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Introducing IT Based Environmental Simulation Courses in Slovak Higher Education (TEMPUS SJEP 09909-95)

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ABSTRACT

This short paper presents an overview of TEMPUS SJEP 09909-95 in terms of background, context, objectives, foreseen outcomes and current state.

BACKGROUND

New democracies in Central and Eastern Europe are experiencing an ongoing process of overall transition towards a market economy. Rapidly changing labour requirements is one of the aspects of this restructuring. Areas, where current lack of skills and knowledge is enhanced by previous centralised policies, certainly include quality control in engineering and global environmental management.

The current 3 year project (1995 - 1998) addresses these needs by restructuring curricula of 4 higher education institutions in Slovakia (Slovak Technical University Bratislava, Technical University Kosice, Technical University Zvolen and University of Agriculture Nitra) in terms of introducing environmental modelling and simulation.

This will be achieved in collaboration with 2 Western institutions with long term expertise in this field (University of Strathclyde, Glasgow, and Eindhoven University of Technology).

CONTEXT

On average people spend about 90% of their whole life inside buildings. Energy consumption in buildings accounts typically for over 40 - 50% of the total national energy consumption. Provision of energy services in buildings (heating, ventilation, lighting, etc.) produces a large proportion of CO_2 and other environmental pollutants.

Actually the built environment is an almost unmanageable micro-cosmos of complexity leading to a number of problems (energy efficiency, indoor air quality, thermal comfort, etc.) commonly experienced in both Western and Central European countries.

The most powerful engineering technique currently available for analysis, design and operation of the complex systems such as the built environment, is computer

modelling and simulation. Using this technology basically involves problem analysis and model definition, performing the simulations, followed by results analysis and interpretation. This process may be repeated for other design options to be analysed. A wide range of performance characteristics (such as energy consumption, system loads, indoor air quality, thermal and visual comfort, condensation risks, and many more) can be predicted and assessed. Figure 1 demonstrates some common performance indicators.

OBJECTIVES

The project objective is to reach two major target groups. The first group consists of final year Building Engineering (or equivalent) students, in order to give them the necessary skills and knowledge, before entering the competitive labour market. The second target group consists of engineers already in practice. For this continuing education activity, close collaboration with a major industrial partner is foreseen.

The new courses will use information technology (computer aided learning, using hyper-text applications on the world-wide-web) and will be in English. A common approach in course structure and content (about 95% of the course-ware will be identical for all partners involved), will ensure the creation of EU compatible and equivalent courses.

The information technology aspect of the courses allow self-learning, unlimited dissemination possibilities (anybody with INTERNET access will be able to use the course material), and will facilitate easy incorporation of future developments or updates.

OUTCOMES

The foreseen major outcomes can be characterised as follows:

- ❑ new EU compatible interdisciplinary courses at 4 Slovak universities;
- ❑ infrastructure (teaching/computer IT laboratory);
- ❑ retrained and updated staff capable of individual teaching assignments;
- ❑ provision of continuing education for Slovakia industry;
- ❑ enhancement of European inter-university collaboration in compatible and
- ❑ equivalent education development;
- ❑ unlimited dissemination capability of the project results.

The main deliverable of the project will consist of course-ware incorporating text, graphics, examples, case studies in the area of fundamentals, methodology, and practical aspects of modelling and simulation. This course-ware will exist in electronic form on the INTERNET, and will be accessible for any interested party. An example of the course-ware is illustrated in Figure 2. The final phase of the project involves close collaboration with the industrial partner in order to introduce modelling and simulation into Slovak practice.

