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MANAGEMENT OF THE INTERACTION AND VISUALISATION WITH THE FKI MEDIA FACADE AND THE ENERGY MANAGEMENT OF THE FKI BUILDING

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The development of computer, information and communication technology has continually affected the creation of new applications based on emergent technologies. Many newly developed devices with different technical specifications have surrounded us in our everyday life and private environment. The main focus of this paper is to describe the management and design of the interaction with and the visualisation on the Media facade of the new Building for Culture and Computer Science (FKI) of the University of Applied Sciences HTW Berlin.

Keywords: media façade, management, design, interaction, visualisation.

The University of Applied Sciences Berlin is currently constructing a new building to concentrate the research in the fields of culture, media and computer science. The intention is not only to create new office and lab space, but also to include modern information, communication and energy technology in the building and to produce more energy with the building than the building and all its equipment consume. The main components for this strategy are a photovoltaic facade (see Fig. 1) and an electrical power storage system in the building. The building combines the theoretical research in the offices and labs, with a large test bed to verify theoretical research results.
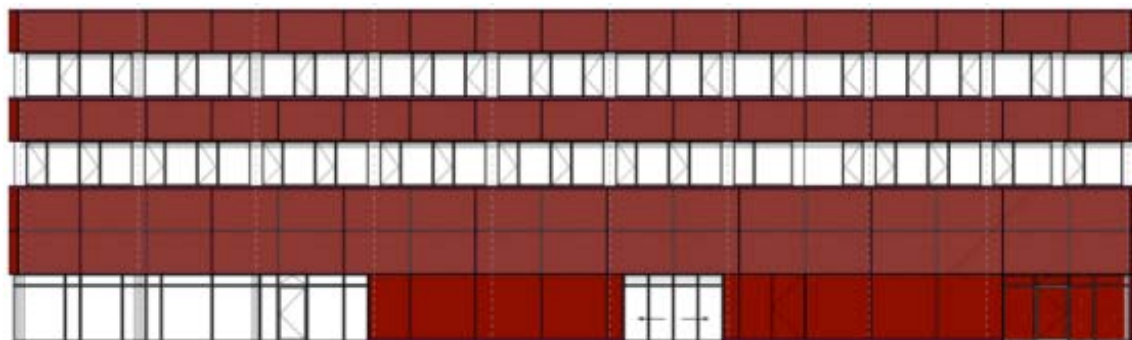

Fig. 1. Photovoltaic facade of the research building

There are many possibilities to measure the parameters of the whole photovoltaic façade, each side of the photovoltaic façade and for each photovoltaic panel (see Fig. 2):
- electrical power;
- energy generation;
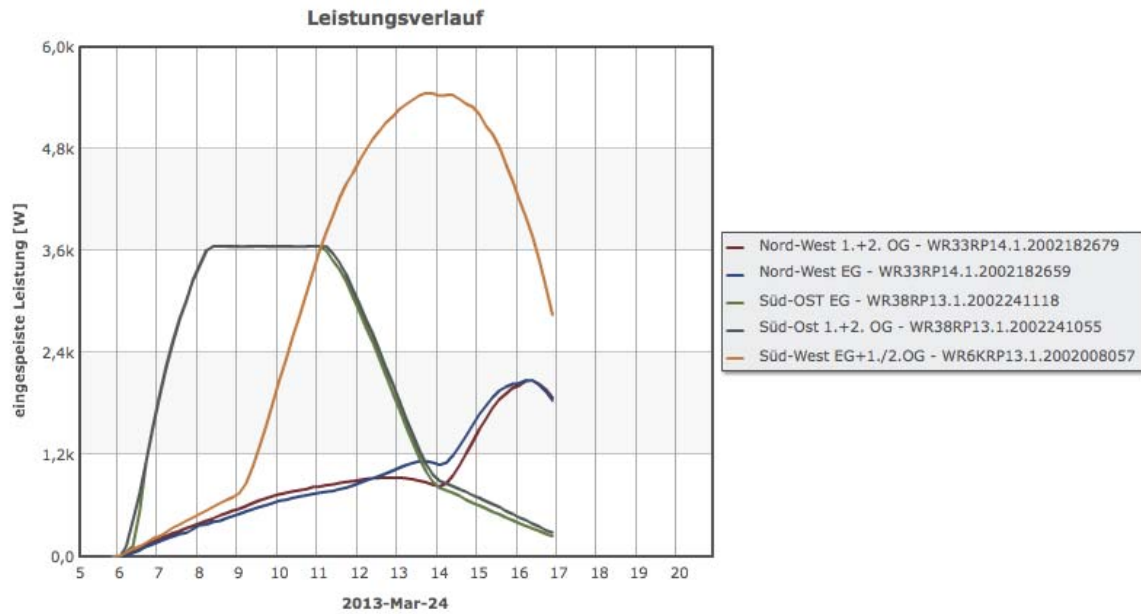- temperature;
- solar radiation;
- …

Fig. 2. Electrical power and energy generation with the photovoltaic facade

Additionally, every visitor should be made aware that there is a building in which people do research for the culture and creative industry. Our approach for the enhancement of the photovoltaic facade into a media-photovoltaic facade is the integration of LED panels in the facade and beamers with rear projection screens in the windows of the building. This allows for a variety of applications with different grades of resolution and light intensity. In order to find the best solution under the requirements to produce a maximum of electrical energy, to facilitate different visualisation during the day as well as during the night, and to perform visualisation with different resolutions and sizes, we developed a variety of designs for the combinations of LED panels and beamers (see Fig. 3).

