Virtual Reality (VR) is a rapidly emerging platform for computing, but most people don’t know how it works, what it’s for, or what its potential applications are. We believe it is crucial to spread the word about VR so that, when it become ubiquitous, people understand it and do not fear it. To this end, we have set about creating a game that clearly demonstrates some of the foundational concepts of virtual reality and showcases a few of the key features at the core of the technology. The game involves two players, each with a smartphone, competing against each other in an asymmetric fashion. One player will be immersed in a VR experience by inserting their device into a Google Cardboard apparatus and attaching it to their head. The other player will not experience virtual reality, but rather will affect the VR player’s world. This “God Player” will see a bird’s-eye view of the game and can see the VR player’s movements and actions represented on the screen. The VR player’s experience will be affected directly by the God Player’s actions, and they will have to immediately adapt to these changes.

VR Space Defender is fundamentally an asymmetric application—that is, the experience of the God Player is much different than that of the VR Player. To keep both players in the same world, however, and to take advantage of the first-party networking APIs Unity offers, both players exist in the same scene in Unity, but have different cameras, view modes (2D vs. 3D), and interfaces. The VR Player has a split-camera view, provided by the Google Cardboard API, to produce an immersive VR experience when wearing a Cardboard headset. When the VR Player gazes at an asteroid, it turns green and a cursor is shown. Clicking the cardboard trigger at this point destroys the asteroid and generates an explosion sound. The VR Player can also see their health, displayed by a shrinking green arc at the top of their display, and is told the direction of incoming asteroids by red arrows which appear as needed (see figure 1). The God Player’s interface also includes a display of the VR Player’s health, as well as a symbol which indicates the direction the VR Player is facing as well as a ring which denotes the spawning location for new asteroids (see figure 2). When the God Player taps on the screen, an asteroid spawns at the corresponding location along the green circle and begins hurling towards the VR Player. The game ends when the VR Player’s health reaches 0 (it is originally 10) or time runs out (120 seconds are allotted).