

Tutorial: Build a Solar System VR in A-Frame

Goal: By the end of this tutorial, you will have a working Solar System VR project where you can click planets, zoom in, and read information.

Step 1 – Set Up Your Project

1. Create a folder called `SolarSystemVR`
2. Inside it, create a file named `index.html`
3. Create another folder inside called `images`. Put planet textures inside (sun, earth, mars, etc.), plus a galaxy background.

✅ **Folder structure should look like:**

```
SolarSystemVR/  
├─ index.html  
└─ images/  
    ├─ sun.jpeg  
    ├─ earth.jpeg  
    ├─ mars.jpeg  
    ├─ mercury.jpeg  
    ├─ jupiter.jpeg  
    ├─ saturn.jpg  
    ├─ uranus.jpeg  
    ├─ neptune.jpg  
    ├─ venus.jpeg  
    └─ milky.jpg
```

Step 2 – Add the A-Frame Base

Open `index.html` and paste:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8" />
  <meta name="viewport" content="width=device-width, initial-scale=1.0"/>
  <title>Solar System VR</title>
  <!-- Load A-Frame -->
  <script src="https://aframe.io/releases/1.7.0/aframe.min.js"></script>
</head>
<body>
  <a-scene background="src: #sky"
            cursor="rayOrigin: mouse"
            raycaster="objects: .clickable; far: 50">

    <!-- We will add content here -->

  </a-scene>
</body>
</html>
```

✅ Open in a browser → you'll see an empty VR world.

Step 3 – Add Assets (Planet Textures)

Inside `<a-scene>`, add:

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

Step 4 – Add the Camera Rig

This lets the user look and move:

```
<!-- Camera rig -->
<a-entity id="rig" position="0 1.6 0"
  animation__move="property: position; dur: 2000; easing: easeInOutQu

<!-- Main camera -->
<a-entity id="camera" camera look-controls wasd-controls position="0 0 0"><

<!-- VR controllers (for Oculus Quest etc.) -->
<a-entity id="rightHand"
  laser-controls="hand: right"
  cursor="rayOrigin: entity"
  raycaster="objects: .clickable; far: 50"
  line="opacity: 0.9"></a-entity>

<a-entity id="leftHand"
  laser-controls="hand: left"
  cursor="rayOrigin: entity"
  raycaster="objects: .clickable; far: 50"
  line="opacity: 0.9"></a-entity>
</a-entity>
```

Step 5 – Add Info Panel and Buttons

We need a popup to show facts + buttons to close or reset.

```
<!-- Info panel -->
<a-entity id="infoPanel" visible="false" position="0 0 -1.2"
  geometry="primitive: plane; width: 1.2; height: 0.6"
  material="color: #222; opacity: 0.9">
  <a-text id="infoText" value="Info" align="center" width="1.1" wrap-count="2"
    position="0 0.06 0.01"></a-text>
</a-entity>

<!-- Close button -->
<a-entity position="0 -0.22 -1.2">
  <a-plane class="clickable" width="0.35" height="0.12"
    material="color: #f44336; opacity: 0.95"
    onclick="document.querySelector('#infoPanel').setAttribute('visible', 'true')">
  <a-text value="Close" align="center" position="0 0 0.01" width="0.9"></a-text>
</a-entity>
```

```

<!-- Return to Start button -->
<a-entity position="0 -0.5 -1.2">
  <a-plane class="clickable" width="0.6" height="0.15" color="#2196f3" opacity="1"
    onclick="document.querySelector('#rig').setAttribute('animation__move', 'property: position; to: 0 1.6 0; dur: 2000; easing: easeInOutQuadratic');"
  <a-text value="Return to Start" align="center" position="0 0 0.01" width="0.6" height="0.1" color="white"
  </a-entity>

```

Step 6 – Add the Planets

Each planet is an `<a-sphere>` with a texture and click event.

Example: Earth 🌍

