VR Wayfinding App

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Purpose

- Wayfinding is an important technique for military science in which users use a map, compass and protractor to read and analyze the location and strategize how to reach the next destination points.
- In non VR wayfinding apps, users can't measure the distance by themselves, and they can't see the real terrain when they walk.

Image Source: https://oegames.tradoc.army.mil/landnav/forest/index.html

Why We're Building This in VR

- Virtual Reality: Simulated experience through the use of head and/or body tracking to give users an immersive feeling of being in a virtual world.
- VR can provide a fully immersive and enriched experience of learning Land Navigation for students in the Military Science program in the School of Management
- 6 degrees of freedom (6DOF) in VR supports rotational movement as well as translational movement (ability to move forward/backward and up/down) thus allowing for a more intuitive experience when learning and practicing on wayfinding techniques
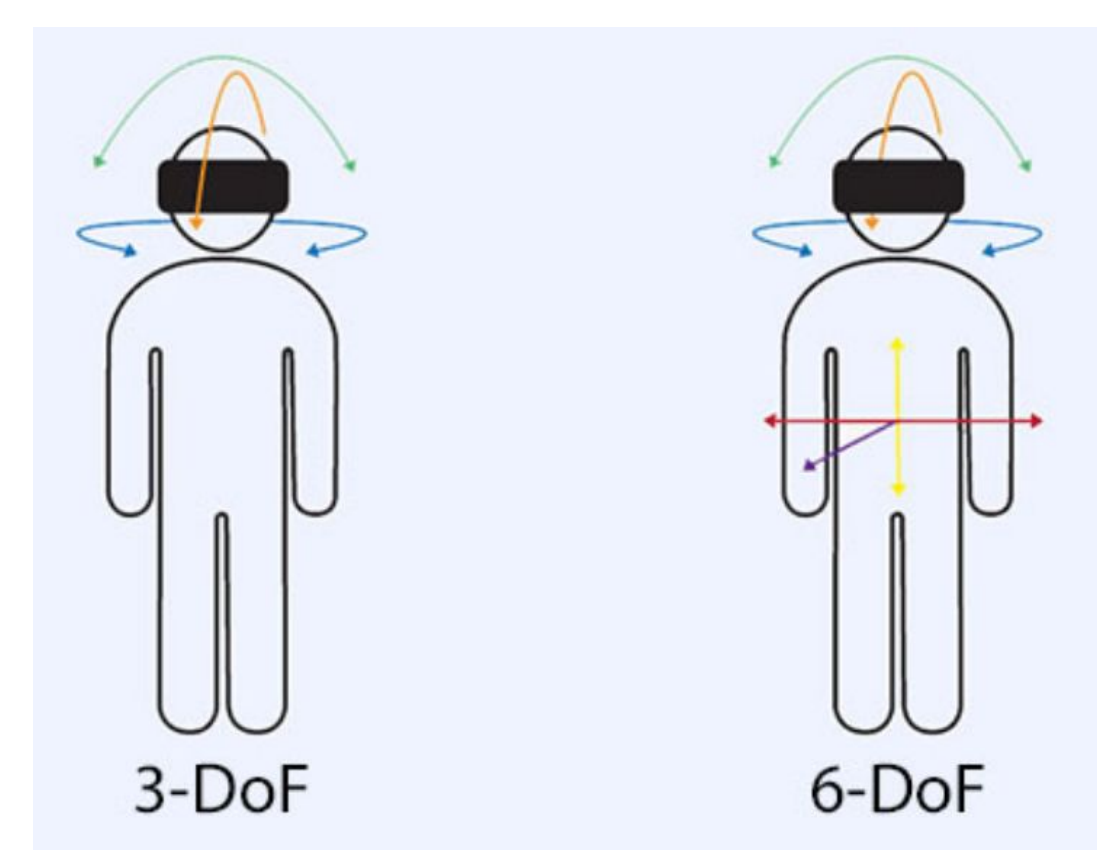

