

BRITISH AIRWAYS



Working Together to Understand Local Air Quality

9th April 2003

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Environment Affairs - BA

Understanding Local Air Quality

- ◆ Modelling,
- ◆ Monitoring,
- ◆ What happens next?

MODELLING

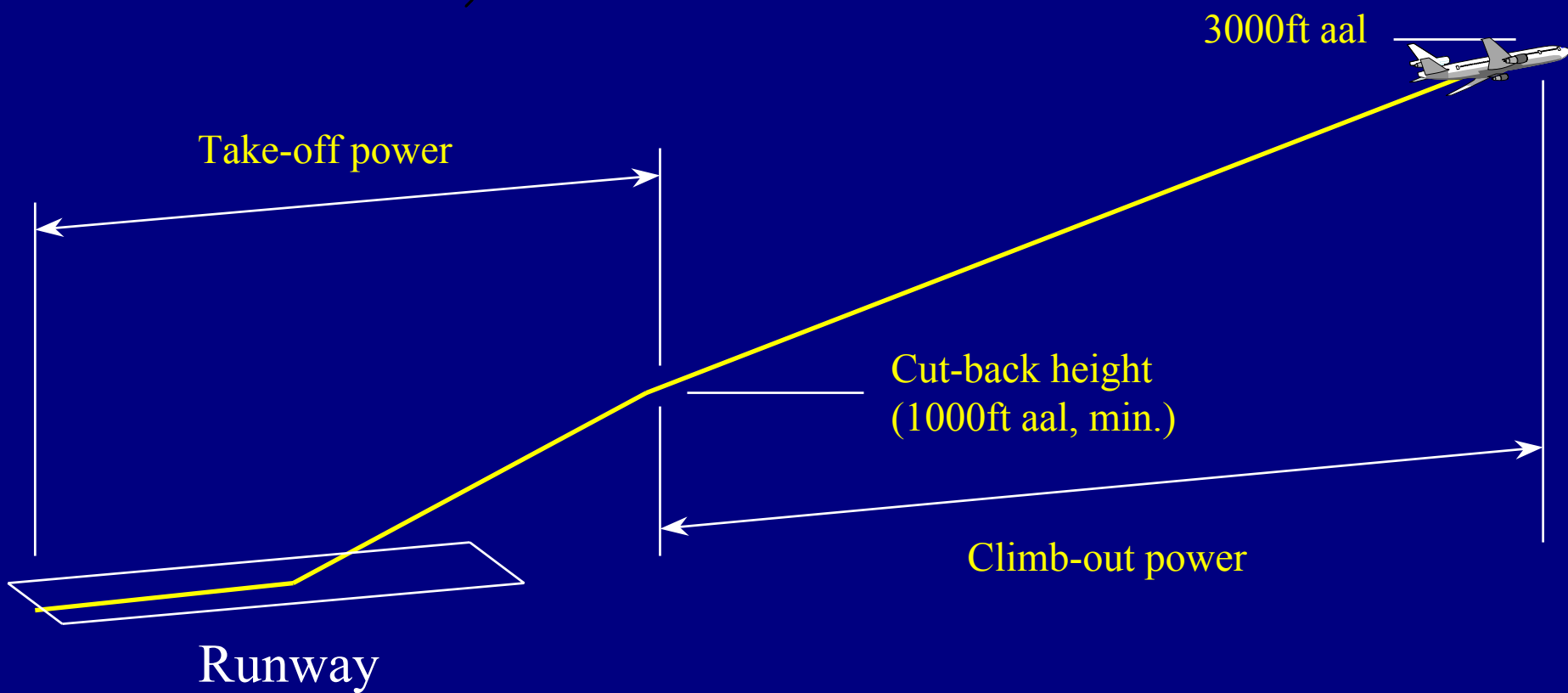
Problems with Inventory models

- ◆ Inventories alone are the wrong approach,
- ◆ Raw ICAO LTO cycle data inappropriate:
 - » 3,000 ft cut-off, some aircraft 30 km away!
 - » times in mode (T/o performance) same for all types!
 - » emission dispersion characteristics not included,
 - » compares 2D traffic with 3D aircraft emissions.
- ◆ Proper dispersion modelling essential, with correct inventory as an input.
 - » cut-off height not important if modelling done correctly

