

Virtual Venues:

Using VR to facilitate more accurate and innovative lighting design and stage control.

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PROBLEM AND SOLUTION OVERVIEW

Across various musical genres, many artists utilize laser light shows synchronized to their songs to enhance the audience's experience at major concerts. Musicians can compose and rehearse songs relatively easily, but the same cannot be said for the corresponding light show. Finding a venue, bringing and setting up the proper equipment, and tweaking all aspects of the lighting display can be extremely tedious. Rearranging lighting is also often necessary, which is a hassle and must be done within the time constraints set by the venue. Lighting design would be much simpler if it were possible to test and create lighting shows on a personal device wherever and whenever one wanted.

Artists could implement Virtual Venues using virtual reality headsets to design and test light shows in advance of their performance. Rendering a 3D version of the venue in which they would be performing, the artist can begin the design process. Using the interface to navigate the venue, the artist can place their chosen style of lights in locations within the virtual venue. After synchronization and light layout are complete, the artist can test the display. To test the display, the artist can play his/her songs along with the light show, assuming different positions within the venue to observe the show as the audience would. Designing light shows using virtual reality could greatly reduce the time and error involved with set-up and testing at the physical venues.

UI SKETCHES

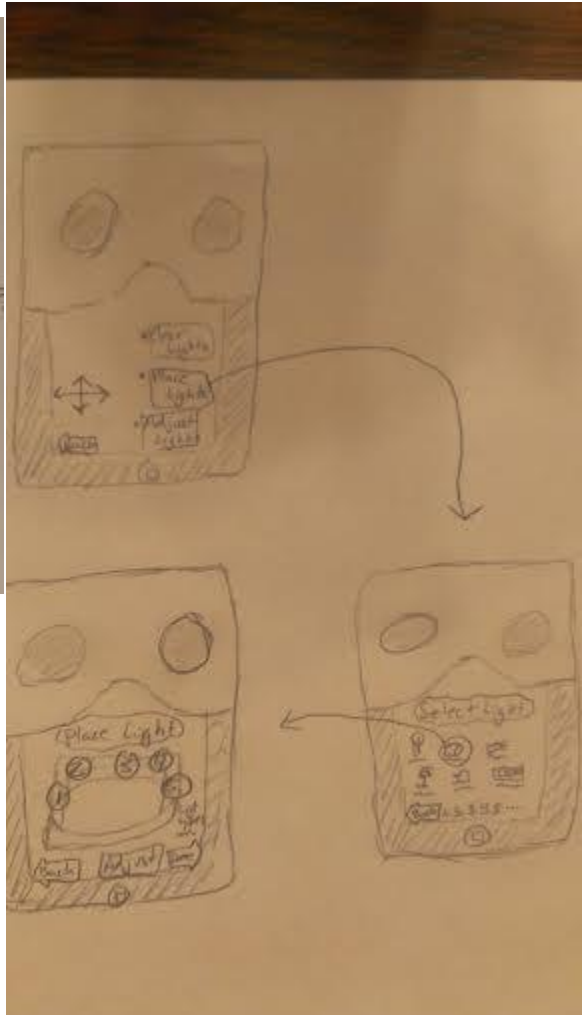


Figure 1. (top) Ipad VR display, project creation menus.
Figure 2. (right) Ipad VR light placement.

