



# OUR NEXT STOP: WEB-AR

## AUGMENTED REALITY FOR YOUR MOBILE BROWSER

**ANASTASIYA MIROSHNICHENKO**  
WEB XR DEVELOPER AT SAINT ELMO'S BERLIN

# ANASTASIIA MIROSHNICHENKO

WEB XR DEVELOPER

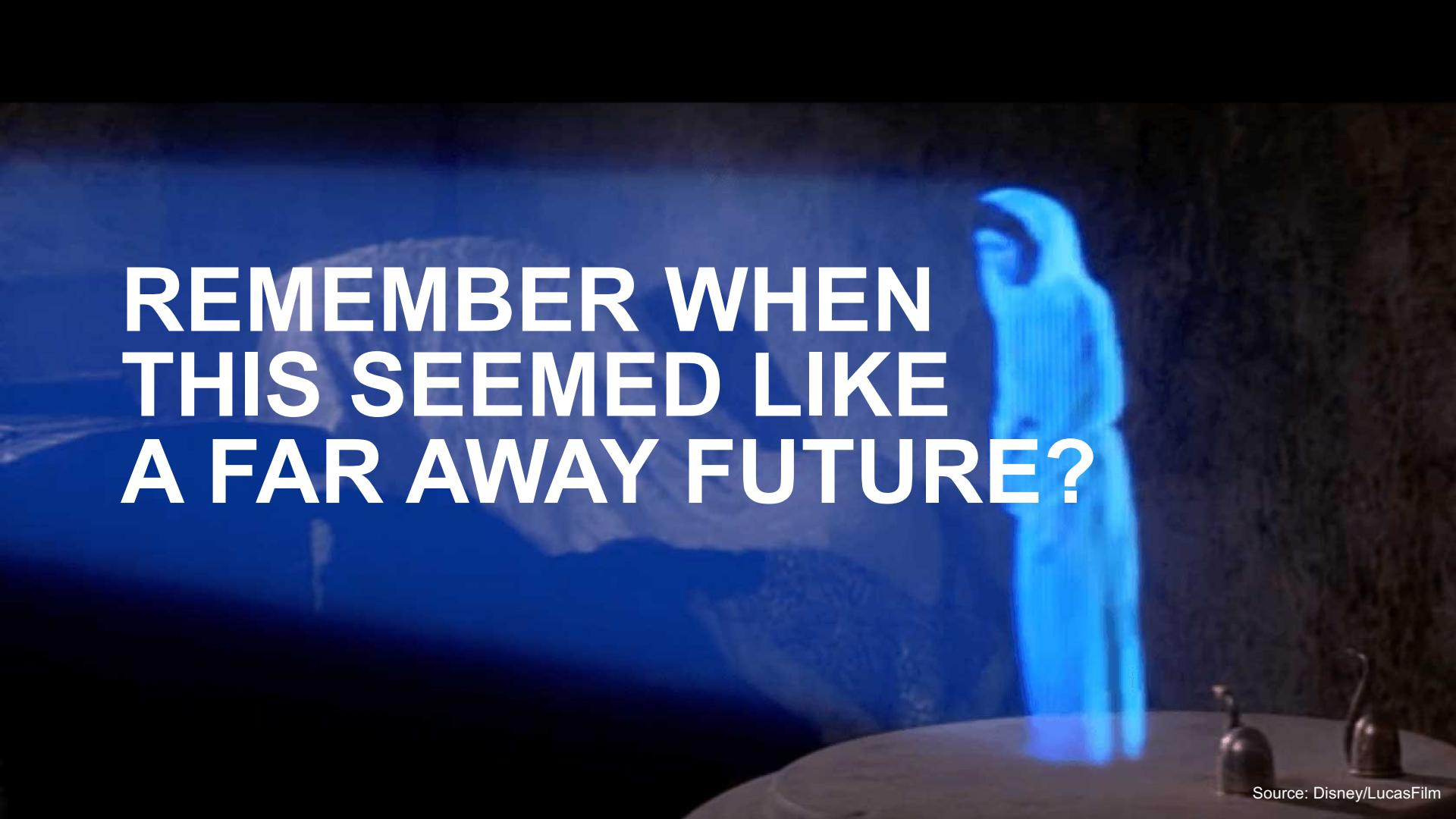
[a.miroshnichenko@saint-elmos.com](mailto:a.miroshnichenko@saint-elmos.com)



@AnastasiiaaaaM



# WEB-AR TECHNOLOGY EXPERIMENTS DEVELOPMENT POTENTIAL

A glowing blue lightsaber hilt stands upright in a dark, rocky landscape under a dark sky. The hilt casts a long, sharp shadow to its left. In the foreground, the circular base of a wooden stool is visible.

