NOISE MODELLING, PREDICTIONS AND COMPARISONS

Heathrow Community Noise Forum

16 May 2018 – James Trow

- How are noise exposure figures prepared and what factors and assumptions affect noise exposure forecasts

- How do we validate assumptions

- The scenarios, outputs, and types of comparisons

- Expansion noise exposure forecasts since 2014

- Example differences in published information

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WHY DO WE MODEL NOISE?

- Cannot measure everywhere whereas modelling allows exposure to be calculated wherever we want

- We cannot measure something that has not happened, so modelling is helpful in allowing us to explore and forecast changes due to technology improvements and new procedures
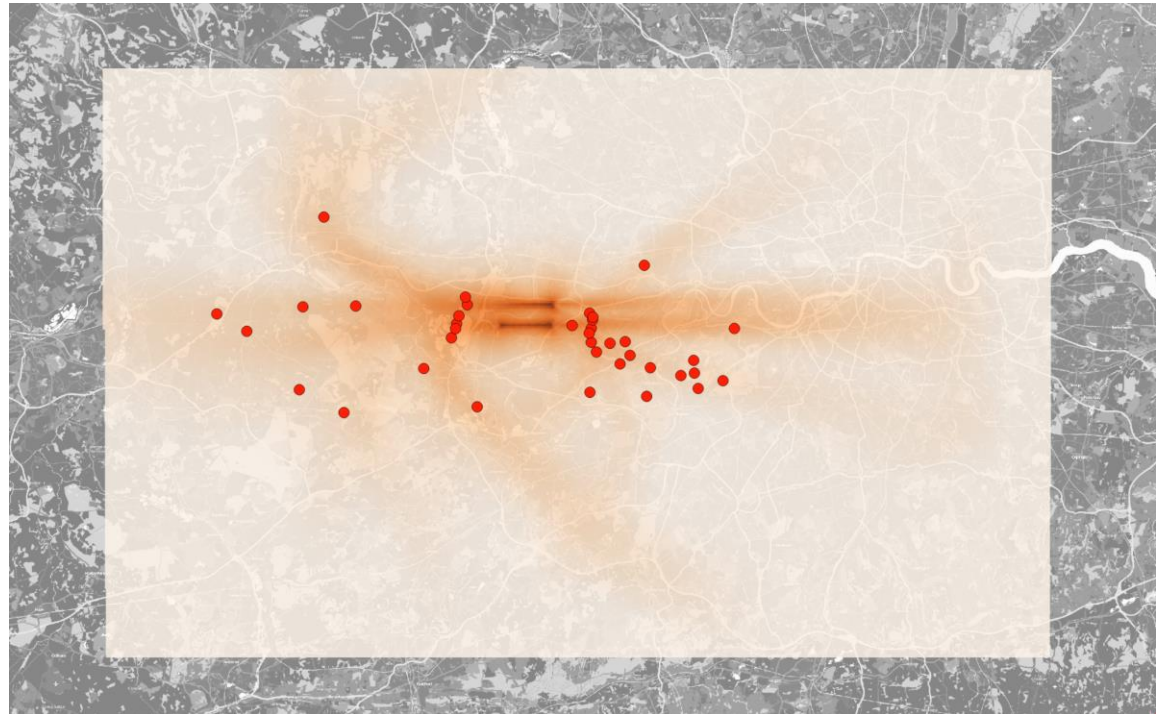
HOW DO WE VALIDATE THE INPUT ASSUMPTIONS?

