HARMO 11 – Airports session

Modelling airport air quality – broader policy context

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The importance of modelling

- Airport air quality modelling is a vital means of understanding the effects of airport operations on pollutant levels in nearby communities
- Modelling airport emissions is highly complex given the large number of sources but much depends upon the results of modelling
- Modelling for predicting air quality futures is increasingly important – as the stakes rise, accuracy and reliability are paramount

Who relies upon modelling information

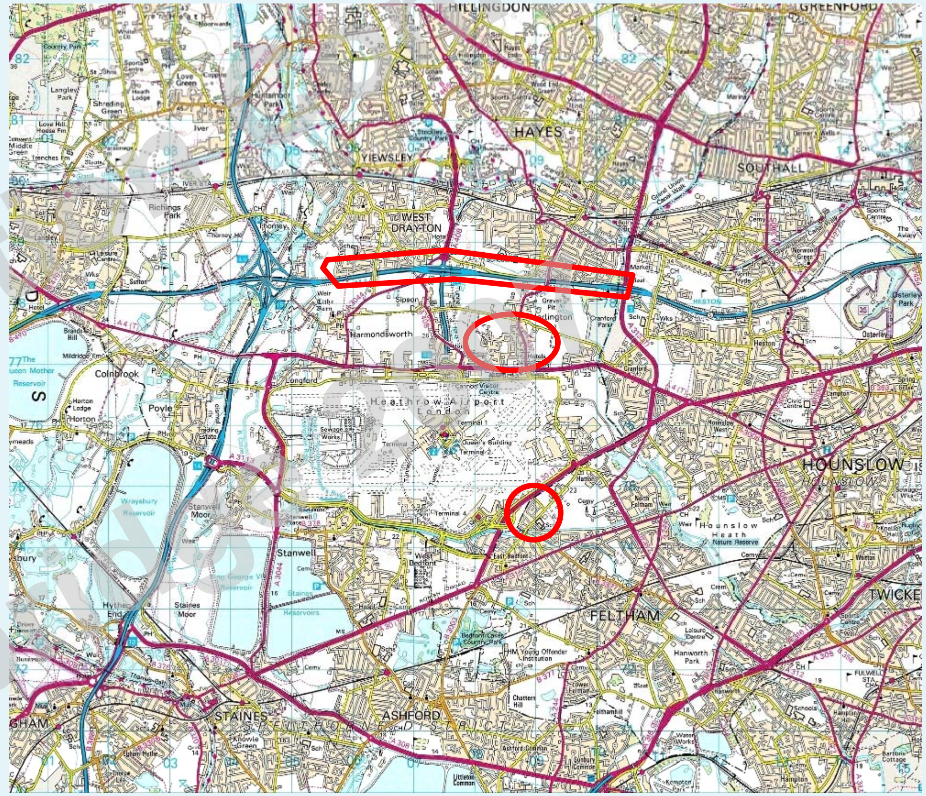
- Government – compliance and policy planning purposes
- Local authorities – air quality management planning
- Airports - for policy and mitigation strategies, including charging
- Airlines – fleet and operational sensitivities
- Airside operators – as above

And of course…..

- The public – safe air to breathe

A lot is riding on modelling….

Increasingly seen as a major part of the process of strategic development planning, environmental impact assessment (EIA), the formal planning processes……… and that will only more pointed as standards are either tightened or come under pressure from growth.