PERFORMANCE ASSESSMENT STANDARD RESULT SET

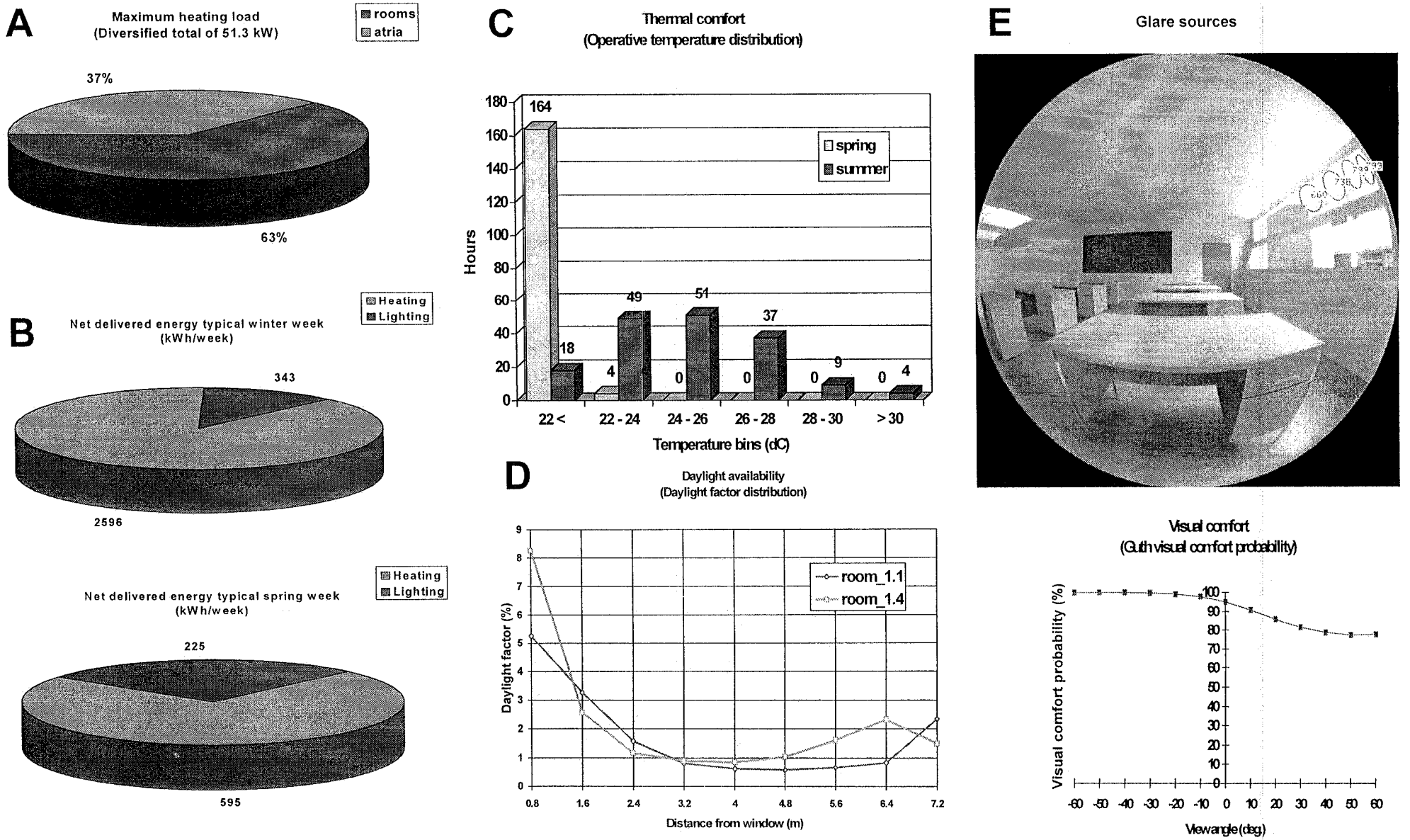

Figure 1. Example of some common performance indicators

CURRENT STATE

The project only started late 1995. At the moment we are enabling the infrastructure in terms of computing equipment, while at the same time we are developing the first version of the course-ware. Intensive courses and workshops later this year will introduce participants to the technology and will give feed-back from the prototype course-ware in terms of the usability for the Slovak situation.