**REMEMBER WHEN  
THIS SEEMED LIKE  
A FAR AWAY FUTURE?**

A person wearing a VR headset and a red t-shirt is standing in front of a large, colorful geometric background composed of triangles. They are reaching out towards a small, glowing blue and purple digital hummingbird hovering near their hand.

THE FUTURE  
IS NOW.

**WE CAME A LONG WAY.**

Aug. 28, 1962

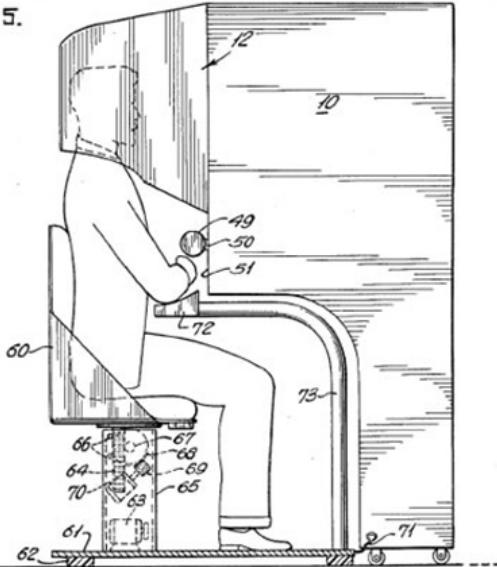
M. L. HEILIG  
SENSORAMA SIMULATOR

3,050,870

Filed Jan. 10, 1961

8 Sheets-Sheet 3

T1Q. 5.



T1Q. 6.

## SENSORAMA

MORTON HEILIG, 1962



INVENTOR  
MORTON L. HEILIG  
BY  
Douglas M. Clarkson  
ATTORNEY

Introducing . . .

# sensorama

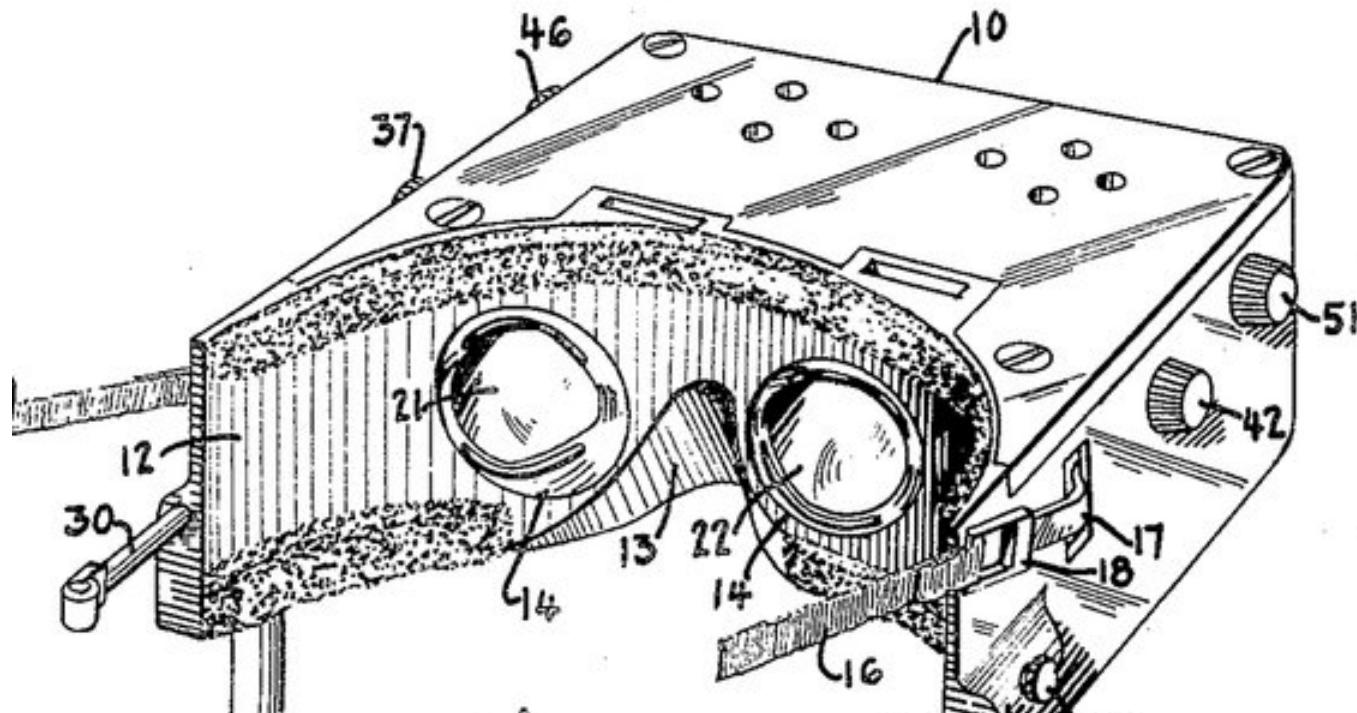
The Revolutionary Motion Picture System  
that takes you into another world  
with