3-DoF   6-DoF

Image Source: https://virtualspeech.com/blog/degrees-of-freedom-vr

What We've Done

- The terrain is being developed separately from this team; the current build is using a temporary map without environmental objects; only ground textures and elevation differences.
- Map and protractor assets were crafted in Blender, a 3D Modeling software application, and using HD scans of the wayfinding map and military protractor as the "texture".
- Additional code was written to support the toggling of objects using the Meta Quest 2 controllers, trigger walking sound effects, increment a step counter UI, handle collision between two "handheld" objects, craft a UI system (start screen, and tutorial screen), and compass functionality based on a set North location acting similar to a magnetic compass.
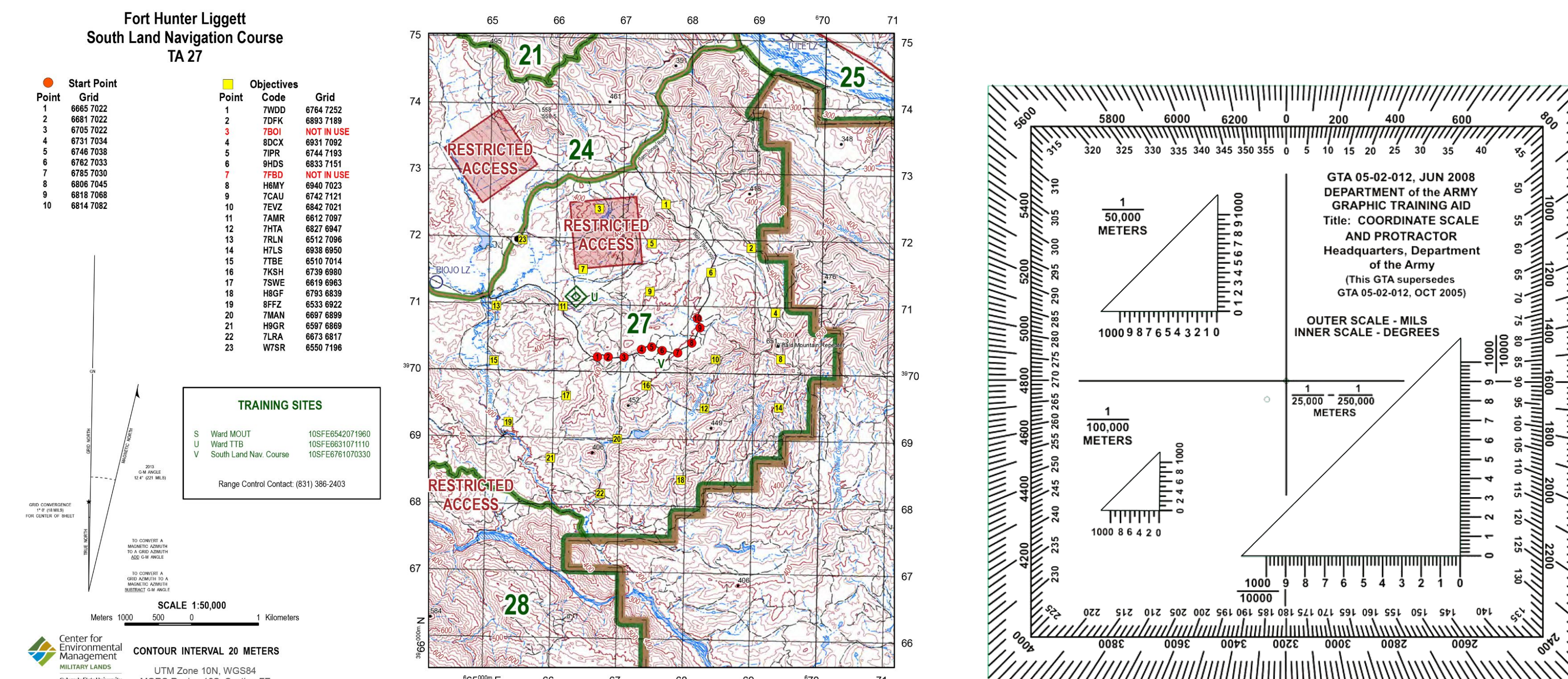
Technologies used
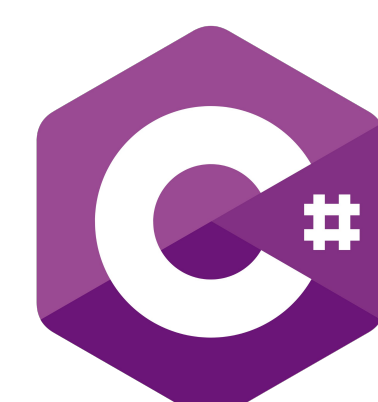