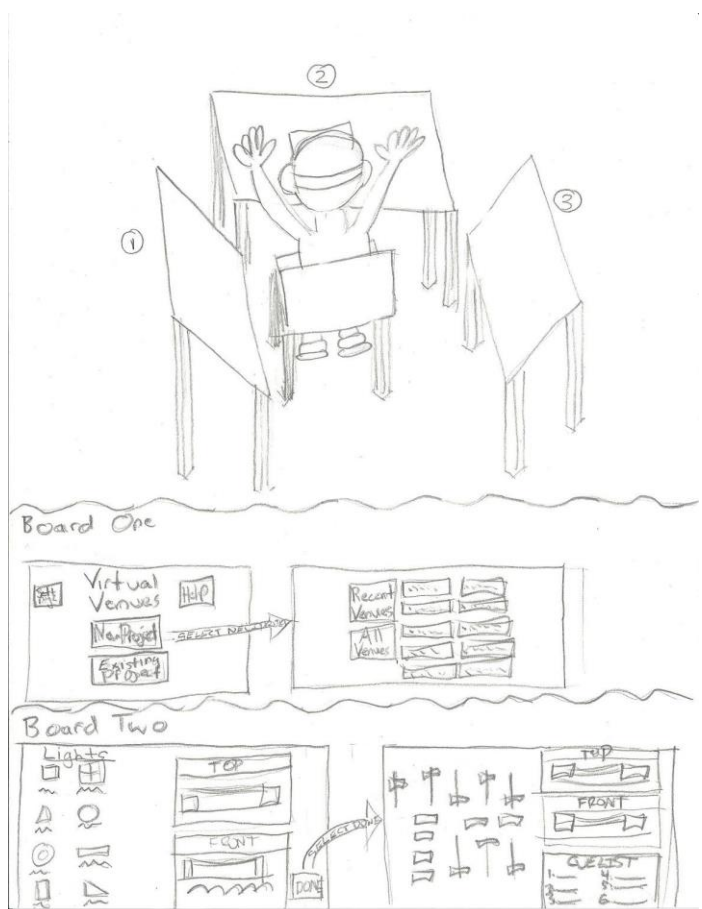


Figure 3. (left) Oculus Rift setup and design menus.
Figure 4. (bottom) Oculus Rift light show test display.



Selected Interface Design

We decided to carry our Oculus Rift interface forward rather than the iPad viewer interface. We elected to do this because we expect the head-mounted display (HMD) to be more convenient for the user than the iPad. One advantage of the HMD over the iPad is that the tablet has to be held up to one's face, while the Rift is hands-free. With the iPad, the user would have to switch back and forth between adjusting lighting and viewing the virtual venue. With the Oculus Rift, on the other hand, the user can wear the headset and view all 360° in the virtual world while simultaneously having the ability to look down and see multiple touch screen interfaces related to lighting and music settings. This makes for a more convenient interface and a more immersive experience, especially since the lighting designer can use the application for longer periods of time without tiring. Additionally, the Rift allows us to include more functions because the platform is so flexible and provides for larger interfaces. Lastly, the Rift has much greater processing capability than an iPad, which is important given that we will be rendering complex and dynamic lighting in our virtual worlds.

<u>Feature</u>	<u>Description</u>
Venue Selection	Allows users to select between existing venues as well as creating their own customizable venues.
Lighting Placement	Enables the ability to drag and drop the desired light type into various lighting positions around venue.
Lighting Adjustment	Selecting various lights the user can adjust the light and light cues to create the light show.
Venue Navigation	The designer is able to "teleport" or jump to various locations within the venue to get all perspective of the light show.
Music Synchronization	Music can be played while designing the light show to provide synchronization between the two.
Show Visualization	At any point throughout the design process the user can test run the light show to observe it as an audience member would.

