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ART + COM Lab Report
BERKOM Project
"New Media in Urban Planning"

Migges M. Glaser
Dipl.-Ing. / Architekt

ART + COM
Projekt für rechnergestütztes
Darstellen und Gestalten e.V.
Hardenbergplatz 2
1000 Berlin 12
West-Germany

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Abstract: The highly developed glasfiber technology of the Berlin ISDN-B prototype network will make it possible to test a future benefit of the possibilities of real time visual communication for architects and planers in their home office. In the project an external user will be able to share high end visual outputs of a Service Center for Visualisation with his own low end CAAD workstation via ISDN-B. The capabilities of these services will range from a still picture archive, real time access to video film archive, a variety of conventional database services to special postproduction for his own 3D data models. The transferred 3D model can be rendered an animated on the Center's systems, if requested also integrated into a video background film. The production will than be available on his workstation screen. These new means will be evaluated in the view of the architects new possibilities for the design process.

Model for a Multi-Media Working Environment for Architecture and Urban Planning

Performance of modern single-user workstations is not only up to supporting clerical work like text processing and administrative tasks, but also to complex graphic design procedures. Thus, computer aid becomes available to occupational groups such as architects or city planners; additionally, graphics oriented interfaces like that of the Macintosh II can be operated perfectly easily without any special knowledge of computing.

Frequently, however, designers and planners are in need of additional information, such as that accumulated in the archives of the public authorities, e.g. ground plans, site plans, town planning maps, traffic frequency and similar data. Moreover, new ways of information transfer like video archives containing original recordings of the surroundings of planned objects can be of valuable assistance to designers.

In future, data banks will make these data available for direct access by computer. The sheer quantity of data thus transmitted requires a fast optical fibre network such as provided by the "BERKOM Testnetz". With this prototype network a wide band communication is possible over glass fiber connections, whose transmission capacity can amount to up to 140 Mbit per second. In comparison, the present day analog telephone network offers a transmission rate of only 64 Mbit per second.

Other external sources of information called on by the designer/constructor according to requirement are highly specialised services like combined video films and computer animations of simulations by supercomputers. Services like this will not be available for individual use even in a medium-term perspective, for reasons of investment and staff expenditure. However, we would expect a full service industry to emerge, provided that suitable means of transmission become available.

The profitable use of such services and their combination with the users' own projects depends on the existence of a multi-media workstation, as it concerns the simultaneous handling of still pictures, plans, films and textual parts; even sound may be used as

a support. As an example of such a multi-media workstation we have chosen Apple's Mac-II. A flexible graphics oriented user interface has to keep data and services transfer (as well as their integration in the user's own work) as transparent as possible.

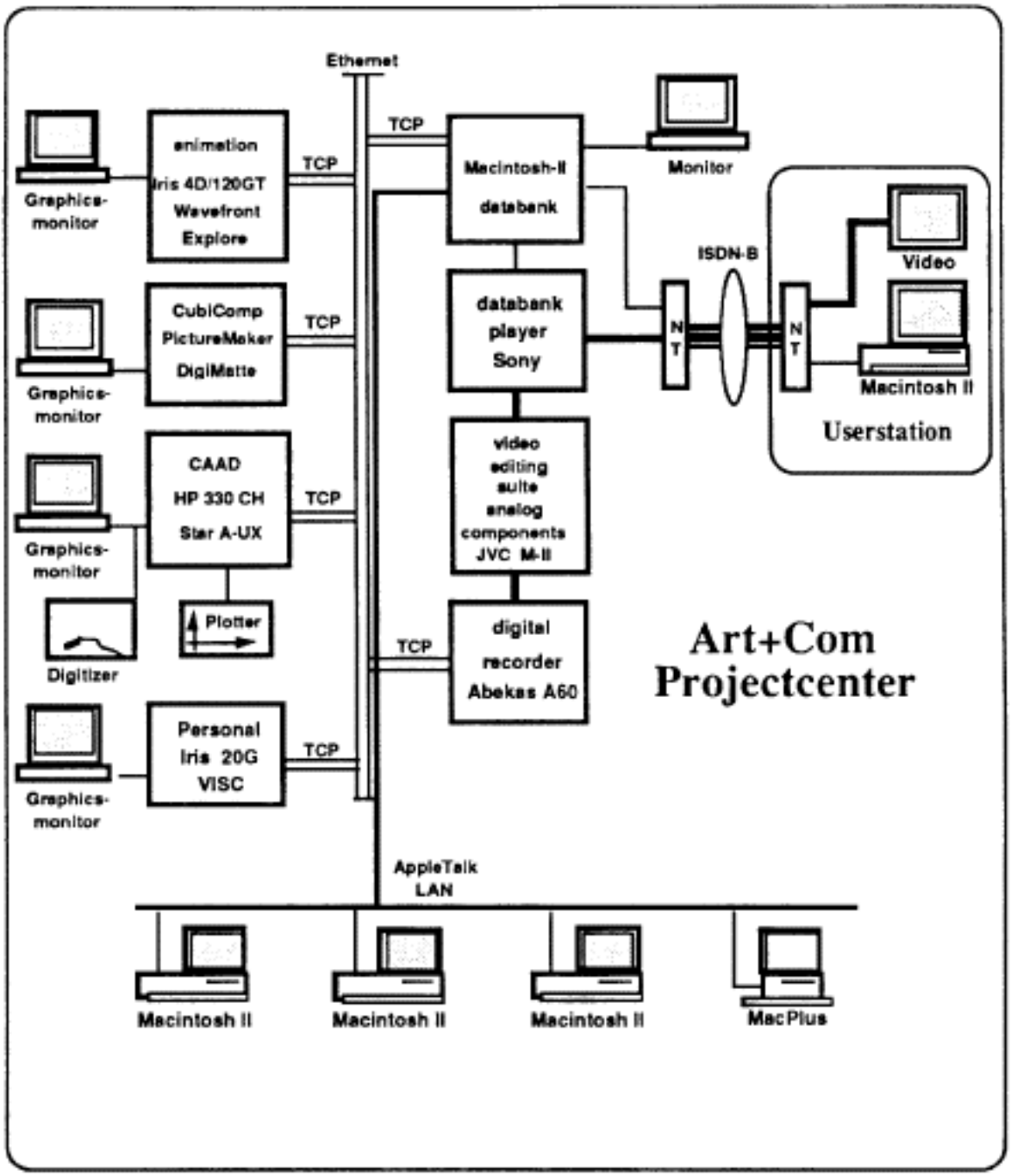
This demand, however, has up to now only been met provisionally with the Hypercard information system and its programming language Hypertalk. But we are presently working out a new version of the user interface on basis of SuperCard with more flexibitities.