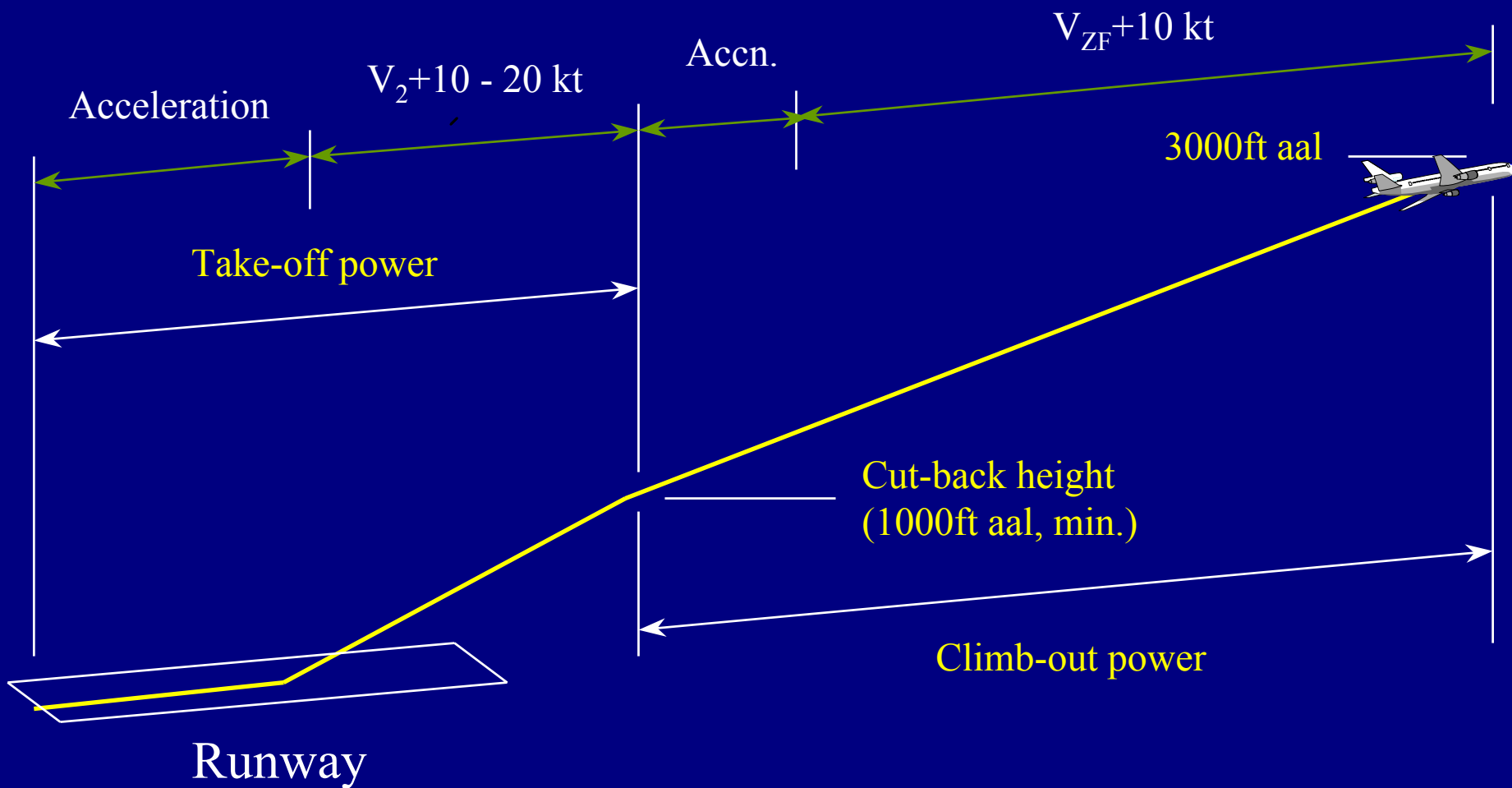
Important Issues

- Aircraft operating procedures largely unknown outside the airline industry,
- Take-off is a complex modelling challenge:
 - » x, y, z, spatial distribution,
 - » acceleration and constant speed segments,
 - » configuration and power changes.

Normal Take-off Procedures



Normal Take-off Procedures



“Steering Group”

