



HEATHROW AIRPORT TERMINAL 5

IES APPOINTED AS SOLE ENERGY AND
ENVIRONMENTAL MODELLING CONSULTANT

Heathrow Terminal 5 is by far and away the largest project ever undertaken by BAA, and the move into a state-of-the-art terminal will transform the flying experience of the 30 million passengers who will pass through it each year.

Designed by the Richard Rogers Partnership, not only is the sheer scale of the building both imposing and impressive, but the sweeping waveform roof, which is a single span, provides a building interior with a vast and flexible space that can easily be adapted according to changing needs.

The new main terminal building offers a challenge on an enormous scale for building services and the management of the interior environment; the interior space alone could accommodate around 50 football pitches. In addition, the large open spaces, extensive use of glazing and complex systems and processes all mean that traditional design calculations were inadequate to realise the most efficient and effective design.

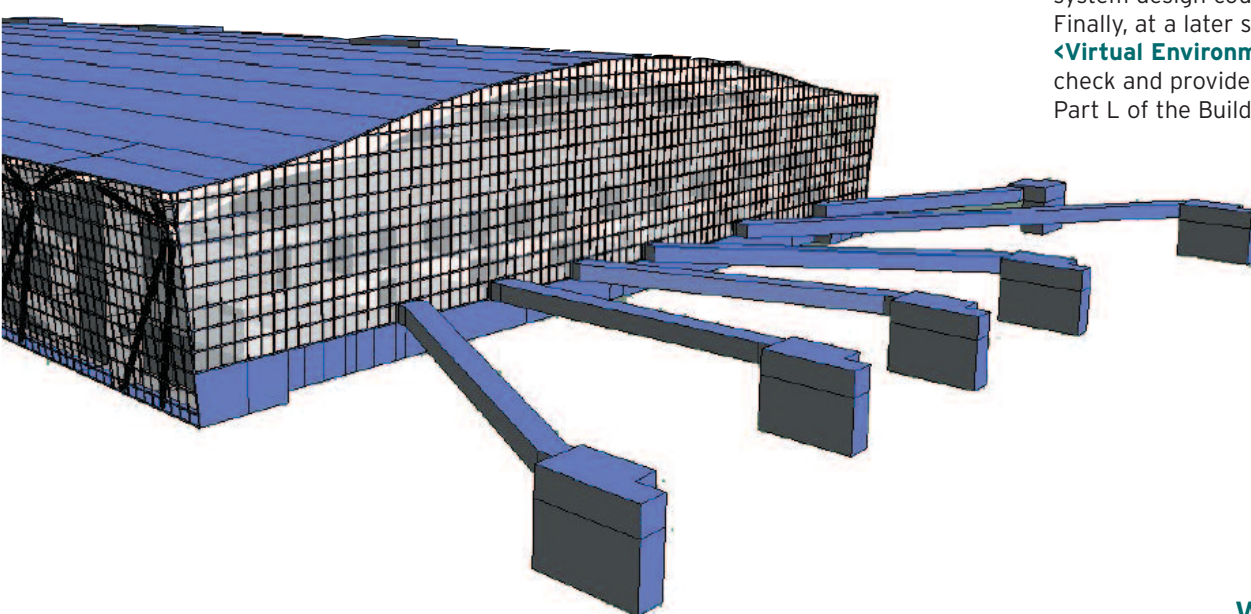
In order to understand and meet the energy and environmental challenges of the building, the design team needed both a new way of modelling the structure and one which was powerful enough to deal with a project of this size and complexity. It was also acknowledged that traditional 'rules of thumb' would have been completely inadequate for analysing a project of this scale.

Following a detailed survey of the modelling software available and the consultancies who could potentially tackle a project of this scale, building services practice DSSR appointed Integrated Environmental Solutions Ltd as the sole energy and environmental modelling consultant.

Initially IES Consulting was commissioned to assess the concept design of the building but as the project progressed, IES's role on the shell and core of the main terminal and satellite buildings continued and expanded into other areas of the design like the analysis of the new Visual Control Room and the Rail Interchange.

IES was asked to apply the **<Virtual Environment>** software to analyse critical design factors including: the building's thermal comfort, airflow, energy consumption, daylight and glare, from concept through to production design.

The **<Virtual Environment>** software provided the design team with accurate performance information on aspects of the building's design such as form and fabric of the roof, facade and solar shading. The selection and sizing of the heating, cooling and ventilation system design could also be examined. Finally, at a later stage, the **<Virtual Environment>** was used to check and provide compliance with Part L of the Building Regulations.



HEATHROW T5 IES CONSULTING CASE STUDY

October 2004 | UK

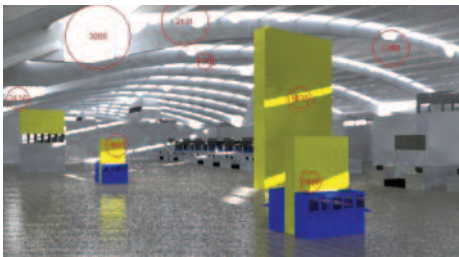


**INTEGRATED
ENVIRONMENTAL
SOLUTIONS**



“IES and their <Virtual Environment> proved themselves over a long period during the concept and definition stages of the services design... culminating in detailed energy, environmental and daylighting models of each major facility”

DSSR

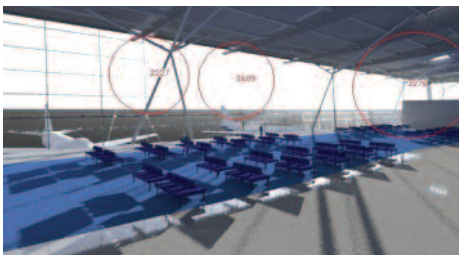


DSSR and BAA selected IES Consulting and the IES **<Virtual Environment>** building simulation software for a number of important reasons. These included:

- the **<Virtual Environment>** was the most powerful modelling tool available.
- the unique integrated data model meant that the simulation processed faster and the data and analyses were managed in a controlled and structured manner.
- the software allowed DSSR to view, query and edit the model and simulation results at any time, providing tremendous flexibility.



In addition, IES was the only organisation which could provide the level of expertise and staff to handle the wide range of design and performance issues involved in such a consultancy role. Although no special customisation was required, IES had the capability of adapting the software if the needs of the project demanded.



IES and DSSR collaborated to create and manage the model and its outputs throughout the different stages of the design. As users of the **<Virtual Environment>**, DSSR was able to clearly understand the inputs to the model and funnel information through to IES for interpretation and application to the model. This meant that the model was based on realistic information and all elements of the building's design and operations were accounted for.

The Terminal 5 project is an enormous building simulation model and one which pushed the tools to their limits. Very few projects are as large and complex as Terminal 5, however this project demonstrates what is possible with the **<Virtual Environment>** and how building projects of any size can be implemented and benefit from the integrated approach that it offers.

“IES and their **<Virtual Environment>** software proved themselves over a long period during the concept and definition stages of the services design. Their knowledge of software allowed the level of definition to be easily altered as more information became available culminating in detailed energy, environmental and daylighting models of each major facility. Many complex issues were investigated and the software enabled these to be evaluated and more easily explained to other members of the team using the in built reporting tools. In particular the software made a significant contribution in the calculations to demonstrate Part L2 compliance.”

IES PRODUCTS USED

ApacheSim, ApacheHVAC, MacroFlo, MicroFlo, ModelIT, Radiance, SunCast.

Daylight levels and glare were assessed throughout the main terminal building.

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