**Time Based Separation at Heathrow**

The biggest single cause of delay to Heathrow arrivals is strong headwinds on final approach. It is possible to separate arriving aircraft by time (Time Based Separation or 'TBS') instead of distance (Distance Based Separation or 'DBS').

### DBS in light headwinds

We've analysed over 100,000 flights to understand the behaviour of aircraft wake vortices in strong headwinds. The results confirm the theory that wake vortices dissipate more quickly in strong headwind conditions. This means that the distance between certain aircraft can be reduced and the time between landings can be kept similar to those arriving in light headwinds.

### TBS in strong headwinds

This world-first innovation will become operational in Spring 2015, and will significantly cut delays and reduce cancellations due to these strong headwinds. TBS will help maintain an efficient landing rate in strong headwinds, saving approximately 80,000 minutes a year.

### Benefits

- **Delay time**: TBS will half delay time caused by strong headwinds saving approximately 80,000 minutes a year.
- **Landing rate**: TBS will help maintain an efficient landing rate in strong headwinds.
- **Cancellations**: TBS will significantly reduce flight cancellations caused by adverse wind conditions. This will help the airport and airlines maintain a robust and reliable operation.

### The comparison

- **Aircraft per hour**
  - DBS: 32-38
  - TBS: 36-40

- **Landing rate**
  - DBS: A fixed landing rate is maintained.
  - TBS: A variable landing rate may be used to maintain a similar level of capacity to that of light headwinds.

- **GROUNDSPEED**
  - Mean speed: 130 Knots

- **WINDSPEED**
  - Strong headwinds: Mean speed reduces due to headwind, aircraft is slower so landing rate reduced.

- **SEPARATION**
  - 6 NM: 135 secs
  - 4 NM: 90 secs
  - 3.4 NM: 113 secs

Wake vortices dissipate quicker so separation distance can be reduced safely.

### STRONG HEADWINDS

We've analysed over 100,000 flights to understand the behaviour of aircraft wake vortices in strong headwinds. The results confirm the theory that wake vortices dissipate more quickly in strong headwind conditions. This means that the distance between certain aircraft can be reduced and the time between landings can be kept similar to those arriving in light headwinds.

Time Based Separation (TBS) will enable us to minimise the impact of strong headwinds on landing rates at Heathrow, thereby reducing delays and cancellations.

### DBS in strong headwinds

Strong headwinds reduce an aircraft’s speed over the ground. Consequently it takes them longer to fly the required separation distance. This impacts on the landing rate and at busy airports such as Heathrow, where operations are scheduled to 99% of capacity, leads to delays and possibly cancellations.

**WARNING**: A reduced landing rate can increase delays and cancellations.

### Not cancelled

Cancellations will still only apply where flight conditions caused by weather result in published delays in excess of 90 minutes.