```

<a-sphere class="clickable" src="#earth" position="-3 3 -10" radius="0.5"
  animation="property: rotation; to: 0 360 0; loop: true; dur: 80000;"
  onclick="
    document.querySelector('#rig').setAttribute(
      'animation__move', 'property: position; to: -3 2 -8; dur: 2000;
    );
    document.querySelector('#infoText').setAttribute('value', 'EARTH - 3rd planet from the Sun');
    document.querySelector('#infoPanel').setAttribute('visible', true);
  ">
</a-sphere>

```

Example: Sun ☀️

```

<a-sphere class="clickable" src="#sun" position="-13 2 -10" radius="4"
  onclick="
    document.querySelector('#rig').setAttribute(
      'animation__move', 'property: position; to: -8 2 -8; dur: 2000;
    );
    document.querySelector('#infoText').setAttribute('value', 'SUN - Center of the Solar System');
    document.querySelector('#infoPanel').setAttribute('visible', true);
  ">
</a-sphere>

```

Do the same for Mercury, Mars, Jupiter, Saturn, Uranus, Neptune, and Venus (with their own size, position, and info text).

Step 7 – Save and Test

1. Save the file
2. Open it in your browser
3. Try clicking planets → you should zoom in and see facts
4. Use "Close" to hide panel, "Return to Start" to reset

✅ **Congratulations! You've built your interactive VR Solar System.**

Reflection

- How does the rig help with camera movement?
- Why is onclick used for planets?
- How could you add Saturn's rings?

Extension Challenges

- Add rotation animations to all planets
- Add a new button: "Go to Sun"
- Add fun facts for each planet
- Test your project in a VR headset

Final Full Code

Here's the complete index.html file:

```
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8" />
<meta name="viewport" content="width=device-width, initial-scale=1.0"/>
<title>Solar System VR</title>
<script src="https://aframe.io/releases/1.7.0/aframe.min.js"></script>
</head>
```

```
<body>
<a-scene background="src: #sky"
          cursor="rayOrigin: mouse"
          raycaster="objects: .clickable; far: 50">

<a-assets>
  
  
  
  
  
  
  
  
  
  
</a-assets>

<!-- Camera rig -->
<a-entity id="rig" position="0 1.6 0"
animation__move="property: position; dur: 2000; easing: easeInOutQuad">

<a-entity id="camera" camera look-controls wasd-controls position="0 0 0

<a-entity id="rightHand"
laser-controls="hand: right"
cursor="rayOrigin: entity"
raycaster="objects: .clickable; far: 50"
line="opacity: 0.9"></a-entity>

<a-entity id="leftHand"
laser-controls="hand: left"
cursor="rayOrigin: entity"
raycaster="objects: .clickable; far: 50"
line="opacity: 0.9"></a-entity>

<!-- Info panel -->
<a-entity id="infoPanel" visible="false" position="0 0 -1.2"
geometry="primitive: plane; width: 1.2; height: 0.6"
material="color: #222; opacity: 0.9">
  <a-text id="infoText" value="Info" align="center" width="1.1" wrap-count:
position="0 0.06 0.01"></a-text>
</a-entity>

<!-- Close button -->
```

```

<a-entity position="0 -0.22 -1.2">
<a-plane class="clickable" width="0.35" height="0.12"
material="color: #f44336; opacity: 0.95"
onclick="document.querySelector('#infoPanel').setAttribute('visible', fa
<a-text value="Close" align="center" position="0 0 0.01" width="0.9"></a-
</a-entity>

<!-- Return to Start button -->
<a-entity position="0 -0.5 -1.2">
<a-plane class="clickable" width="0.6" height="0.15" color="#2196f3" opa
onclick="document.querySelector('#rig').setAttribute('animation__move',
'property: position; to: 0 1.6 0; dur: 2000; easing: easeInOutQuad')"></a-
<a-text value="Return to Start" align="center" position="0 0 0.01" width:
</a-entity>
</a-entity>