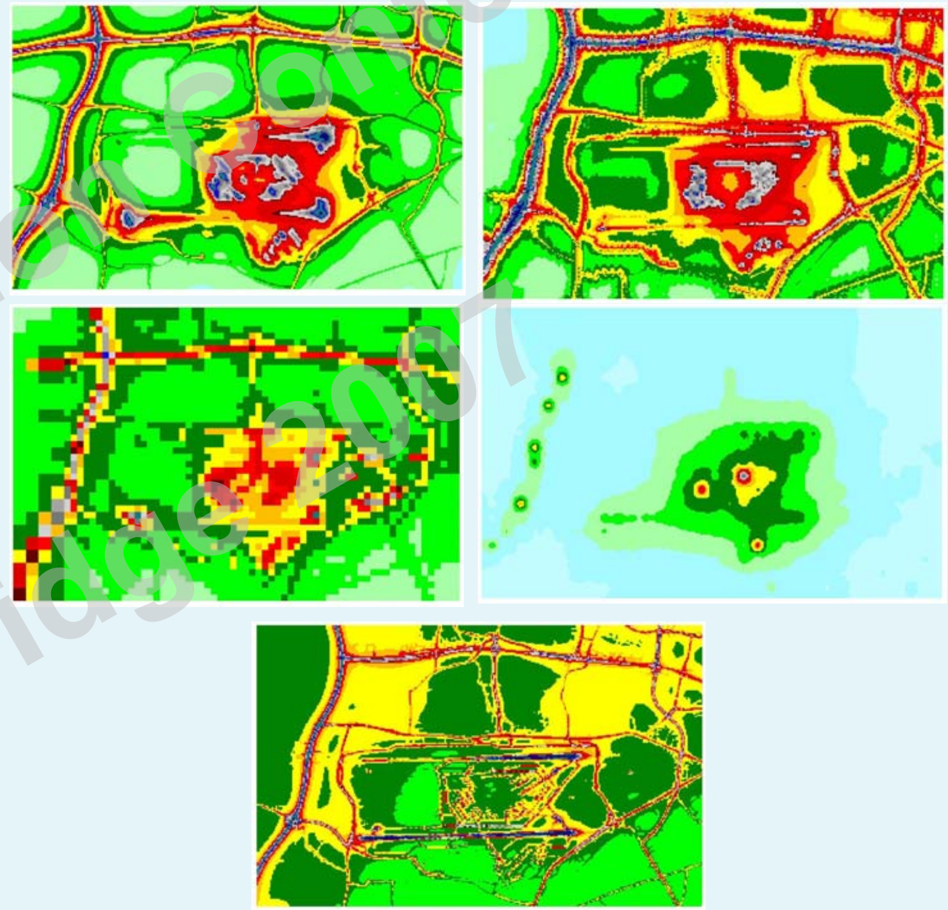


Realities of the airport emissions debate

- Its getting harder to reduce key emissions
- Pollutant standards are tightening
- The reality of trade-offs
- Pressures are growing disproportionately on aviation
- Public expectations are increasing
- Growth is threatened
- Challenge is more likely……..
- 'INFORMATION IS KING'