Fig. 3. Design studies for the media facade

The installed media infrastructure allows the visualisation of different media types such as high-resolution movies with a beamer, large-size texts and graphics with the LED panels as well as high-resolutions, large-size movies with multiple linked beamers where each beamer visualised only parts of the movie and these parts are stitched together (see Fig. 4 and 5).

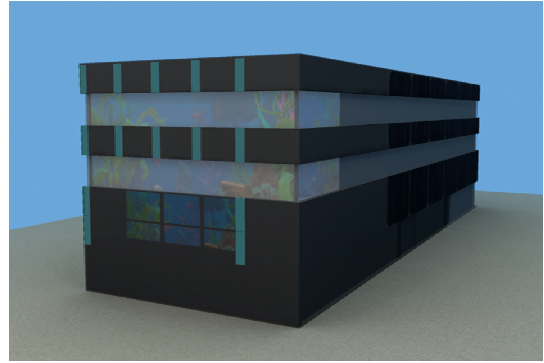Fig. 4. Simulation of the media facade with texts and videos

Fig. 5. 3D-simulation of the media facade

The installed infrastructure allows four additional characteristics:
- a mixed visualisation where parts are visualised with beamers and others with LED panels;
- an interaction with the facade with the help of mobile devices (tablet computers and smart phones) and sensor systems (Radio Frequency Identification, Near Field Communication, WiFi, Bluetooth, video and audio sensors 3D accelerator, Microsoft Kinect and Nintendo Wii, …);
- the control and management of the photovoltaic facade, the electrical power production and consumption and
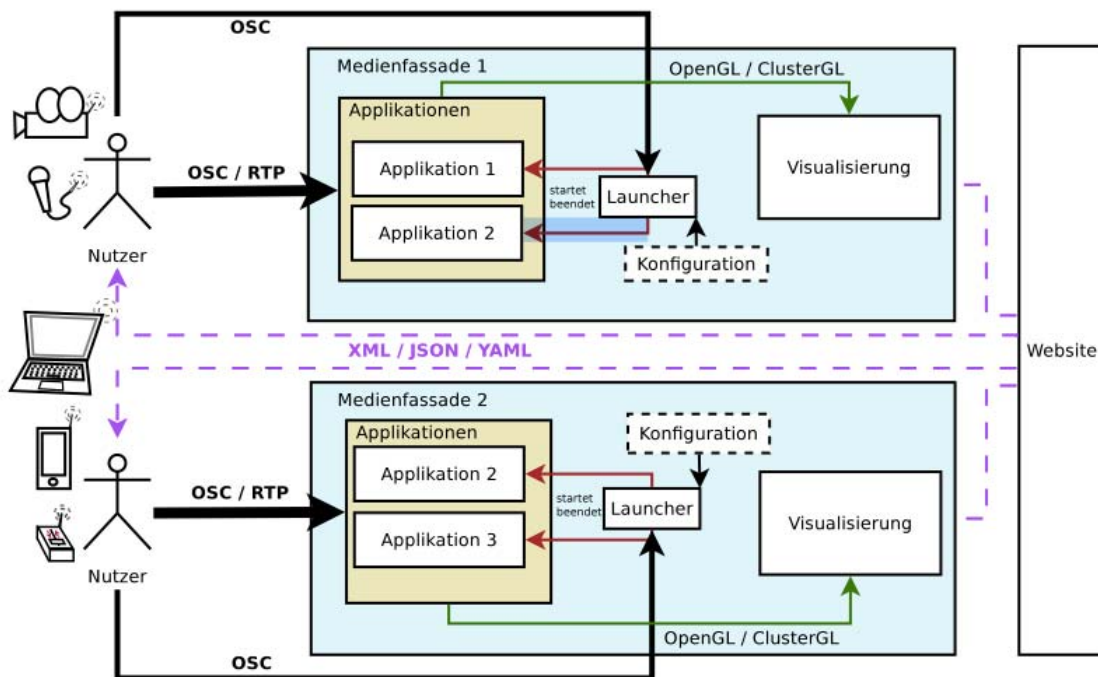- the visualisation of the energetic situation of the building.

Fig. 6. System architecture of the media facade and interaction

The media facade with all its additional infrastructure components allows new applications with new easy-to-use interaction concept with a minimal consumption of resources.

Fig. 7. Widgets for wether forecast (left) and sun position and energy produktion forecast (right)

The combination of energy-efficient information and communication infrastructure, visualisation technology, interaction concepts, sensor systems and mobile devices opens a wide range of new fields of applications. The developed and installed applications can be easily adapted for other areas.

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Управление и визуализация для медиа-фасадов FKI и управление энергопотреблением здания ЦКИ.

Развитие компьютерных, информационных и коммуникационных технологий способствовало появлению новых приложений. В настоящее время появились и стали востребованными новые устройства с различными техническими характеристиками. В докладе описаны особенности управления, дизайна и визуализации для медиа-фасада нового здания Центра культуры и информатики (ЦКИ) Университета прикладных наук HTW Берлин. Рассмотрены также особенности обеспечения экономного энергопотребления этого здания.

Ключевые слова: *медиа-фасад, управление, дизайн, взаимодействие, визуализация.*