- 3-D
- WIDE VISION
- MOTION
- COLOR
- STEREO-SOUND
- AROMAS
- WIND
- VIBRATIONS



SENSORAMA, INC., 855 GALLOWAY ST., PACIFIC PALISADES, CALIF. 90272

TEL. (213) 459-2162

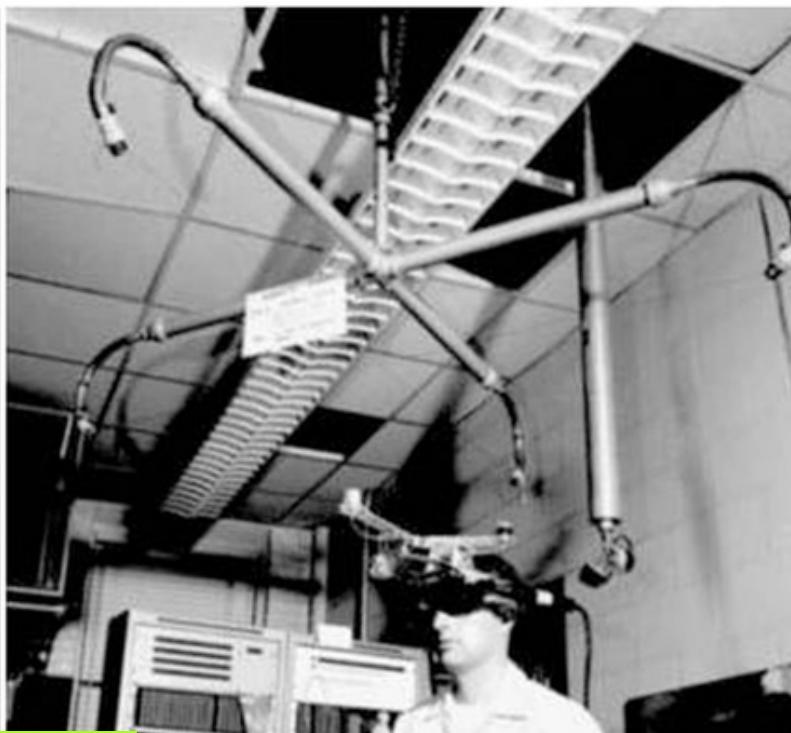


## FIRST VR PATENT

MORTON HEILIG, 1960



INVENTO  
*Morton L. Heilig*  
BY  
*Boggs*  
his ATTORNEY



## FIRST VR HEAD MOUNTED DISPLAY

IVAN SUTHERLAND, 1968

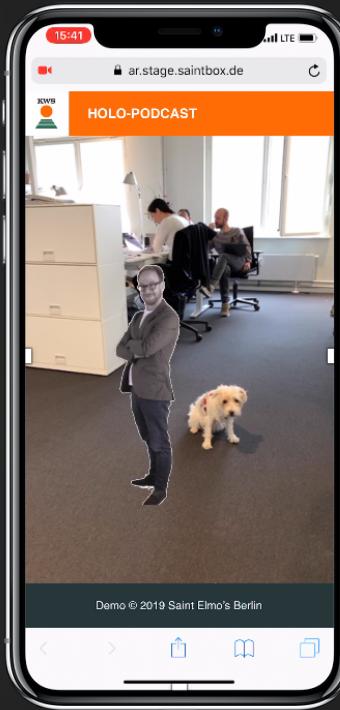


Source: YouTube, Giulio Di Vico

**TODAY YOU HOLD  
THE FUTURE IN  
YOUR HAND.**



WITH MARKER



MARKERLESS

**WHERE TO START?  
WHERE TO GO?**

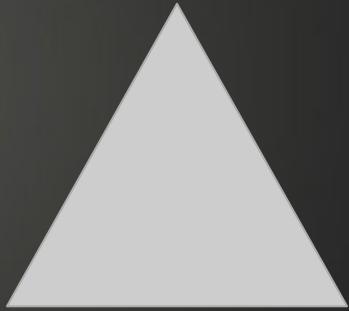




## ELECTRIC FLOWER WEBGL

SAINT ELMO'S / 15

Source: [webglsamples.org](http://webglsamples.org)



