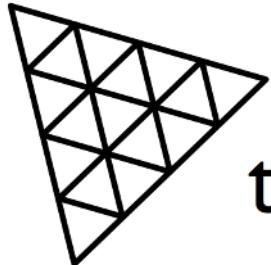
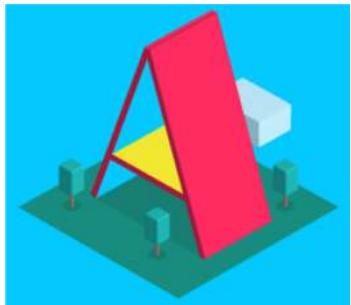


Virtual Reality with JavaScript

Lukas Akermann, 12 September 2017

A-Frame

- A web framework for building virtual reality experiences
- Make WebVR with HTML and Entity-Component
- Works on Vive, Rift, desktop, mobile platforms
- It is primarily maintained by Mozilla and the WebVR community
- <https://aframe.io>

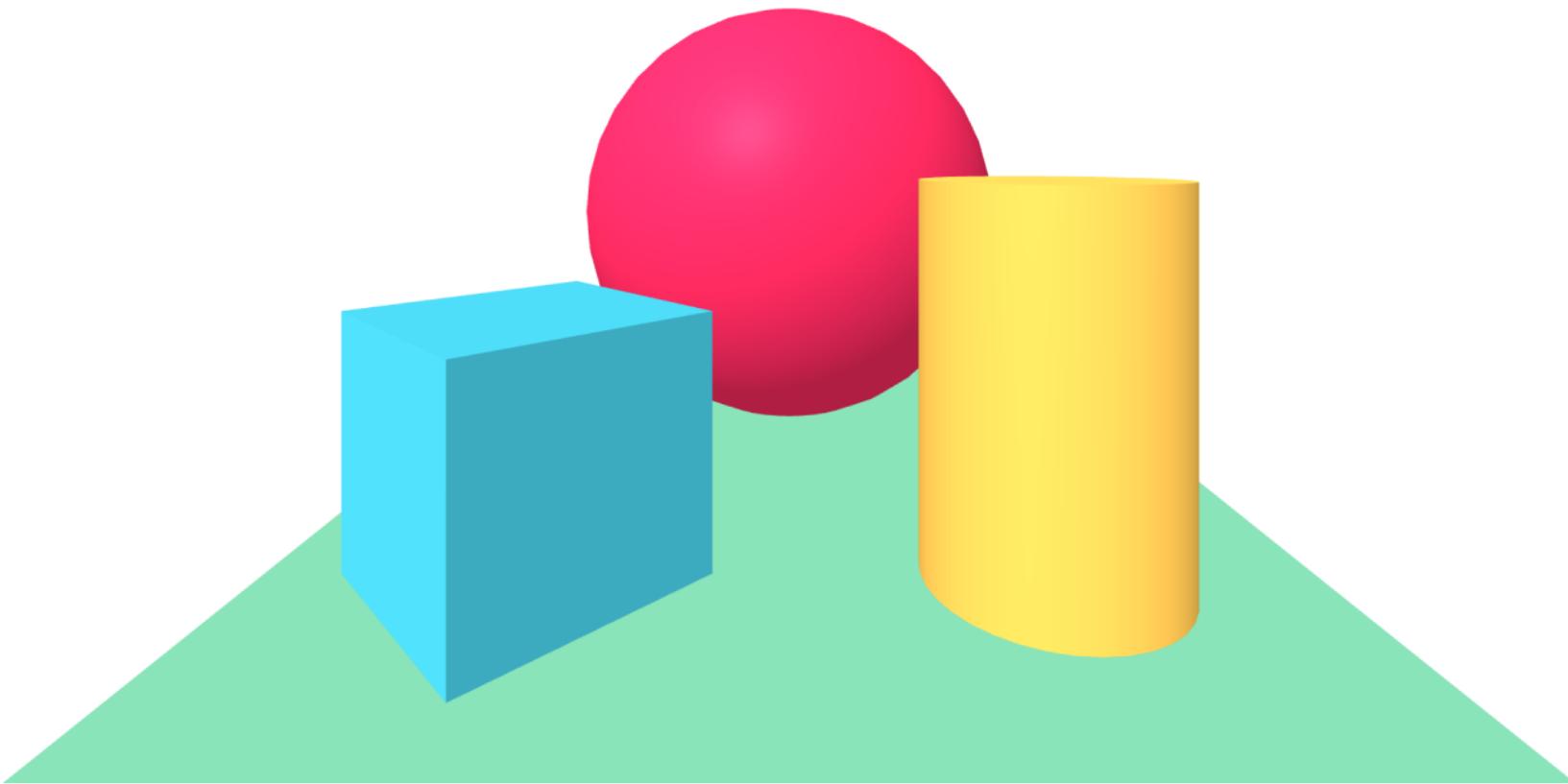


three.js



Hello WebVR

```
<html>
<head>
  <script src="scripts/aframe-0.6.1.min.js"></script>
</head>
<body>
<a-scene>
  <!-- Objects -->
  <a-box position="-1 0.5 -3" rotation="0 45 0" color="#4CC3D9"></a-box>
  <a-sphere position="0 1.25 -5" radius="1.25" color="#EF2D5E"></a-sphere>
  <a-cylinder position="1 0.75 -3" radius="0.5" height="1.5" color="#FFC65D"></a-cylinder>
