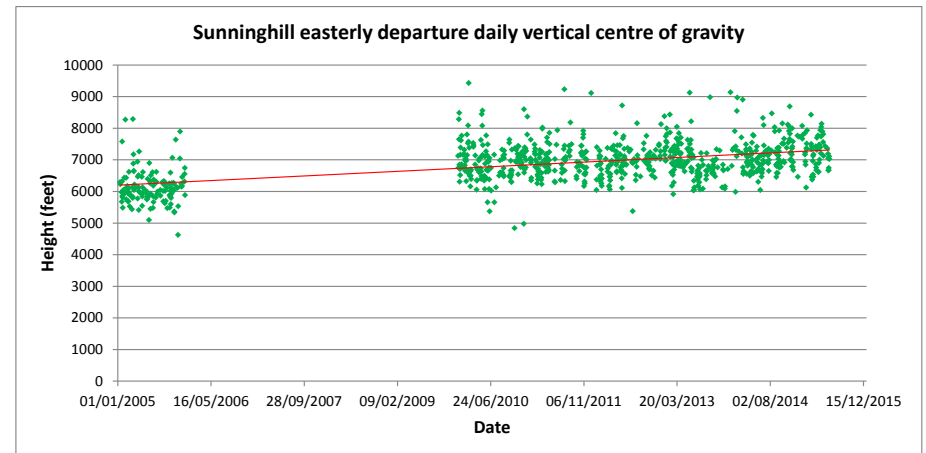
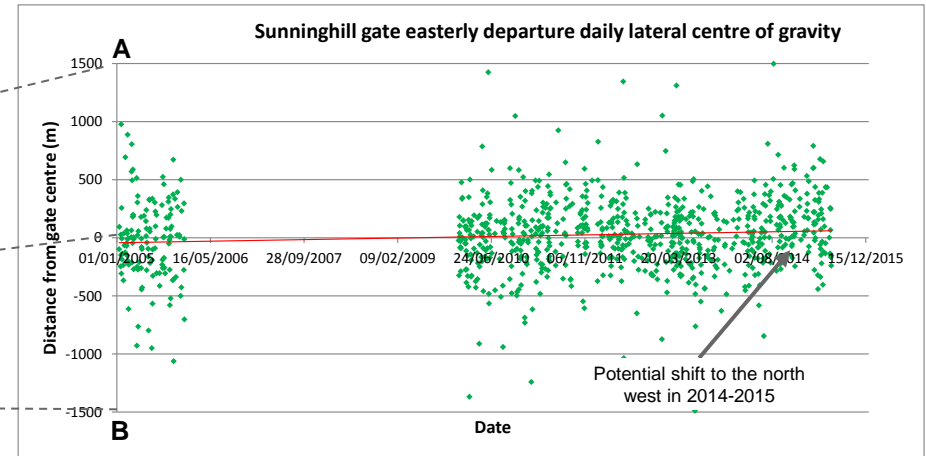
The centre of gravity of easterly departure traffic is at the centre of the gate with a slight trend to the north west and there is an upward trend on minimum height

Approximate centre of gravity and extent of easterly departures



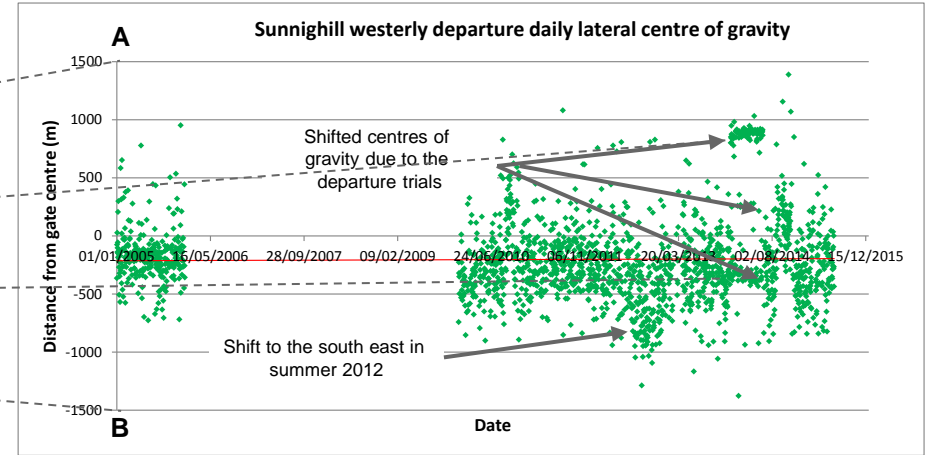
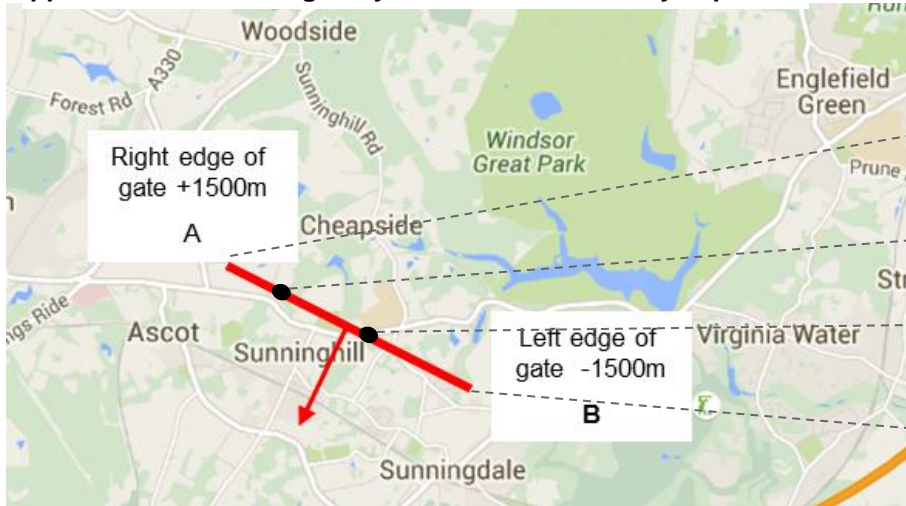
The average lateral centre of gravity (CoG) of the easterly departure traffic is near to the centre of the gate, over Sunninghill. This appears to be shifting slightly to the north west. However, there is considerable scatter from day-to-day over an extent around 1km wide.

There is upward trend on the vertical CoG of the easterly departure traffic from just over 6000 feet in 2005 to just over 7000 in 2015. There is, however, day-to-day variation on this height, from circa 6000 feet and lower to approximately 8000 feet and higher



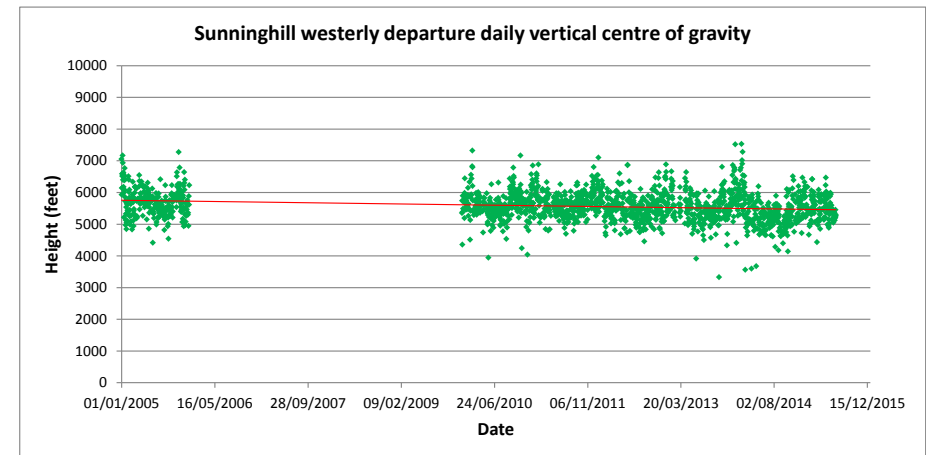
Westerly departures were shifted during the trials but have reverted since: there is an underlying downwards trend in height, with summer:winter cyclical variation

Approximate centre of gravity and extent of westerly departures



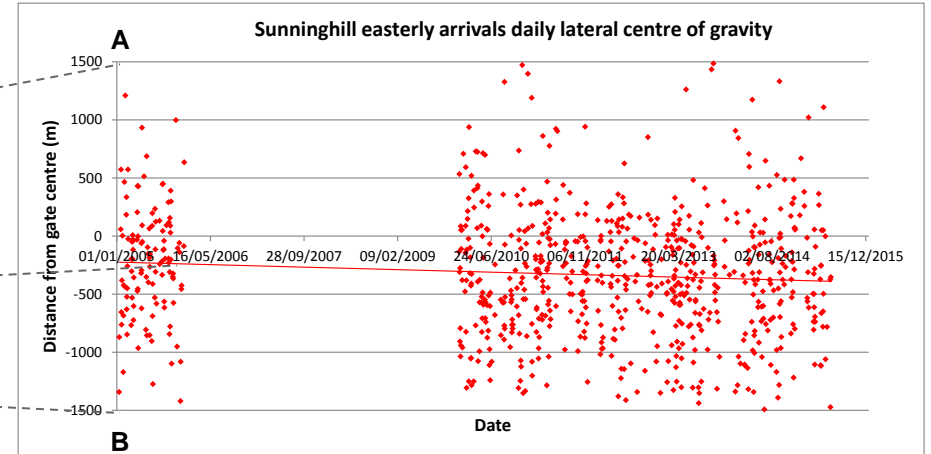
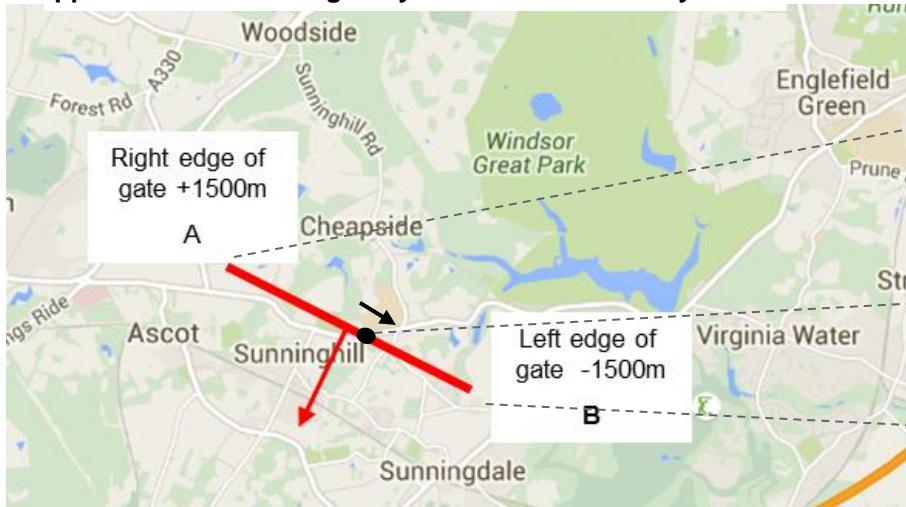
Other than during the trials, the average lateral centre of gravity (CoG) for westerly departures is approximately 200m to the left of the centre of the gate. In 2014, the trials shifted the centre of gravity to various different locations across the gate. In 2012, there was a shift of the centre of gravity to the south east

There is a downward trend on the vertical CoG from approximately 6000 feet in 2005 to approximately 5400 in 2015 with wide daily variation. There is a cyclical pattern in the vertical CoG indicating westerly departures are generally lower in summer than in winter



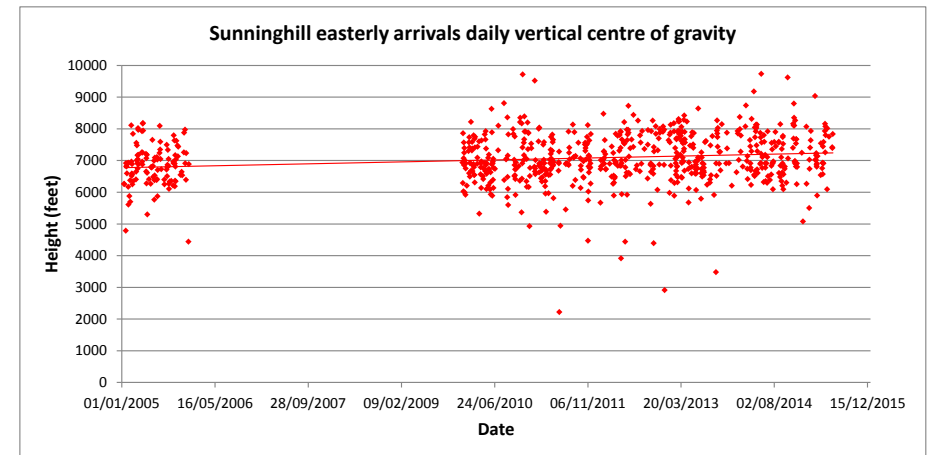
There has been slight shift of the centre of gravity of easterly arrivals towards the south east of the centre of the gate

Approximate centre of gravity and extent of easterly arrivals

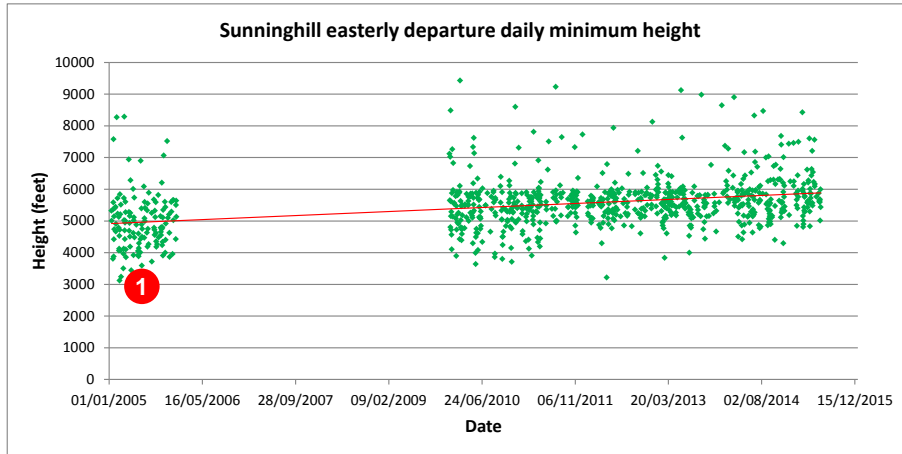


The average lateral centre of gravity (CoG) for easterly arrivals is just to the left of the centre of the gate but with large day-to-day fluctuations. There is a trend for this to shift towards further towards the south east

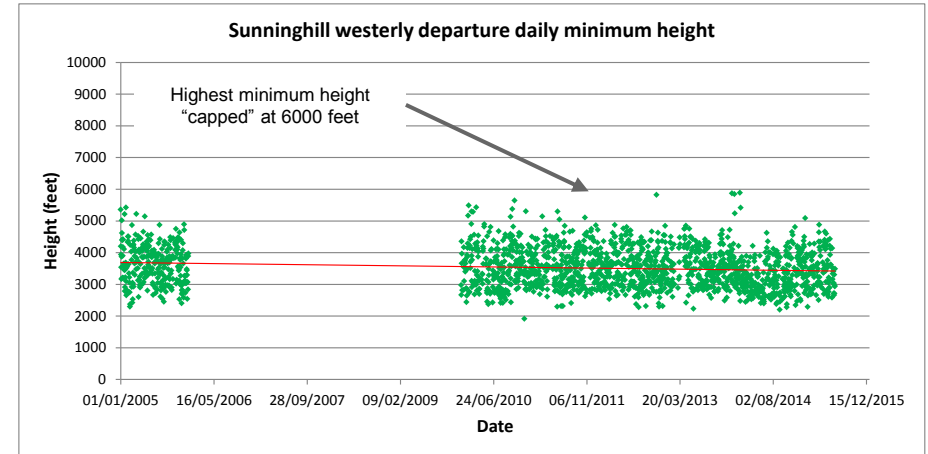
There appears to be a slight upwards trend on the CoG for easterly arrivals.



The trend on the minimum height for easterly departures is upwards whereas that for westerly departures is downwards



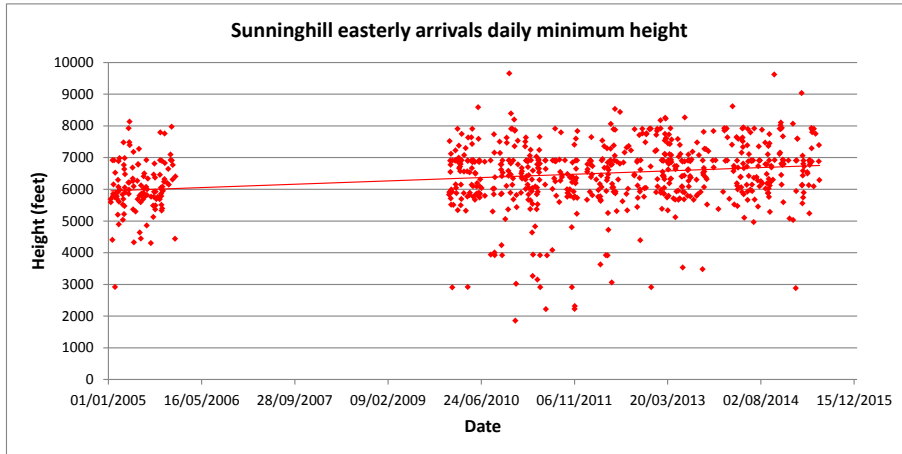
The minimum height for easterly departures shows an upwards trend from 2005 to 2015 from 5000 feet to 6000 feet with large fluctuations from 4000 feet to 9000 feet. The low departures shown at (1) in the above figure no longer appear to operate



The minimum height for westerly departures shows a slight downward trend for 2005 to 2015 from 3800 feet to 3200 feet. There are a considerable number of flights with minimum height below 3000 feet.

The chart shows the cap on minimum height of 6000 feet as departing aircraft are held down by air traffic control to avoid conflicts with arrivals traffic.

Easterly arrivals show an upward trend in minimum daily height



The average minimum height for easterly arrivals has increased from around 6000 feet in 2005 to nearly 7000 feet in 2015.