Meta Quest 2   C#   Unity (2020.3.8)   Blender

Challenges

- Unity is a big undertaking when coming into it with no previous knowledge of it or its VR capabilities.
- Meta Quest is a finicky device and requires a few different softwares to be working properly in order to be used in a development environment. Setup and working with them proved to be a small but frequent challenge.
- Deciding the easiest way to deal with all of these objects within VR without feeling too uncomfortable required a few revisions on functionality.
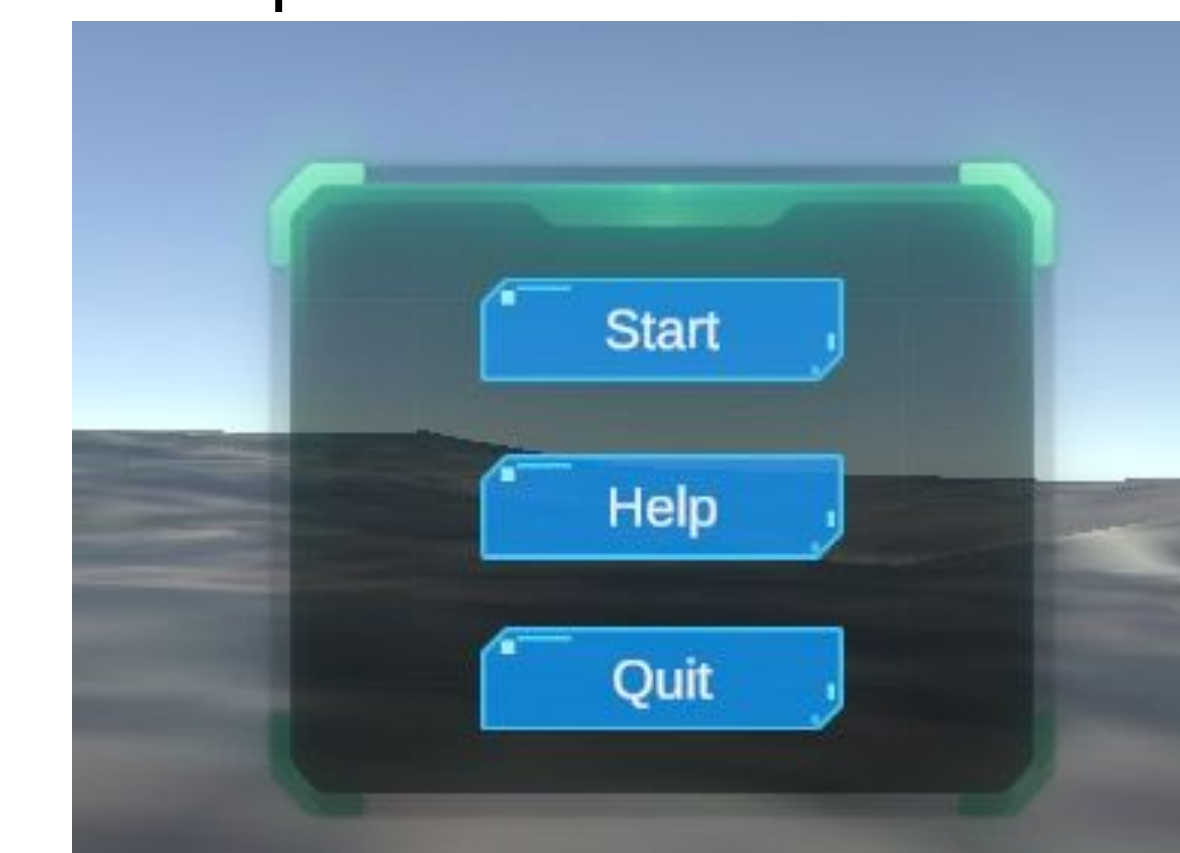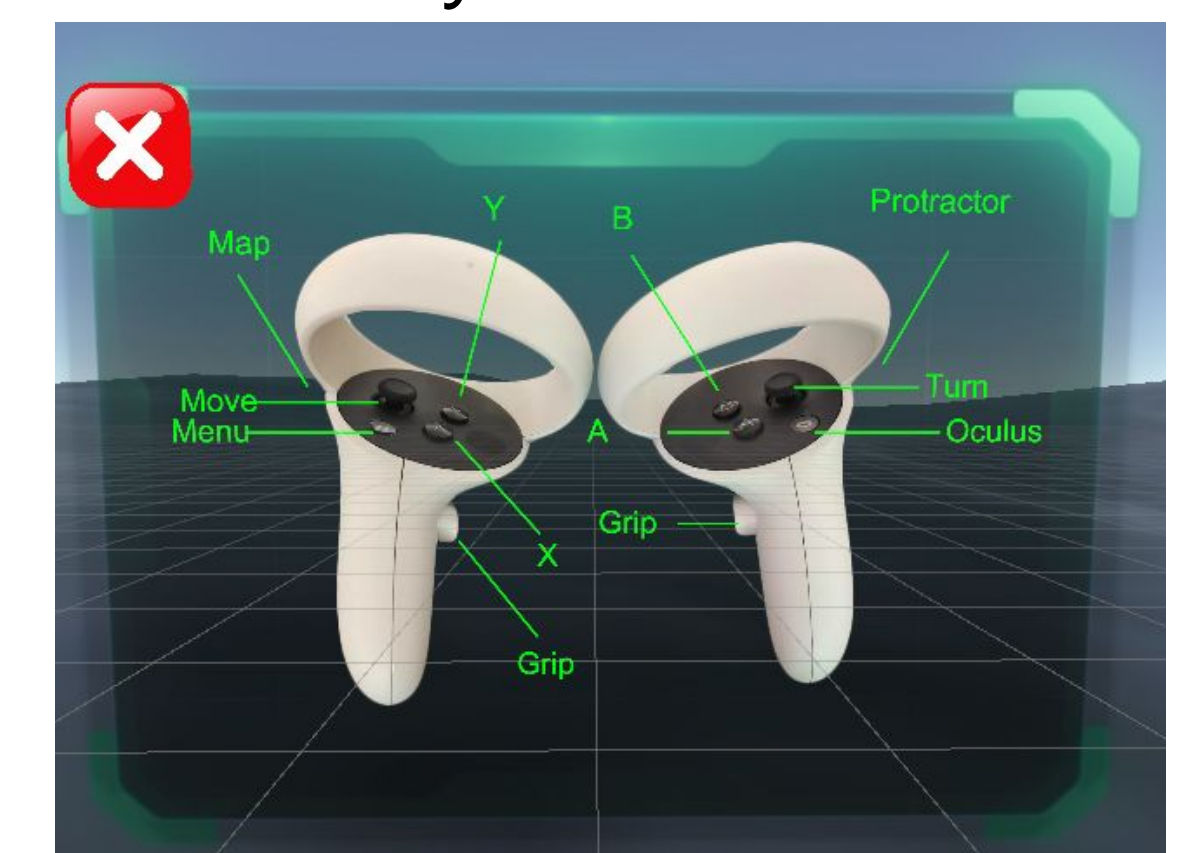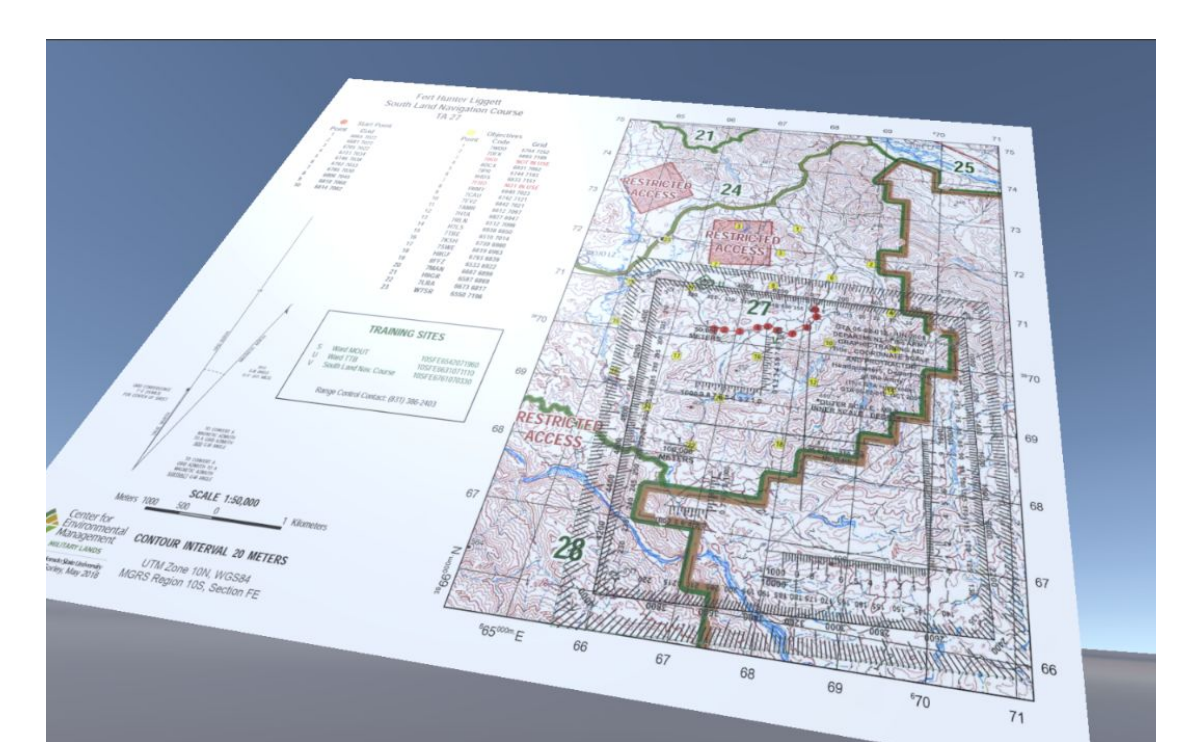

