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## Introduction



HTC Vive

Oculus Rift CV1

The re-introduction of consumer-ready virtual reality (VR) head-mounted displays (HMDs) in early 2016 allowed potential in several research applications to be realized as more capable and affordable CPUs and GPUs also became available for PCs. Specifically, fields like education and data visualization are being explored fervently by entities like NASA and Boeing, for example, to influence more effective training methods. This application is designed to view and draw in 3D around meteorological datasets with another user to discuss notable structures of thunderstorms and other atmospheric phenomena in an intuitive and immersive manner.

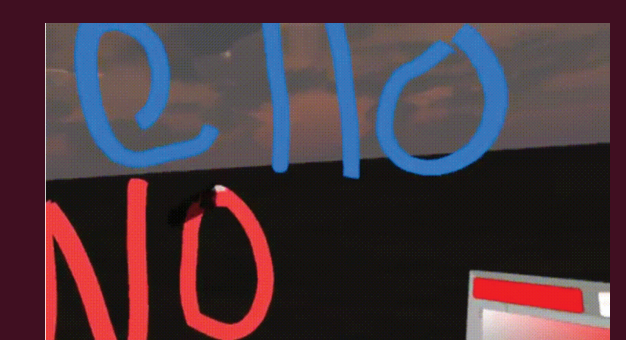
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## Acknowledgements

Sources/Thanks to:

Developer Advice



Andrew Nakas,  
 OpenBrushVR  
<https://github.com/andrewnakas/OpenBrushVR>



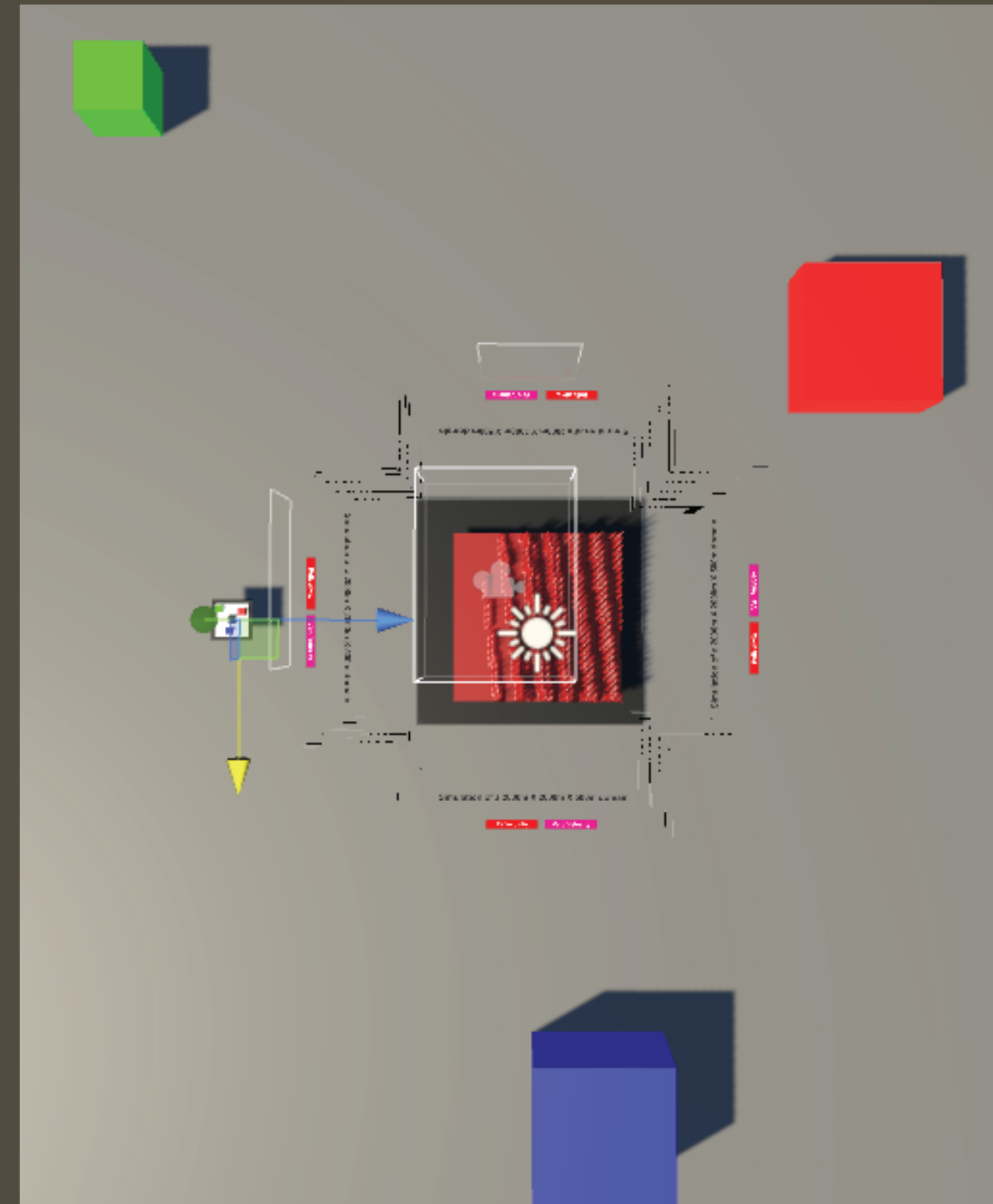
Jasper Flick,  
 Catlike Coding



## The Virtual Environment

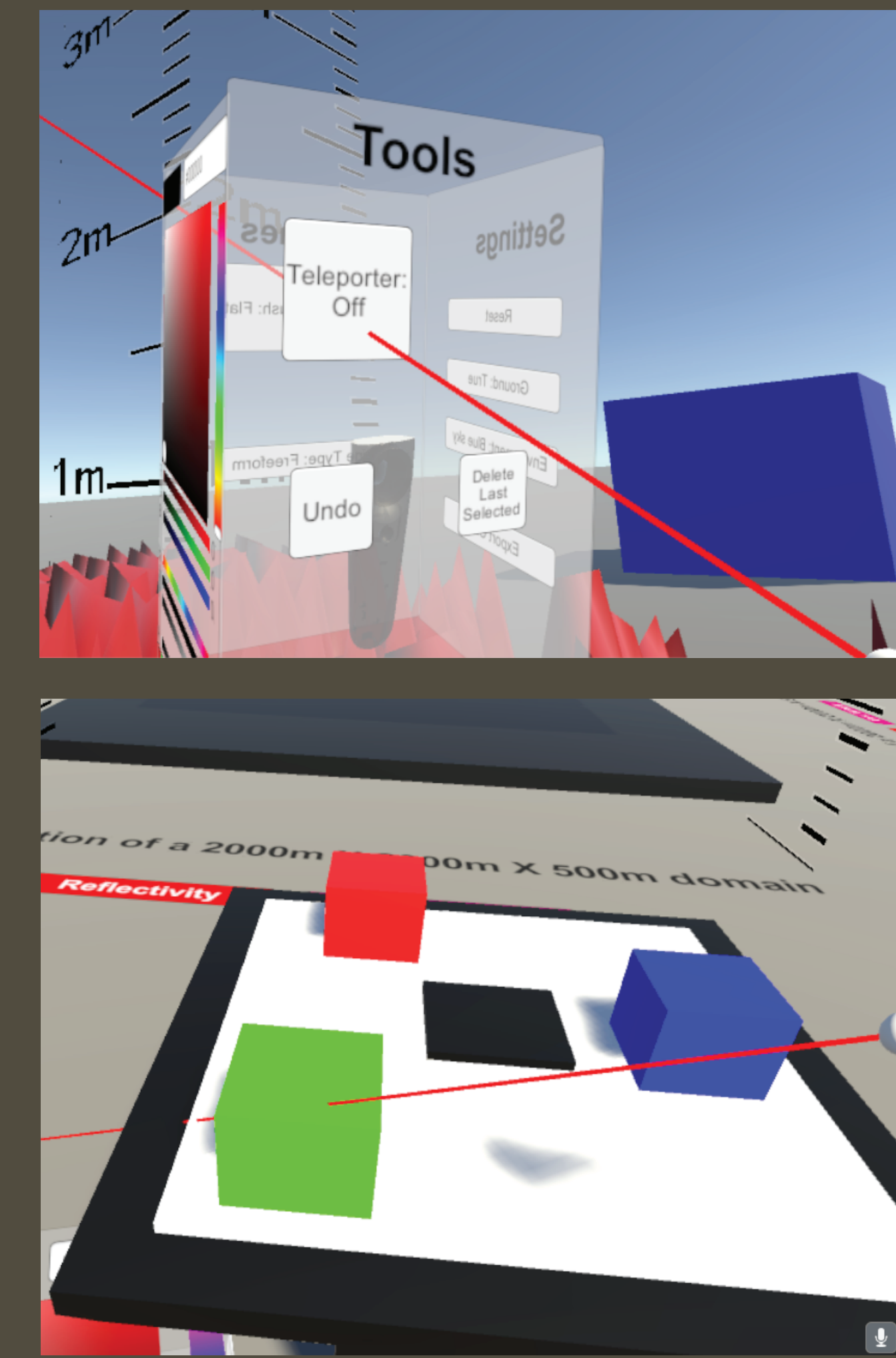
### Layout

This environment has a virtual floor space of 200x200 meters, with teleportation blocks that can be rearranged to specific areas like the