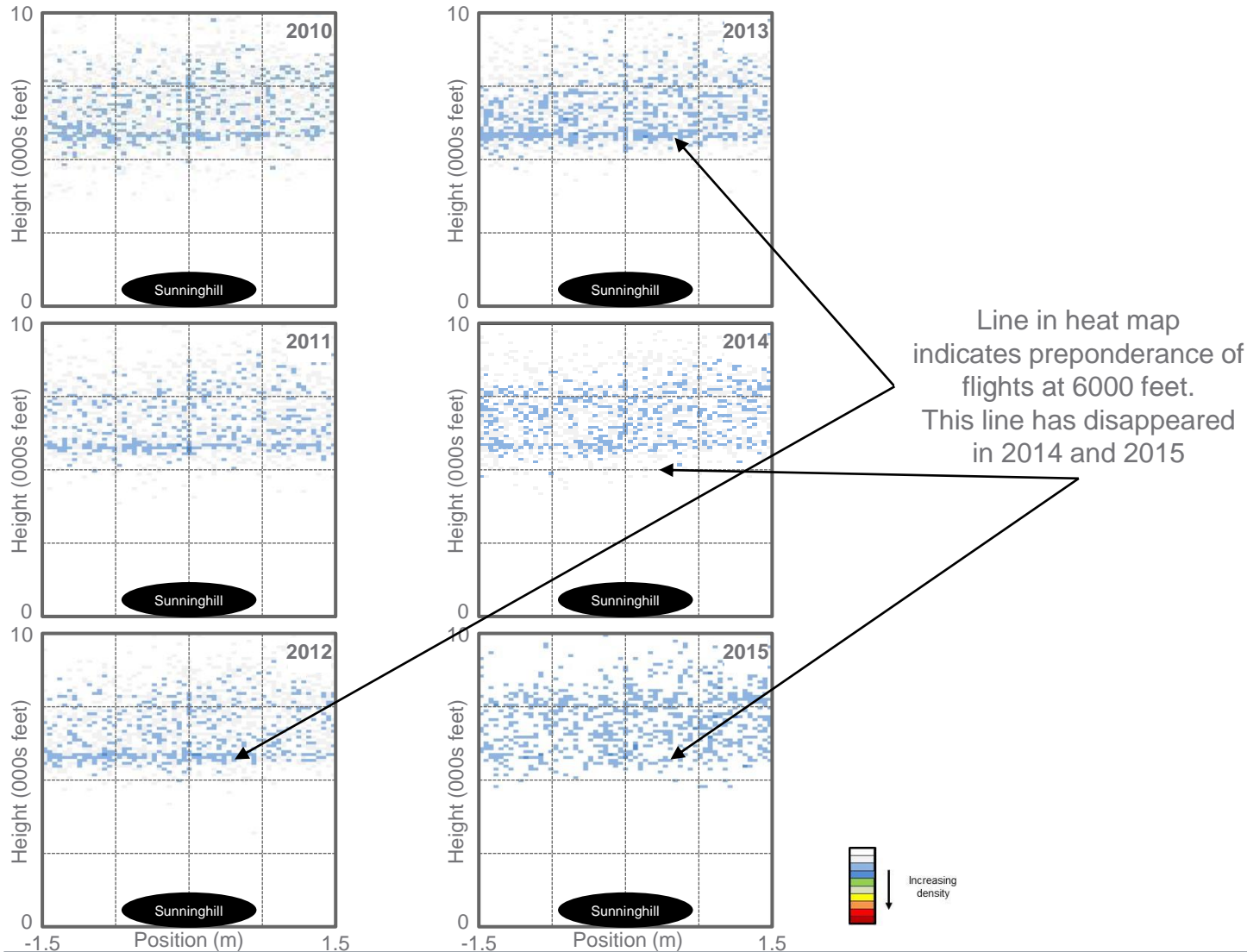
The flights below 3000 feet are generally technical flights used to calibrate the airport's landing systems



EASTERLY DEPARTURES

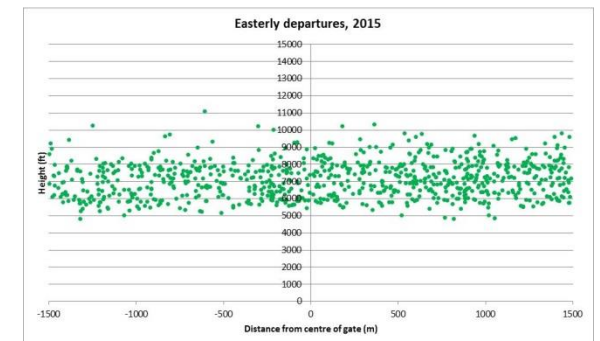
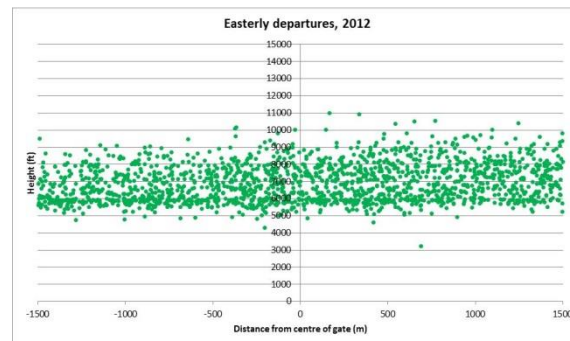
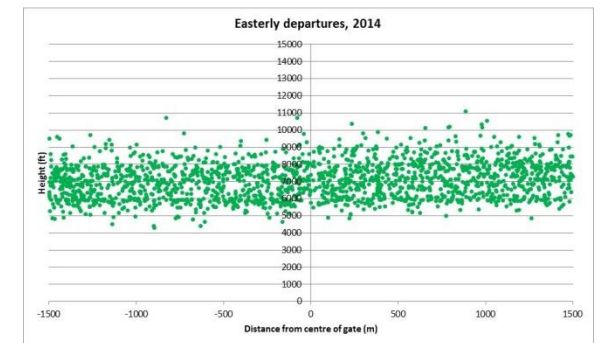
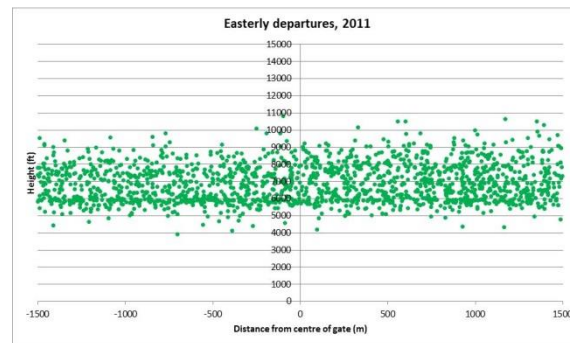
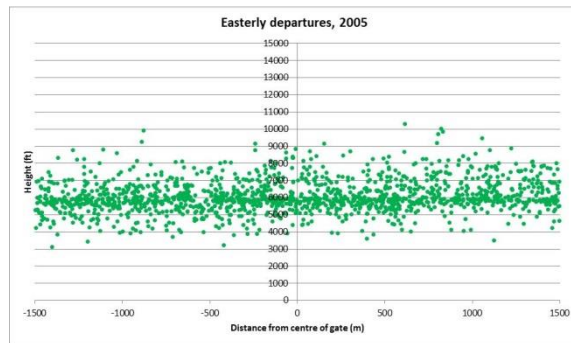
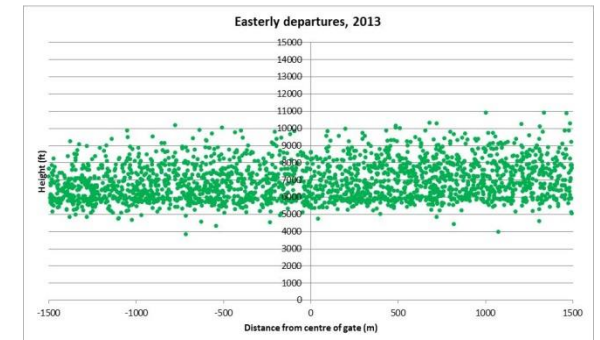
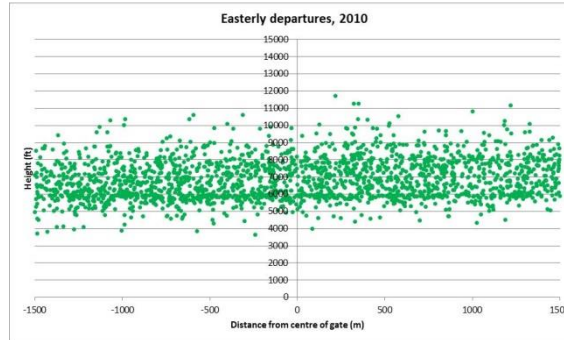
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Easterly departure heat maps show the random distribution of flights across the gate, generally above 5000 feet and above

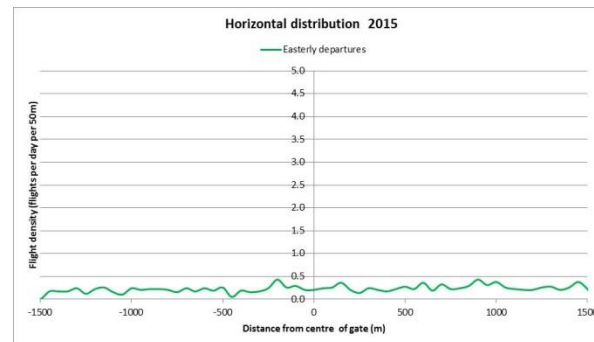
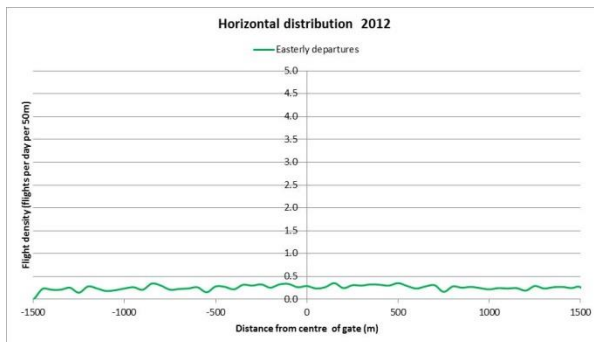
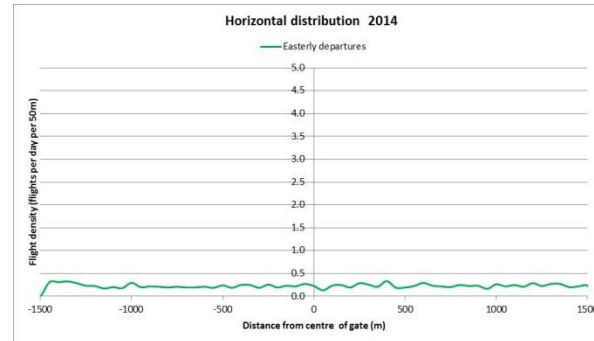
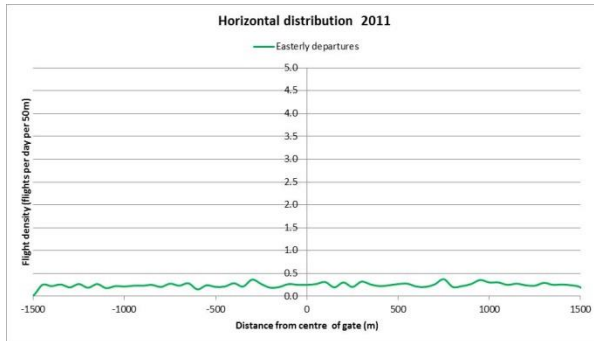
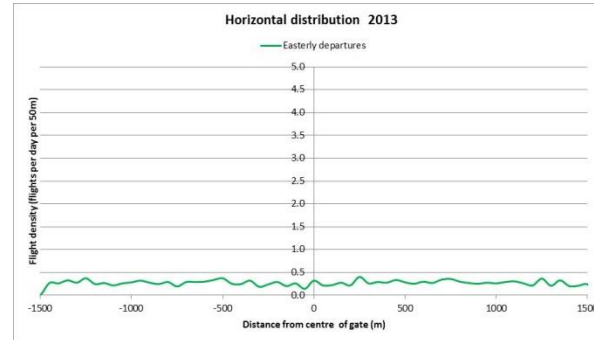
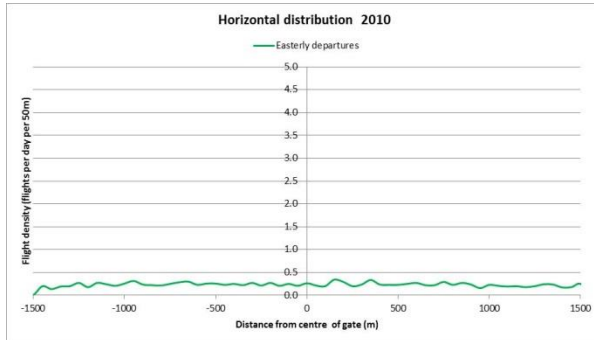


Scatter plots for easterly departures show the random distribution of flights across the gate

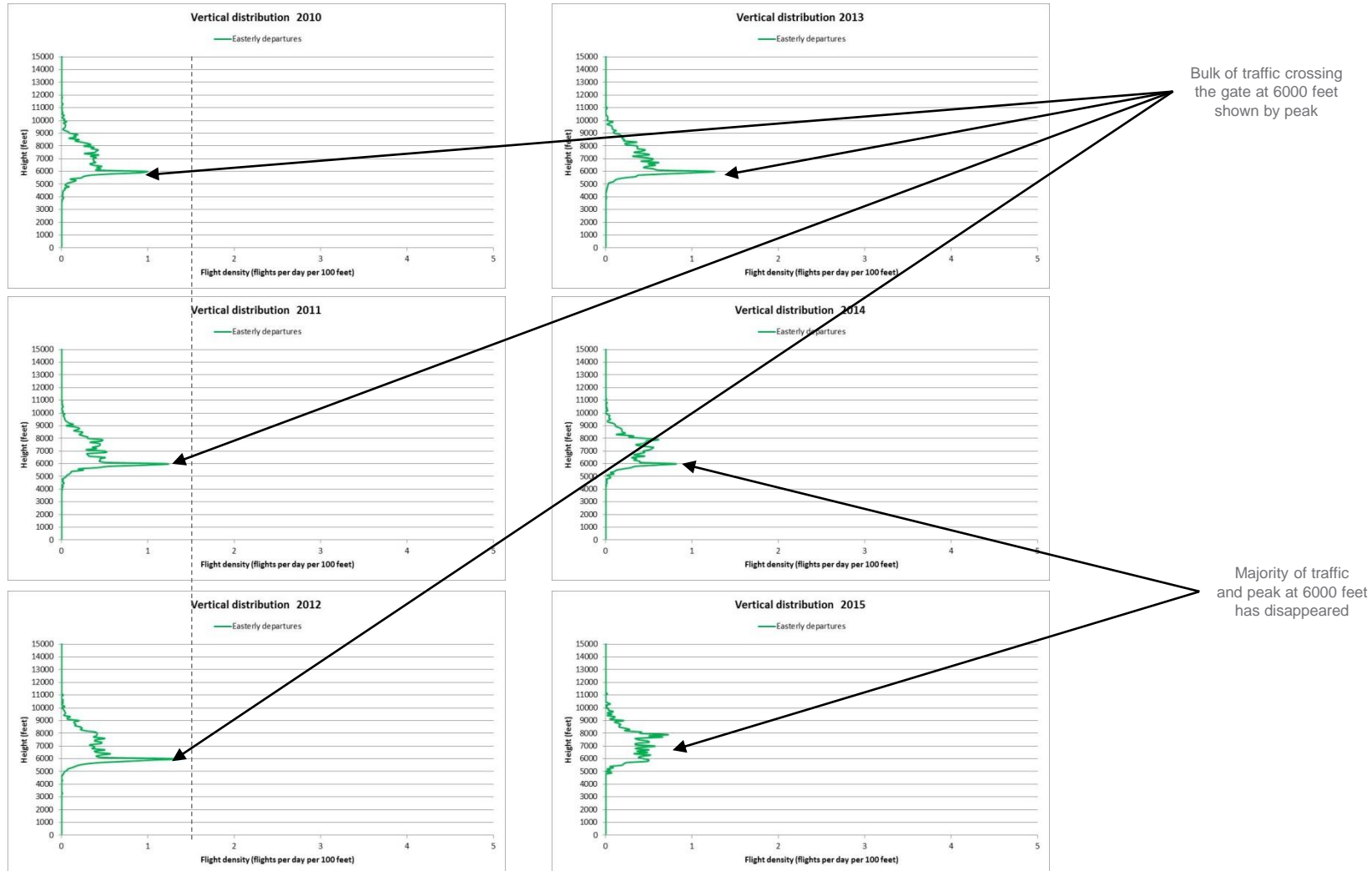
Easterly departure traffic is randomly distributed across the gate with a floor at approximately 5000 feet although some flights cross lower than this



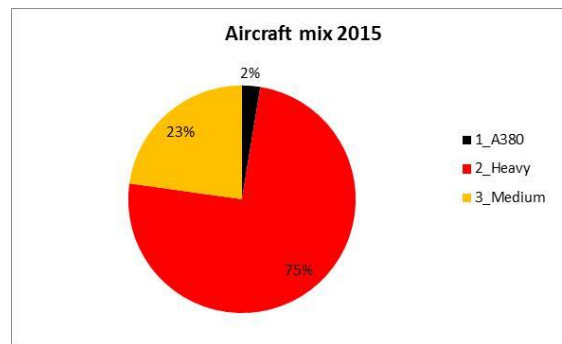
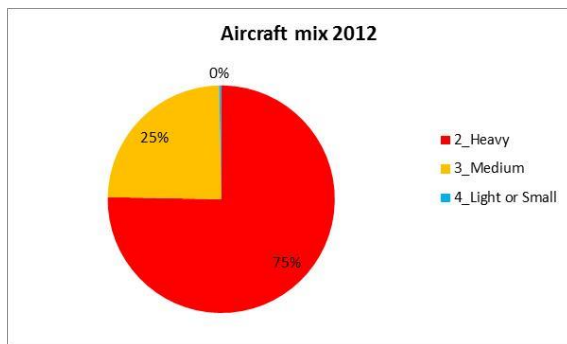
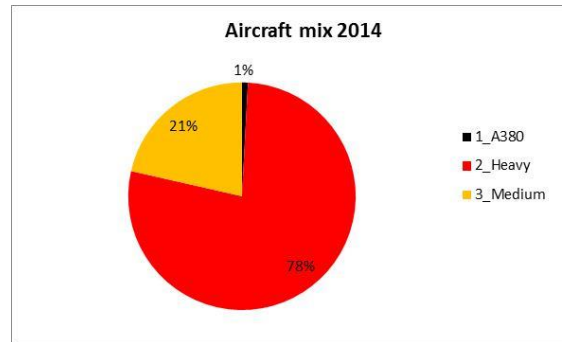
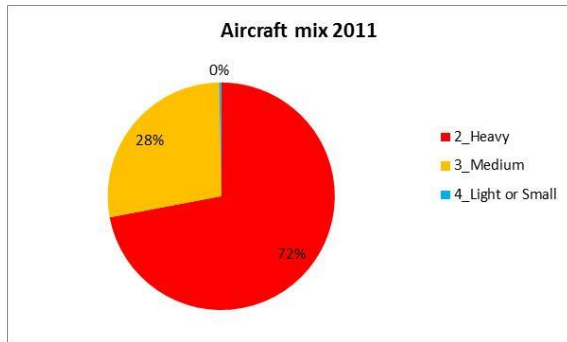
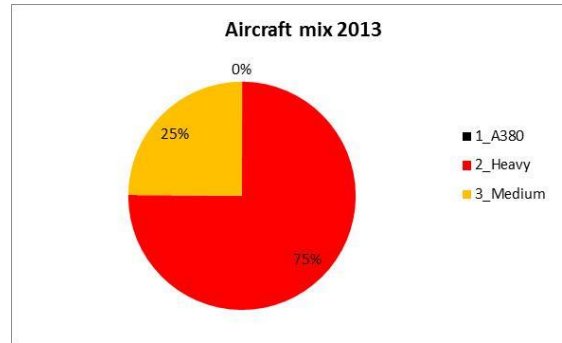
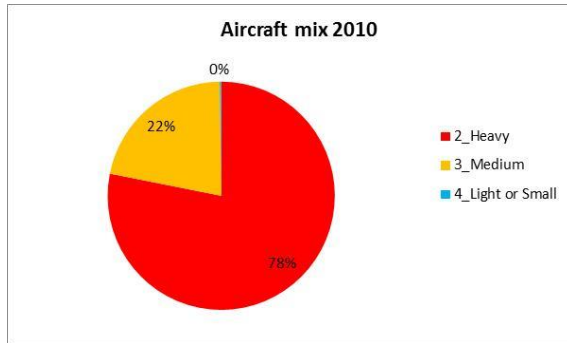
The horizontal traffic distributions confirm the low volume and random nature of easterly departure traffic crossing the gate



