Alternative Design #2

Integrated Virtual Reality and Head Movement Tracking System

TEAM #7

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Alternative Design 2

The second design is targeted at the portability aspect of our system. This will be accomplished by the use of the Wrap 1200VR virtual reality glasses from Vuzix as seen in Figure 2. Usually used for watching movies on long plane rides, or for the use in video games, the glasses are ideal for our application. These glasses are 3-D capable, have a screen resolution of 1280 x 720 pixels, and also have a head tracking feature that allows for three degrees of freedom. The glasses also provide the user with a 35-degree diagonal field of view, which will allow the test to incorporate eye movements of larger degrees. They are designed so that they fit over most prescription glasses, and are adjustable for variable eye separation distances. This will allow a wide variety of people to use the device. A storage device will be attached to the glasses, on which the visual test will be stored and run from. The head is able to move in six degrees of freedom, so the limitation of only being able to track three degrees of freedom is a disadvantage to this design when compared to the first design. The major advantage however, is the portability that these glasses give the system.

Figure 2. Vuzix Wrap 1200VR
To deal with the visual disruptions that can occur while wearing glasses, the Wrap Lightshield will be used. This shield, as seen in Figure 3, attaches to the glasses and helps block external light around the forehead, and cheekbone areas. Since the subject will most likely be dazed after a suspected traumatic brain injury, the blocking of external light will allow them to be more immersed in the virtual reality. This in turn will make the test run smoother and provide results faster.

![Figure 3. Vuzix Wrap Lightshield](image)

The auditory test will consist of at least 20 small circular speakers. The speakers will be arranged in a way that allows the auditory test to mimic the visual test. This means that they will be set up so that the subject can follow the auditory stimuli 20 degrees in any direction with their eyes. The distance the subject sits from the speaker set up will affect the amount of degrees they can follow the stimuli with their eyes. To solve this, a specific distance will be established for all subjects. Since all different eye movements will be tested, there will need to be speakers relatively close to one another to allow for cascading sound from one speaker to the next. Using this arrangement will hopefully allow the auditory test to mimic the visual test as closely as
possible.