**SAINT ELMO'S** / 16

```
<!DOCTYPE html>
<html>
<head>
    <title>Our next stop: WebAR</title>
</head>
<body>
    <canvas id="canvas"></canvas>

    <script>
        var canvas = document.getElementById('canvas');
        var gl = canvas.getContext('webgl');
    </script>
</body>
</html>
```

```
var canvas = document.getElementById('canvas');
var gl = canvas.getContext('webgl');

var vertices = [
    -0.25,0.5,0.0,
    -0.5,-0.5,0.0,
    0.5,-0.5,0.0,
];
var indices = [0,1,2];

var vertex_buffer = gl.createBuffer();
gl.bindBuffer(gl.ARRAY_BUFFER, vertex_buffer);
gl.bufferData(gl.ARRAY_BUFFER, new Float32Array(vertices),
gl.STATIC_DRAW);
gl.bindBuffer(gl.ARRAY_BUFFER, null);

var Index_Buffer = gl.createBuffer();
gl.bindBuffer(gl.ELEMENT_ARRAY_BUFFER, Index_Buffer);
gl.bufferData(gl.ELEMENT_ARRAY_BUFFER, new Uint16Array(indices),
gl.STATIC_DRAW);
gl.bindBuffer(gl.ELEMENT_ARRAY_BUFFER, null);

var vertCode =
    'attribute vec3 coordinates;' +
    'void main(void) {' +
        ' gl_Position = vec4(coordinates, 1.0);' +
    '}';
var vertShader = gl.createShader(gl.VERTEX_SHADER);
gl.shaderSource(vertShader, vertCode);
gl.compileShader(vertShader);
```

```
var fragCode =
    'void main(void) {' +
        ' gl_FragColor = vec4(0.0, 0.0, 0.0, 0.1);' +
    '}';
var fragShader = gl.createShader(gl.FRAGMENT_SHADER);
gl.shaderSource(fragShader, fragCode);
gl.compileShader(fragShader);

var shaderProgram = gl.createProgram();
gl.attachShader(shaderProgram, vertShader);
gl.attachShader(shaderProgram, fragShader);
gl.linkProgram(shaderProgram);

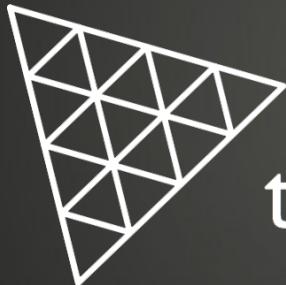
gl.useProgram(shaderProgram);

gl.bindBuffer(gl.ARRAY_BUFFER, vertex_buffer);
gl.bindBuffer(gl.ELEMENT_ARRAY_BUFFER, Index_Buffer);

var coord = gl.getAttribLocation(shaderProgram, "coordinates");
gl.vertexAttribPointer(coord, 3, gl.FLOAT, false, 0, 0);
gl.enableVertexAttribArray(coord);

gl.clearColor(0.5, 0.5, 0.5, 0.9);
gl.enable(gl.DEPTH_TEST);
gl.clear(gl.COLOR_BUFFER_BIT);
gl.viewport(0,0,canvas.width,canvas.height);
gl.drawElements(gl.TRIANGLES, indices.length,
gl.UNSIGNED_SHORT,0);
```

# LIBRARIES & FRAMEWORKS



three.js

A-FRAME



PLAYCANVAS



babylon.js



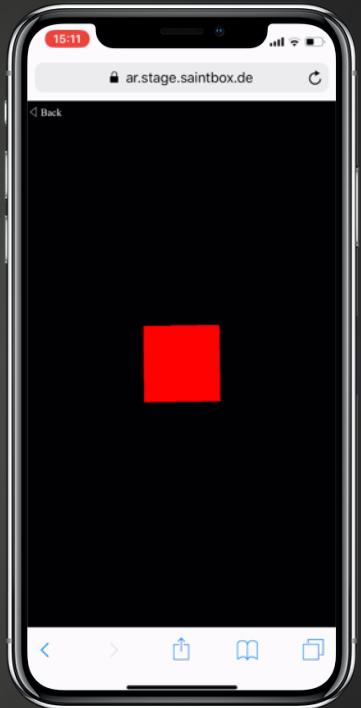
three.js

three.js r104

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[forum](#)  
[irc](#)  
[slack](#)**Interactive 3D Graphics**  
Taught by Eric Haines**Three.js Cookbook**  
By Eric Haines, Michael Weller, and others  
UDACITY



**RED CUBE  
THREE.JS**

```
<!DOCTYPE html>
<html>
<head>
  <title>Our next stop: WebAR</title>
  <script src="https://cdnjs.cloudflare.com/ajax/libs/three.js/104/three.js"></script>
</head>
<body>
  <script>
    var scene = new THREE.Scene();
    var camera = new THREE.PerspectiveCamera( 75, window.innerWidth/window.innerHeight, 0.1, 1000 );

    var renderer = new THREE.WebGLRenderer();
    renderer.setSize( window.innerWidth, window.innerHeight );
    document.body.appendChild( renderer.domElement );

    renderer.render( scene, camera );
  </script>
</body>
</html>
```