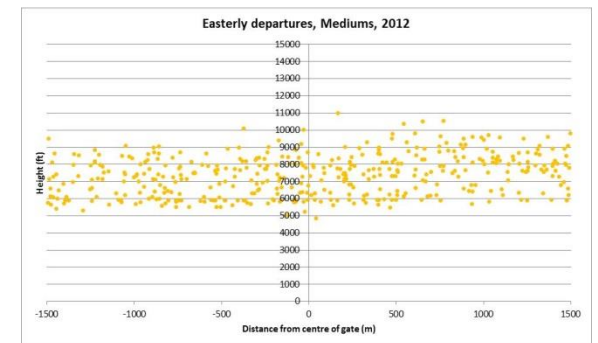
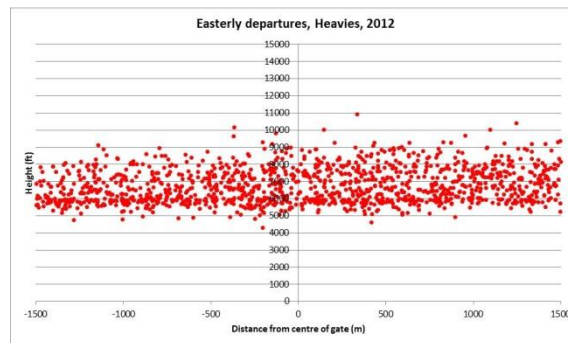
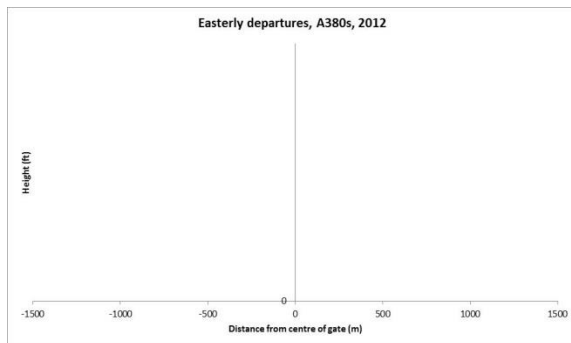
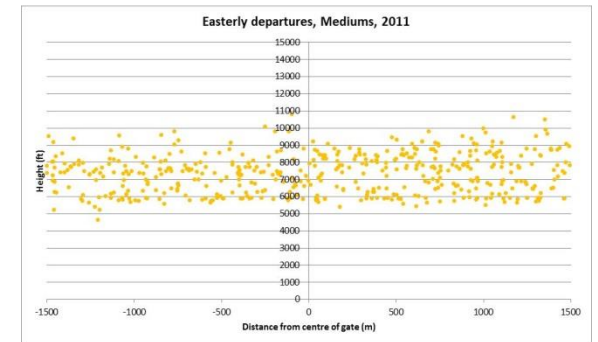
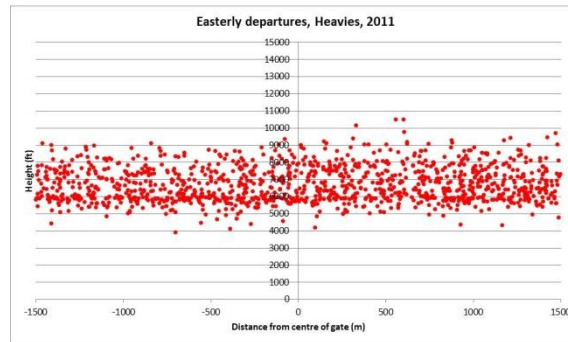
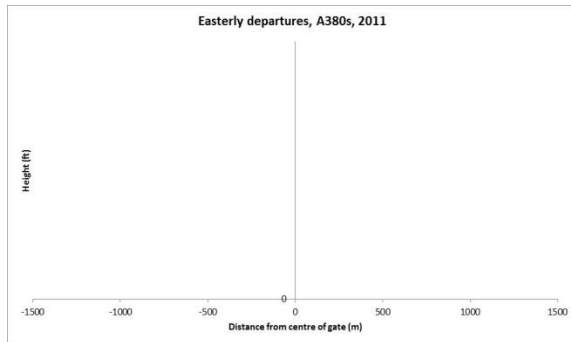
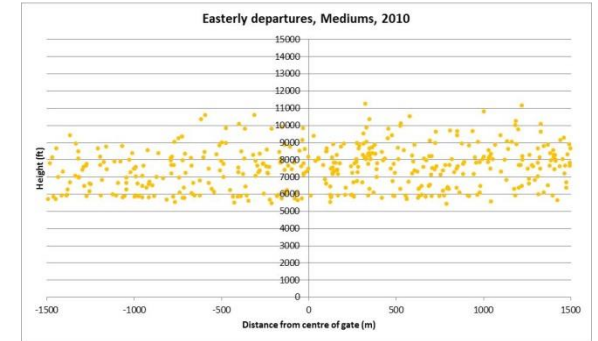
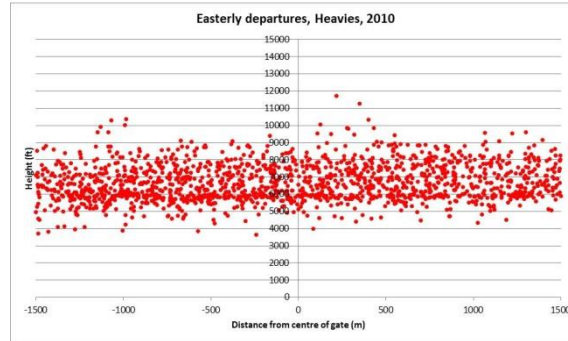
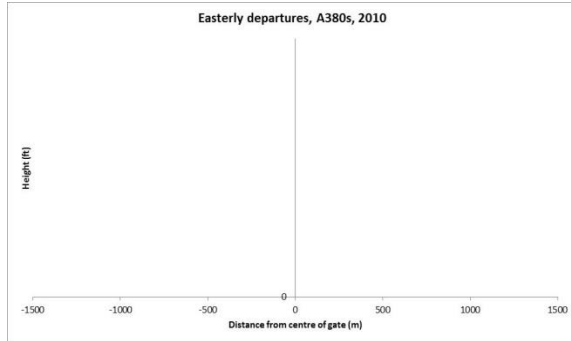
Vertical distributions show pre-2015 the most likely departure height was 6000 feet: this has now become more evenly distributed in height



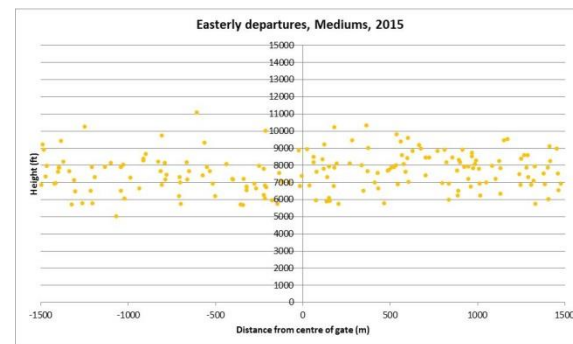
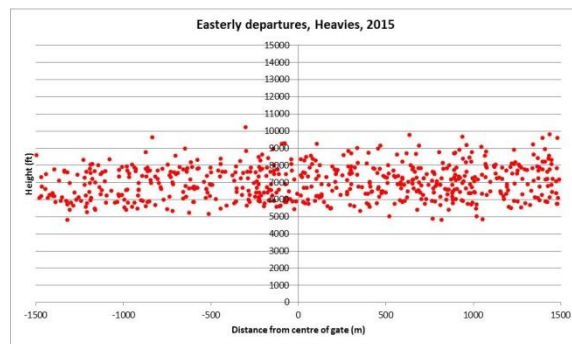
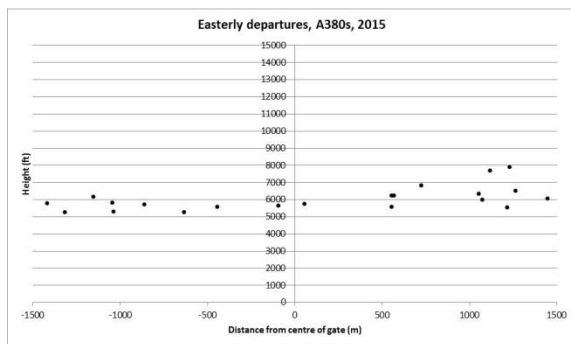
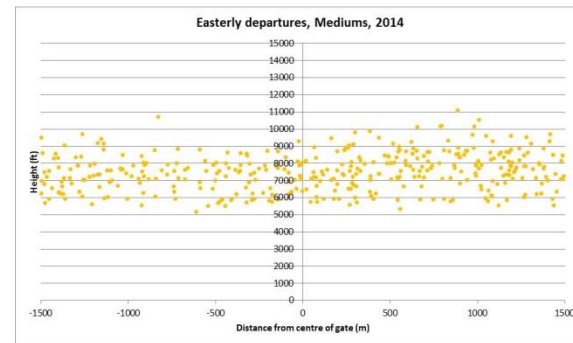
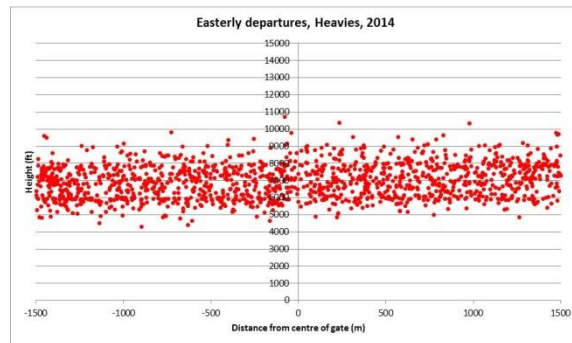
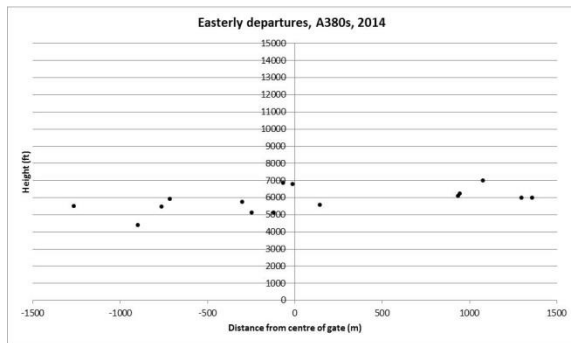
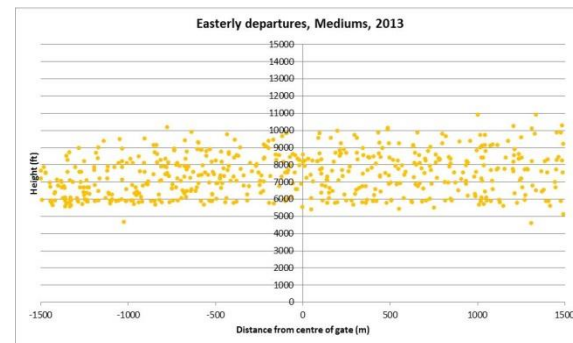
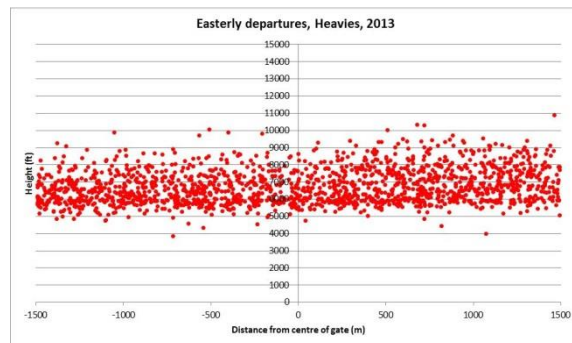
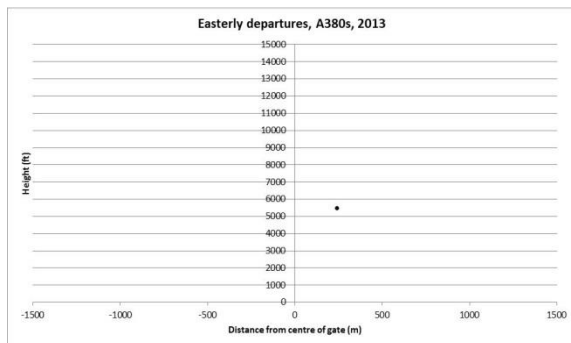
The proportion of large aircraft in the easterly departure mix is has increased from 75% in 2012 and 2013 to approximately 77% with A380s making up 2% in 2015



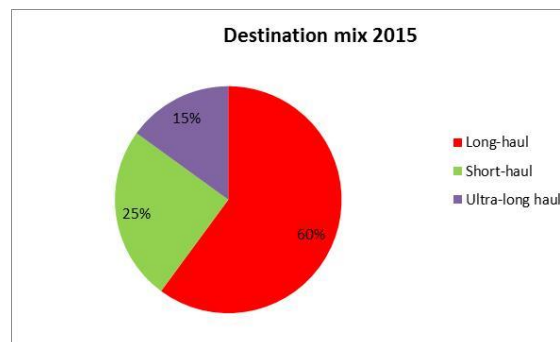
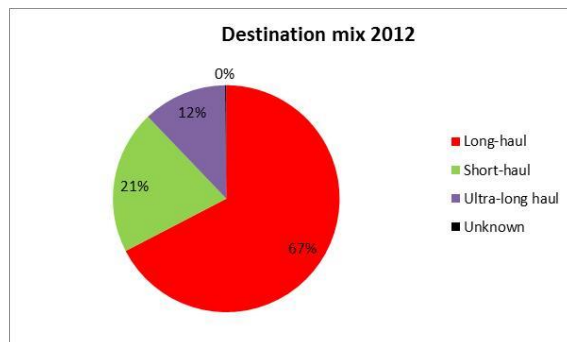
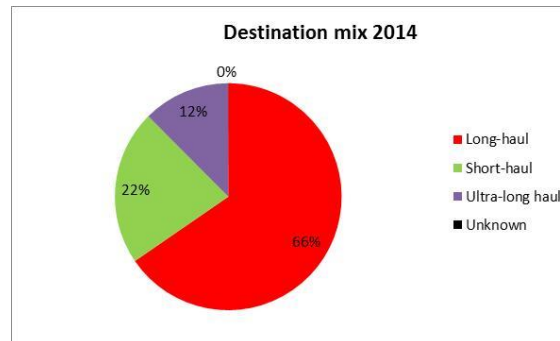
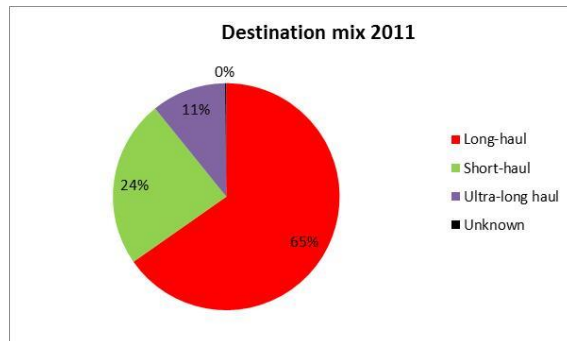
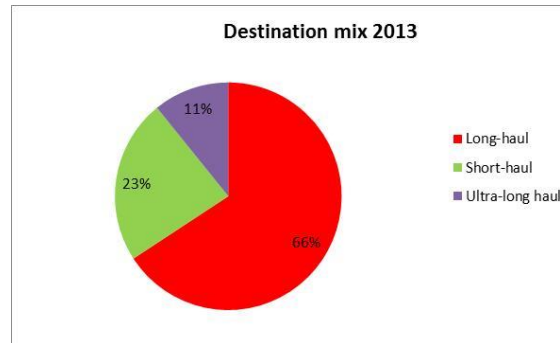
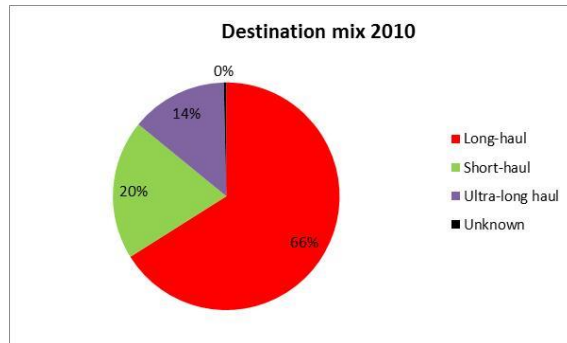
There does not appear to be any bunching by size of aircraft from 2010 to 2012



There also does not appear to be any bunching by aircraft size from 2013 to 2015 although A380s start to appear on 2013



The proportion of ultra long and long-haul destinations served by easterly departure traffic is consistent with the proportion of large aircraft in the mix, around 75%



Short-haul destinations typically have flights times shorter than three hours

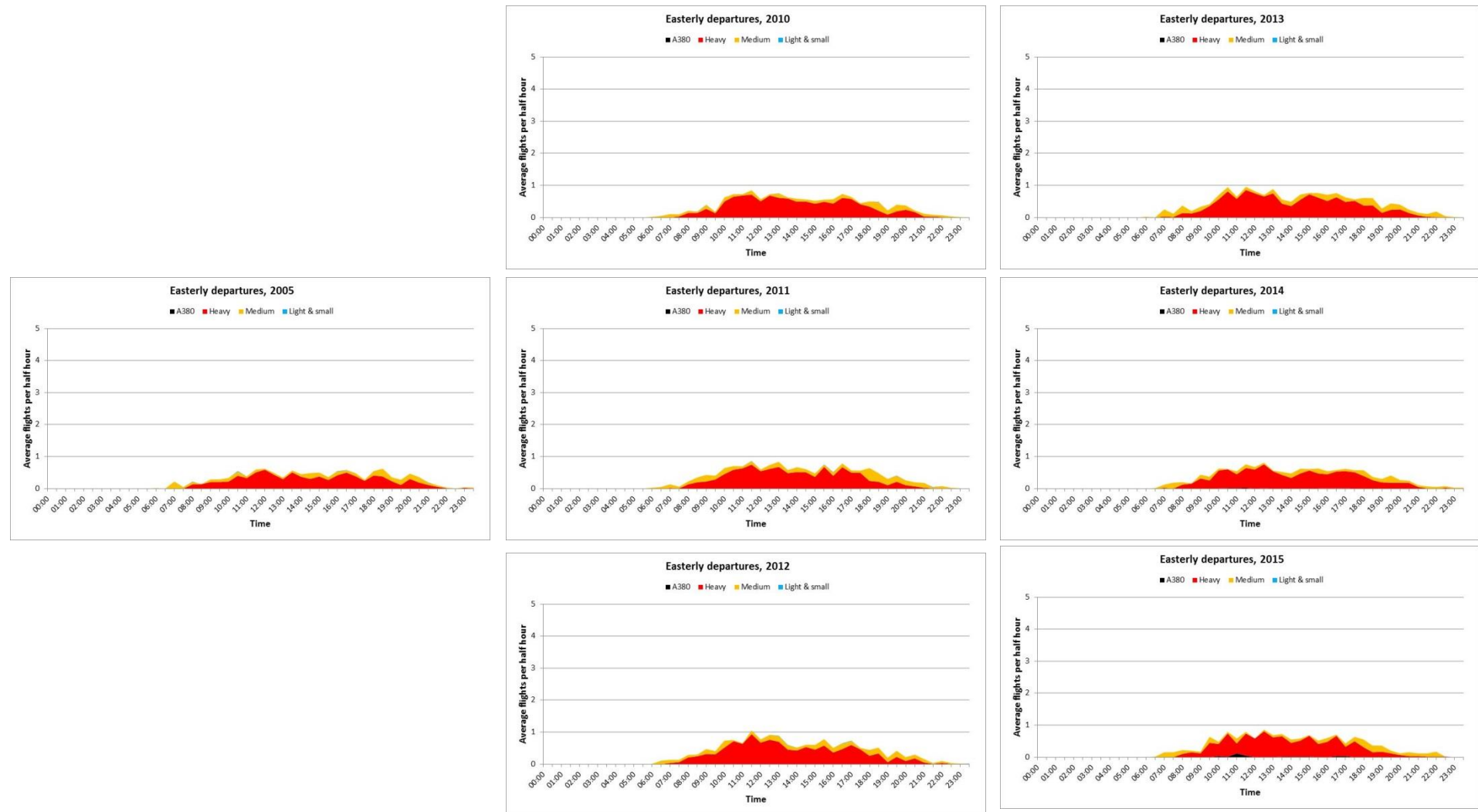
Medium-haul destinations typically have flight times between three and six hours

Long-haul destinations typically have flight times between six and nine hours

Ultra long-haul destinations typically have flight times greater than nine hours

Destinations marked as “unknown” do not have a recognised airport code associated with the flight in the data used for analysis

