



*SLIGHTLY STEEPER APPROACHES:
ENGAGEMENT ON COMPREHENSIVE LIST OF OPTIONS*



September 2019

Heathrow

PURPOSE OF THIS PRESENTATION

To explain the different options explored for introducing Slightly Steeper Approaches (SSA) at Heathrow in the short-term, ahead of airspace modernisation and expansion

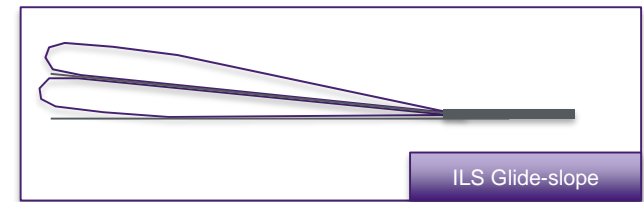
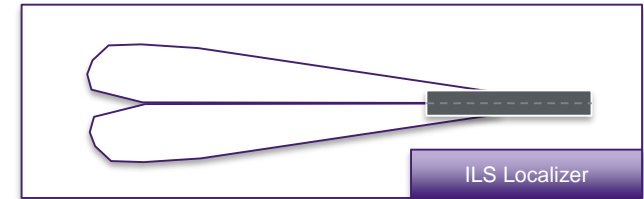
We will cover:

- *What is an Instrument Landing System (ILS)?*
- *What are Area Navigation (RNAV) Approaches?*
- *Heathrow's proposal to introduce slightly steeper approaches using RNAV*
- *Options for different RNAV approach angles*
- *Next Steps*



WHAT IS AN INSTRUMENT LANDING SYSTEM (ILS)?

- The ILS is a radio navigation system which provides aircraft with horizontal and vertical guidance just before and during landing
- It consists of physical equipment on the airfield which gives a 'precision approach' meaning it is accurate in any weather condition or level of visibility



LIMITATIONS OF THE INSTRUMENT LANDING SYSTEM (ILS)

- International guidelines state that for 'high precision' approaches, angles greater than 3.0° should only be used for obstacle clearance (i.e. the glide path of the arriving aircraft makes a 3.0° angle to the ground)
 - *e.g. London City Airport has a 5.5° approach due to obstacle clearance, but aircraft cannot land during low visibility*
- Heathrow's ILS is only certified to operate at 3.0° during low visibility (i.e. bad weather)
- It is not possible to change the ILS approach angle between 'good' and 'bad' weather conditions without suspension of the Heathrow operation for a significant amount of time
- In addition, many *aircraft* are limited to a maximum approach angle of 3.15° when using an ILS in low visibility

➤ **Introducing a steeper approach using the ILS is not an option for Heathrow at this time**



WHAT ARE AREA NAVIGATION (RNAV) APPROACHES?

- RNAV approaches use satellite technology to provide the navigational accuracy required to guide aircraft to the runway: RNAV approaches can only be flown by aircraft with specific modern technology on board
- Once established on Final Approach, there is no difference to the position of aircraft over the ground when using an ILS or RNAV approach
- RNAV approaches are not as precise as ILS approaches which means in poor visibility, RNAV approaches become redundant and ILS approaches are required in order to land aircraft safely