  <a-plane position="0 0 -4" rotation="-90 0 0" width="4" height="4" color="#7BC8A4"></a-plane>
</a-scene>
</body>
</html>
```



Hello WebVR (Firefox)
A-Frame (<https://aframe.io/examples/showcase/helloworld/>)

Add Camera & Sky

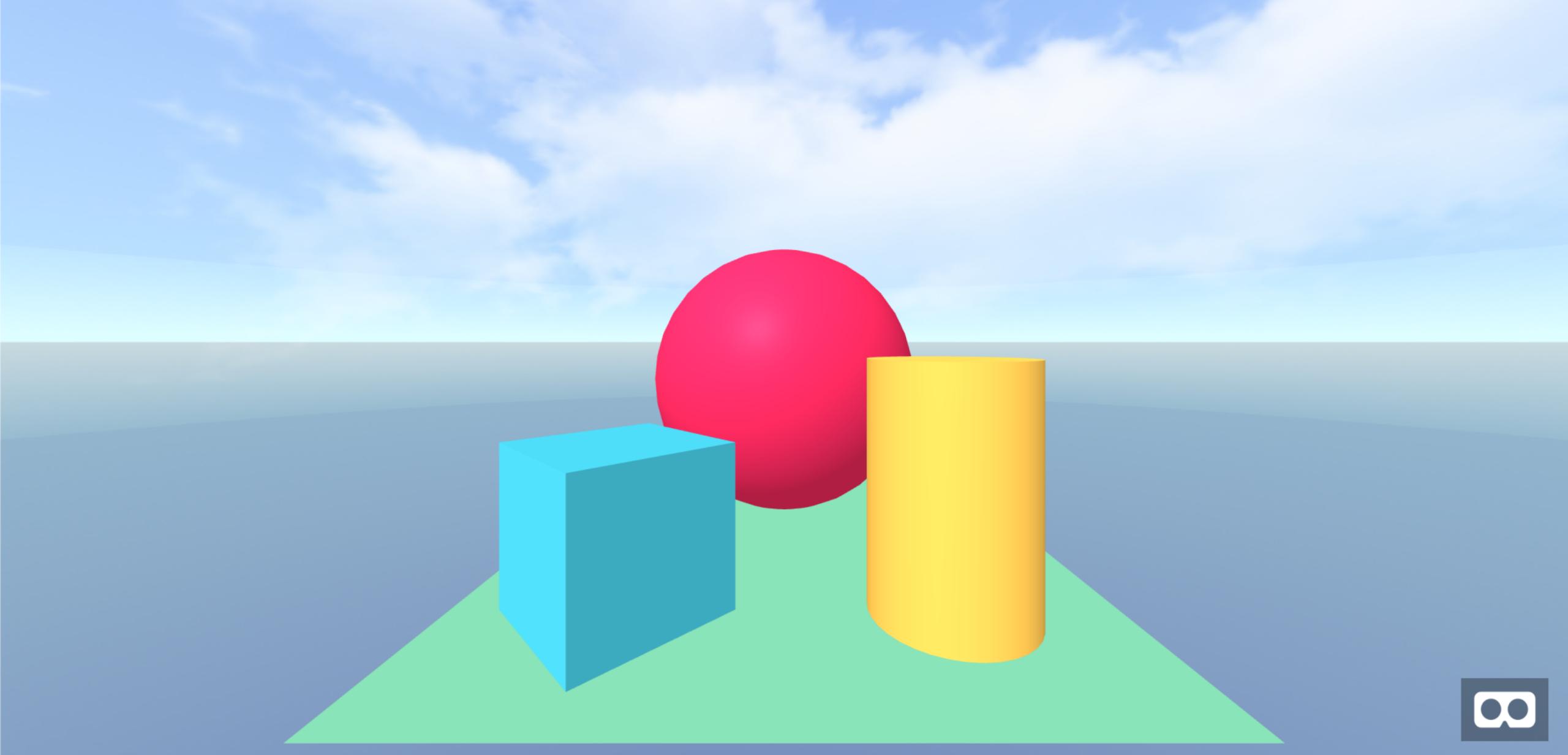
```
<a-scene>
  <a-assets>
    
  </a-assets>

  <!-- Sky -->
  <a-sky src="#sky"></a-sky>

  <!-- Camera -->
  <a-entity camera look-controls wasd-controls position="0 1.6 0"></a-entity>

  <!-- Objects -->
  <a-box position="-1 0.5 -3" rotation="0 45 0" color="#4CC3D9"></a-box>
  <a-sphere position="0 1.25 -5" radius="1.25" color="#EF2D5E"></a-sphere>
  <a-cylinder position="1 0.75 -3" radius="0.5" height="1.5" color="#FFC65D"></a-cylinder>
  <a-plane position="0 0 -4" rotation="-90 0 0" width="4" height="4" color="#7BC8A4"></a-plane>

</a-scene>
```