Easterly departure traffic is spread broadly across the day

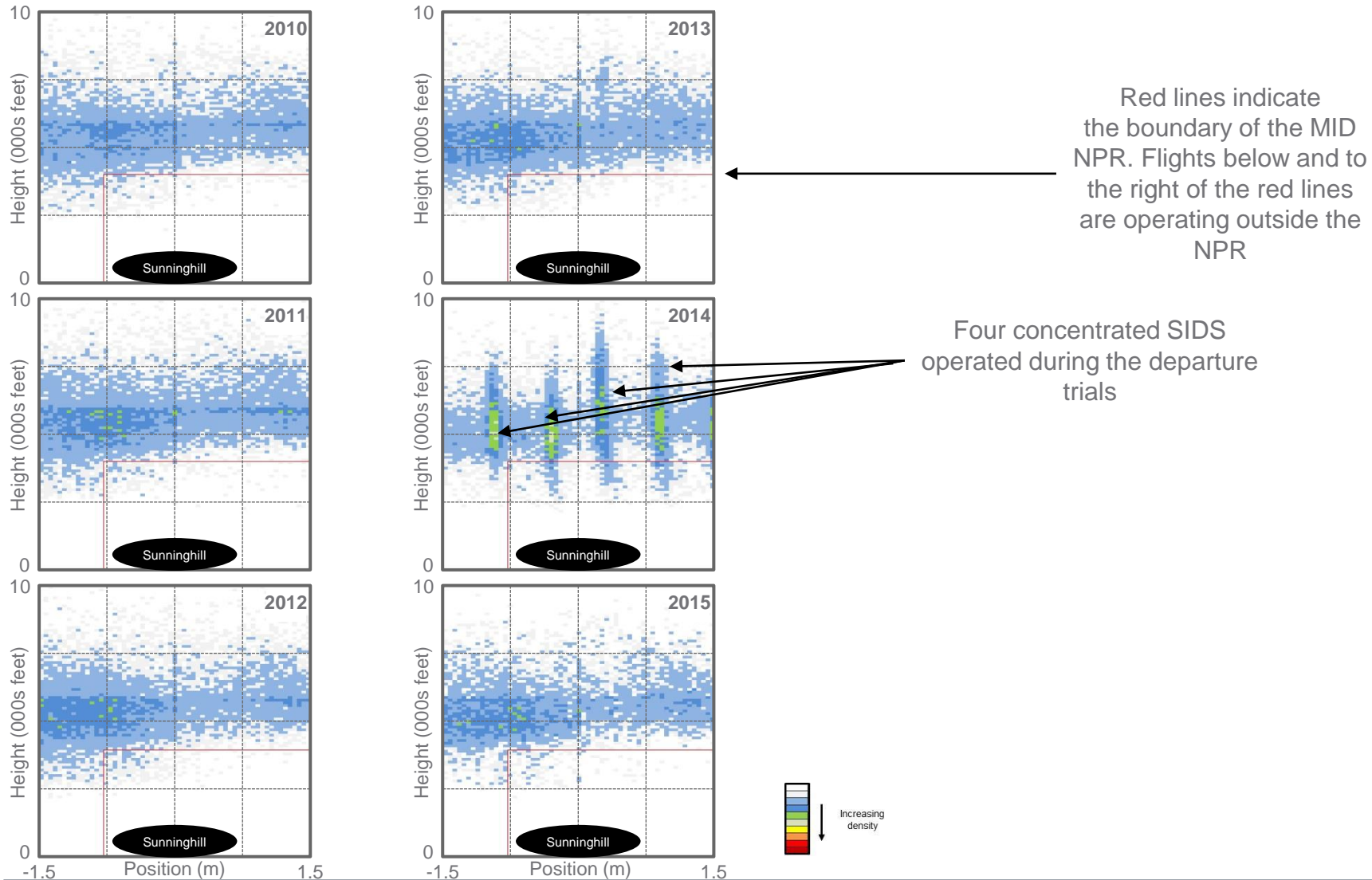




WESTERLY DEPARTURES

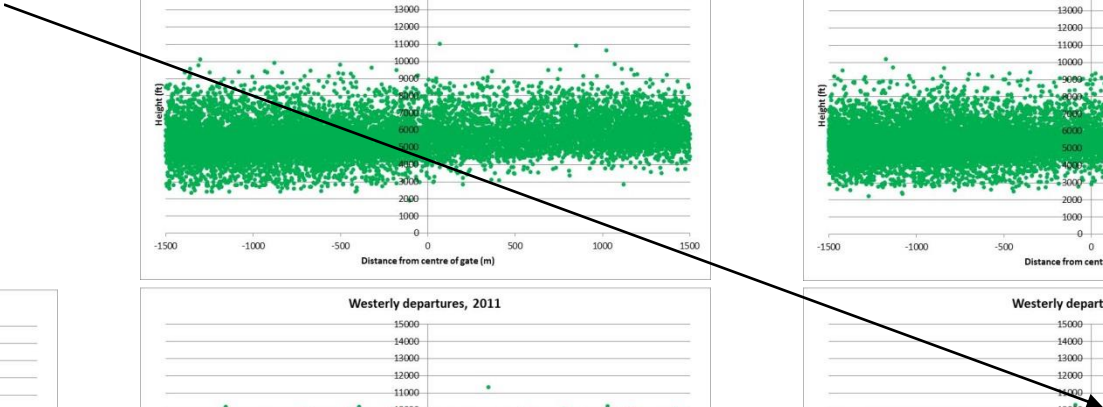
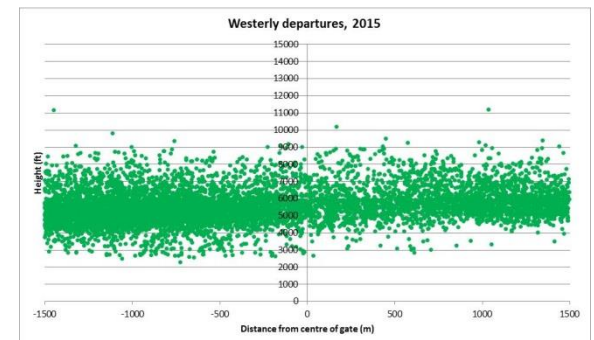
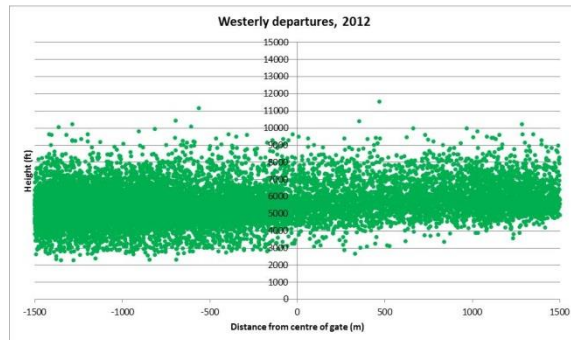
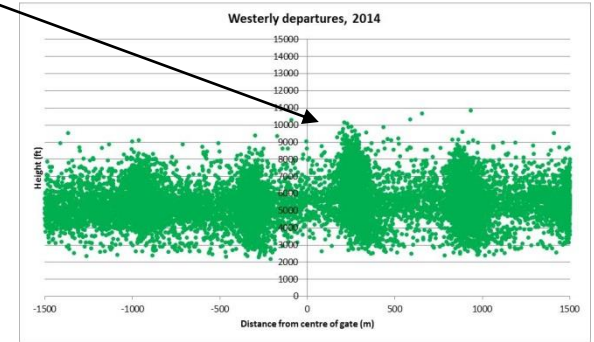
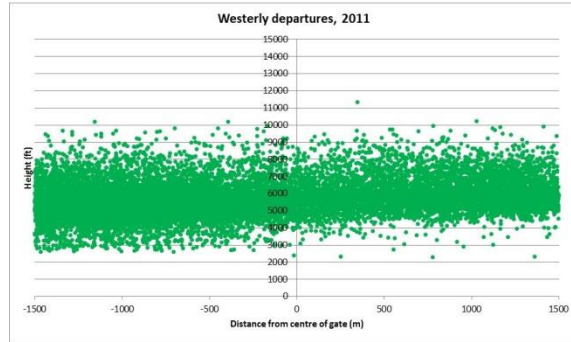
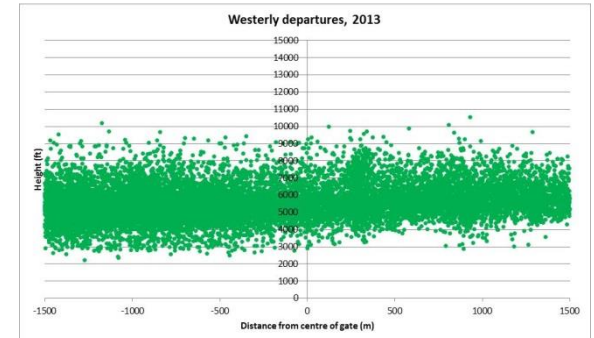
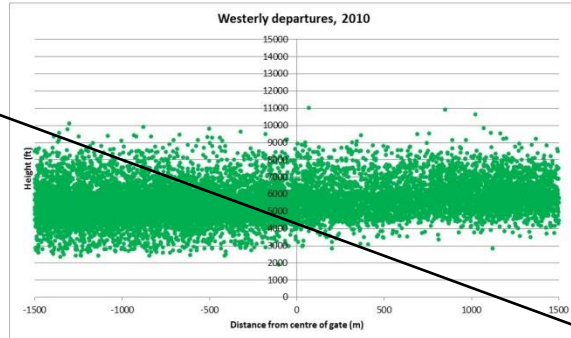
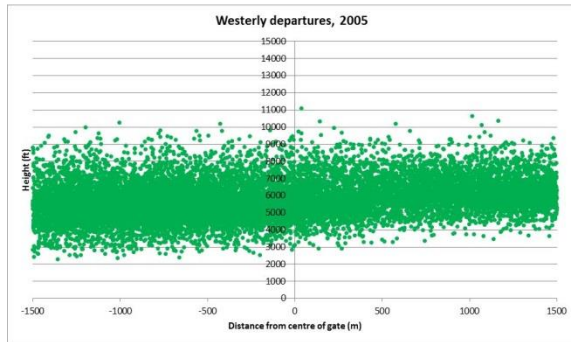
5

The westerly departure heat maps clearly show the impact of the departure trials in 2014 but are very similar across all years other than during the trial period

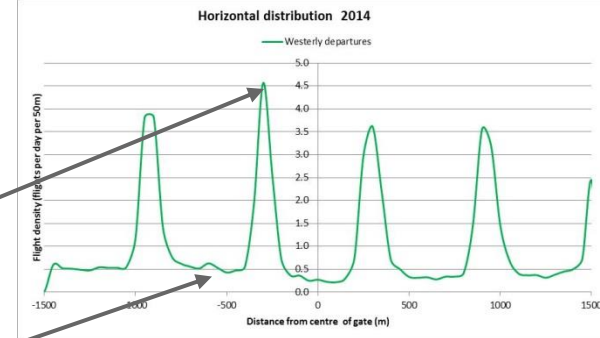
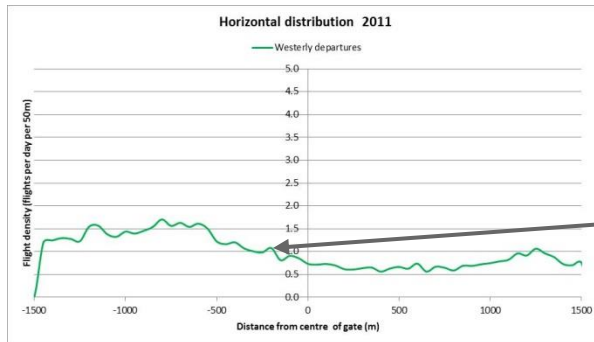
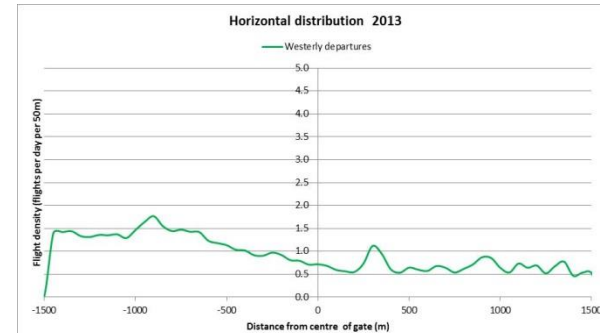
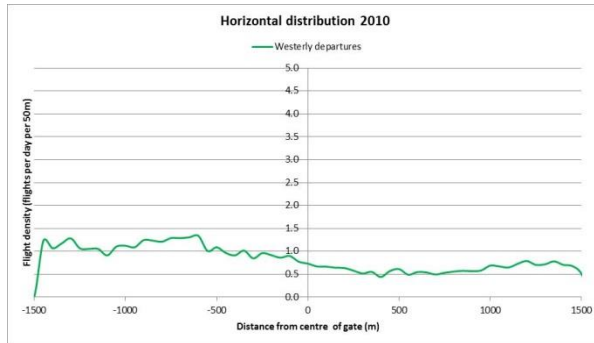


Westerly departure scatter plots show the trials SID structure but are otherwise broadly distributed across the gate at other times

Bunched structure shows trial SIDs

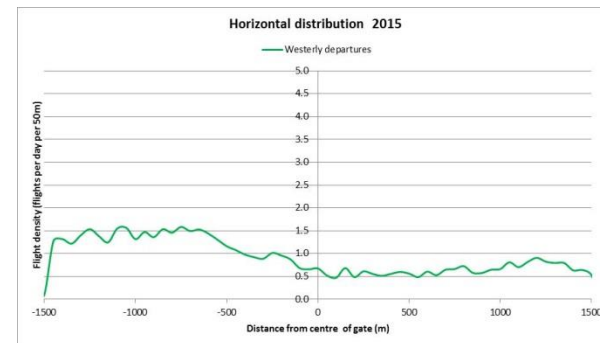
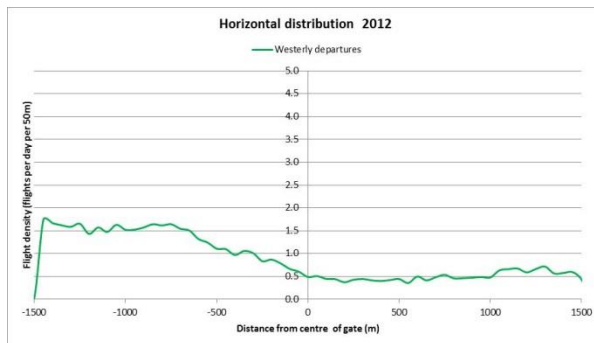


Lateral distributions for westerly departures show the degree of concentration reached during the trials reverting to the “normal” distribution afterwards

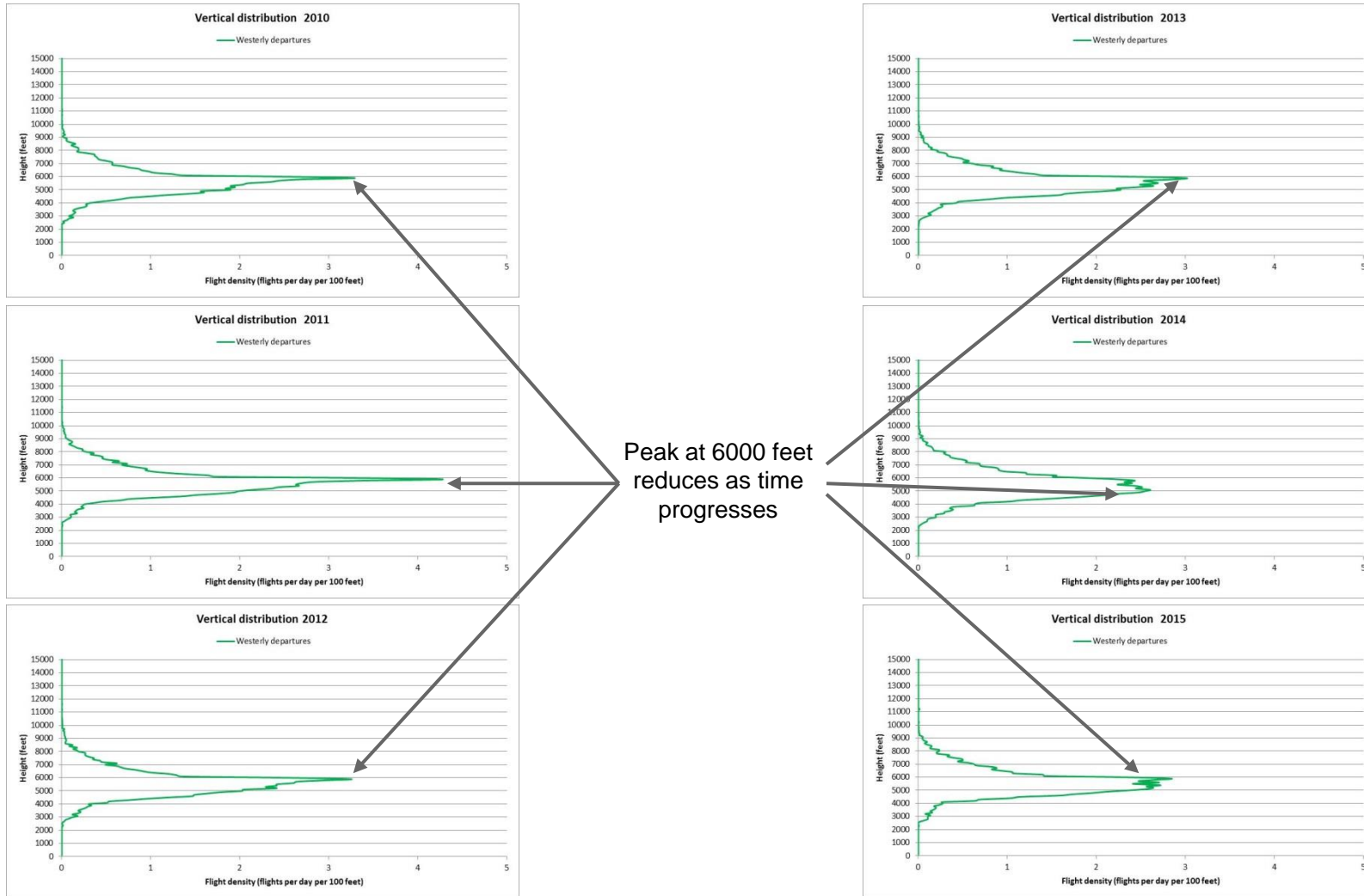


Trial peak of order four times higher than normal traffic levels

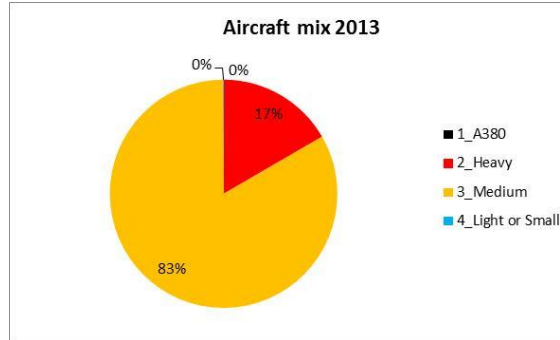
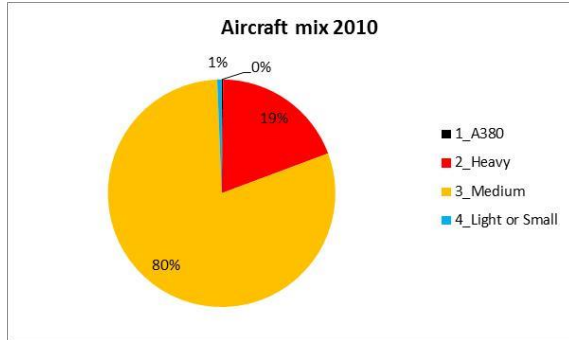
“Background” levels during trial reduced by around a factor of three compared to normal levels



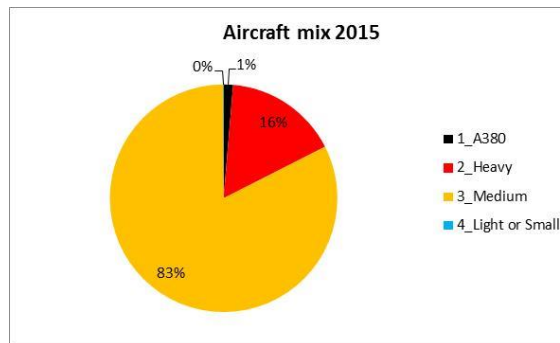
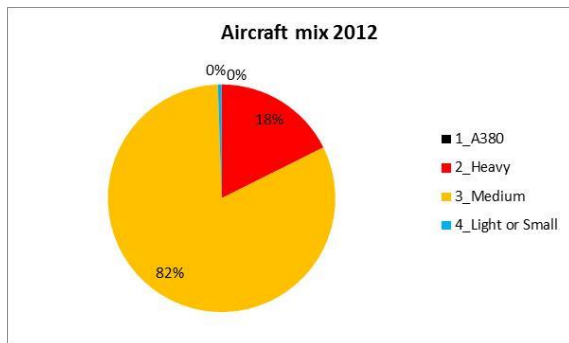
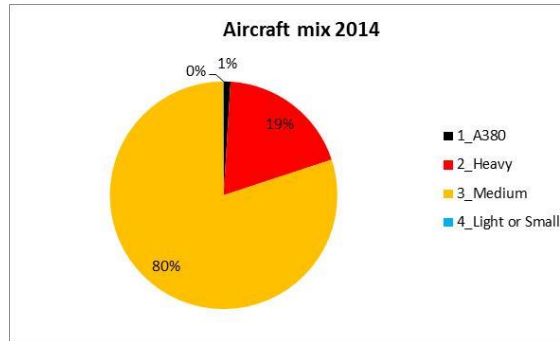
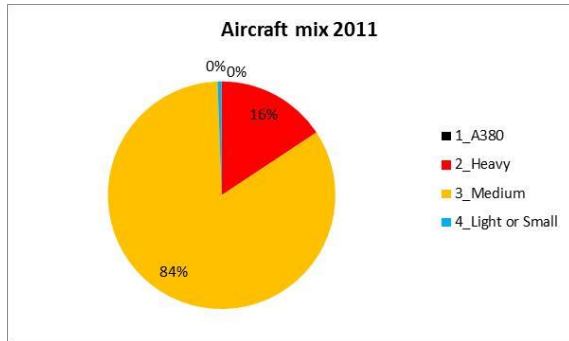
The concentration of traffic at a height of 6000 feet has reduced and broadened over time