<!-- Planets -->
<a-sphere class="clickable" src="#sun" position="-13 2 -10" radius="4"
onclick="
document.querySelector('#rig').setAttribute(
'animation__move','property: position; to: -8 2 -8; dur: 2000; easing: ea
);
document.querySelector('#infoText').setAttribute('value','SUN — G2V yello
document.querySelector('#infoPanel').setAttribute('visible', true);
"></a-sphere>

<a-sphere class="clickable" src="#mercury" position="-7 2 -10" radius="0
onclick="
document.querySelector('#rig').setAttribute(
'animation__move','property: position; to: -5 2 -8; dur: 2000; easing: ea
);
document.querySelector('#infoText').setAttribute('value','MERCURY — Smal
document.querySelector('#infoPanel').setAttribute('visible', true);
"></a-sphere>

<a-sphere class="clickable" src="#earth" position="-3 3 -10" radius="0.5
animation="property: rotation; to: 0 360 0; loop: true; dur: 80000; easi
onclick="
document.querySelector('#rig').setAttribute(
'animation__move','property: position; to: -3 2 -8; dur: 2000; easing: ea
);
document.querySelector('#infoText').setAttribute('value','EARTH — Our ho
document.querySelector('#infoPanel').setAttribute('visible', true);
"></a-sphere>

```

```
<a-sphere class="clickable" src="#mars" position="-2 2 -10" radius="0.25"
onclick="
document.querySelector('#rig').setAttribute(
'animation__move','property: position; to: -2 2 -8; dur: 2000; easing: ea
');
document.querySelector('#infoText').setAttribute('value','MARS - The Red
document.querySelector('#infoPanel').setAttribute('visible', true);
"></a-sphere>
```

```
<a-sphere class="clickable" src="#jupiter" position="1 2 -13" radius="1"
onclick="
document.querySelector('#rig').setAttribute(
'animation__move','property: position; to: -2 2 -8; dur: 2000; easing: ea
');
document.querySelector('#infoText').setAttribute('value','JUPITER - Gas
document.querySelector('#infoPanel').setAttribute('visible', true);
"></a-sphere>
```

```
<a-sphere class="clickable" src="#saturn" position="4 2 -10" radius="0.8"
onclick="
document.querySelector('#rig').setAttribute(
'animation__move','property: position; to: 6 2 -8; dur: 2000; easing: ea
');
document.querySelector('#infoText').setAttribute('value','SATURN - Iconic
document.querySelector('#infoPanel').setAttribute('visible', true);
"></a-sphere>
```

```
<a-sphere class="clickable" src="#uranus" position="7 2 -10" radius="0.7"
onclick="
document.querySelector('#rig').setAttribute(
'animation__move','property: position; to: 9 2 -8; dur: 2000; easing: ea
');
document.querySelector('#infoText').setAttribute('value','URANUS - Ice g
document.querySelector('#infoPanel').setAttribute('visible', true);
"></a-sphere>
```

```
<a-sphere class="clickable" src="#neptune" position="10 2 -10" radius="0"
onclick="
document.querySelector('#rig').setAttribute(
'animation__move','property: position; to: 12 2 -8; dur: 2000; easing: ea
');
document.querySelector('#infoText').setAttribute('value','NEPTUNE - Fartl
document.querySelector('#infoPanel').setAttribute('visible', true);
"></a-sphere>
```

```
<a-sphere class="clickable" src="#venus" position="-1 2 -8" radius="0.45"
onclick="
document.querySelector('#rig').setAttribute(
  'animation__move','property: position; to: -1 2 -6; dur: 2000; easing: easeOutCubic
');
document.querySelector('#infoText').setAttribute('value','VENUS - Hottest planet in the solar system');
document.querySelector('#infoPanel').setAttribute('visible', true);
"></a-sphere>

</a-scene>
</body>
</html>
```