VIDEO-COMPUTER SIMULATION AND ARCHITECTURAL CREATION

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Abstract: Videosimulation is one of the most exciting and rapidly developing branches of computer science, multimedia, cinema. In the architectural designing process videosimulation means an anticipated performance, imitation, visual representation or visualization of the artifacts of the creative concepts or intents. In application videosimulation gains a new and more significant role – it becomes a tool, an auxiliary method of modeling or anticipating more complicated systems of the spatial manifestations of the material environment and of the continuity of their the space-time effects. Videosimulation creates specific conditions for the verification, appreciation and creation of the aesthetic and functional quality of material and spiritual substance. In architecture, spatial videosimulation is the most effective method of scientific research/recognition. In the Technical University of Moldova "Video-Computer Simulation" course has been elaborated and included into the curriculum of the specialty "2401, Architecture".

Key words: architecture, computer, graphics, layer, mask, channel, perspective, education.

The term videosimulation means a kind of hint, an anticipated performance, imitation, visual representation or visualization of the artifacts of the creative concepts or intents. In application videosimulation gains a new and more significant role – it becomes a tool, an auxiliary method of modeling or anticipating more complicated systems of the spatial manifestations of the material environment and of the continuity of their the space-time effects [3]. There are tree main reasons for using the videosimulation: increase in productivity; exploration of new type of imaginary; development of the computer as a more equal partner in creative process. Videosimulation creates specific conditions for the verification, appreciation and creation of the aesthetic and functional quality of material and spiritual substance. In architecture, spatial simulation is the most effective method of scientific research/recognition. Employment of videosimulation can have different purposes, depending in the end the set of technical means, methods of work and its final result. In

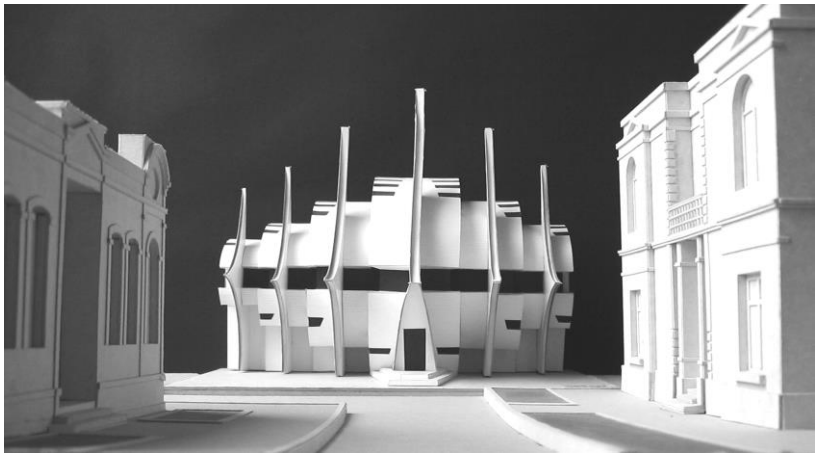
general we can speak about four main functions of videosimulation in architectural designing process [2]:

- illustrative function – employment of visual information for the demonstration of the design solution to the client;
- sociological function – employment of visual information for testing uses-getting data on social appreciation of the design before its realization;
- scientific and research function – employment of visual information by professional designers in the process of working out the design and by researchers solving general methodological tasks;
- educational function–employment of visual information for rising the efficiency of the process at various stages of architectural education.

During the architectural videosimulation implementation a photograph is taken of the supposed place of the object construction from the given points (at the same time a place of camera setting and optic axis direction as well as the direction of the sun rays are fixed). A three-dimensional geometrical model of the object is created. The model is visualized at the set cameras, background and directional light sources. The result of this is a raster image of the object. The photomontage of the object image and its environment is carried out by means of the raster graphics.