For the practicable demonstration of our project, we have selected an existing architectural example dealing with the area around the "Zoopalast" cinema on Breitscheid Square, Berlin. For this area, plans, texts, film sequences, traffic noises and a computer animation can be directly accessed. The potential user with a MacII and a supplementary video screen can connect directly with the ART+COM facilities at Hardenbergplatz via the optical fibre test network. ART+COM facilities provide then a highly sophisticated system of development and testing of computer simulation and its combination with video film materials.

Technology of the User Workstation

As an example of a minor architectural CAD system, we employ the program "Architrion" operated from a Mac-II with hard disk and a high definition color screen; it enables its user to sketch, design and display in a 3D wireframe models (with the ability to supress hidden lines, if required). A laser printer or plotter can be connected with it locally, but a plotter service via the central workstation may be more appropriate with larger sized plans. Additionally, the interactive data access system programmed at ART+COM under SuperCard is made available. This program communicates with the central station via one of the serial 64-Kbit-channels which are provided by the employed codecs, alongside with the video transmission.

Even though transfer of video picture data, up to now, can only take place in one direction (from ART+COM to the user), data traffic is possible in both directions. Consequently, not only control commands but also user files like 3D models, vector graphics, digitized images or text can be transmitted and received. The user-friendly Macintosh programming guidelines allow the flexible manipulation of such files through various programs.



Technology and Working Routine in the Project Center

As corresponding station, ART+COM also uses a Mac-II equipped with an opto-magnetic mass storage device and a serial controlled video player. The opto disk holds examples of 3D architectural data, vector graphics, digitized photographs and text. The video player puts analog moving picture recordings at the user's

disposal. As soon as the equipment becomes available, the use of recordable analog video disks (Sony) is planned.

Ideally, the working routine at the Project Center runs as follows:

From the user's initial plans or sketches the user can contact the center for additional information on the surrounding site, from statistical data to video recordings. As necessary, he can also order additional recordings on the basis of site plans which are produced by the Center and stored on the video player. At appropriate stages in the design, the user can transfer his object files to the central Mac-II together with his specifications for colours, materials, positions and illumination and order a fully rendered visualization of the building in situ. This information is questioned by the mac-like menu driven user interface of the interactive access program and stored in a simple ascii file which is to be transferred with the 3D model data.

The staff at the Center transfer the models to a high-end architectural system (Star Architecture-UX on Hewlett-Packard computers) through a file converter. There possible or necessary revisions can be made, and especially complex models which would be beyond the capabilities of a Mac-II can be constructed by adding together single files from the user's machine. From the architectural system, the combined object data, alongside with the user's specifications, are passed to an animation system (Wavefront or TDI on Silicon Graphics). There, the models are rendered as high-quality stills or animation sequences and laid down on the digital recorder (Abekas A60). Surfaces such as glass, chrome or textured materials can be simulated naturalistically. In order to make the best use of animation sequences which are provided by the computer in Component format, the whole video suite from recording to mixing and editing is laid out in analog Component video (M-II). Thus, according to the desires of the user, even multi-layer combinations of prerecorded material of the existing environment and simulations of the planned objects can be produced. Finally the end result of this interactive production scenario is made available to the user via the optical fibre network.

Conclusion

No personal computer has, up to now, been able to achieve the above described services economically. Although CAAD systems with simple surfaces and rendering are becoming increasingly

affordable, methods for the design of very natural surfaces as well as video technology in combination with real recordings are still very costly. This is true with respect to the procurement of equipment as well as the demand on staff and training costs. We have experienced that today's animation systems are to complex for easy use in an architects office. The different understanding of groups and the absence of layers in the animation programs makes it necessary reorganize the users data by an architect of the center before passing the model to an animation system. Given such complex capabilities will not be constantly required while an architect or designer is working on the matter, the idea to offer centralized services makes sense. Because live pictures contain a very high information density, only a wide band communication network is possible in the interest of an effective integration in the designing process in light of speed considerations.