ShadowLight is a virtual reality application that provides a spatially immersive environment for rapid prototyping and design. Rather than restricting users to the fixed toolkit of artistic or construction-centric manipulators of traditional systems, it provides a novel degree of flexibility by supporting a plugin architecture that allows the designer to utilize high-level components as the design media.

The user interface in ShadowLight has been constantly refined based on informal user studies. After a year of continual use of ShadowLight 1, the results of informal user observations were applied to design a new interface. The second interface was designed from the ground-up for VR, and used new context-aware popup menus to access common commands. The mode-based interface was replaced by context-aware wand actions, and the floating control palette was replaced with a floating materials palette that could be summoned and dismissed on demand. User studies showed that the interface of ShadowLight 2 was quite intuitive for our user demographics, and we had few major suggestions for changes. Hence, the interface to ShadowLight 3 was based on ShadowLight 2. However, the menus are pluggable and now dynamic and can be modified by plugins to add/remove/edit elements as necessary.

VR operating systems treat the output of applications as standalone regions in space. ShadowLight is based on independent objects, allowing the output of multiple plugins to be combined and used together in a single world. ShadowLight provides a loosely defined environment capable of sustaining interactive schematic design using a variety of virtual media types. Design in ShadowLight is based around the notion of a "world," defined as a set of independent objects, as opposed to a single, monolithic design environment.

Design evaluation at full-scale is usually impossible due to technical and financial limits. Traditional computer modeling software systems present a three-dimensional medium, but partially negate the three-dimensionality of that medium by constraining the user with a two-dimensional interface both during creation and in experiencing the resulting world. To interact with this world, a six-degree of freedom "wand" is used which allows the user to travel to any location in the world through any path, to freely explore the space from locations not possible in real life.

Current VR modeling systems are very specialized and only support certain design tasks.

- **Ribbon tool used to annotate a fluid simulation**
- **Mode, Paste, Select Only, Redo**
- **ShadowLight's central plugin area**
- **THE SHADOWLIGHT EXPERIENCE**
- **ShadowLight's mode-based palette**
- **ShadowLight's popup menus and materials palette**
- **Schematic sketch of a pool house at full scale**
- **Current plugin architectures for VR systems do not facilitate mixed-media creations, they are still subject to the limitations of their host applications, so that plug-ins, which are applications that can be loaded by the main application, are not properly integrated within the main application.**
- **Current VR libraries are designed to write single applications that stand alone. ShadowLight allows independently-written applications to be combined and used together in a single world.**
- **VR operating systems act as an interface layer to string together legacy applications. ShadowLight treats plugins as full-fledged core components. Plugins can be written to be aware of each other and call functions within each other and ShadowLight provides object-level services such as polygon management and manipulation.**

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