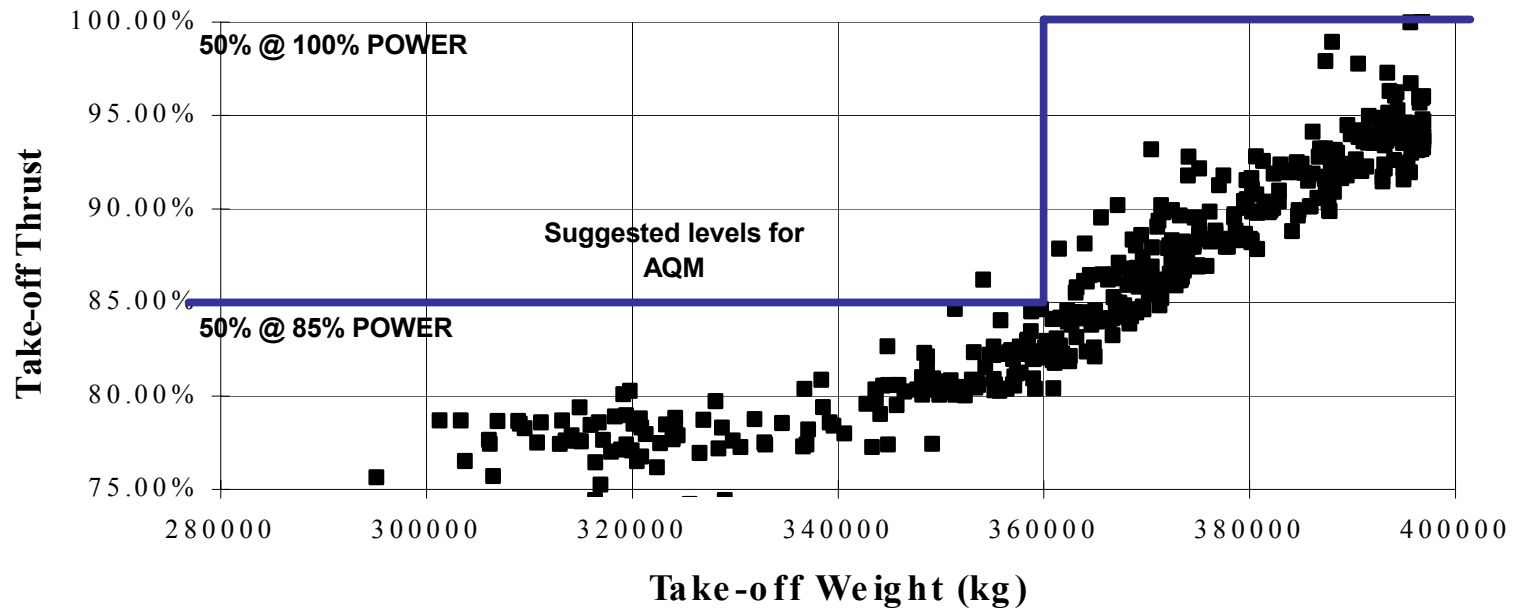
- Working with steering group to share knowledge and information:
 - LB Hillingdon,
 - LB Hounslow,
 - Slough BC,
 - Spelthorne BC
 - DfT,
 - DEFRA ,
 - CAA,
 - BAA, BAA(Heathrow),
 - Imperial College,
 - Manchester Metro. Uni.,
 - Information sent to GLA