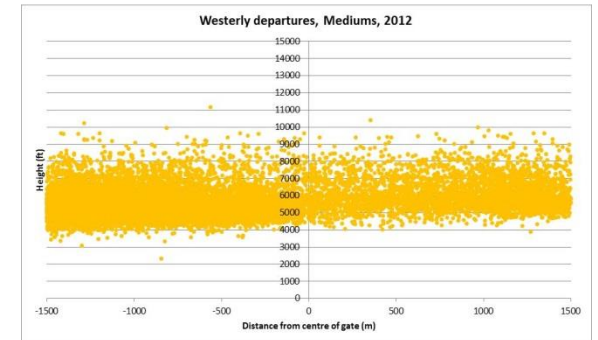
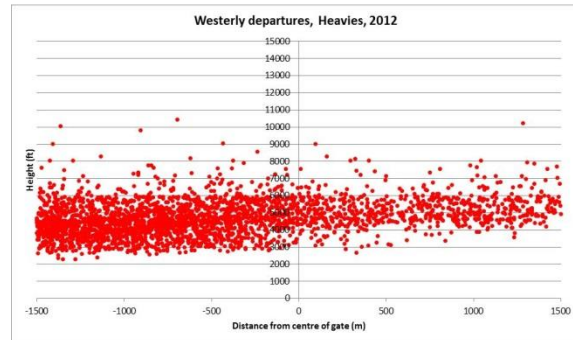
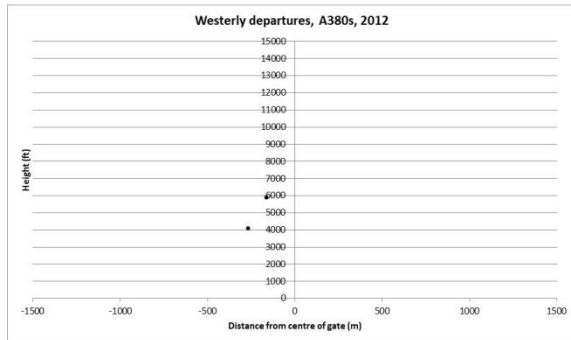
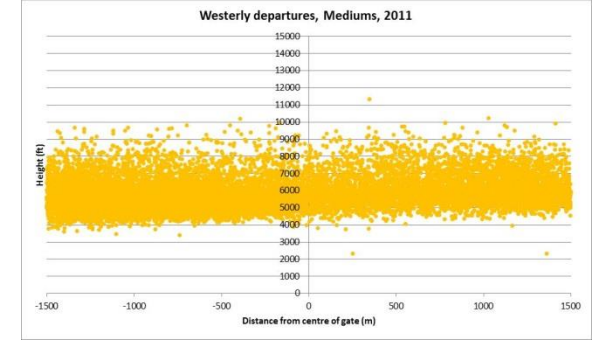
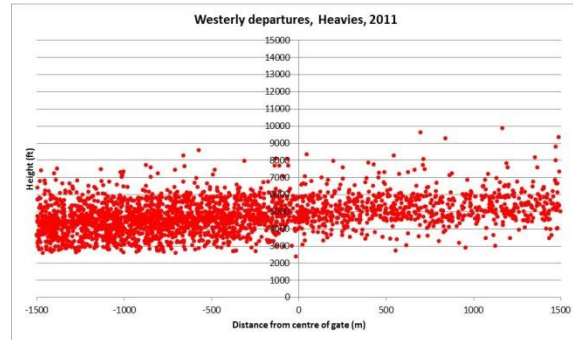
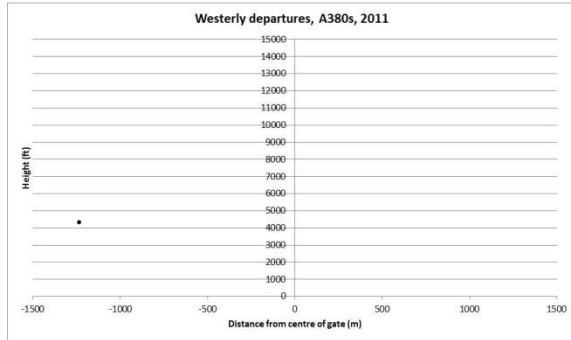
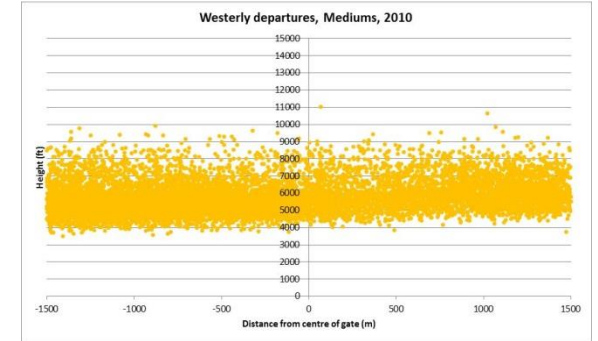
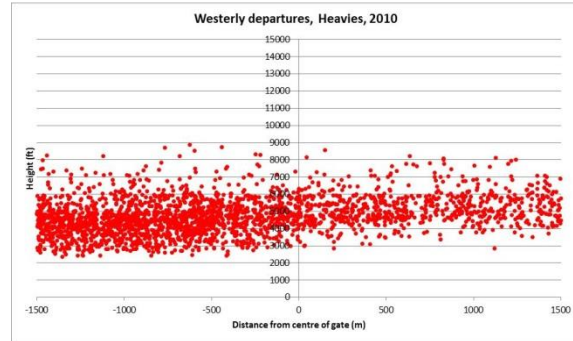
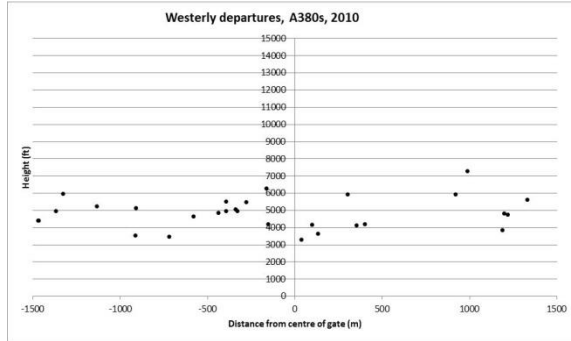
The underlying traffic mix is approximately 83% medium aircraft and 17% large aircraft, around 1% of which are A380s: this proportion increased during the trials



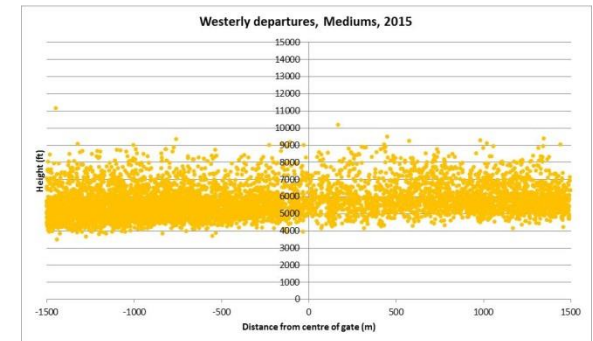
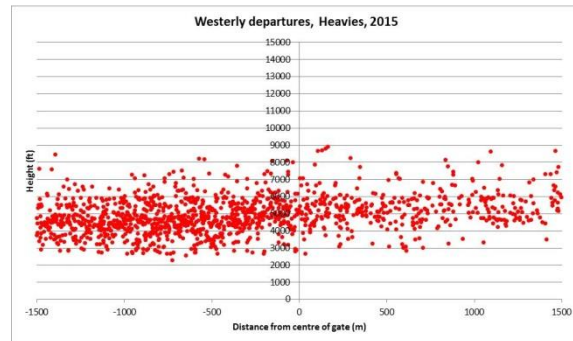
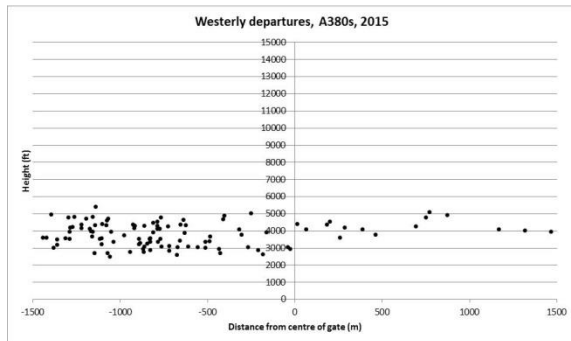
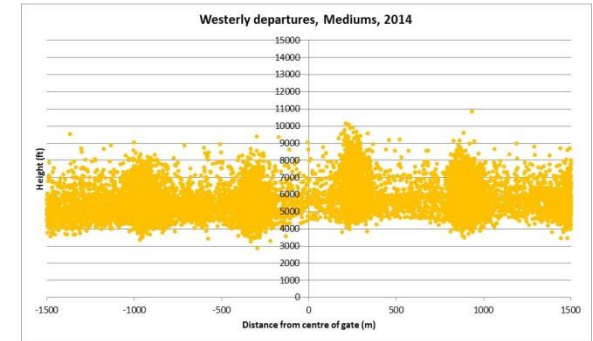
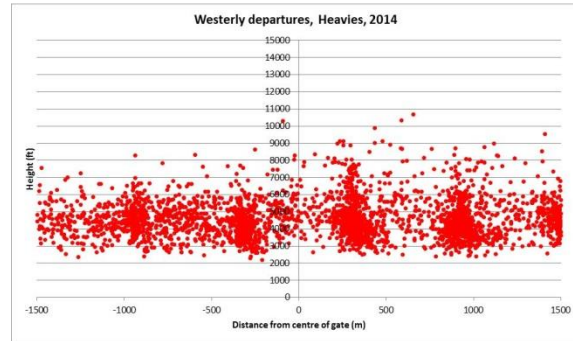
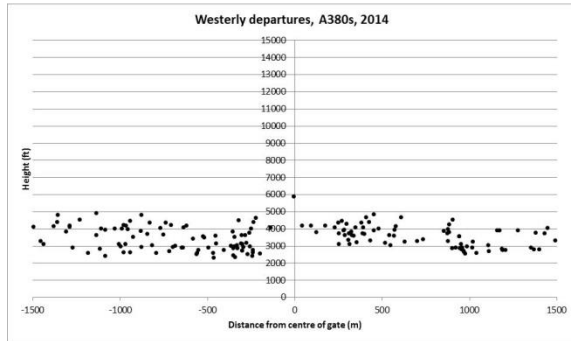
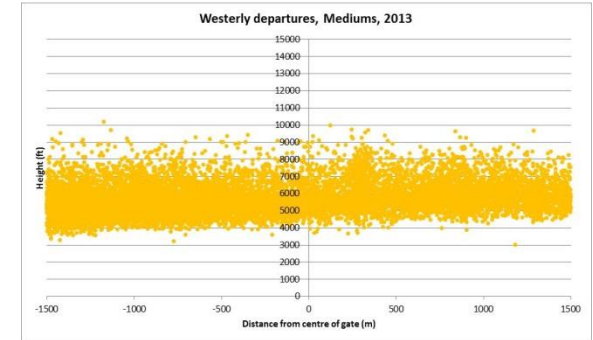
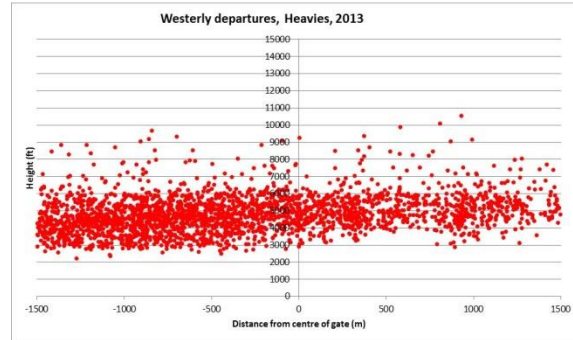
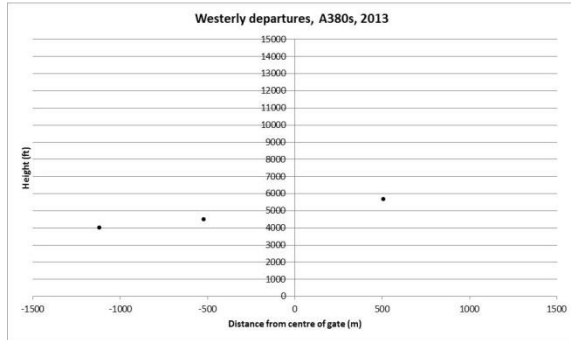
The proportion of medium aircraft in the mix has stayed approximately the same of the analysis period except during the trial period in 2014 when the proportion of medium aircraft decreased slightly to be replaced by heavy aircraft



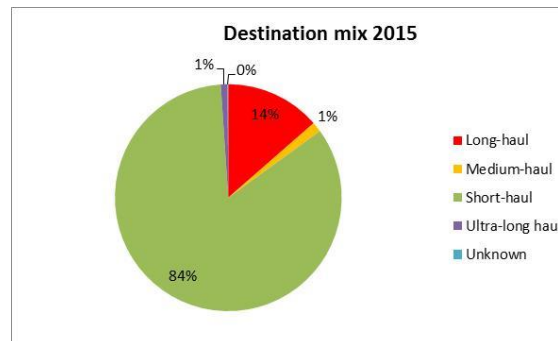
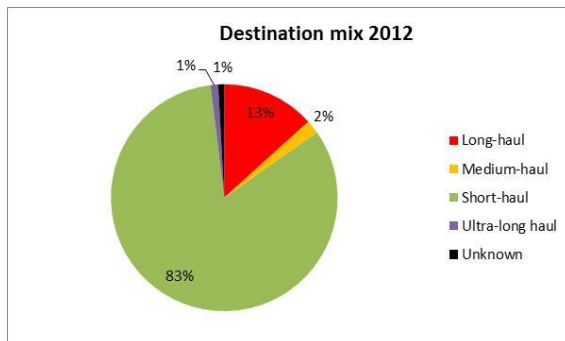
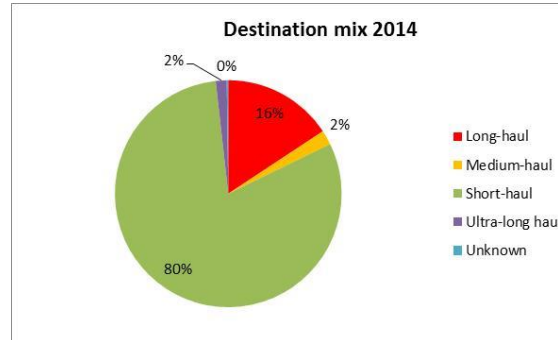
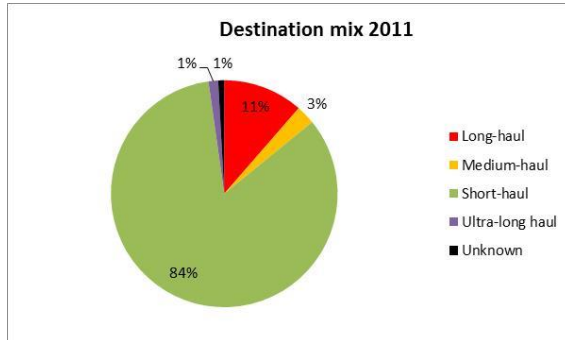
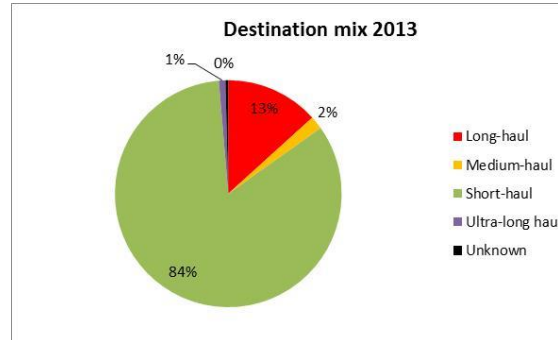
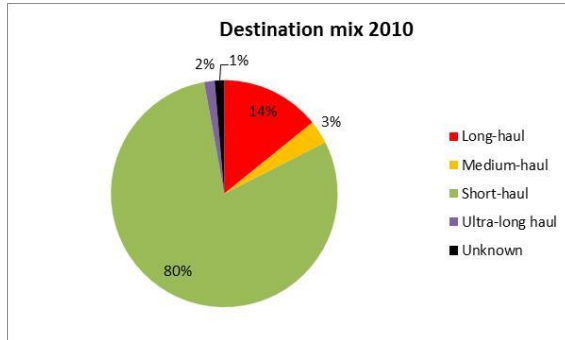
During the period 2010 to 2012, there does not appear to be any bunching of aircraft types



During the trials in 2014, all categories of aircraft are bunched in the trial SIDs : afterwards they revert to a more random distribution



During the trial period, the proportion of long-haul traffic in the mix increased from its background level of ~13% at other times to 18% and then reverted



