DayMedia – A Multimedia Teaching Package on Daylighting

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Abstract

DayMedia is an interactive web-based teaching package on daylighting issues for architects. It is funded by the EEC Leonardo programme. It was developed by LEARN, University of North London in collaboration with four other European academic partners. The main objective of the project is to make available the latest results in research in the field of low-energy architecture.

Introduction

In the context of the threat of global warming we face the urgent need to reduce the energy consumption of our buildings. The European Commission has been promoting the use of renewable and alternative energies with research grants and many research projects have been undertaken in this field.

In the age of our forefathers, when daylight was the primary source of light for the interior, skills were developed that made maximum use of natural daylight. In the last 40 years, these skills have become lost. Energy was available in abundance, so most commercial buildings were artificially lit and air-conditioned. Little thought was given to the daylight performance of buildings as long as they were nicely block-shaped and finished with mirrored glass.

Background

To help architects and building engineers re-discover the skill of making buildings that actually function the EEC has supported research within the framework of several research programmes such as JOULE and THERMIE which promote renewable energies and rational use of energy. As a result considerable work has been done in the field of low-energy architecture. However, the dissemination of the results has been rather slow. This is even more true for those who could get the highest benefit and make the biggest impact on the global reduction of the use of energy, namely the architectural practitioners and building engineers, as well as students.

To remedy this situation, the EEC Leonardo programme has funded a project co-ordinated by the Low Energy Architecture Research uNit, LEARN, at the University of North London. Participating partners are the Universities of Athens, Florence, and Trondheim, the Ecole National in Lyon, as well as London-based production company ARTEC.

The main objectives of the project are:
- to transfer and disseminate through training the expertise in daylighting design developed in the EEC research and development programmes JOULE and THERMIE
- to meet the needs of European professionals with regard to the use of daylighting techniques in buildings
- to provide a flexible training tool ideally suited to the small enterprises that are typical of architectural and consulting engineering practices, i.e. a CDROM based programme
- to provide a flexible training tool ideally suited to university students via the web, and integrate aspects of daylighting techniques in the architecture curricula of the academic partners
- to promote a European dimension in training on architecture

The project aims at developing a flexible training package which will incorporate the newest daylighting techniques as well as reintroducing some of the wisdom of the past and making them widely available to practitioners across Europe.

Technical Aspects

The DayMedia is produced entirely in HTML, the language that is used to describe pages on the World Wide Web. This guarantees true independence from computer platforms and operating systems, resulting in the widest possible audience. To overcome the static nature that is characteristic of HTML pages JavaScript is used, allowing for interactions with the user beyond the classic hyperlink concept. Proprietary packages and tools were considered in the early design stages. They would have offered more sophisticated layouts and ways of interacting. However, much of the ease of use and portability would have been lost and later alterations to the package and its contents would have been impossible. Another final reason for HTML was lower production costs.
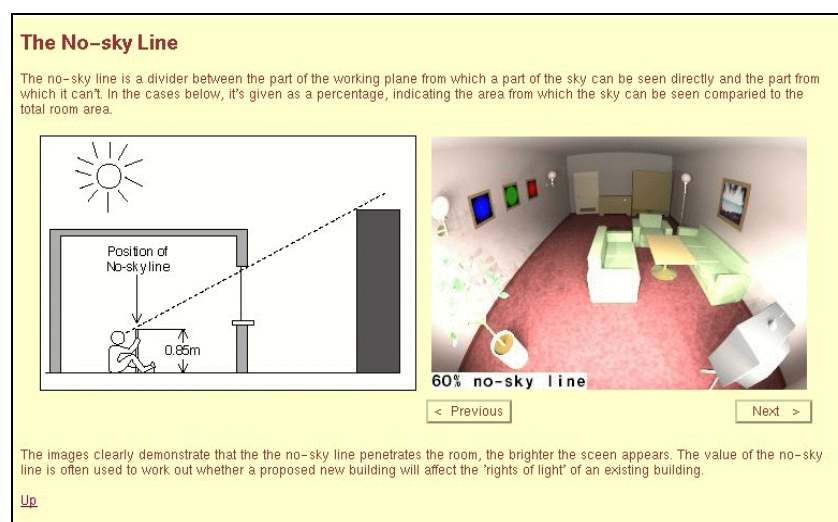

Figure 1: Interactive page about the no-sky line.