Home Screen   Controls Mapping
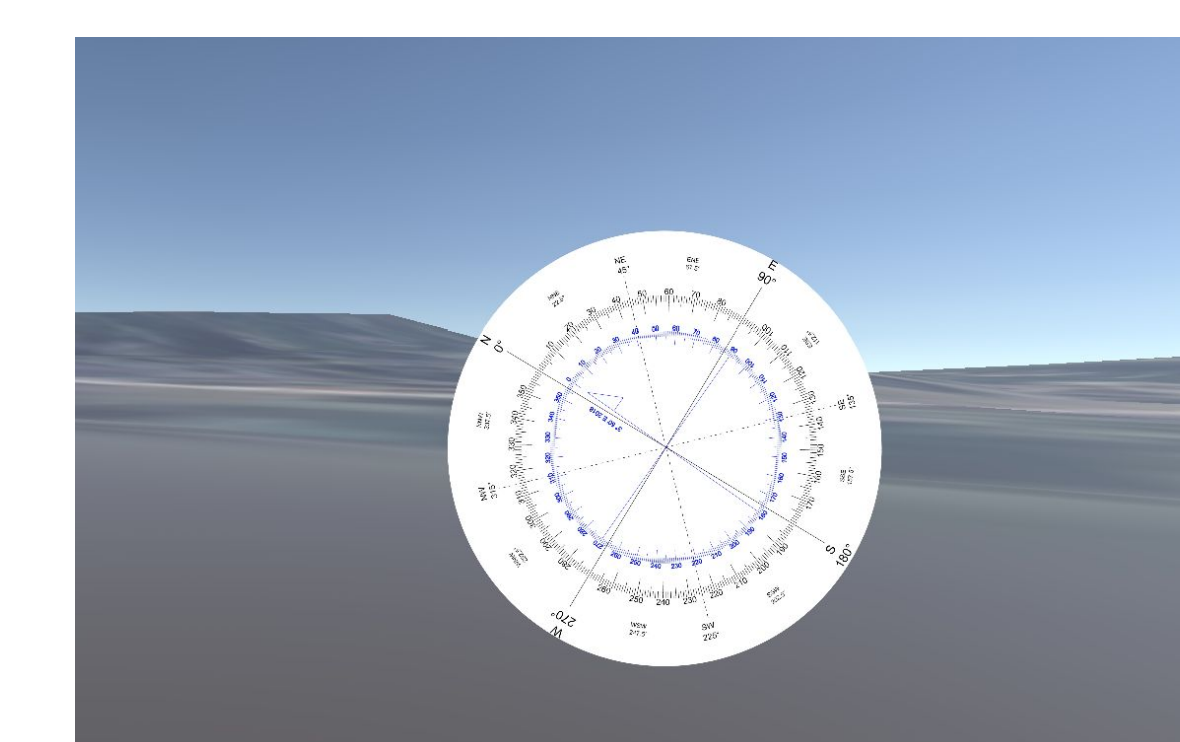
Compass UI   Map and Protractor

Image Source: Work in progress Screenshots from the VR Wayfinding app

Development Process at a High Level

- First month was a Unity bootcamp covering the basics of VR in unity
- Brainstormed object functionality and how they can be implemented in unity
- Weekly meetings held to discuss what progress has been made and what changes are needed for object functionality
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