Short-haul destinations typically have flights times shorter than three hours

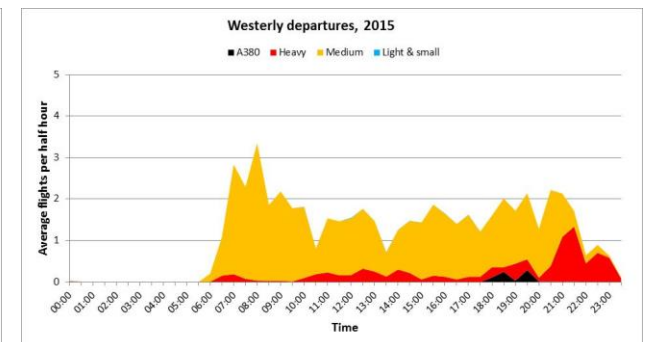
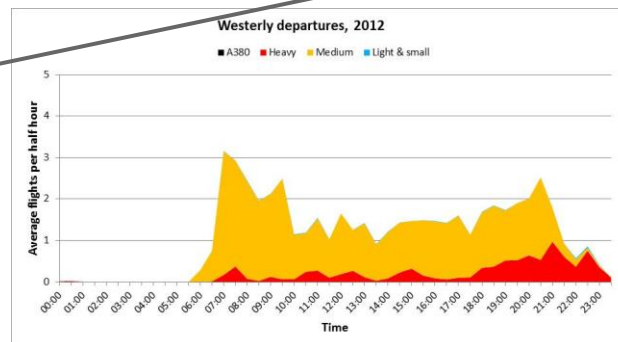
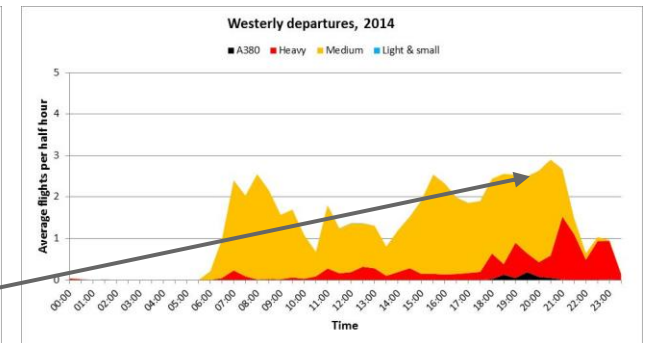
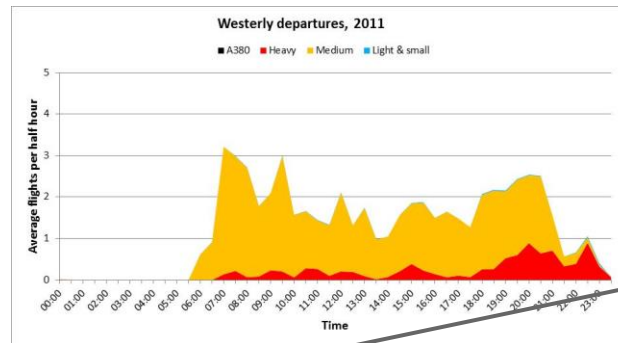
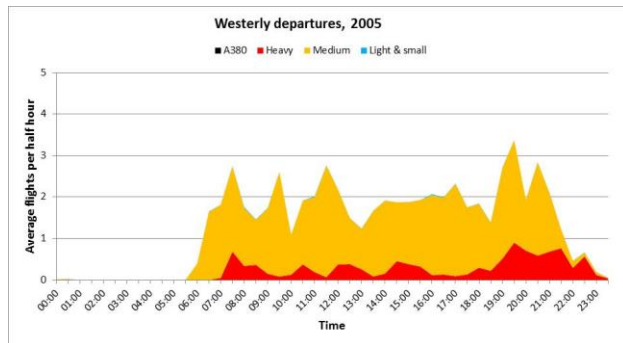
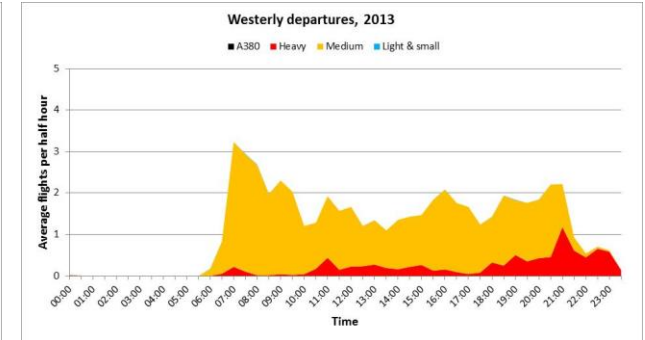
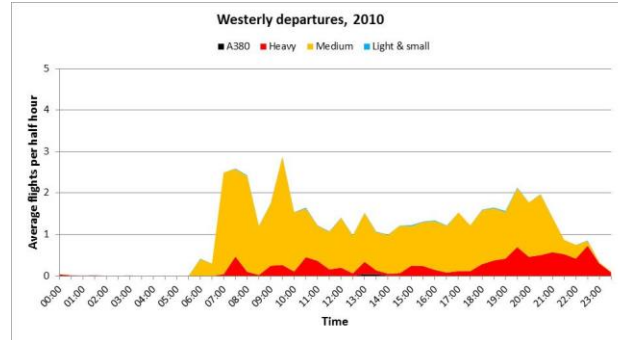
Medium-haul destinations typically have flight times between three and six hours

Long-haul destinations typically have flight times between six and nine hours

Ultra long-haul destinations typically have flight times greater than nine hours

Destinations marked as “unknown” do not have a recognised airport code associated with the flight in the data used for analysis

The main traffic peak for departures is in the morning but during the trials the evening peak increased: late night flights are predominantly heavy aircraft



Increased evening traffic peak compared to most other years, with higher proportion of heavy aircraft

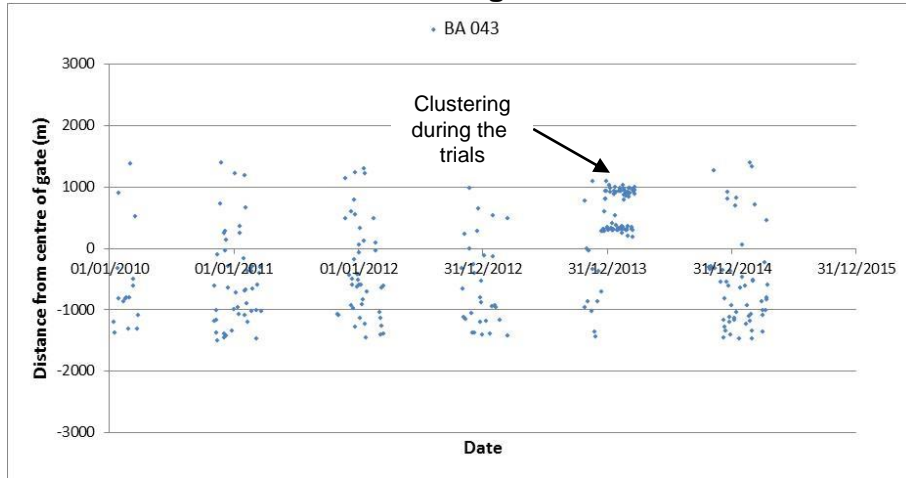


FOCUS ON SPECIFIC FLIGHTS

6

BA 043 only crosses the gate during the winter season

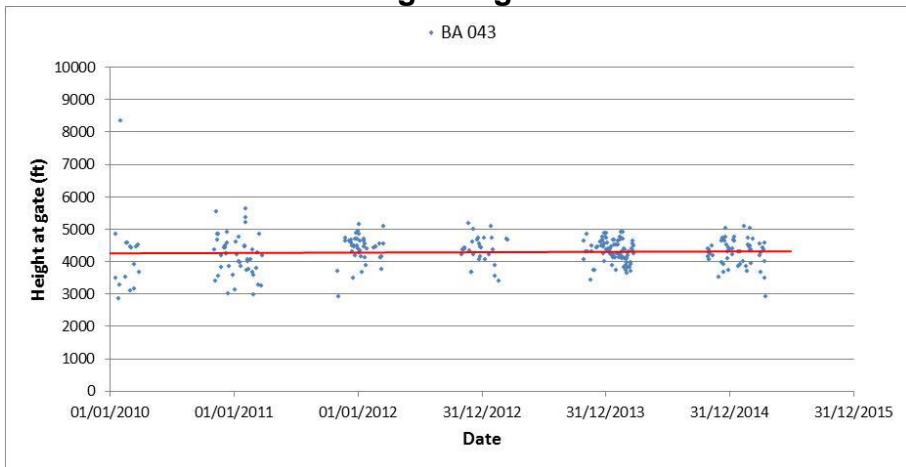
Distance from gate centre



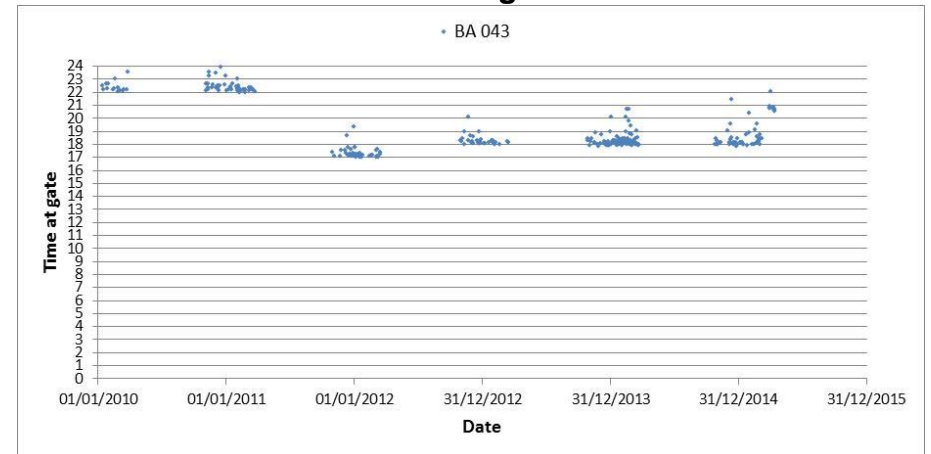
The charts show the position (relative to the centre of the gate), height and time at which the flight crosses the gate each day as a time series from the beginning of 2010 through to mid-2015.

Other than during the trials when it was clustered on the trials SIDs, BA 043's position at the gate is broadly distributed across the gate. Its average height has remained constant at the gate but this fluctuates from day-to-day over the range 3000 feet to 5000 feet. Time at gate shows large changes in schedule from winter 2009-10, when the gate was crossed between 22:00 and 23:00 hours. In winter 2014, time at gate was typically 18:00 hours but with some later flights at 20:00 and 22:00 hours.

Height at gate

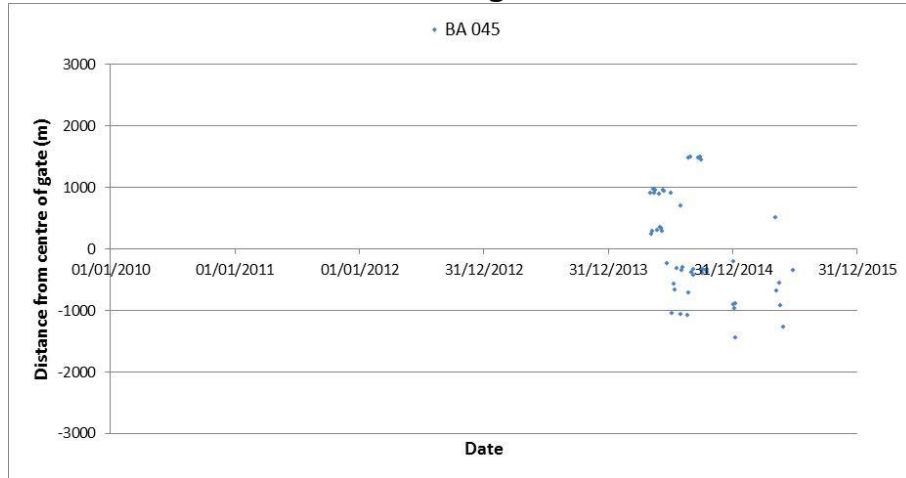


Time at gate



BA0 45 started to cross the gate in summer 2013 and does not cross the gate every day

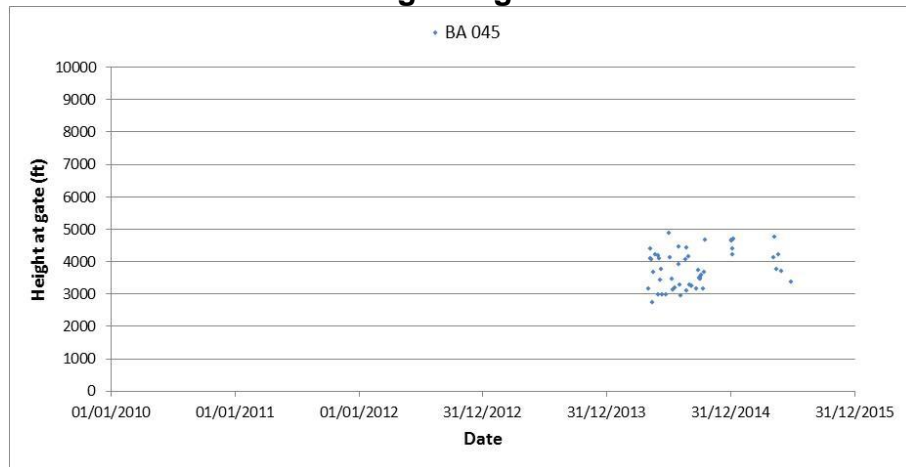
Distance from gate centre



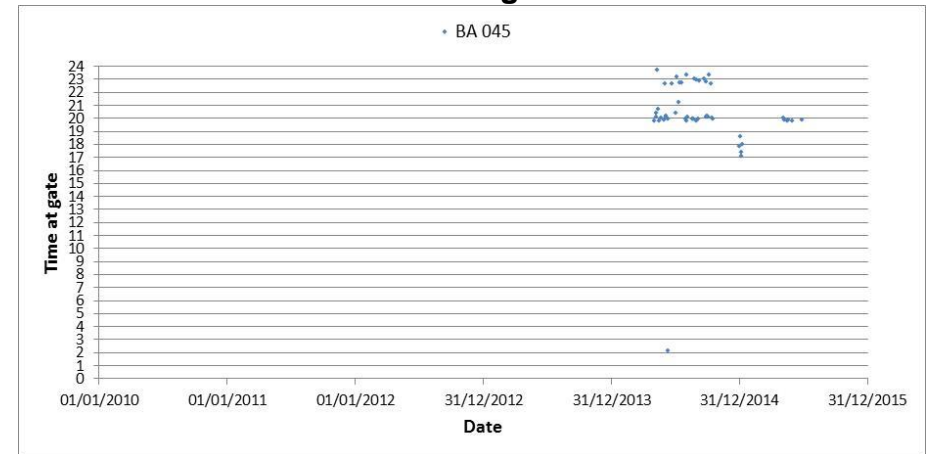
The charts show the position (relative to the centre of the gate), height and time at which the flight crosses the gate each day as a time series from the beginning of 2010 through to mid-2015.

The position that BA 045 crosses the gate was right of centre, clustered on the trial SIDs during the trial period. After the trials, the position fluctuates but is more focused left of centre. Height at the gate also fluctuates from day-to-day over the range 3000 feet to just under 5000 feet. Time at gate shows clusters at approximately 20:00 hours and 23:00 hours during summer 2014. There is a period of earlier operations, spread between 17:00 hours and 19:00 hours in winter 2014 followed by a switch to 20:00 hours in summer 2015.

Height at gate

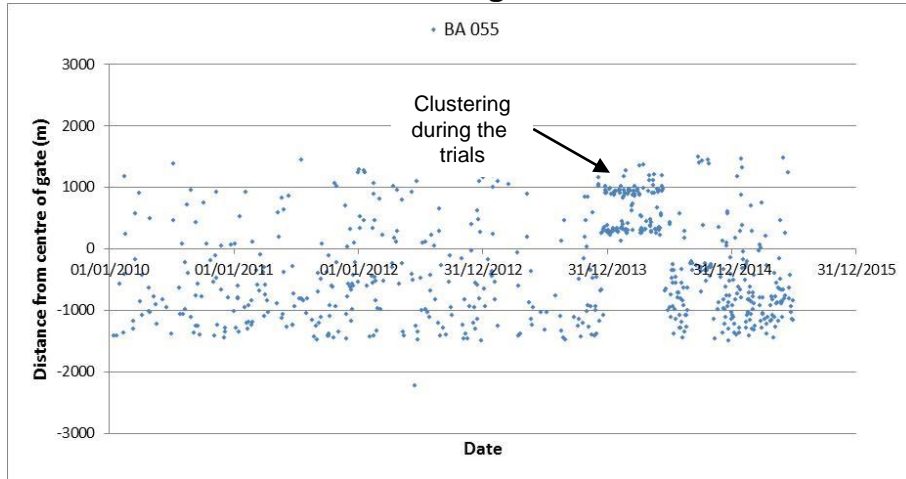


Time at gate



BA 055 crosses the gate daily but at different times in the summer and winter

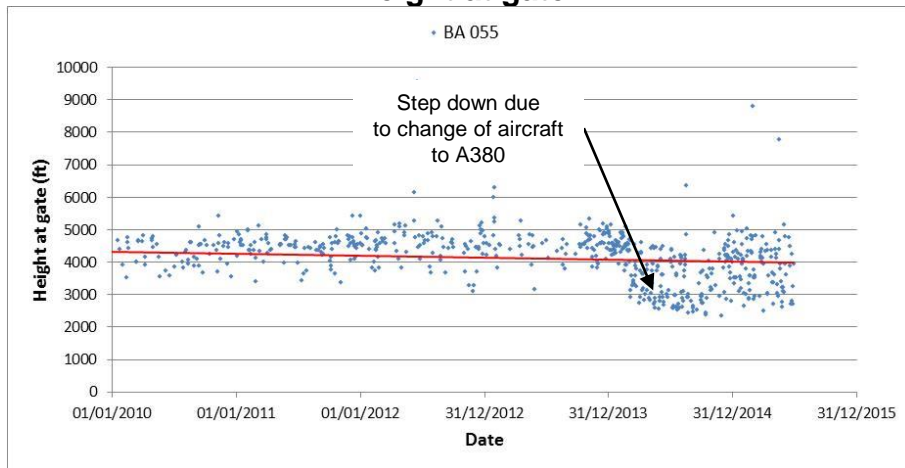
Distance from gate centre



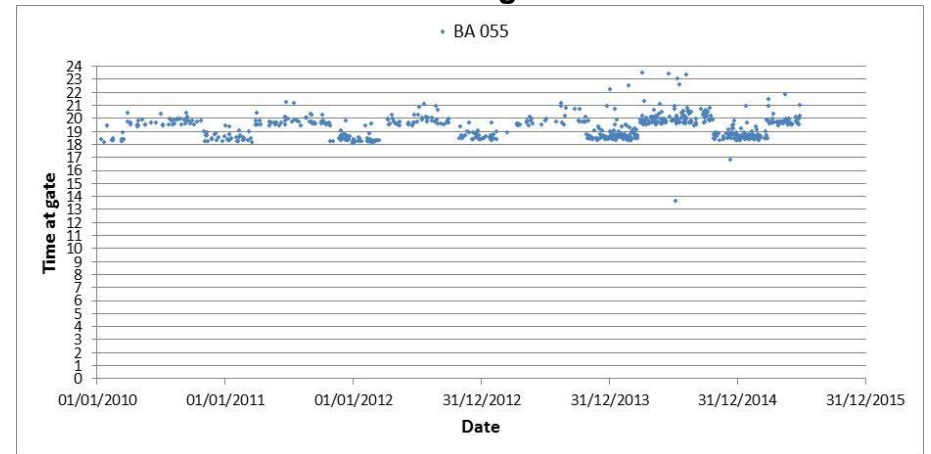
The charts show the position (relative to the centre of the gate), height and time at which the flight crosses the gate each day as a time series from the beginning of 2010 through to mid-2015.

Other than during the trials, the position that BA 055 crosses the gate is spread widely across the gate. Height at the gate shows a strong downward trend from above 4000 feet in 2010 to just over 2000 feet in 2015. There is a step change downwards in early 2014 when the aircraft type was changed to A380. The flight generally crosses the gate between 18:00 and 19:00 hours in winter and 19:00 and 20:00 hours in summer (due to scheduling changes associated with clock change). There are some flights, particularly in summer 2014 and summer 2015 that operated later, from 21:00 to 23:00 hours.