- 'Who/Where' Factors
  - *Assumptions around what destinations fly what routes*
    - Forecasting – speaking to airlines, assess demand
  - *What the schedule drives in terms of the number of aircraft on each route*
    - Route by destination, basis of departure headings
  - *Where the routes are*
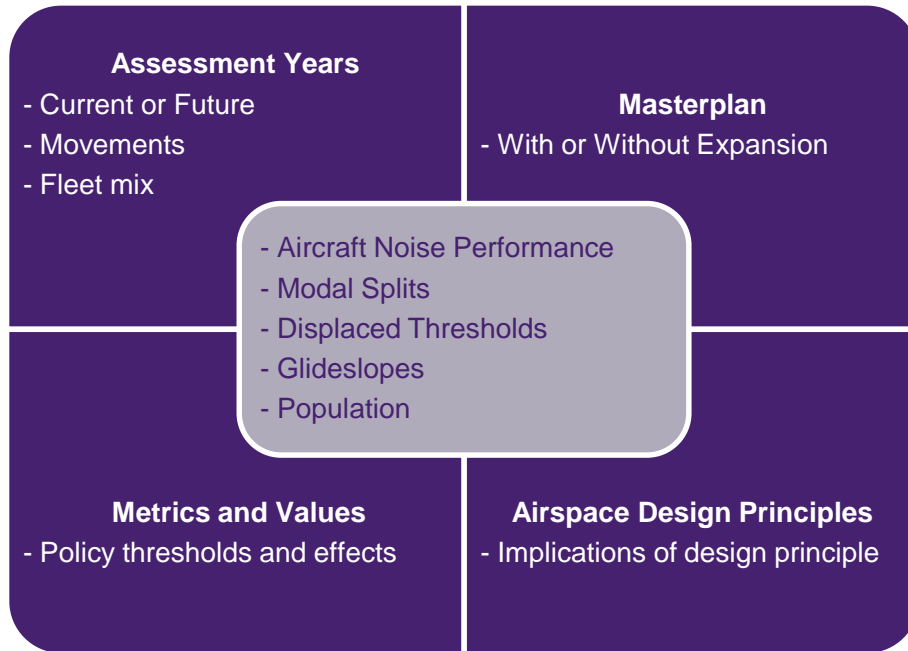   - e.g. AC work considered indicative routes by design principle.

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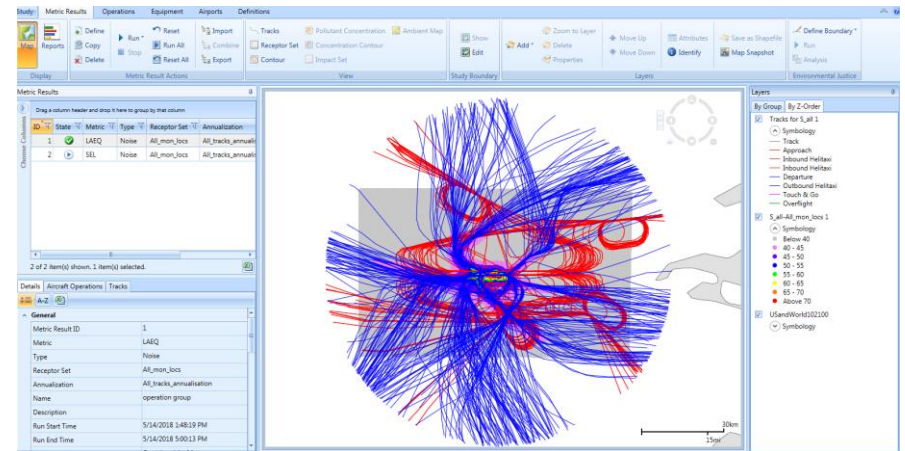
HOW DO WE VALIDATE THE INPUT ASSUMPTIONS?

- 'How Much' Factors
  - *The fleet mix*
    - Linked to forecast – what aircraft types comprise the movements, aircraft associated with airlines
  - *The number of movements*
    - Forecast –demand and growth rates
  - *Whether the noise model is validated or not*
    - Validation of NPD and flight profile data against measured performance
  - *Known / forecast aircraft noise performance*
    - Aircraft technology, industry goals, aircraft development timelines
  - *Operational procedures i.e. glide slopes, procedures*
    - Airspace experts in conjunction with airlines
  - *Airfield layout - i.e. displaced thresholds*
    - Safety and operational requirements

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SCENARIOS AND OUTPUTS - WHAT ARE THE COMPARISONS?