entrance of a jet streak or frontal boundary. Data switching buttons are placed on the floor at each side.

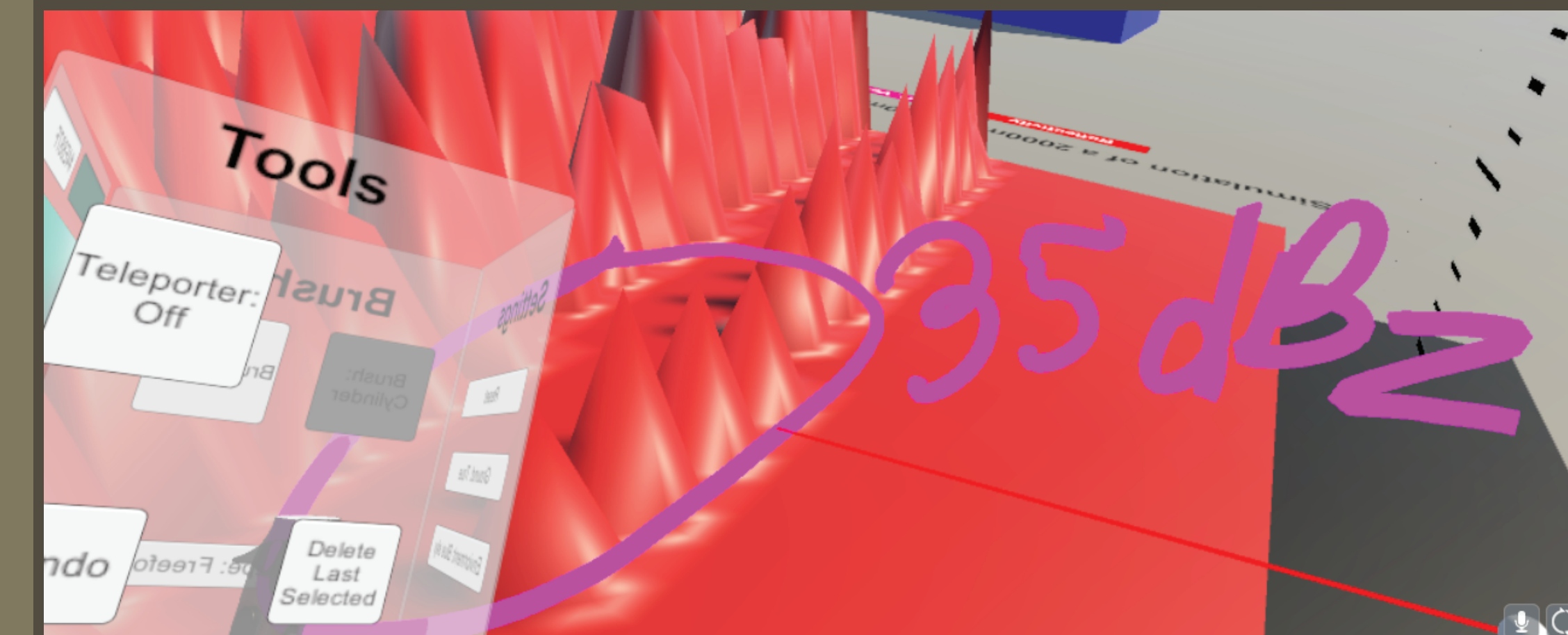


### Navigation

Moving around the virtual floor space and into the data mesh can be done by either pointing at the blocks on the world-in-miniature (WIM) board, or using the “laser” pointer on the controller to select exactly where you want to go.