Height at gate

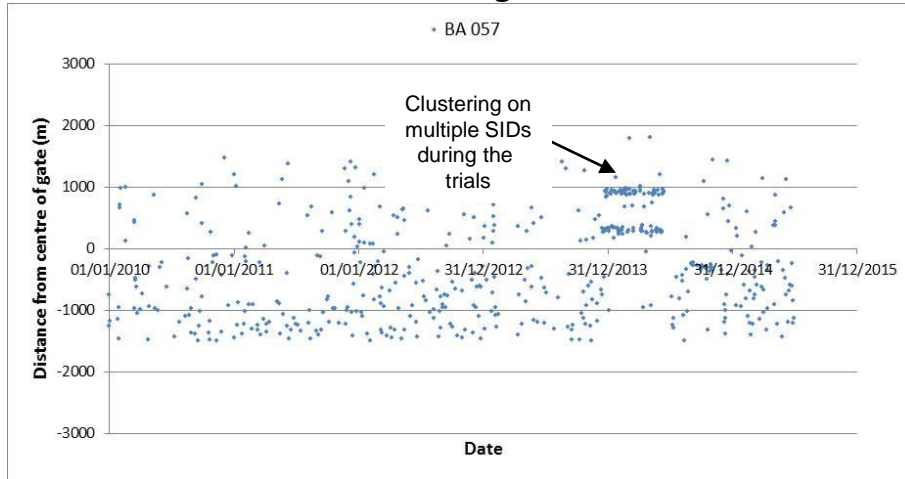


Time at gate



BA 057 crosses the gate on a daily basis at points fluctuating widely from day-to-day

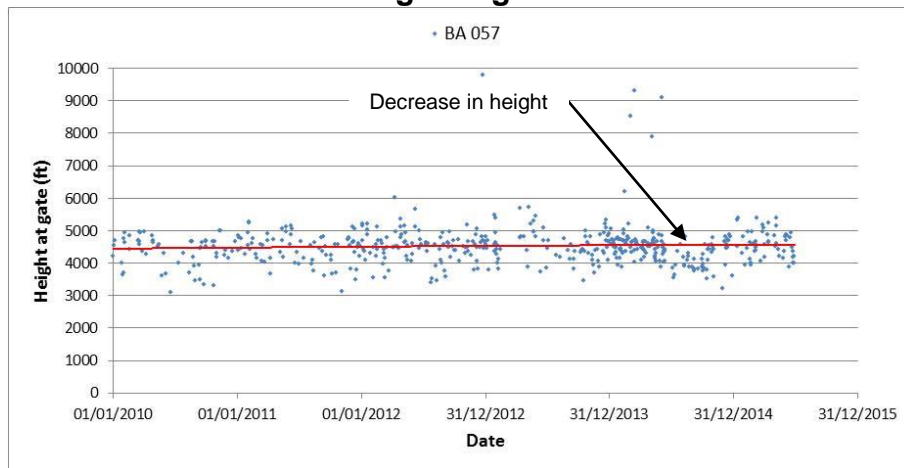
Distance from gate centre



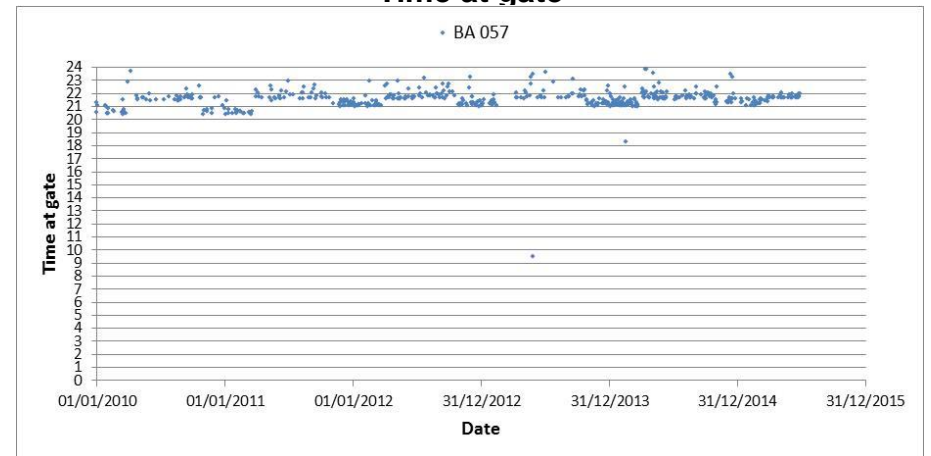
The charts show the position (relative to the centre of the gate), height and time at which the flight crosses the gate each day as a time series from the beginning of 2010 through to mid-2015.

Other than during the trials, the position that BA 057 crosses the gate is spread widely across the gate. Height at the gate typically fluctuates between 3500 feet and 5000 feet and does not show a particular trend but there was a step change downwards in summer 2014 and reversion afterwards. This does not appear to be associated with change of aircraft type. Since 2012, the flight generally crosses the gate at around 22:00 hours in winter and between 21:00 and 22:00 hours in summer with some flights operating later.

Height at gate

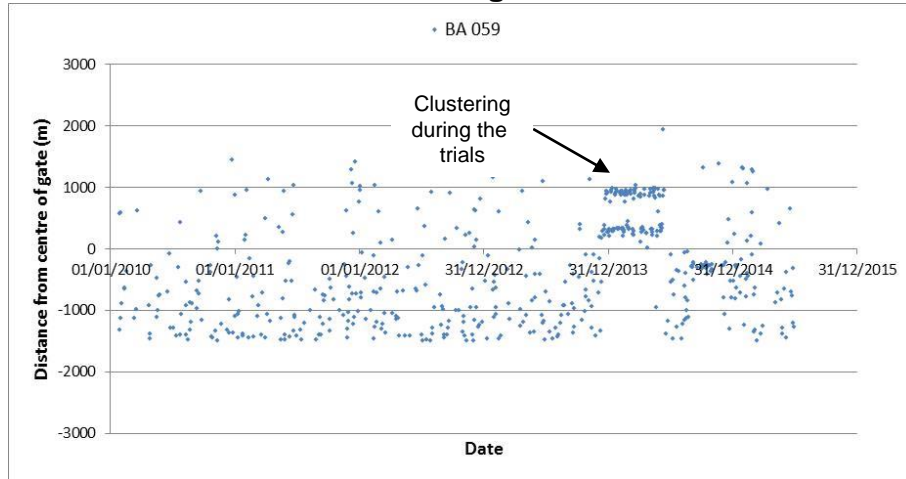


Time at gate



BA 059 crosses the gate daily and started to operate later in summer than in winter in summer 2014

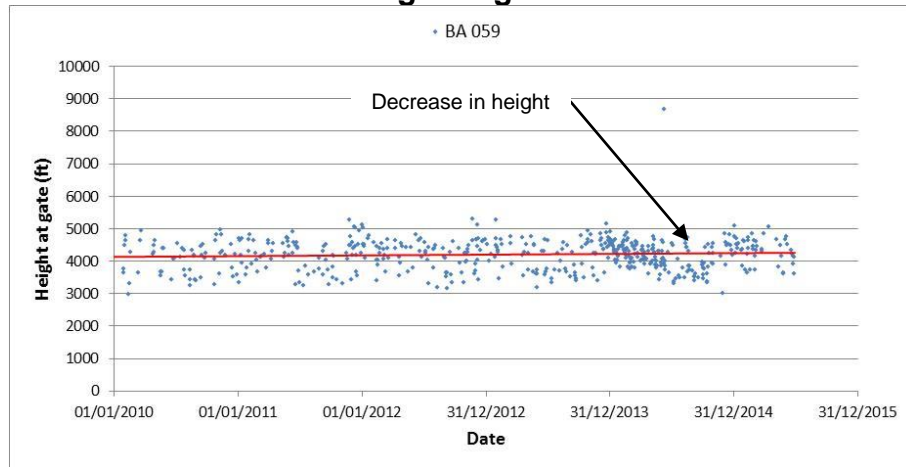
Distance from gate centre



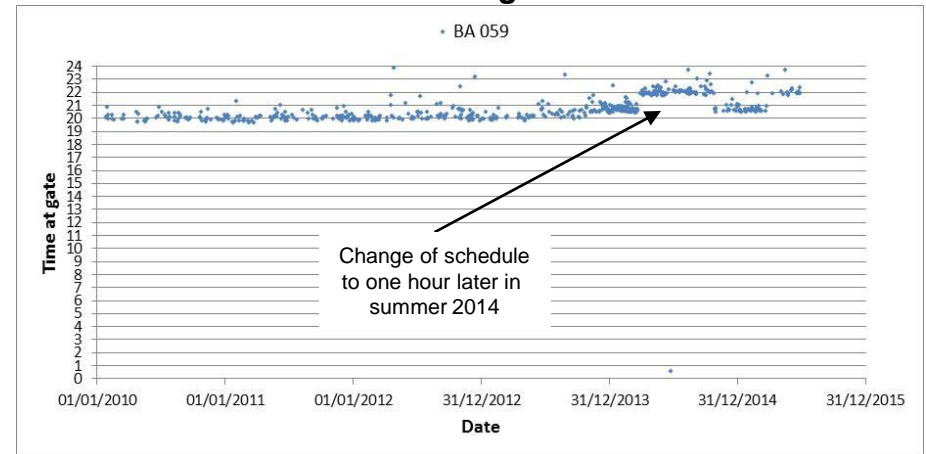
The charts show the position (relative to the centre of the gate), height and time at which the flight crosses the gate each day as a time series from the beginning of 2010 through to mid-2015.

Other than during the trials, the position that BA 059 crosses the gate is spread widely across the gate. Height at the gate typically fluctuates between 3000 feet and 5000 feet and does not show a particular trend but there was a step change downwards in summer 2014 and reversion afterwards. This does not appear to be associated with change of aircraft type. During winter, the flight operates between 21:00 and 22:00 hours in winter and between 22:00 and 23:00 hours in summer, with some late running flights operating later.

Height at gate

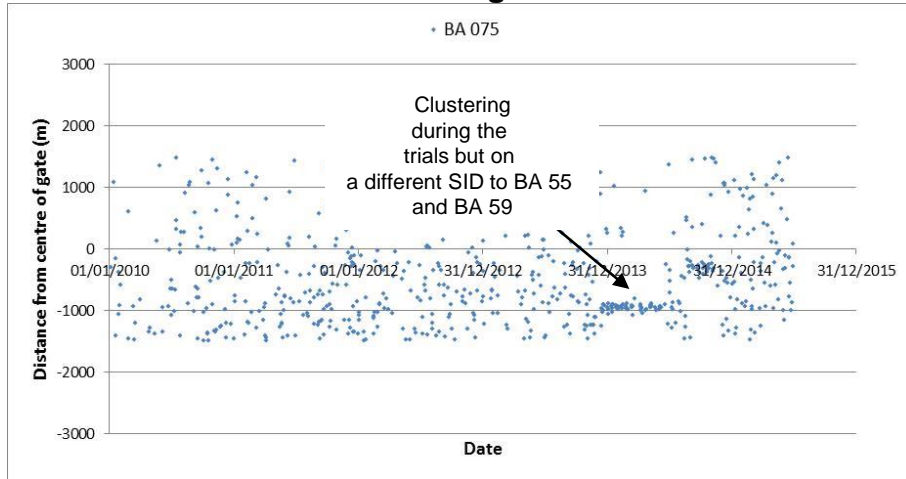


Time at gate



BA 075 shows a cyclical height pattern at the gate: higher in winter than in summer and was clustered on one SID during the trials

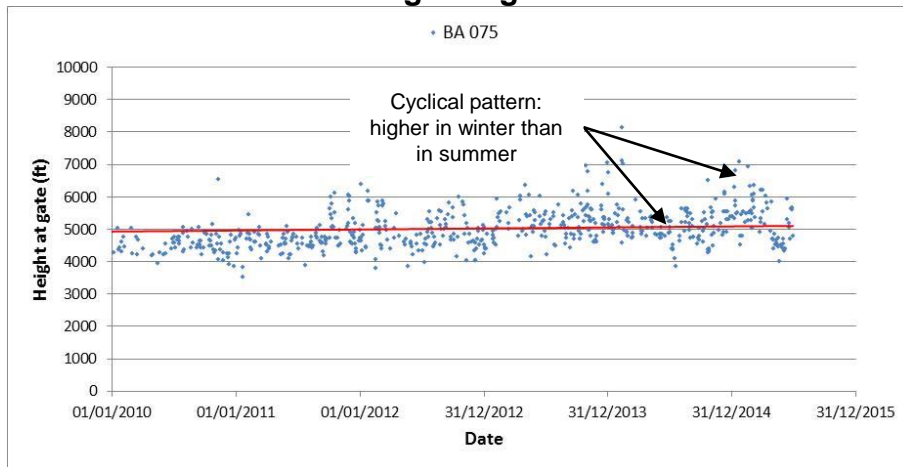
Distance from gate centre



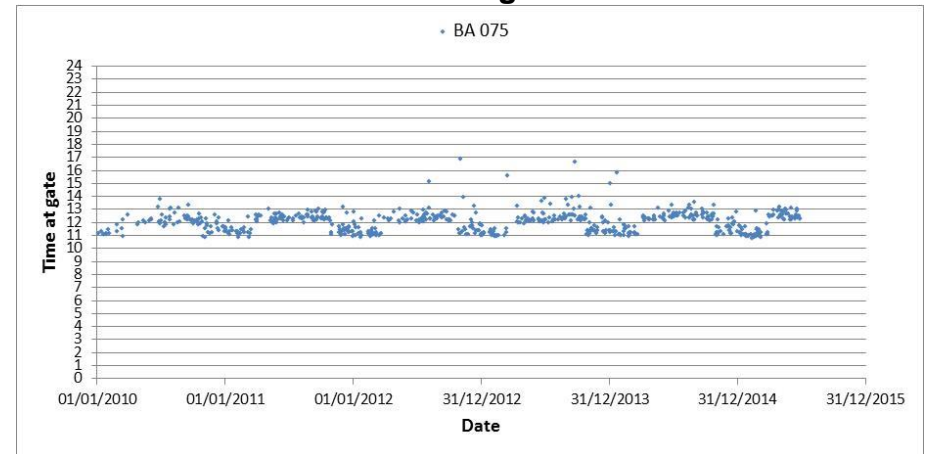
The charts show the position (relative to the centre of the gate), height and time at which the flight crosses the gate each day as a time series from the beginning of 2010 through to mid-2015.

Other than during the trials, the position that BA 059 crosses the gate is spread widely across the gate. Height at the gate is cyclical, higher in winter than in summer but with no underlying trend. During winter, the flight operates between 11:00 and 12:00 hours in winter and between 12:00 and 13:00 hours in summer.

Height at gate

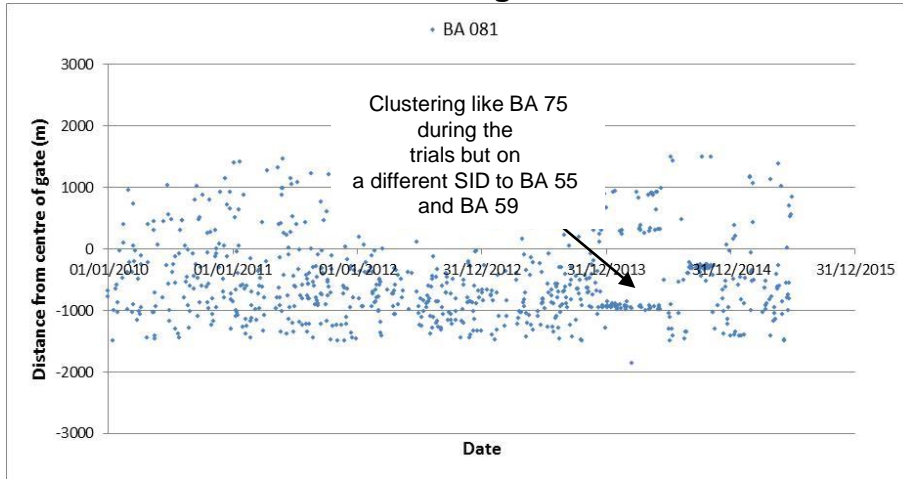


Time at gate



BA 081 crosses the gate daily broadly spread across the gate except during the trials when it was clustered on one trial SID

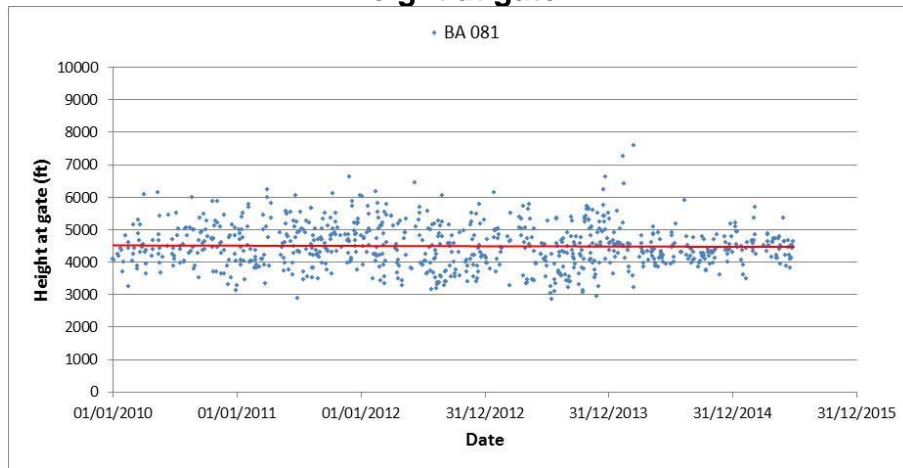
Distance from gate centre



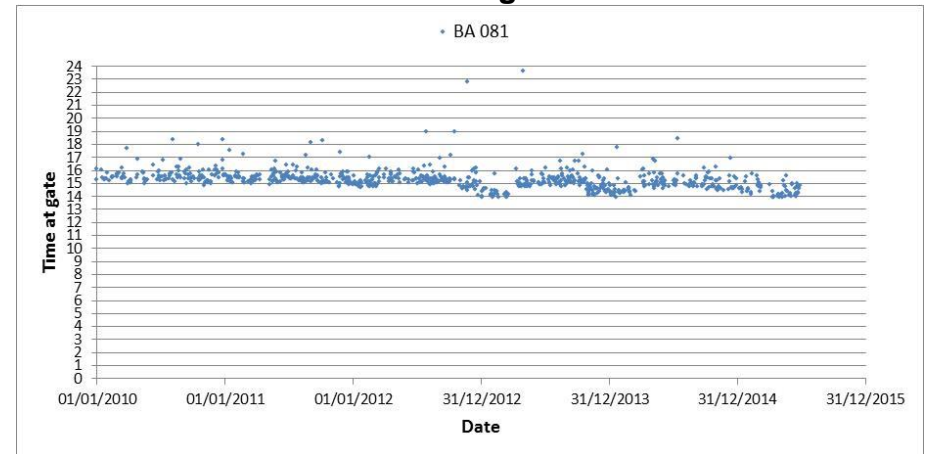
The charts show the position (relative to the centre of the gate), height and time at which the flight crosses the gate each day as a time series from the beginning of 2010 through to mid-2015.

Other than during the trials, the position that BA 059 crosses the gate is spread widely across the gate. Height at the gate is cyclical, higher in winter than in summer but with no underlying trend. During winter, the flight operates between 11:00 and 12:00 hours in winter and between 12:00 and 13:00 hours in summer.

Height at gate

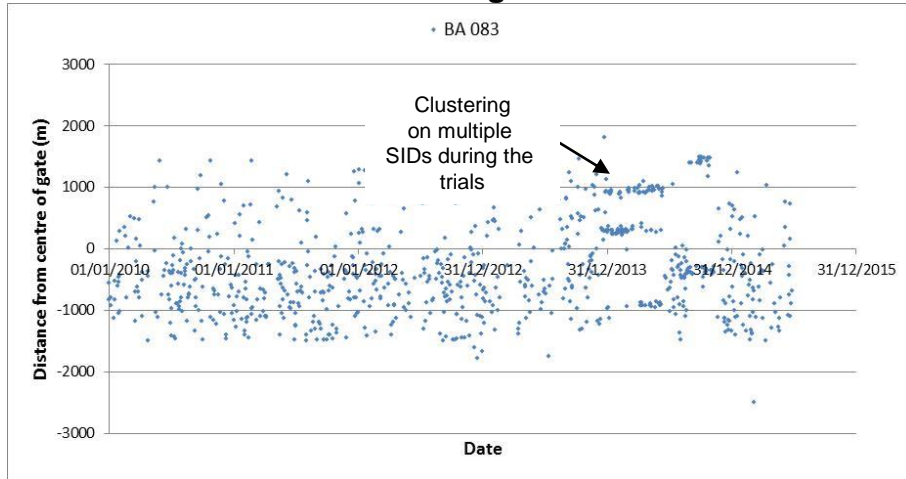


Time at gate



BA 083 operates daily, late at night and, other than clustering on multiple SIDs during the trials, crosses the gate at points that fluctuate widely from day-to-day

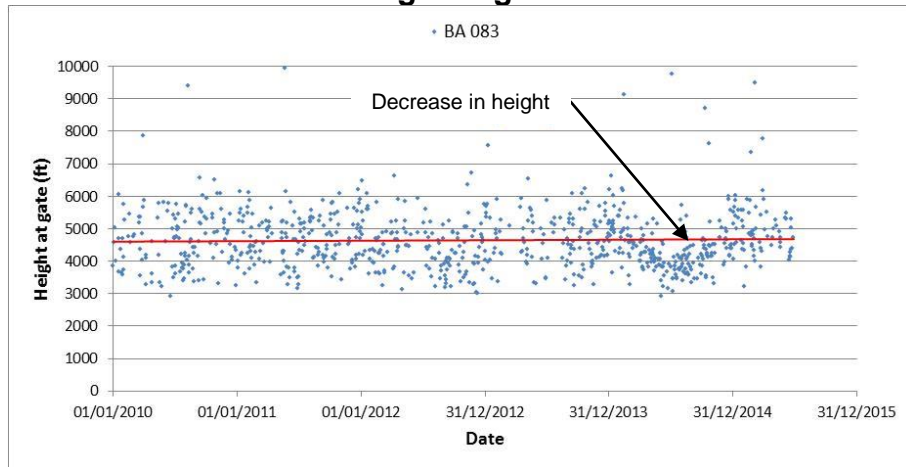
Distance from gate centre



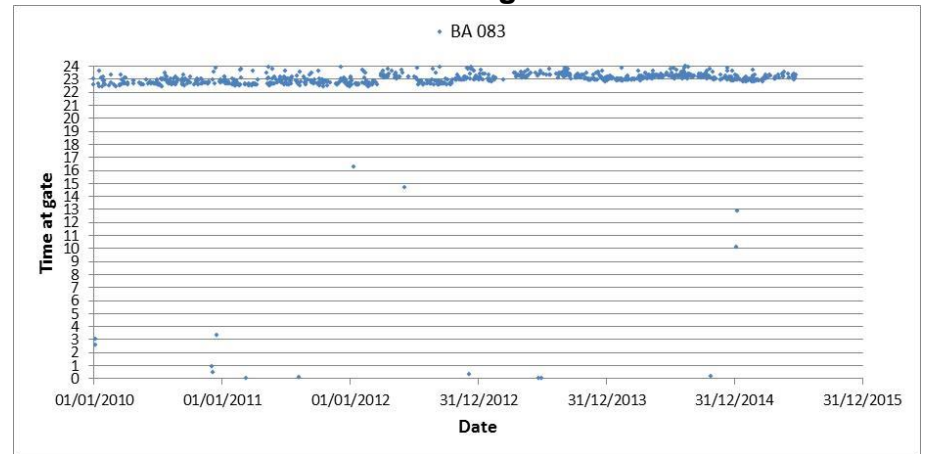
The charts show the position (relative to the centre of the gate), height and time at which the flight crosses the gate each day as a time series from the beginning of 2010 through to mid-2015.