Due to the approach taken, the package can be delivered in one of two different ways:
- via the Internet. This ensures maximum availability and dissemination. The only drawback will be potentially long download times, since there are many images and

animations requiring large bandwidths. The pages will be hosted by LEARN at the University of North London under
http://www.unl.ac.uk/LEARN/port/1998/daymedia/index.html.

- as a CDROM. This overcomes the bandwidth problem but adds production costs. These could potentially be covered by sponsors, however as of August 2000, this is still under investigation by the partners.

Developed in English, the original intention was to also make DayMedia available in Italian and French. Sadly the latter two languages had to be dropped due to the short development time and insufficient fundings.

Contents of DayMedia

DayMedia is structured into four main categories:
- Nature of daylight: - Sky types
  - Availability of daylight
  - The path of the sun
  - Simulating daylighting
- Quality of daylight: - Colour temperature
  - Contrast and glare
  - Modelling ability of daylight
- Use of daylight: - Criteria of daylight
  - Controlling daylight
  - Transmitting daylight
  - Maximising daylight
  - Integrating daylight and artificial light
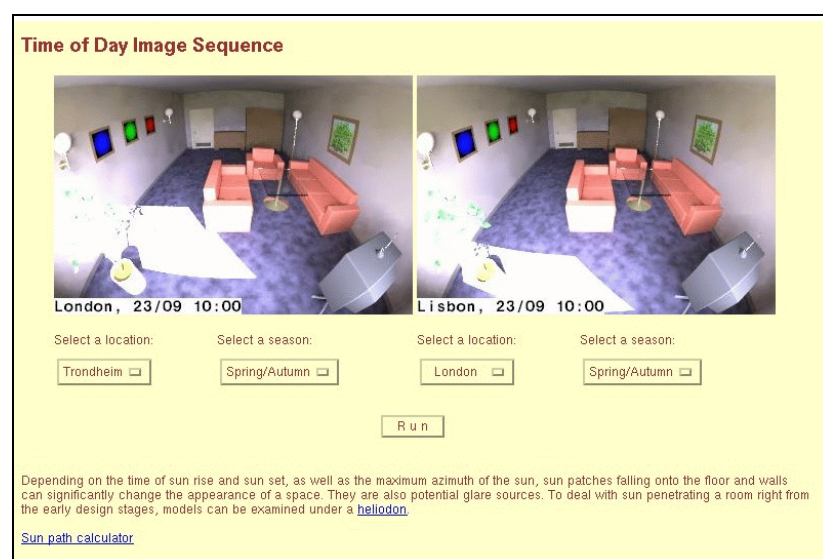- Case studies: - Daylighting of hospitals
  - Daylight Europe

Figure 2: Animated sequence showing sun patches in a room for different geographical locations and seasons.

The images used in DayMedia are partly photographs taken by the partners and partly computer simulations, mostly done in RADIANCE. The flexibility of the package allowed for the automatic creation of large number of images while altering one or two variables, such as the position of the sun and the geographical latitude of the location. The output could then be looped and animated with JavaScript, resulting in sequences just like a movie clip.

Although reasonably comprehensive, DayMedia does not aim to be the replacement of all text books written on the subject or the ultimate almanac. It neither covers all possible aspects, nor goes into a deep discussion of the topics. The main objective was to provide a visually attractive supplement to other sources of information, making it easier for the student and architect to comprehend to concepts and formulae given there.

Conclusion

The authors hope that all partners will agree to distribute DayMedia under a license similar to the GPL that is known for Open Source Software. This would allow the free use and distribution of the package and even alteration of its contents. However, all changes will have to be given back to the community. This way, everybody using DayMedia could add to it its contents. This would ensure that DayMedia would grow from the outcome of an EEC research project into a truly European or even global resource for teaching and learning about daylighting.