Design by Emma Smith.
Textual content by Emma Smith and Kalev Leetaru.

Architectural Design in Immersive Virtual Reality

Architects have always needed somewhere to draw. History has seen dirt, stone, wood, and paper each serve in turn as the architect's medium.   Every technological advance has helped to manifest these exploratory visions in ever-increasing fidelity, while influencing the way in which the design process is conducted.   Computer technology is the latest step in this progression, adding a third dimension to the architect's drawings. Programs like form•Z™ and 3ds max™ allow the architect to build lifelike models and take clients on fly-throughs. Now, virtual reality has advanced architectural drawing to "full body design", letting architects experience their creations, rather than just seeing those creations in front of them. ShadowLight-Mirage offers a unique environment in virtual reality in which to create rich ambiances of vibrancy, vitality and vigor.

Full Body Design • ShadowLight-Mirage is based in full-scale design, where everything is drawn "life size". Architects are forced to use their bodies for scale, to stretch out their arms, move from side to side, duck under planes, look over them, back away, or move in. They are forced to become physically involved with their creations, rather than quietly gaze upon them from afar. This active use of body sits at odds with the traditionally passive process of design, suggesting the concept of "full body design". The active nature of this new design process is also reflected in the immediacy of changes. Rather than wade through a complex series of menu options or wait for glue to dry, architects can simply reach out and manipulate the world with their hands. No longer are architects forced to peer into tiny models and imagine what it is like to be inside. Now they can *experience* the height of a ceiling, the narrowness of a doorway, or the sequence of a room. All that architects have tried to express with endless models, plans, and ornate boards, can now be demonstrated by actually immersing the client in the design.

Spatial Sequence • A critical benefit of being able to evaluate a design at full-scale is that its spatial sequence may be examined. An architectural design is simultaneously the union of its pieces and the position and orientation of those pieces relative to each other. The continuity of this sequence is just as critical to a visually pleasing design as the appearance of the individual pieces. At the miniature scale of a model, it becomes nearly impossible to adequately scrutinize sequence, and the architect must use a liberal dose of imagination to picture the full-scale sequence. ShadowLight-Mirage takes the guesswork out of this process and allows the spatial environment of a design to be explored in six degrees of freedom in its original scale. The architect can move from inside to outside, above to below, walk through walls, stand on the roof, or fly to any location for a bird's-eye-view. Movement and circulation can be evaluated from any location, and changes can be assessed in their global context.

Vibrancy and Vitality • All too often in architectural design, color and texture are relegated to the status of an afterthought. Models are often created in monotone materials with differences in shade distinguishing individual components. However, like spatial sequence, color exerts a powerful influence on how a design affects the senses. When materials are selected as a second stage, after the design has been finalized, they become merely decoration, instead of an intimate part of the design's soul. Materials must then conform to what already exists, rather than shaping their host. In ShadowLight-Mirage, color and texture are inescapable. They become a part of the design process from the beginning, serving as insightful inspiration, keeping the union of color and form at the forefront of the architect's mind.

The Virtual Future • ShadowLight-Mirage allows architects total freedom to focus on design by temporarily removing the real-world restrictions of gravity and structure. Instead of being limited by these concerns at the conceptual stage, the architect is free to express the creation in its entirety. Once the design has been fully manifested, the architect can go back and constrain the design in a global context. By addressing gravity and structure in a second stage, the designer sees the big picture, and can potentially make a different set of design choices than if the concept had been materialized in a contemporary bottom-up fashion. ShadowLight-Mirage is now in its second generation and is constantly evolving to forge the future of architectural design in virtual reality.
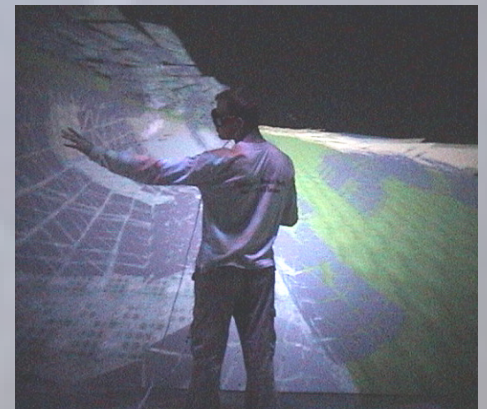
For more information on ShadowLight-Mirage, please see <http://shadowlight.ncsa.uiuc.edu/>, and for more information on architectural design in virtual reality, please see <http://vrarchitecture.ncsa.uiuc.edu/> .