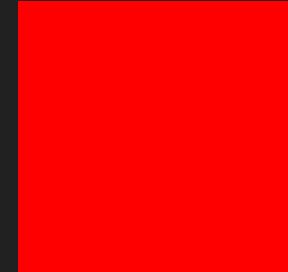
```
<script>
var scene = new THREE.Scene();
var camera = new THREE.PerspectiveCamera( 75, window.innerWidth/window.innerHeight, 0.1, 1000 );

var renderer = new THREE.WebGLRenderer();
renderer.setSize( window.innerWidth, window.innerHeight );
document.body.appendChild( renderer.domElement );

var geometry = new THREE.BoxGeometry( 1, 1, 1 );
var material = new THREE.MeshBasicMaterial( { color: 0xff0000 } );
var cube = new THREE.Mesh( geometry, material );
scene.add( cube );

camera.position.z = 5;

renderer.render( scene, camera );
</script>
```



```
<script>

var scene = new THREE.Scene();
var camera = new THREE.PerspectiveCamera( 75, window.innerWidth/window.innerHeight, 0.1, 1000 );
var renderer = new THREE.WebGLRenderer();
renderer.setSize( window.innerWidth, window.innerHeight );
document.body.appendChild( renderer.domElement );

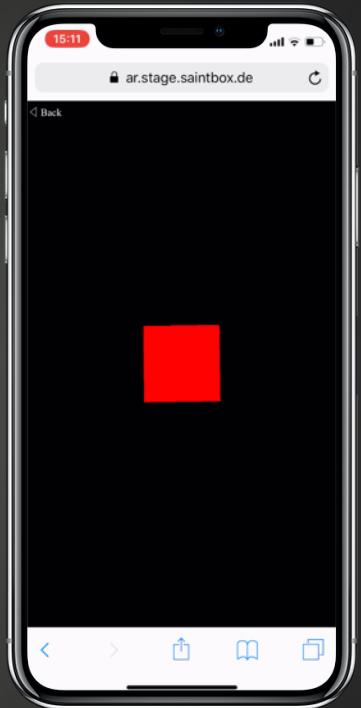
var geometry = new THREE.BoxGeometry( 1, 1, 1 );
var material = new THREE.MeshBasicMaterial( { color: 0xff0000 } );
var cube = new THREE.Mesh( geometry, material );
scene.add( cube );
camera.position.z = 5;

function animate() {
    requestAnimationFrame( animate );

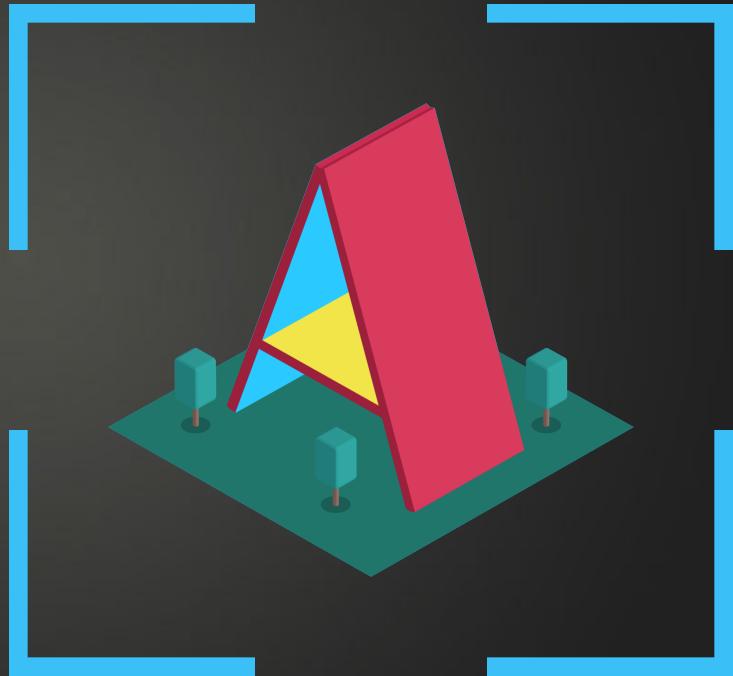
    cube.rotation.x += 0.01;
    cube.rotation.y += 0.01;

    renderer.render( scene, camera );
}
animate();

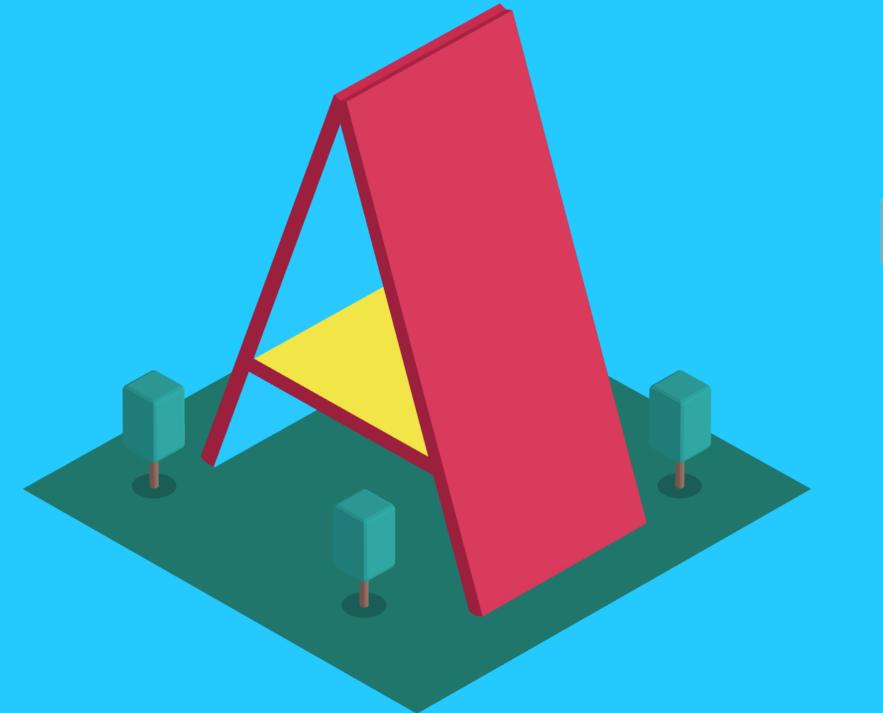
</script>
```