Sky (Firefox)
KIIRA (<https://opengameart.org/content/sky-box-sunny-day>)

Add Terrain

```
<head>
  ...
  <script src="scripts/aframe-terrain-model-component-0.2.3.min.js"></script>
</head>

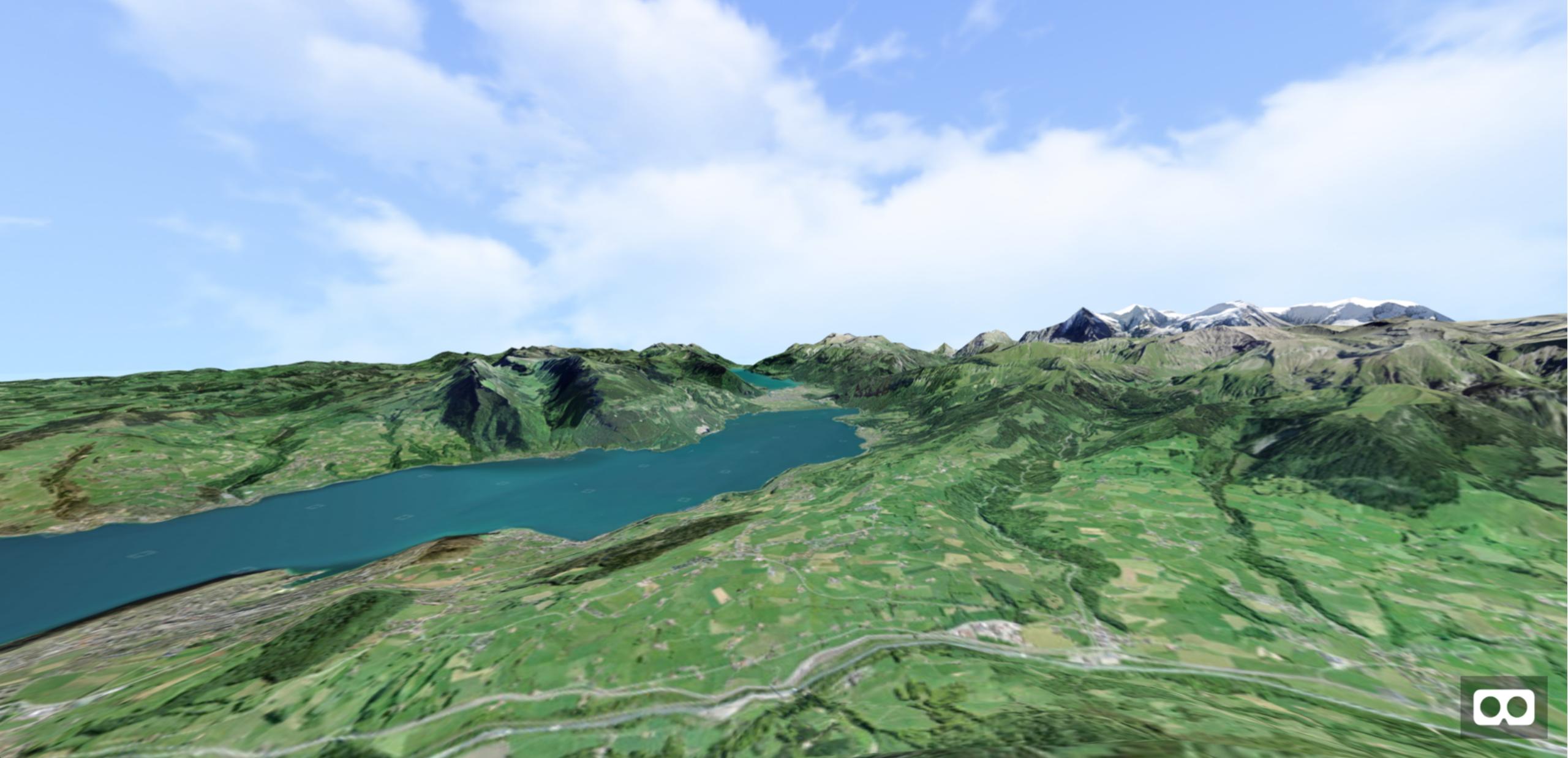
...
<a-scene>
  <a-assets>
    
  </a-assets>

  <!-- Sky -->
  <a-sky src="#sky" position="0 -700 0"></a-sky>

  <!-- Camera -->
  <a-entity camera look-controls wasd-controls></a-entity>

  <!-- Terrain -->
  <a-entity terrain-model="DEM: url(data/DHM200_bernese_oberland.bin);
    texture: url(data/DHM200_bernese_oberland.jpg);
    planeWidth: 5000; planeHeight: 5000; segmentsWidth: 199; segmentsHeight: 199; zPosition: 370;" 
    position="-620 -190 -1065" rotation="0 75 0"></a-entity>

</a-scene>
...
```