New information

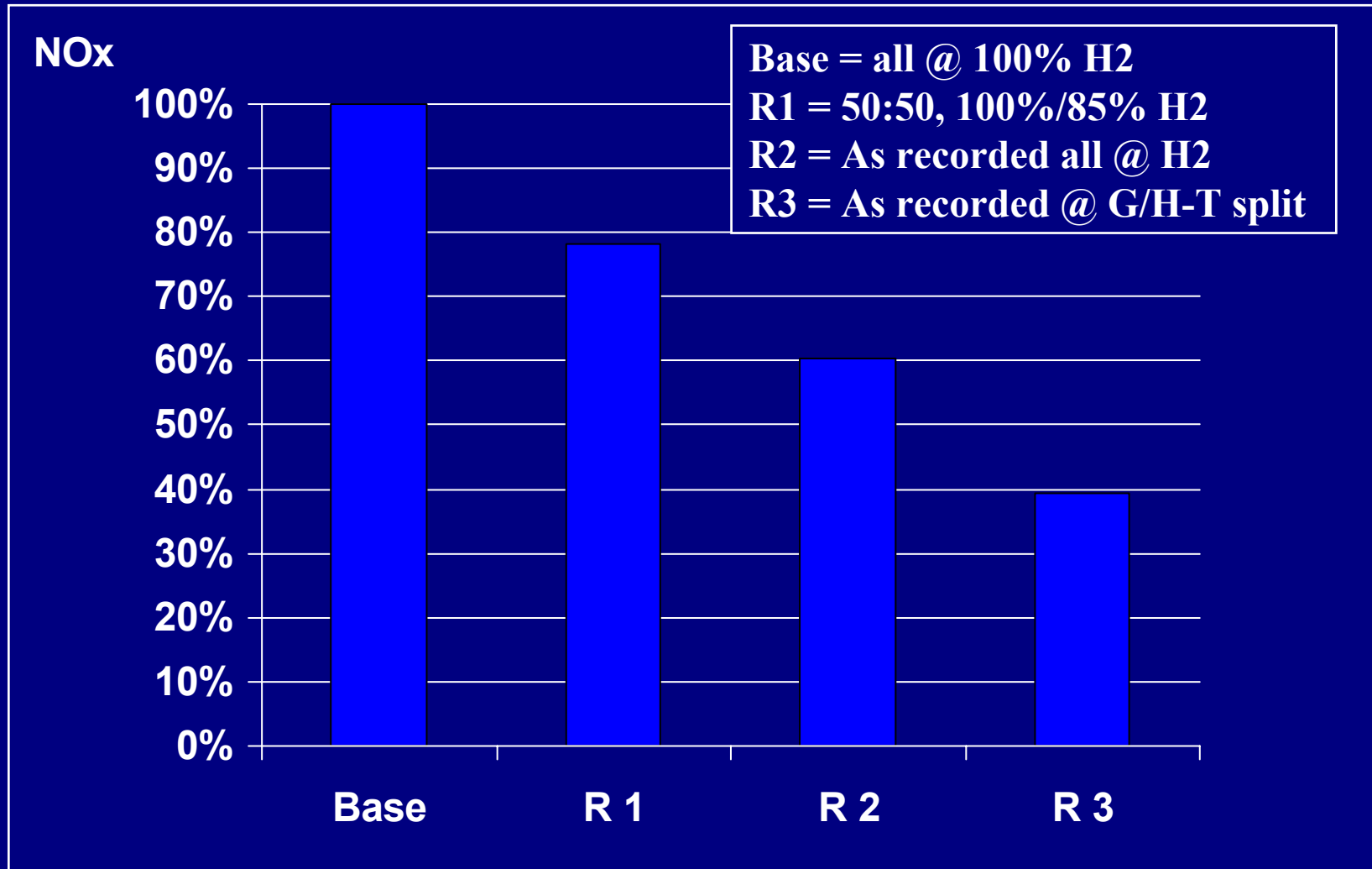
- 100% take-off thrust operations are the exception rather than the norm,
- Identification of actual take-off thrust levels from FDR system,
- Actual taxi-times available,
- Data for Ground running and APU's, collected,

Take-off power settings - B747-436

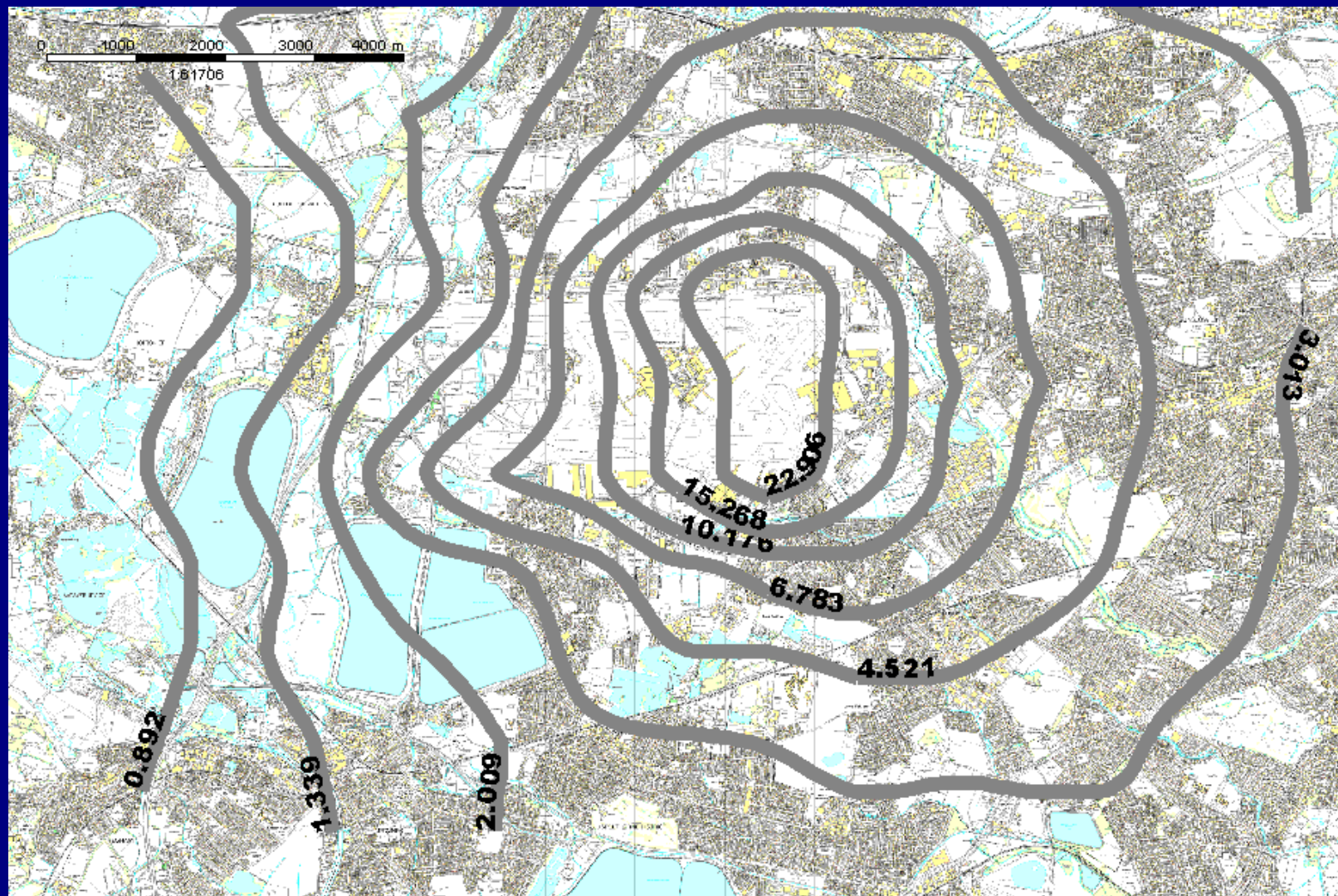
BOEING 747-436 REDUCED TAKE-OFF THRUST USE AT LHR