**RED CUBE  
THREE.JS**



# A-FRAME

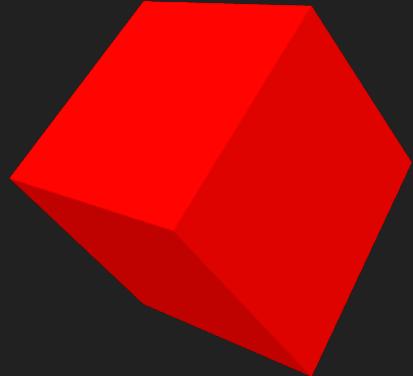
[Blog](#)[A Week of A-Frame 159 - 161](#)[Examples](#)[Hello WebVR](#)[Hello Metaverse](#)[360° Image](#)[360° Image Gallery](#)[360° Video](#)[Animation](#)[Anime UI](#)[BeatSaver Viewer](#)[Lights](#)[Snowglobe](#)[Gunters of OASIS](#)[Supercraft](#)[Super Says](#)[Towermax Fitness](#)[A-Blast](#)[A-Painter](#)[A Saturday Night](#)[DOCS](#) [FAQ](#) [BLOG](#) [COMMUNITY](#) [SHOWCASE](#)

A web framework for building virtual reality experiences

Make WebVR with HTML and Entity-Component  
Works on Vive, Rift, Daydream, GearVR, desktop

[GET STARTED](#)

```
<!DOCTYPE html>
<html>
<head>
  <title>Our next stop: WebAR</title>
  <script src="https://aframe.io/releases/0.9.1/aframe.min.js"></script>
</head>
<body>
  <a-scene>
    <a-box color="red" position="0 1.6 -3" rotation="0 45 45"
      animation="property: rotation; to: 0 405 45; loop: true; dur: 5000"></a-box>
  </a-scene>
</body>
</html>
```