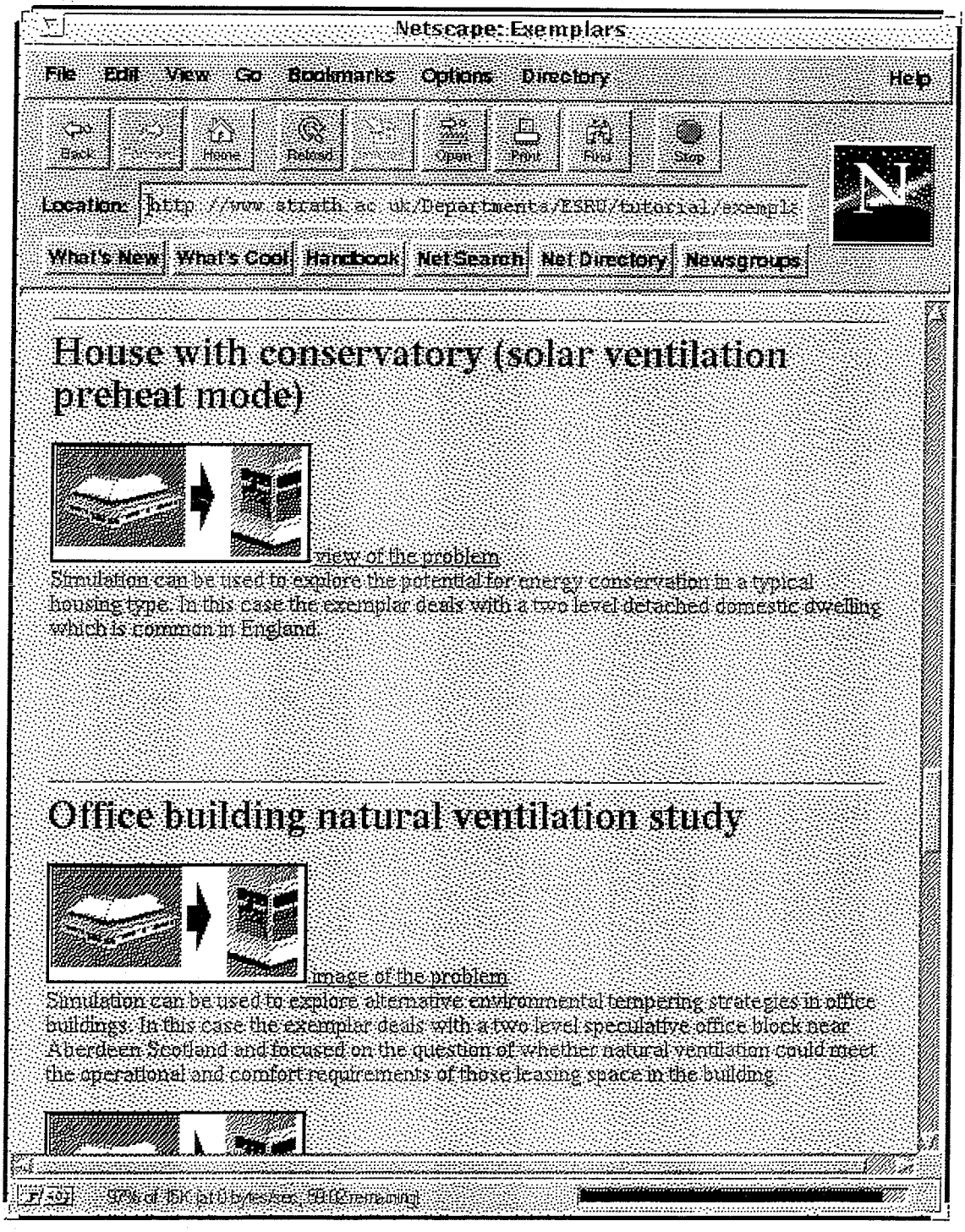

Figure 2. Example of the course-ware.