Refinements e.g. B747-436 take-off



NO₂ results 2000 (Scaled to ALL operators)



MONITORING

Objective

- ◆ To get some hard NO₂ data across, and away from the airport,
- ◆ Verify magnitude of NO₂ concentrations
- ◆ Confirm “drop-off” rates,
- ◆ Increase knowledge and understanding of NO₂ concentrations within the group,

Two studies

◆ 1 Week study

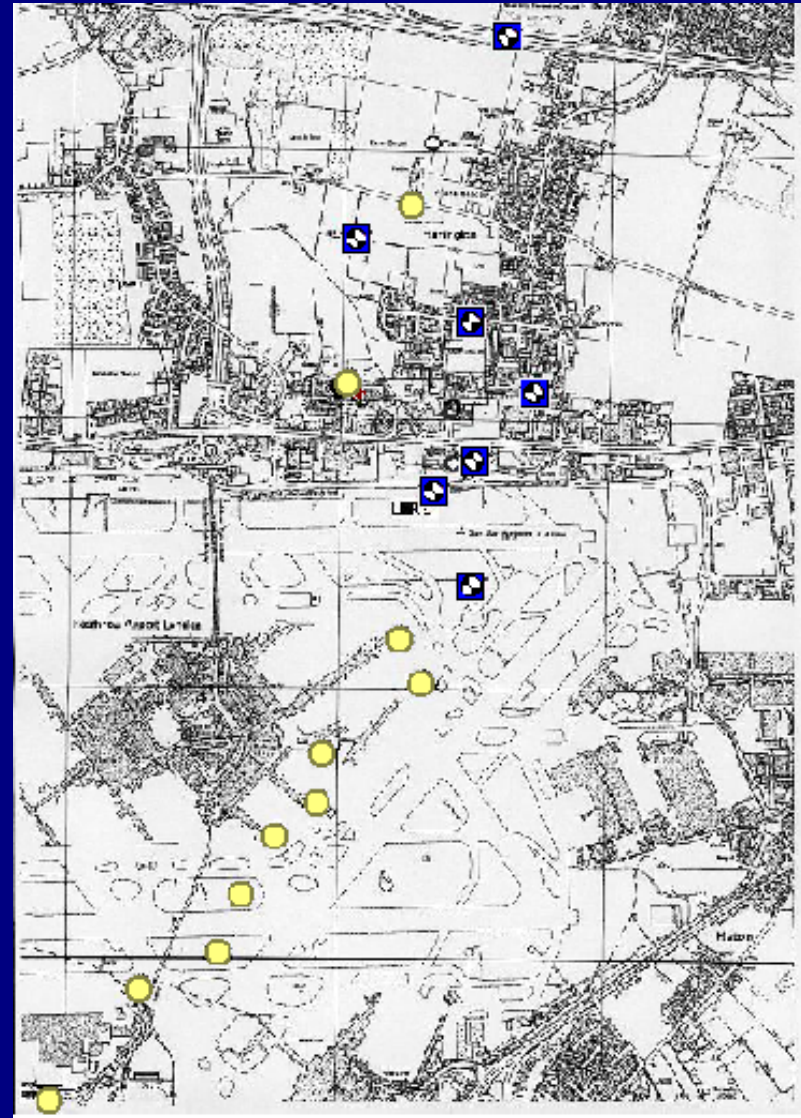
- ◆ Identified with BAA and Imperial College
- ◆ 15 sites
 - 8 on airport
 - 6 North of airport
 - 1 at Waterside
- ◆ Triple NO₂ tubes
 - 1 with LHR 2 monitor
- ◆ 7 day duration