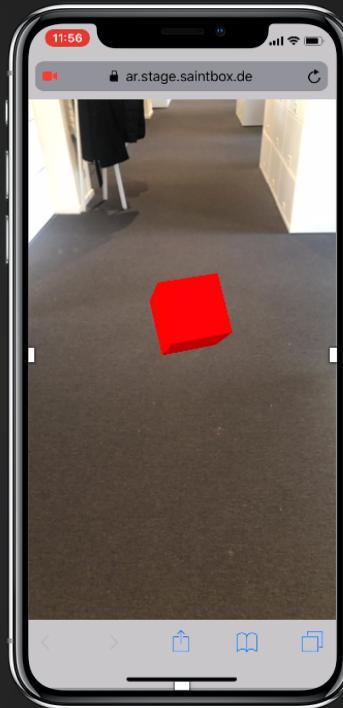


## RED CUBE A-FRAME

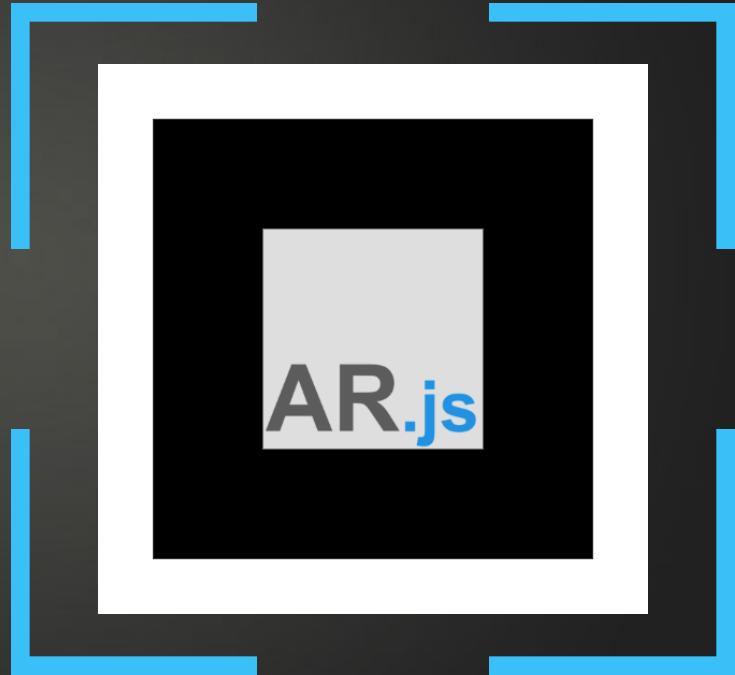
# WHERE TO GO FROM HERE?