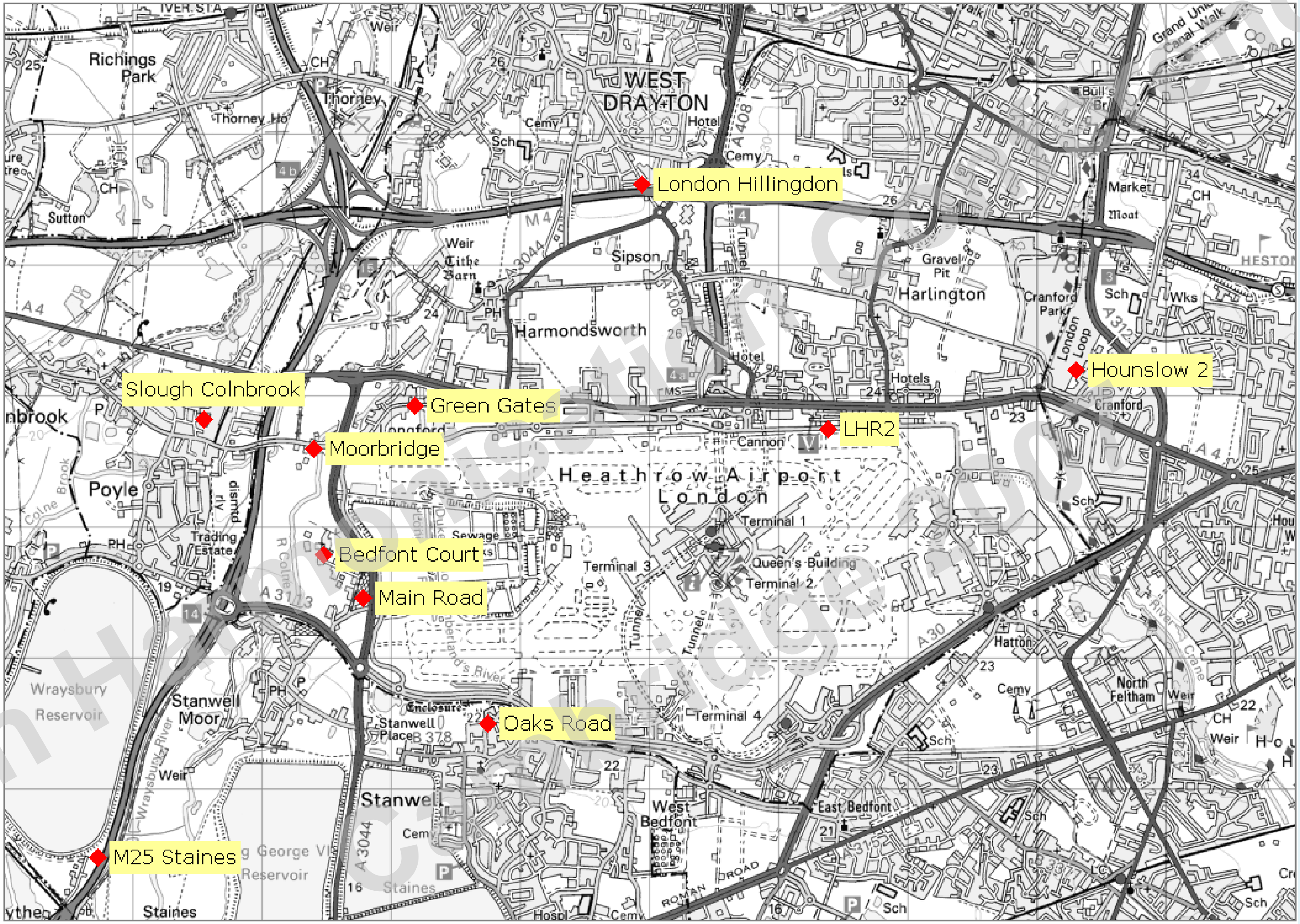
Confidence in results

- As pressures increase, modelling will be viewed as a legal battleground
- Modelling approaches can be pitted against each other so…
- Transparency, QA and validation become ever more important – need to have a visible audit trail



Take the Heathrow example

- Already exceed NO_2 2010 level but is subject to strong growth and plans for 3^{rd} runway
- Most densely monitored urban air quality in Europe
- Subject to DfT, local authority, BAA and BA air quality modelling before and after Air Transport White Paper
- Project for the Sustainable Development of Heathrow (PSDH) technical panel process
- Much depends upon the results of predictive modelling of growth scenarios
- Heathrow's pressures will soon be felt elsewhere



Manchester Metropolitan University / Cranfield University
University of Cambridge / University of Oxford
University of Sheffield / University of Leeds
University of Reading / University of Southampton
Loughborough University

Omega

A partnership to meet the environmental challenge of aviation growth

Difficulties looming

- Cars getting cleaner so aviation looms larger
- Predicted demand pressures
- Pace of technology response
- Aircraft size growth adds complexity
- Air transport system structure and business models
- Containment within airport boundary?
- Measurement and modelling become decisive tools

Attribution

- Targeting the right sources at specific locations – poor information can cost big money
- Modelling output may only be as good as the inventory input and the source codes but the need for solid information that unpicks the various sources is essential
- Airports can have dozens of contributing sources
- Getting the background level right also matters

Modelling amid other improvements

Continuous improvement expected in **ALL** areas

- Improved emissions source characterisation
- Technology advancing – aircraft & other sources
- Airport air quality planning greatly enhanced
- Wide range of mitigation strategies
- Smarter operations
- Better predictions
- Better monitoring and modelling

The future matters as much as the present

- Modelling has a large role to play in future assessments of aviation impacts
- Horizons are 25+ years – DfT White Paper, ICAO goals
- Dificulty in knowing how the emission sources perform but also…..
- Future meteorology and ozone trends, background emissions, etc

Increasingly international perspective

- International Civil Aviation Organisation (ICAO) uses AQ modelling for:
  - Examining the need for tightening source emission standards
  - The trade-offs debate (between emissions, with noise and with altitude emissions impacts)
  - Progress checking against long-term goals

Comparison and verification

- Similar to Heathrow PSDH, ICAO has undertaken a model inter-comparison exercise for a 'sample problem'
- Checking model operation, capabilities and application
- Getting groups and developers together

- Next step is to develop ICAO Air quality guidance on modelling (and measurement)
- Further scrutiny of how modelling works and how it is applied

Areas of uncertainty

- Initial dispersion of aircraft emissions, especially during take–off and landing
- PM emissions from several sources
- Refinement of attribution analysis

…and to finish

How does Omega fit in?

- UK Government supported knowledge transfer activity that strengthens the academic contribution to addressing key aviation sustainability questions
- Goals: understand problems, advance solutions, enhance sustainability
- 9 universities working with key stakeholders on air quality noise and climate - study, dialogue and innovation
- 17 studies so far, more to come
- Raise the knowledge threshold and provide core information

Omega AQ studies

…on the website

Conclusions

- Concentrate on getting a full understanding of what is produced by source and where it goes
- Refine models, especially on initial dispersion – **Omega** helping
- Continued comparison exercises help to improve all tools but don't expect harmonisation
- Models and modelling will increasingly need to be bullet-proof

Thank you for your attention

Any questions?