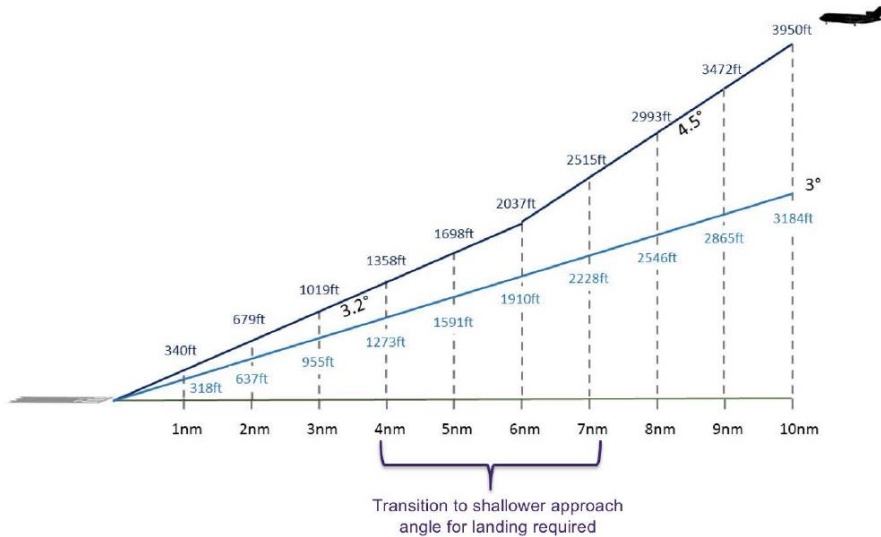


HEATHROW'S PROPOSAL TO INTRODUCE SLIGHTLY STEEPER APPROACHES USING RNAV

- International rules permit RNAV Approaches at angles of up to 3.5° in 'good' weather conditions
- It is therefore possible to increase the angle of Heathrow's RNAV approaches above 3.0°, leaving the ILS unaffected and available for use in all weather conditions
- It is important to note that only 1-2% of Heathrow's arrivals fly RNAV approaches. This is due to the increased Air Traffic Control and Pilot workload associated with these approaches
- This airspace change proposal is not related to Heathrow's Expansion project. If a 3rd runway is consented, Heathrow aspire to introduce Slightly Steeper Approaches for **all** arrivals as part of that airspace change



OPTIONS FOR DIFFERENT RNAV APPROACH ANGLES



>3.5° Landing on the runway from angles greater than 3.5° is not operationally viable for many aircraft and some may require modifications.

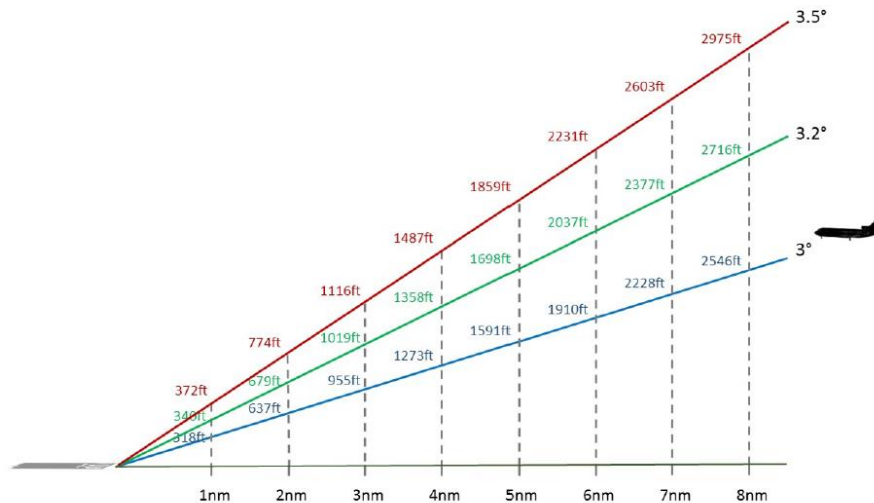
To have a final approach angle steeper than 3.5° at Heathrow would require a 'segmented approach' which is where the steeper angle has to shallow prior to landing. Operators would require training and individual operational approval from the CAA to fly segmented approaches.

Heathrow safely trialled segmented approaches in 2014 for just 6 flights with a minimum final approach spacing of 10nm between arriving pairs. This significant increase in final approach spacing would be detrimental to the existing Heathrow operation.

3.5° Operators expressed concerns over the ability to adhere to the strict speed limits imposed on final approach at Heathrow which could lead to increased risks of go-arounds or increased runway occupancy time. In addition, increased spacing on final approach would be necessary to address the risk of turbulence from following aircraft flying a 3.0° approach. No data available on the impact of 3.5° approaches on a high intensity operation.

3.2° Heathrow's live trials have provided evidence that this angle provides a small noise reduction (average 0.5db SEL) with no negative operational impact.

3.0° Today's approach angle.



NEXT STEPS

- Late 2019: Evaluation and Appraisal of the Options
- Spring/Summer 2020: Consultation on Preferred Option
- Late 2020: Submit ACP
- 2021: Permanent adoption of RNAV Slightly Steeper Approaches at Heathrow