◆ 1 Year study

- ◆ Based on previous positions + 4 new
- ◆ 19 sites
 - 11 on airport
 - 7 North of airport
 - 1 at Waterside
- ◆ Triple NO₂ tubes
 - 1 with LHR 2 monitor
- ◆ 12 x 1 month duration

19 (well 18) locations

- ◆ Locations:
- ◆ Security an issue,
- ◆ Difficult to get away from road sources.
- ◆ 19th location at Waterside



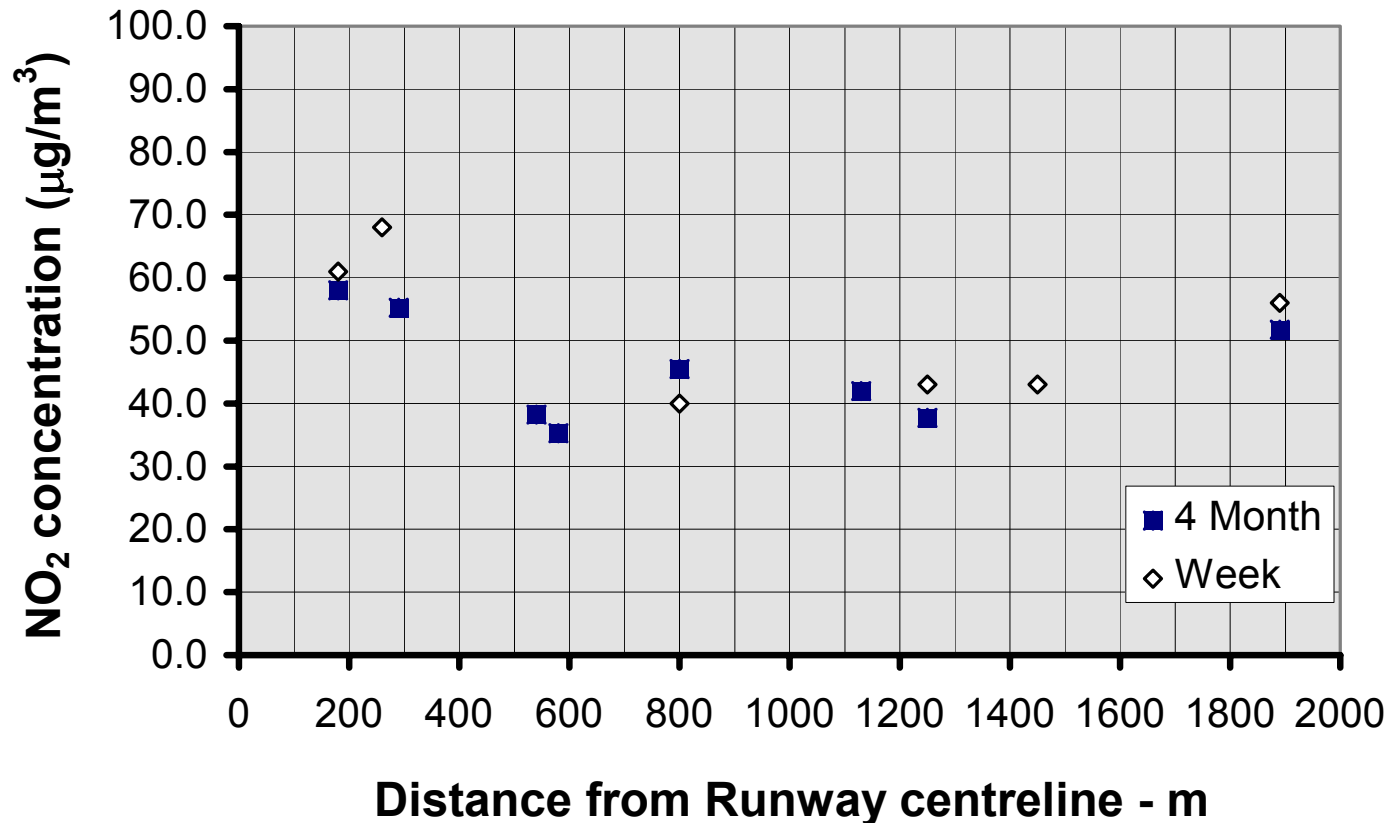






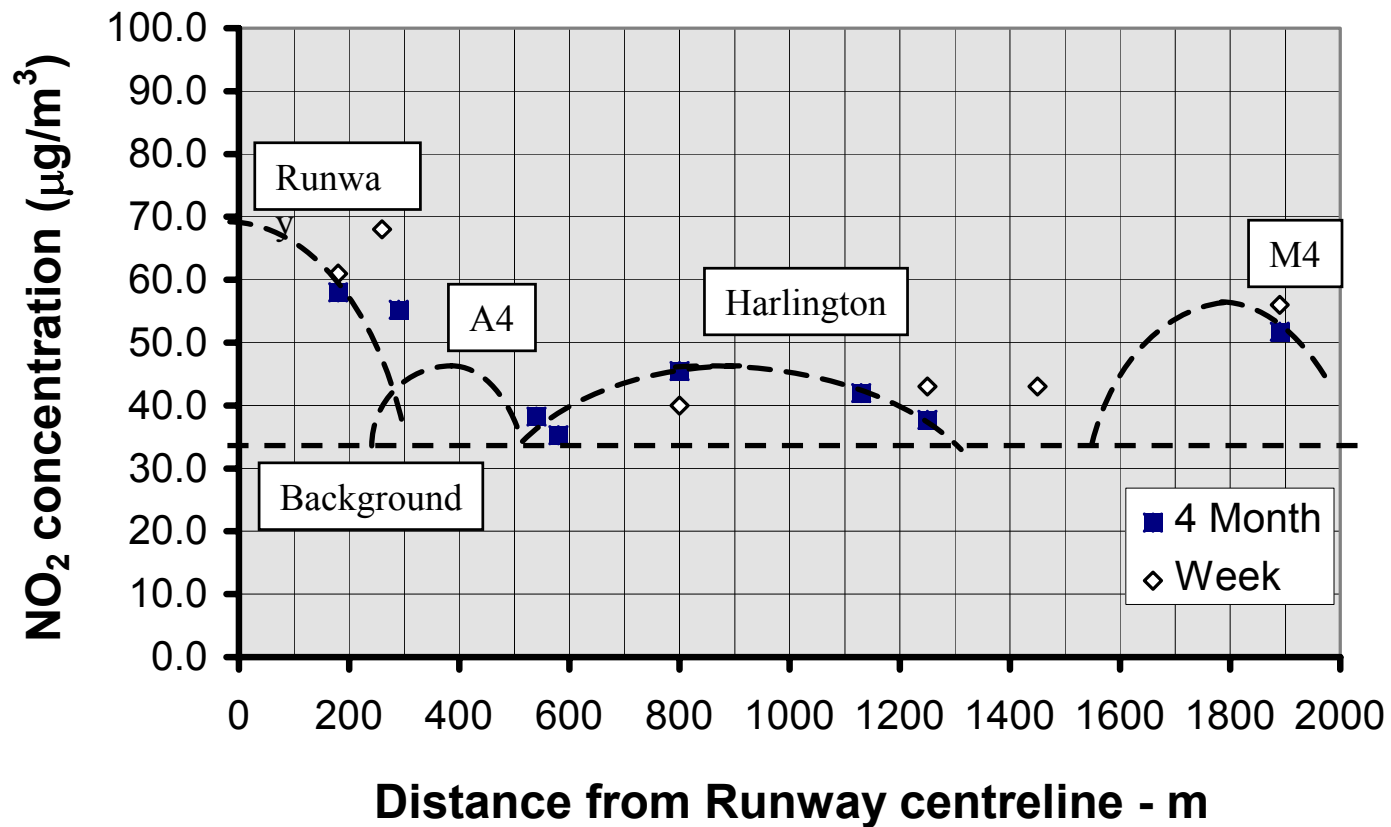
PRELIMINARY Results NO₂

NO₂ transect monitoring at LHR



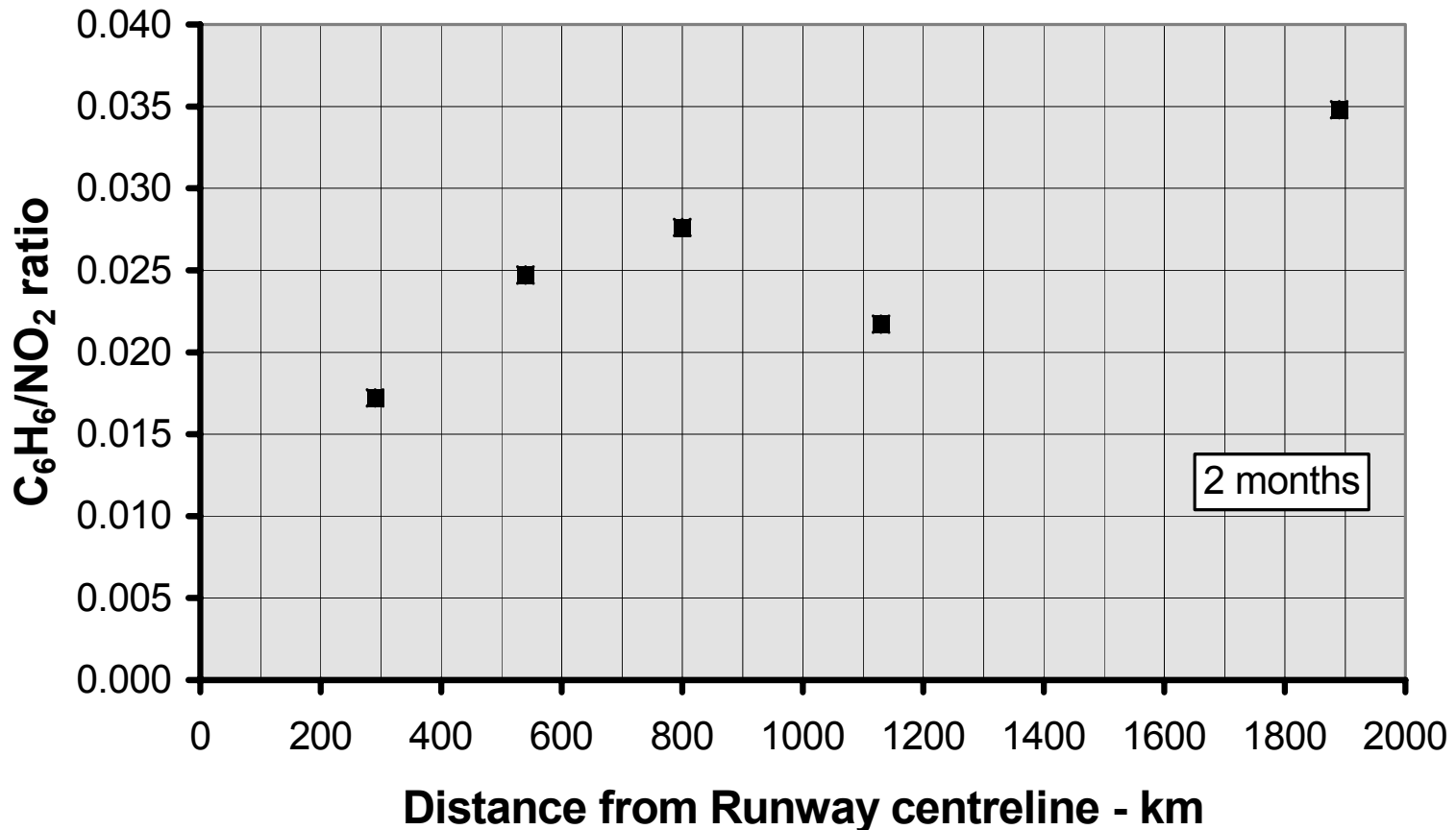
One interpretation

NO₂ transect monitoring at LHR



PRELIMINARY Results benzene

Benzene transect monitoring at LHR



Conclusions

- Working together with the Local Councils, BAA, and other scientific and political bodies,
- Dialogue as least as important as the modelling
- trust built up, knowledge shared,
- Focus on getting the correct inputs for dispersion modelling rather than on the actual model, though modelling effects important.

NEXT STEPS

Further Work - Modelling

- Modelling just started, refinement of inputs ongoing:
- More data required:
 - Actual taxi power settings, engine out taxi, reduced thrust take-off, effect of reverse thrust, main engine start, refinement of APU cycle,
- GSE, airside road vehicles,
- Landside vehicles.

Further Work - Monitoring

- Monitoring nearly half way through, continue for complete year,
- BTX tubes now located at most sites to the North of the airport,
- Possible additional sites?
- Continue to work with other groups, e.g. ARTEMIS, and AEROJET 2.

Further Work - Sharing information

- Continue to work with the “Steering Group”
- Website containing modelling and monitoring data from as many sources as possible:
 - www.Heathrowairwatch.org.uk
- Dissemination of information to other groups:
 - » ICAO CAEP WG 3
 - » EU AERONET

BRITISH AIRWAYS



Not The End!