Terrain (Firefox)

Texture / Elevation Model: Federal Office of Topography swisstopo

Add Paraglider

```
...
<a-scene>
  <a-assets>
    
    <a-asset-item id="paraglider-model" src="data/paraglider.gltf"></a-asset-item>
  </a-assets>

  <!-- Sky -->
  <a-sky src="#sky" position="0 -700 0"></a-sky>

  <!-- Camera -->
  <a-entity camera look-controls wasd-controls></a-entity>

  <!-- Paraglider -->
  <a-entity gltf-model="#paraglider-model" scale="0.88 0.88 0.88" position="0 -0.8 -0.5"
    rotation="10 0 0"></a-entity>

  <!-- Terrain -->
  <a-entity terrain-model="DEM: url(data/DHM200_bernese_oberland.bin);
    texture: url(data/DHM200_bernese_oberland.jpg);
    planeWidth: 5000; planeHeight: 5000; segmentsWidth: 199; segmentsHeight: 199; zPosition: 370;">
    position="-620 -190 -1065" rotation="0 75 0"></a-entity>

</a-scene>
...
```



Paraglider (Firefox)

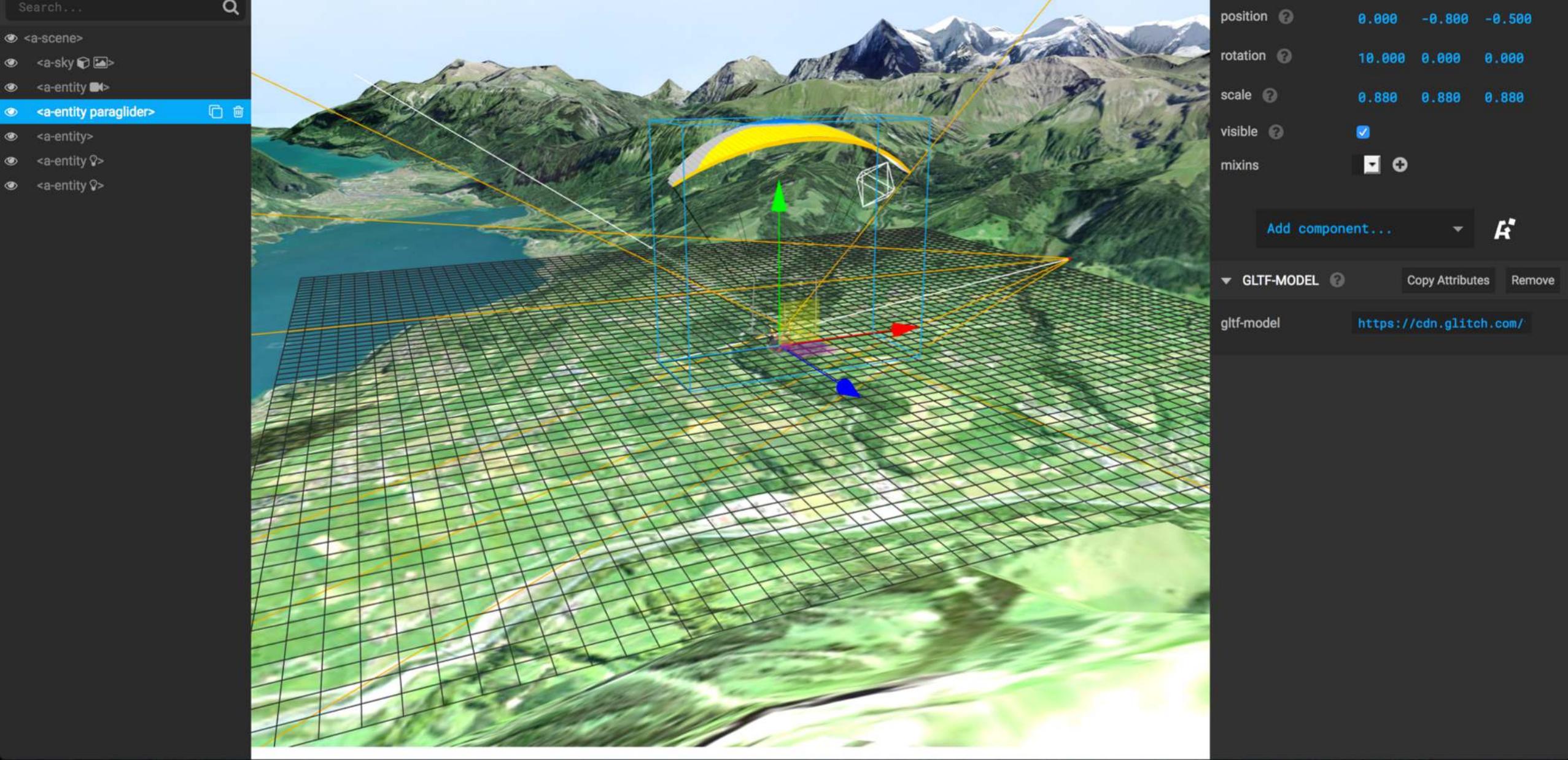
Model: Raphael T. (<https://3dwarehouse.sketchup.com/collection/c166a0a48065f4403a426bad1ca64772/real-life-paraglides>)





Paraglider (Firefox)

Model: Raphael T. (<https://3dwarehouse.sketchup.com/collection/c166a0a48065f4403a426bad1ca64772/real-life-paraglides>)



A-Frame Inspector (Firefox)

Add animation

```
...
<a-scene>
  <a-assets>
    
    <a-asset-item id="paraglider-model" src="data/paraglider.gltf"></a-asset-item>
  </a-assets>

  <!-- Sky -->
  <a-sky src="#sky" position="0 -700 0"></a-sky>

  <a-entity>
    <!-- Camera -->
    <a-entity camera look-controls wasd-controls></a-entity>

    <!-- Paraglider -->
    <a-entity gltf-model="#paraglider-model" scale="0.88 0.88 0.88" position="0 -0.8 -0.5"
       rotation="10 0 0"></a-entity>
    <a-animation attribute="position"
      dur="30000"
      easing="linear"
      to="0 -180 -1600"
      delay="2000">
    </a-animation>
  </a-entity>
  ...
</a-scene>
...
```



Animation (Firefox)