Other than during the trials when it was clustered on several SIDs, the position that BA 083 crosses the gate is spread widely across the gate. Height at the gate typically fluctuates between 3000 feet and 6000 feet and does not show a particular trend but there was a step change downwards in summer 2014 and reversion afterwards. This does not appear to be associated with change of aircraft type. The flight operates between 23:00 and 24:00 hours with some late running flights operating later in the early morning of the following day.

Height at gate

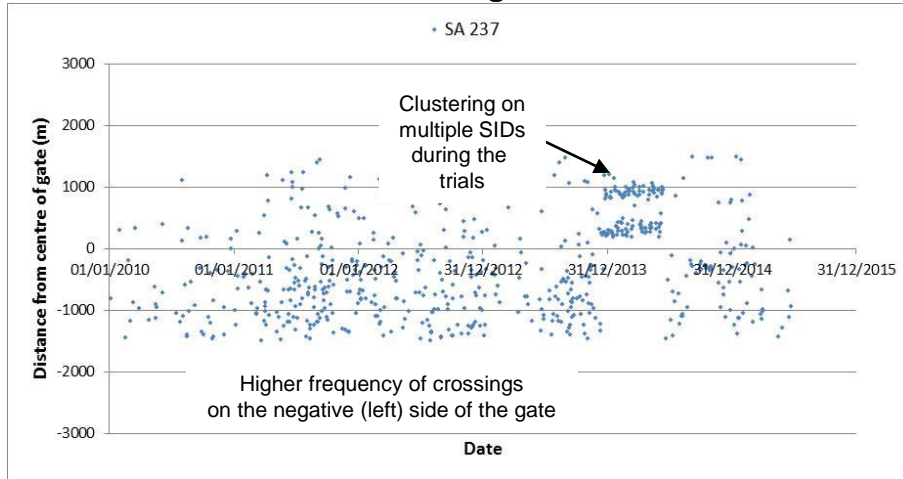


Time at gate



SA 237 operates daily and, other than during the trials, is spread broadly across the gate but with a slight bias towards the right hand side with a downward height trend

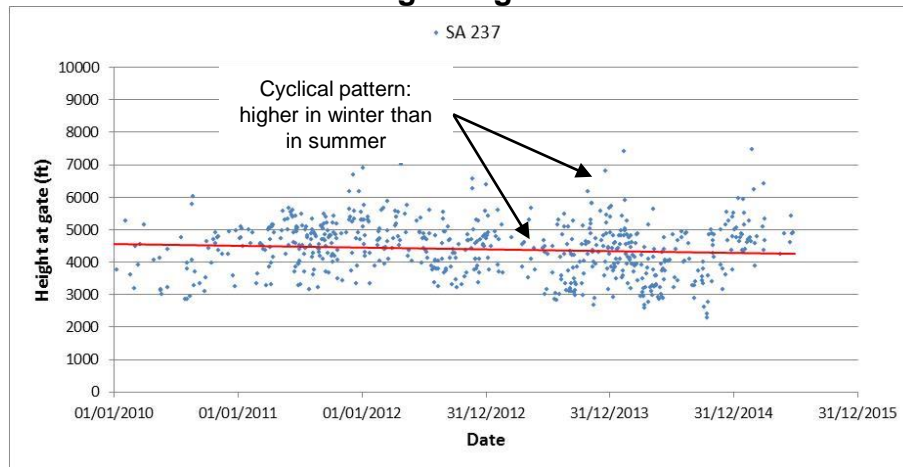
Distance from gate centre



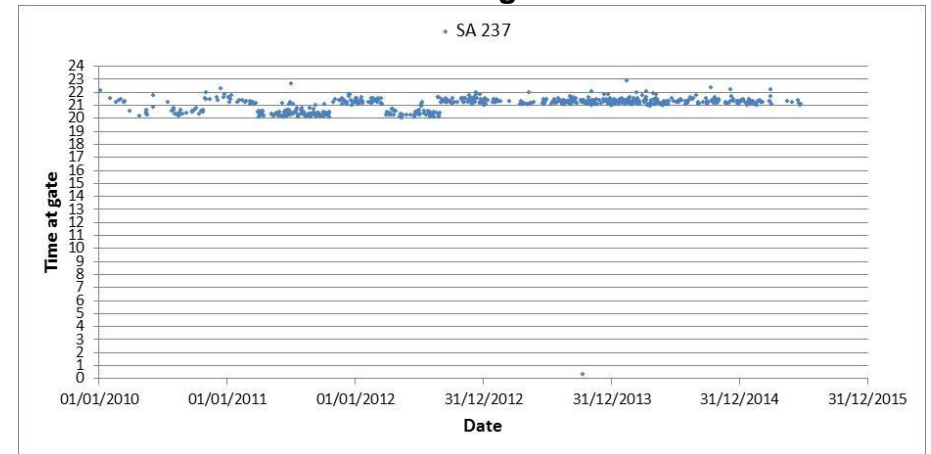
The charts show the position (relative to the centre of the gate), height and time at which the flight crosses the gate each day as a time series from the beginning of 2010 through to mid-2015.

Other than during the trials, the position that SA 237 crosses the gate is spread broadly but with a higher frequency to the left hand side of the gate. Height at the gate is cyclical, higher in winter than in summer with an underlying downward trend. The flight currently operates between 21:00 and 22:00 hours both in summer and winter.

Height at gate

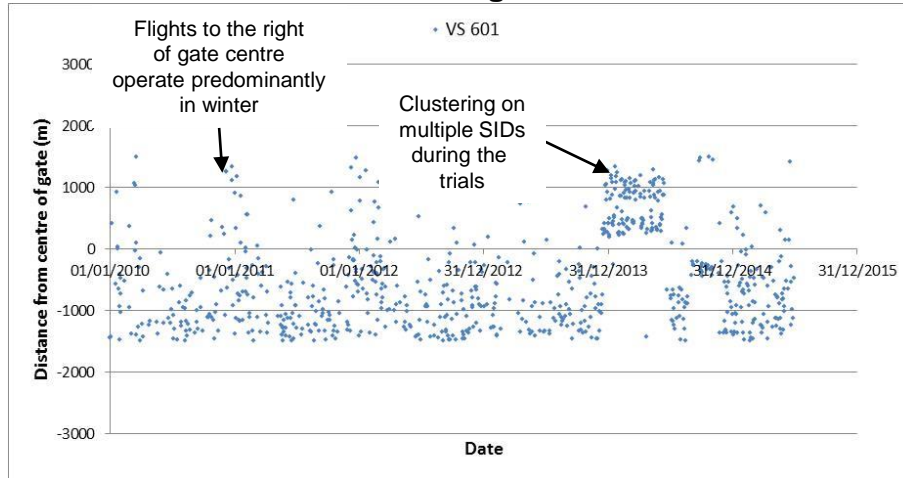


Time at gate



VS 601 crosses the gate to the right hand side of centre during winter and the trials but crosses the left hand side of the gate at other times

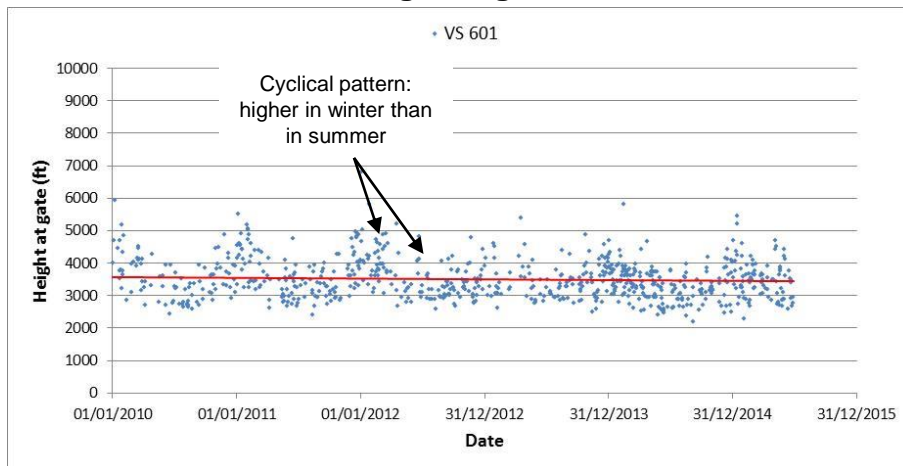
Distance from gate centre



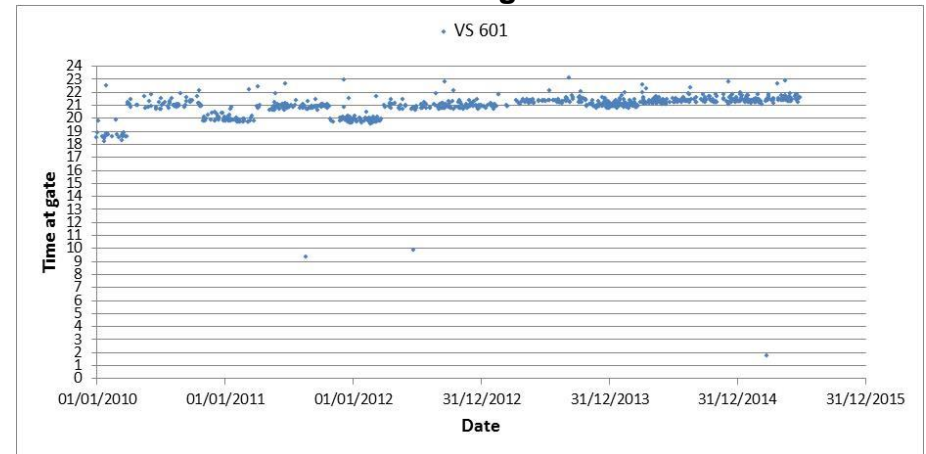
The charts show the position (relative to the centre of the gate), height and time at which the flight crosses the gate each day as a time series from the beginning of 2010 through to mid-2015.

During the trials, the points at which VS 601 crosses the gate are clustered on the trial SIDs, to the right of gate centre. Other than at these times, VS 601 then only crosses the gate to the right of centre during winter. At other times, during both winter and summer the flight crosses the gate to the left of centre. Height at the gate is cyclical, higher in winter than in summer with an underlying downward trend. The flight currently operates between 21:00 and 22:00 hours both in summer and winter.

Height at gate

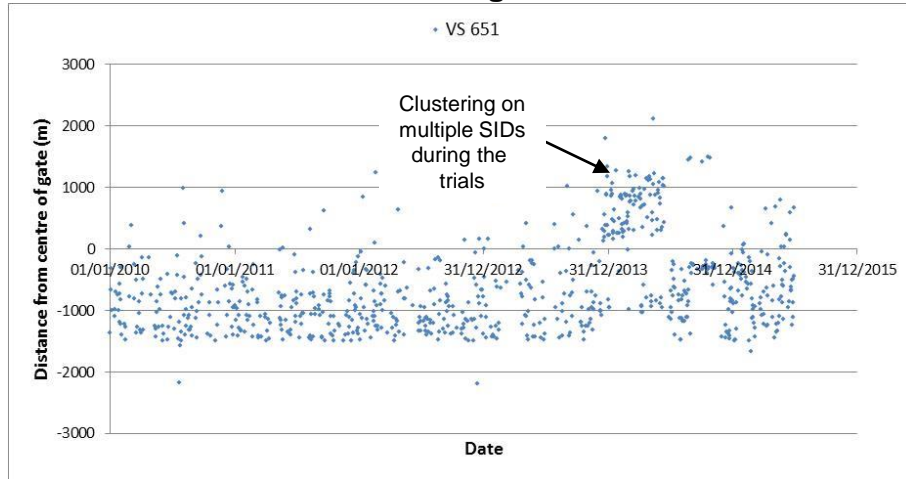


Time at gate



Other than during the trials, VS 651 crosses the gate to the left of centre and shows a cyclical height pattern on top of an underlying upward trend

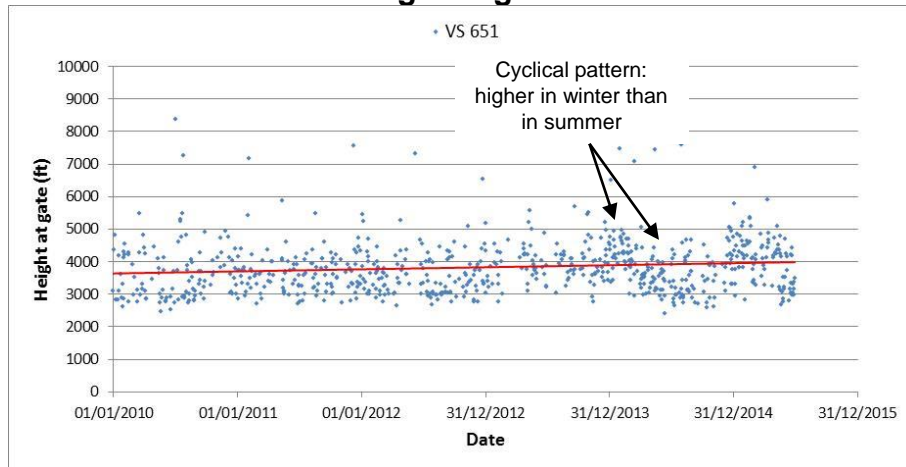
Distance from gate centre



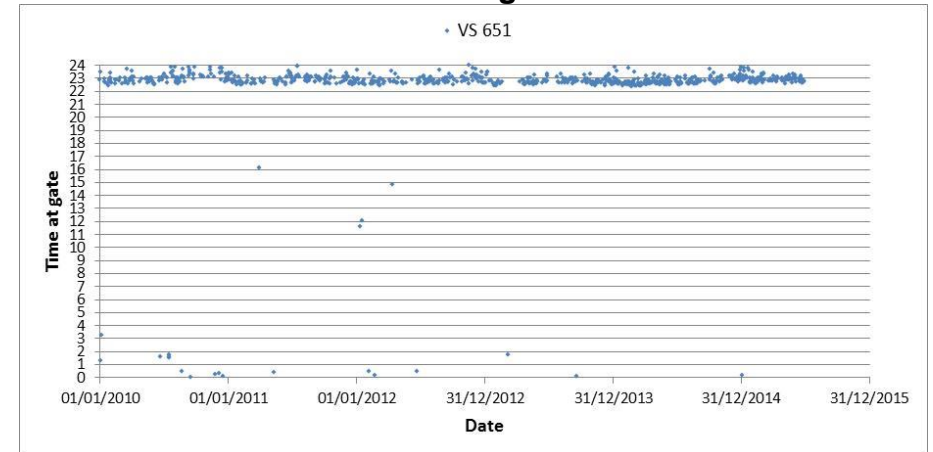
The charts show the position (relative to the centre of the gate), height and time at which the flight crosses the gate each day as a time series from the beginning of 2010 through to mid-2015.

During the trials, the points at which VS 651 crosses the gate are centred on the trial SIDs, to the right of gate centre but the clustering is not as distinct as is observed on other flights. Other than during the trials, VS 651 crosses the gate to the left of centre. Height at the gate has become cyclical since 2012, higher in winter than in summer with an underlying upward trend. The flight currently operates between 23:00 and 24:00 hours both in summer and winter. The frequency of occasional late running flights operating early the next morning appears to have decreased.

Height at gate

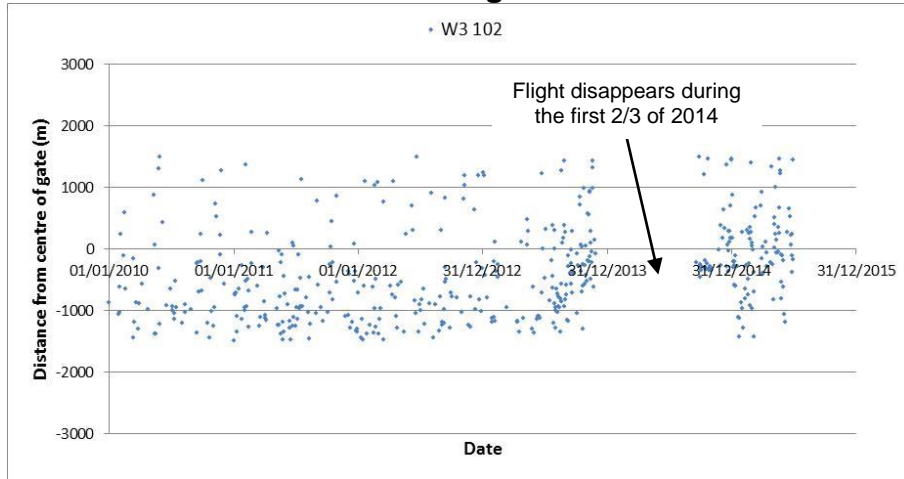


Time at gate



W3 102 operates across the gate but with higher frequency to the left of centre: the flight disappeared from the gate from the end of 2013 to September 2014

Distance from gate centre

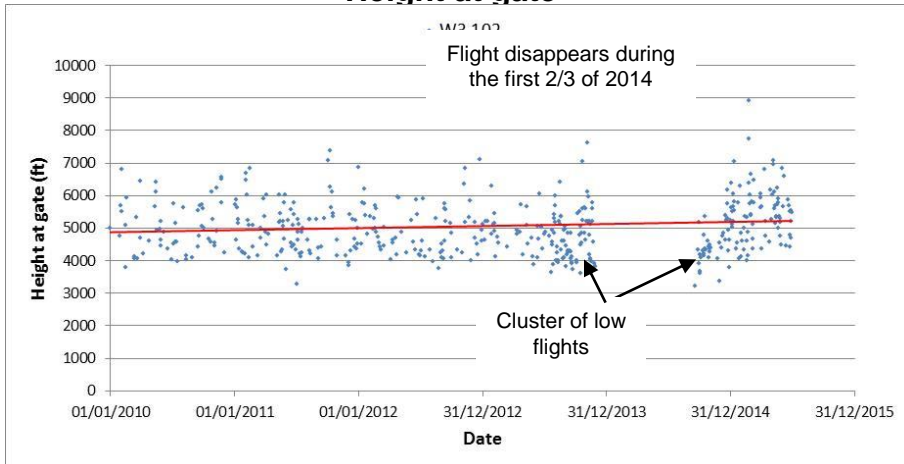


The charts show the position (relative to the centre of the gate), height and time at which the flight crosses the gate each day as a time series from the beginning of 2010 through to mid-2015.

W3 102 operates predominantly to the left side of the gate. The flight disappeared from the gate at end of 2013 reappearing in September 2014. There is an underlying upward trend on the height that the flight crosses the gate, although this ranges from around 4000 feet to 7000 feet. There were clusters of low flying immediately before and after the flight disappeared from the gate.

since its reappearance the flight appears to be operating earlier than previously, between 21:30 and 22:30 as opposed to between 22:00 and 23:00. However, there the number of late running flights between 23:00 and 24:00, has increased.

Height at gate



Time at gate