### Collaboration

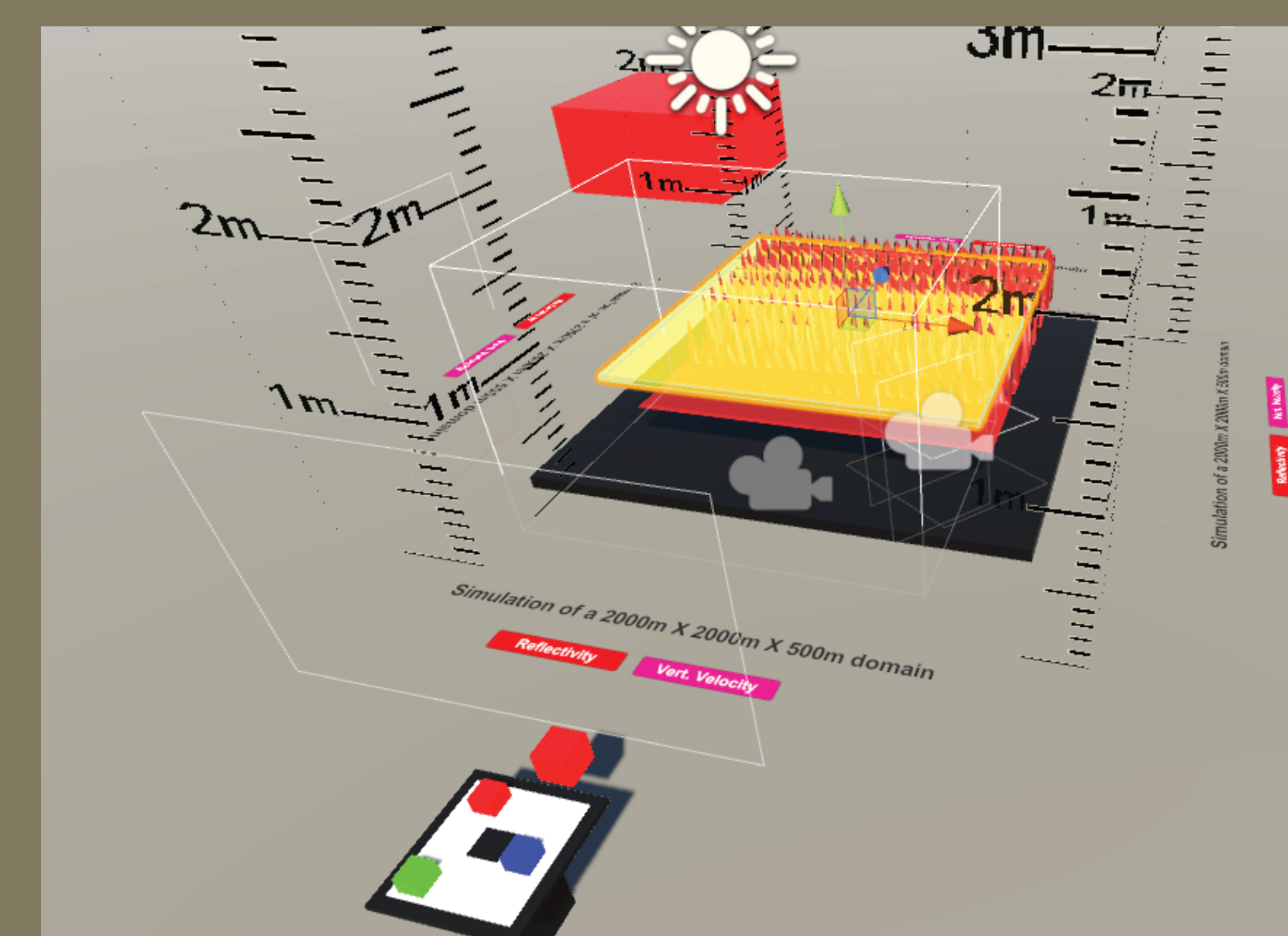


Users will be able to see each other’s head-set, controllers with pointers, annotations as well as speak with each other. Each user will be able to see each other’s position on the WIM board and move other users around to their own annotations or important values, analogous to gathering around a painting.