Assessment Years
- Current or Future
- Movements
- Fleet mix

Masterplan
- With or Without Expansion

- Aircraft Noise Performance
- Modal Splits
- Displaced Thresholds
- Glideslopes
- Population

Metrics and Values
- Policy thresholds and effects

Airspace Design Principles
- Implications of design principle

- Example comparisons
  - Future 3R compared to Future 2R
    - EIA comparison, required for DCO
  - Future 3R compared to Existing 2R
    - Policy and Commitments
  - Future 2R compared to Existing 2R
    - What would happen without expansion

- Comparisons of this nature have featured in assessment work as part of the AC and ongoing ANPS
- Comparison often consistent in metric, value, case, assessment year and to some degree airspace design but lots of other factors make a difference
- Need a range of comparisons to understand and make noise management decisions

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WHERE CAN WE FIND NOISE PREDICTIONS FOR THE EXPANSION PROJECT

June 2014
Heathrow's own assessment work

June 2015
Airports Commission Final Report

Feb 2017
Draft ANPS AOS1

October 2017
Revised Draft ANPS AOS2

- Reports submitted by Heathrow to the Airports Commission (2014). These were called Taking Britain Further (TBF). These were produced by Heathrow to show the forecast noise exposure based on our proposals for expansion;

- Airports Commission final report. These were produced by the Airports Commission to compare the potential impacts of the shortlisted schemes;

- Appraisal of Sustainability (AOS1) for the draft National Policy Statement (NPS). These were produced by Department for Transport to compare the potential impacts of the options being considered

- Appraisal of Sustainability (AOS2) for the revised draft NPS. These included new forecasts based on different input data from the draft NPS and used different metrics to the previous report

  – Heathrow has not published any of its own data since 2014 and the AC - all new data released since then have been produced by the Government

  – Heathrow will publish data as part of the DCO process

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COMPARISON OF NUMBERS AFFECTED

- The below table shows a comparison of 2030 base year 54dBL$_{Aeq,16h}$ models
  - This is the only metric/base year that is common across all documents reviewed
  - NB this metric is not actually presented in AoS1, though it is presented in the Noise Local Assessment/ERCD compendium of results which is the source for this data

- There are differences, which can be attributed to:
  - Different models (e.g. INM / ANCON)
  - Different ATMs
  - Different fleet mixes
  - Different mitigation assumptions

Document	Ref	Metric	Number of people	Model	Assessment year	Option	Flight schedule/fleet mix	Pop growth?	Modelling assumptions
AC final report	Figure ES.4, p6	54 dBL$_{Aeq,16h}$	456,200	ANCON	2030	T	652k ATMs, 35/65/0 current/imminent/future	Y	"Displaced thresholds supplied by scheme promotor", 3.2 glideslope
Air and Ground Noise Assessment (TBF)	Table 6.1, p46	54 dBL$_{Aeq,16h}$	297,600	ANCON	2030	T	570k ATMs, 6/94/0 current/imminent/future	N	Displaced thresholds (see Table D.4), 3.2 glideslope (see table 5.1)
Air and Ground Noise Assessment (TBF)	Table E.4	54 dBL$_{Aeq,16h}$	279,800	INM	2030	T	570k ATMs, 6/94/0 current/imminent/future	N	Displaced thresholds (see Table D.4), 3.2 glideslope (see table 5.1)
ERCD AC: Compendium of results (AoS1)	Table A48	54 dBL$_{Aeq,16h}$	504,400	ANCON	2030	T-NCT	740k ATMs, 38/61/0 current/imminent/future	Y	"Displaced thresholds supplied by scheme promoter", 3.2 glideslope
AoS for revised draft ANPS	Figure 6.1, p75	54 dBL$_{Aeq,16h}$	653,900	ANCON	2030	T	753k ATMs, 32/67/0 current/imminent/future	Y	"Displaced thresholds supplied by scheme promoter", 3.2 glideslope

OVERVIEW

- Different assumptions lead to different results when the scenarios may appear the same

- Assumptions are based on what is foreseeable at the time

- Heathrow has worked hard to gather evidence to support assumptions made to the AC and will continue to ensure all future assumptions are also evidence-based

- Heathrow have made public commitments on noise exposure i.e. fewer people exposed than today (2013)

- Delivering this commitment is underpinned by the noise envelope
  - A framework for sustainable management and control of the effects of noise that balances growth and noise reduction and provides certainty about how noise will be addressed for the long term
  - At Consultation 1 we asked the public for their views on the objectives and timeline for development

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Thank you

Any questions?

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