UI Storyboards

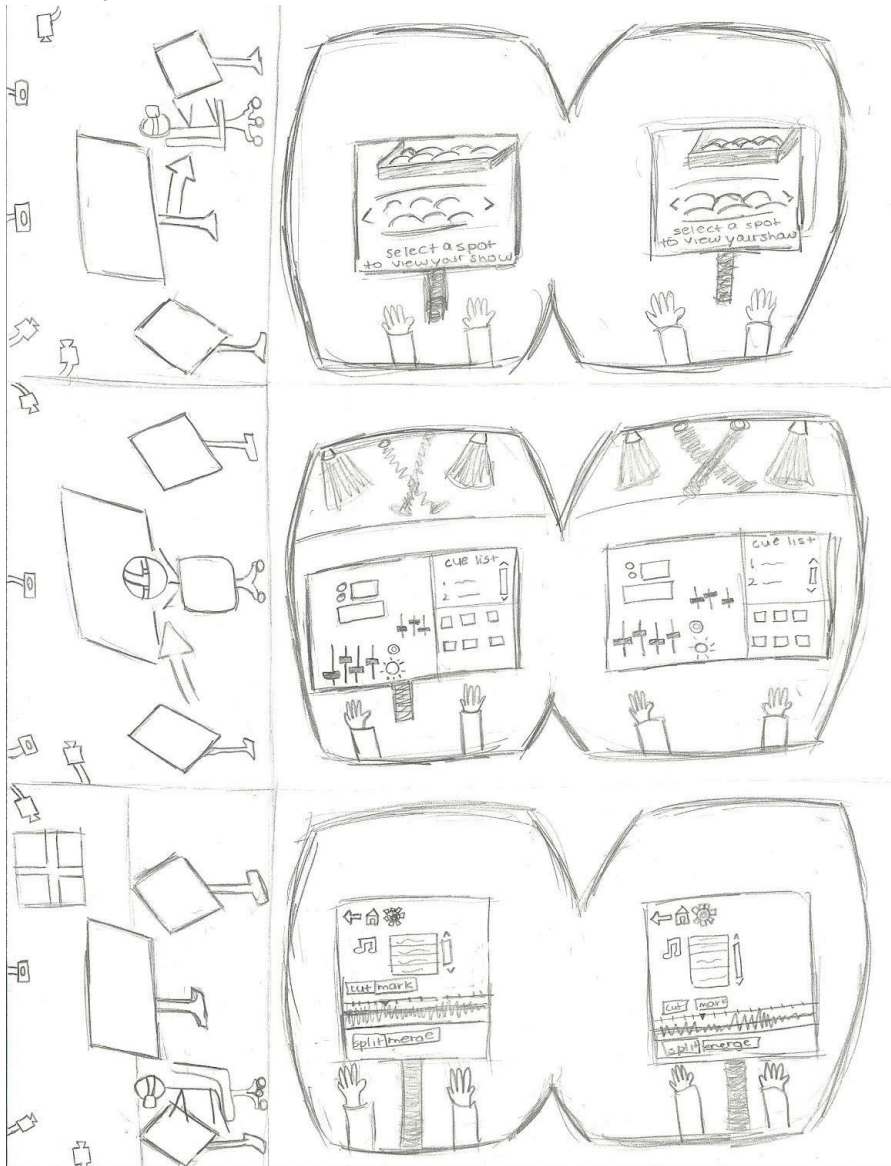
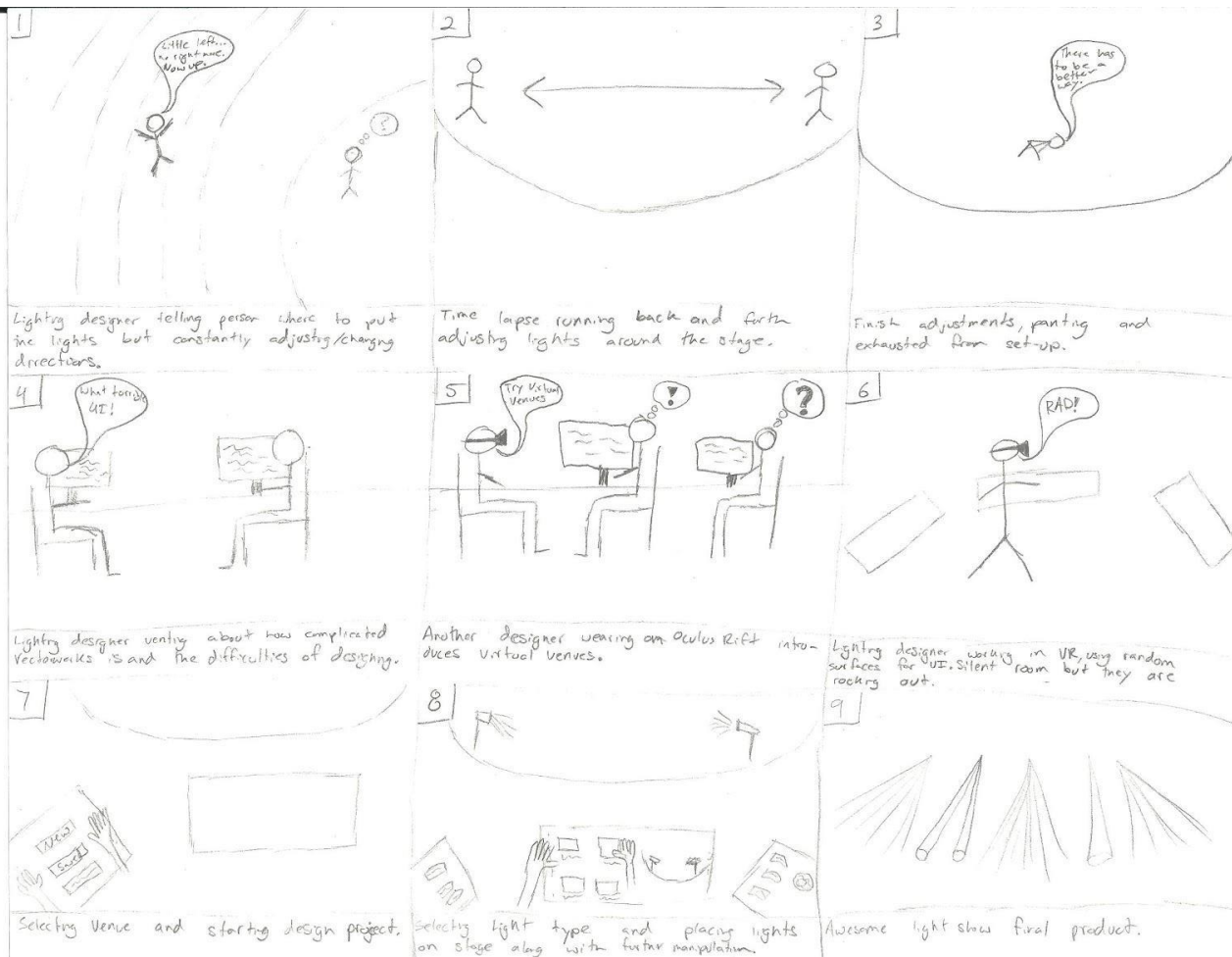


Figure 5. Project creation, show design, and show testing using Oculus Rift (top to bottom).

Video Planning Storyboards



Concept Video Description

Our concept video displayed the struggle of designing and testing a light show on a laptop, and also how using Virtual Venues is easier and more fun. A few scenes were difficult to film. For one, it was difficult to figure out how to realistically pretend to toy with the lights in person. Second, it was time-consuming to create a suitable U-shaped surface with the limited surfaces and objects in the Virtual Human Interaction Lab. Lastly, Tyler struggled to act exactly as if he were interacting with the Virtual Venues interface. However, we feel that all of the scenes ended up working out pretty well. We think we did a good job contrasting certain scenes. For example, contrasting the scene of running around the stage with the scene where Tyler visualizes the show with the Oculus Rift shows how much easier Virtual Venues is. Additionally, the contrast between watching Tyler use Virtual Venues as an observer and seeing the first person experience is humorous. But more importantly, it highlights how quick it is to go from real life to an awesome concert. Once he is visualizing the show with Virtual Venues, it is clear that Tyler is

really enjoying the show. Overall, it took us about 1 hour to design the video, 3 hours to shoot the video, and 3 hours to edit it. The video can be viewed at <http://youtu.be/QPcQTmC3B0w>.