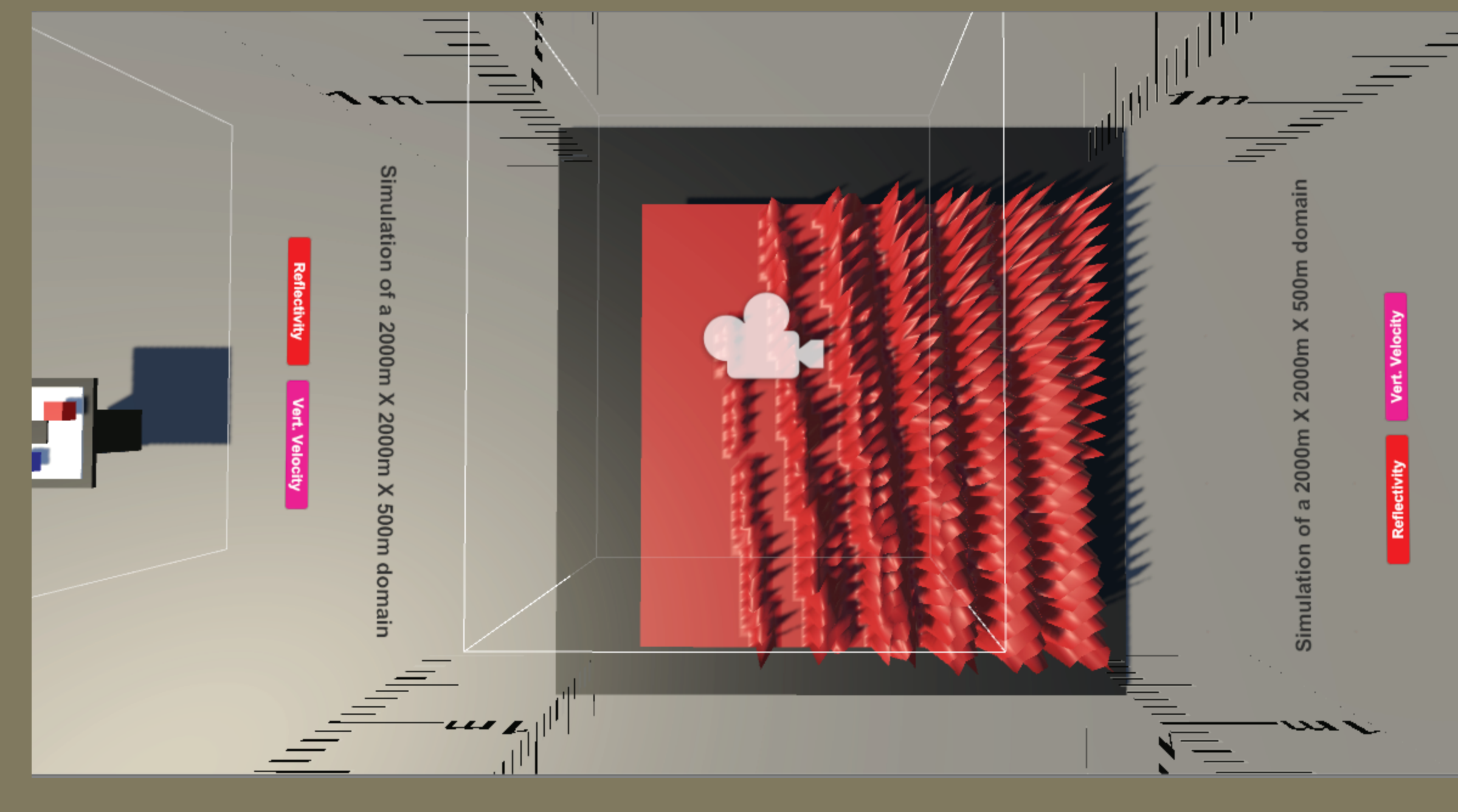
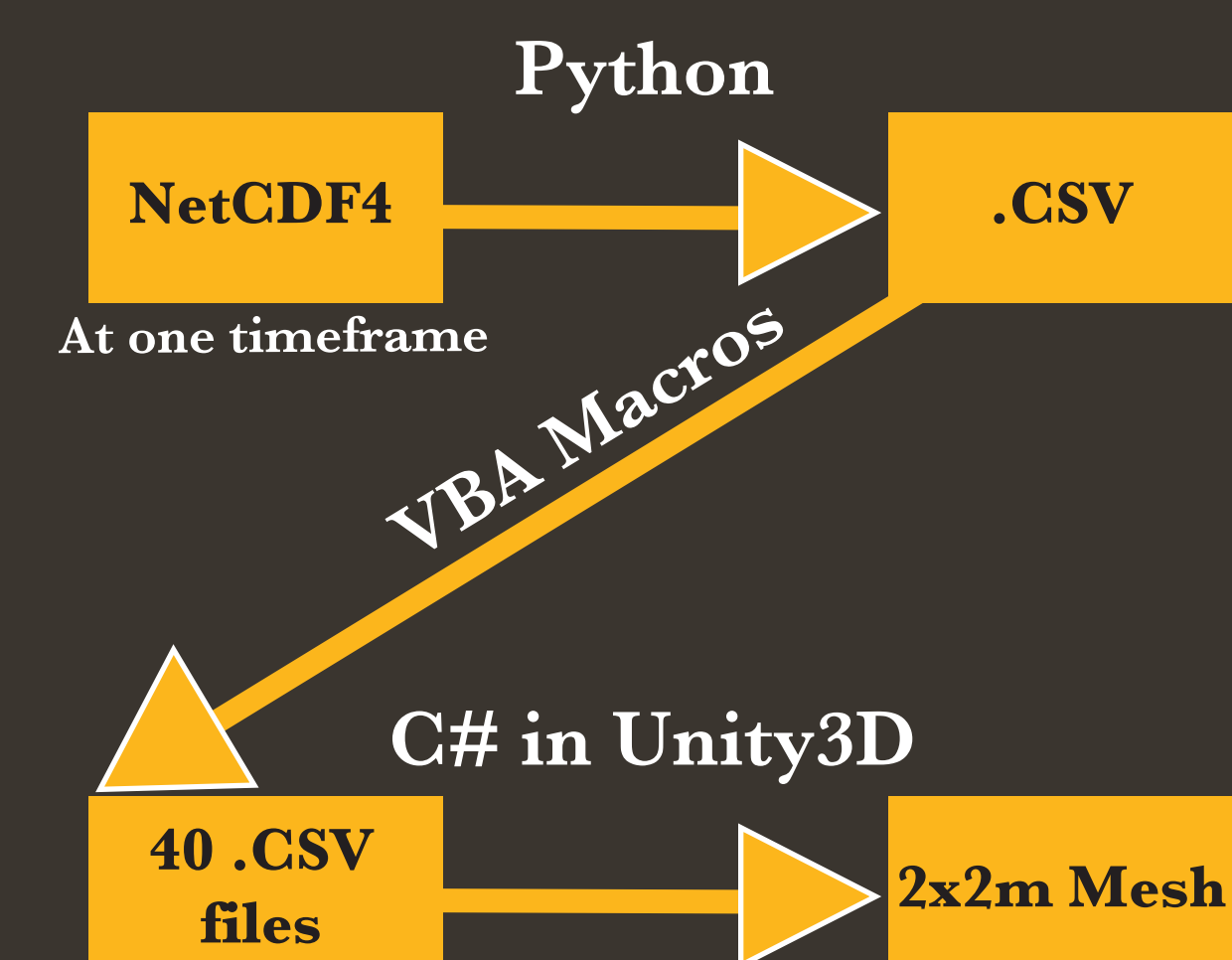
## Data Presentation

The mesh form of the dataset is built off of a 60 by 60 by 40 point grid system, with levels displayed individually and limited in both height and negative values by code. The “peaks” and “valleys” in the mesh are a result of interpolation yet to be completed, but represent simulated values.

The dataset can be occluded to where only certain values appear, and other levels can be selected manually.



### Dataset Processing



## Future Work



The ongoing nature of this research lends itself to plenty of future applications and troubleshooting of original goals. Here are a few of them:

- Radar dataset compatibility
- Animation
- Isosurface building/coloring
- Enabling/testing multiplayer navigation
- User Interface evaluation
- Mesh point processing refinements, ability to point at the mesh and get values
- Augmented/Mixed Reality Software