In general videosimulation as process has 2 inputs (visual information of a real situation and visual information of design proposal) and output ("image-simulacrum"). By Jean Baudrillard: "The simulacrum is never that which conceals the truth—it is the truth which conceals that there is none. The simulacrum is true." [1]

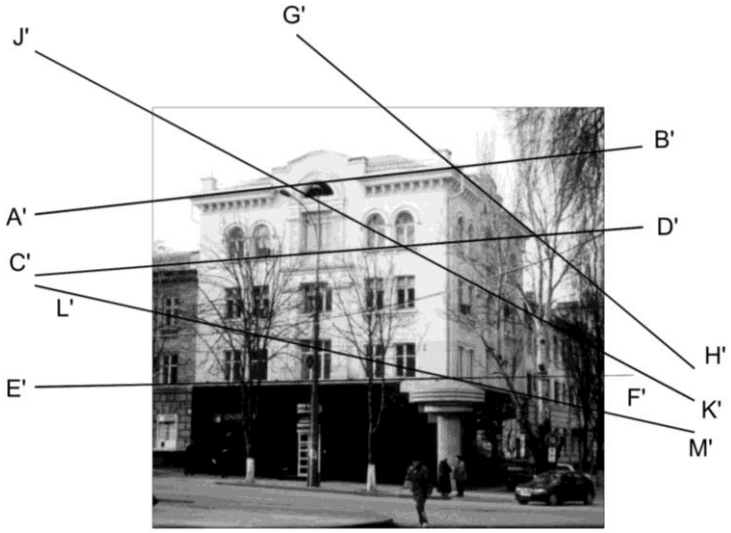
Let us illustate all this by a number of eamples for educational and experimentak work (fig.1, 2, 3).



(a)

(b)

Fig. 1. Videosimulation on the basis of the traditional architectural models
(a) Video-frame of the composition made of white cardboard;
(b) The model of the composition in video frame of a real situation (Kishinev, 31 August Street)
(author – stud. ARH034 IonTukuser)



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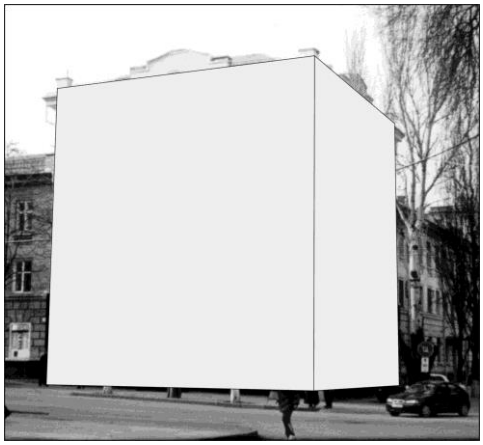

(b)

(c)

Fig. 2. Geometrical elements of the perspective on the plane:
(a) Video frame of real situation (Kishinev, Bonulescu-Bodoni Street), geometrical elements of the perspective; (b) The **xy***- and* **xz***-coordinate planes in 3-D coordinate space; (c) Design solution of the building "Unibanc"*

(a)

Fig. 3. Videosimulation on the basis of the3D- models:
(a) The 3D-model of the Business Center; (b) The 3D-model in video frame of a real situation (Kishinev, Dacia Bd.) (author – stud. ARH-003 Evgeni Penkov)

In the Technical University of Moldova "Video-Computer Simulation" course has been elaborated and included into the curriculum of the specialty "2401, Architecture" (10^{th} semester). This course appeared in many respects due to the one of the leading specialists of Europe in the field of the computer modeling, the head of the Laboratory of videosystems of Moscow Architectural Institute (State Academy), Prof. M. Matalasov, who conducted a seminar at "Urbanism and Architecture" department of the Technical University of Moldova in October 2004 [4] and handed over a wide collection of the scientific, methodological and illustrative materials.

Further you can see the lecture contents of the above-mentioned course (32 hours). Introduction. Videosimulation on the basis of the traditional architectural models. Gulliver's effect. Endoscopes. Videosimulation on the basis of the raster computer graphics. Layers of the raster document. Color systems. Algorithms of the color mixture. Channels. Bezier's contour. Masks. Videosimulation on the basis of the vector computer graphics. Photograph as a perspective image on the plane. Geometrical elements of the perspective on the plane, methods of their determination. Abstract 3-D space.

Seminars (32 hours) include practical exercises to fasten the material of the lectures. A course work is envisaged, which objective is to insert a real image of the three-dimensional model of a given architectural object into the image of the existing environment. The work is evaluated according to the following criteria: coincidence of the central points of the model image and the environment; coincidence of the resolutions and tones of the object image and the environment; coincidence of the lighting parameters of the object and the environment; the presence of the environment images overlappings over the object images.

The course is finished with the exam on the theoretical part of the course.

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