WITH MARKER



MARKERLESS



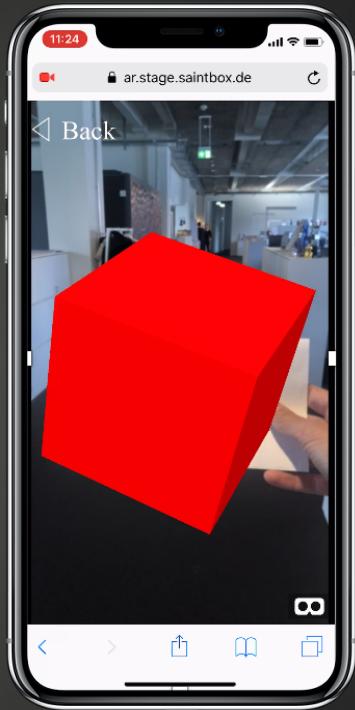


Hiro

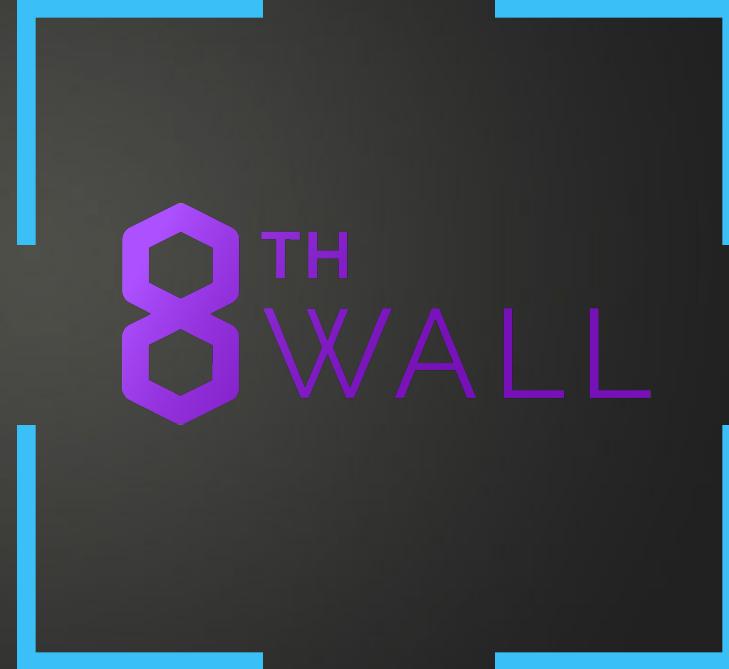
```
<!DOCTYPE html>
<html>
<head>
  <title>Our next stop: WebAR</title>
  <script src="https://aframe.io/releases/0.9.1/aframe.min.js"></script>
  <script src="https://cdn.rawgit.com/jeromeetienne/AR.js/1.6.2/aframe/build/aframe-ar.js"></script>
</head>
<body>
  <a-scene arjs embedded>

    <a-marker preset="hiro">
      <a-box color="red" position="0 1.6 -3" rotation="0 45 45"
        animation="property: rotation; to: 0 405 45; loop: true; dur: 5000"></a-box>
    </a-marker>

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



## RED CUBE AR.JS WITH HIRO MARKER



8<sup>TH</sup> WALL



## WEB-AR WITH IMAGE-TARGETS

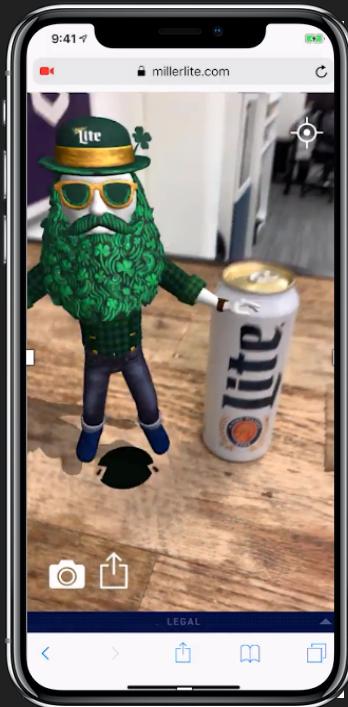


**SPIDERMAN**  
**SONY**

**SAINT ELMO'S / 39**

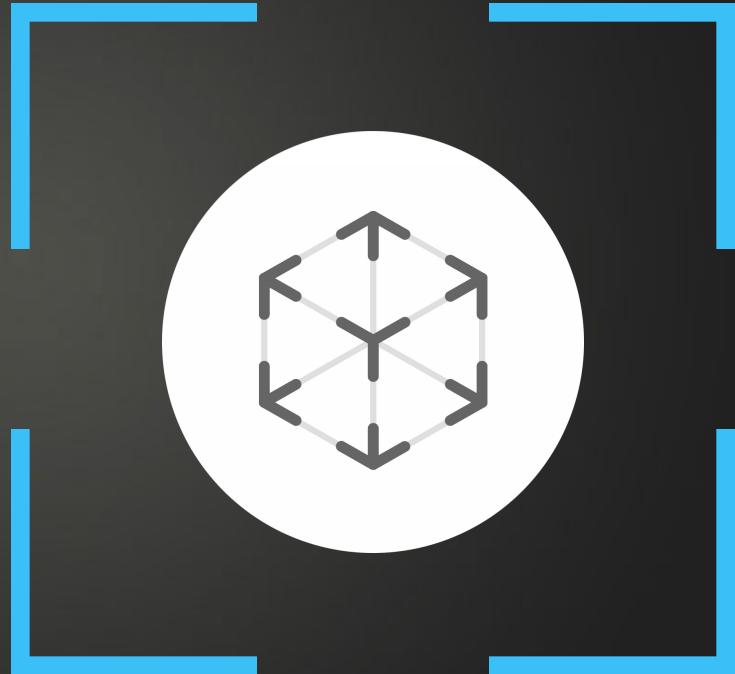


**LEGO CITY**  
**LEGO**



**MILLER LIGHT**  
**MILLEROORS**

Source: 8th Wall Inc.

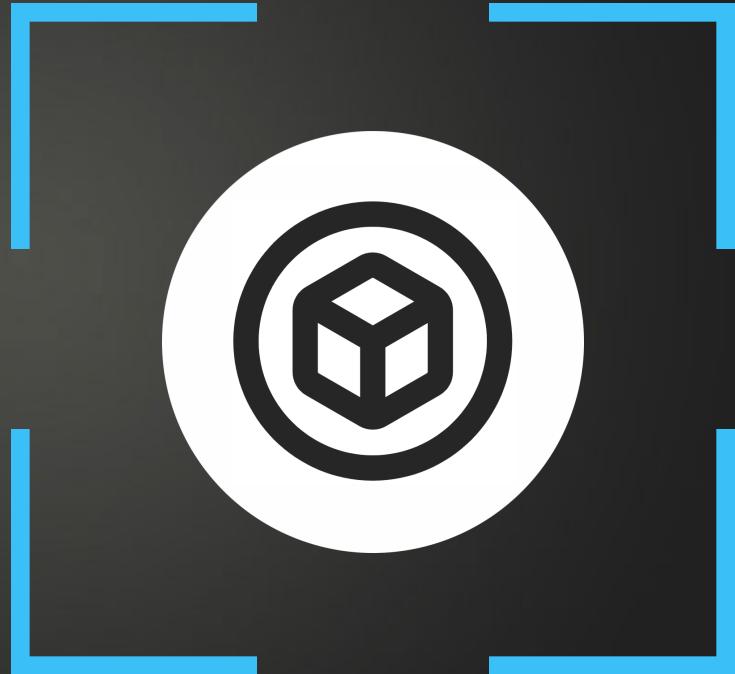


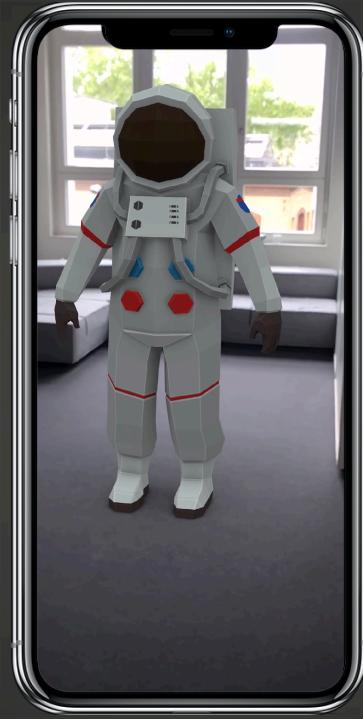


## APPLE QUICK-LOOK USDZ-FORMAT

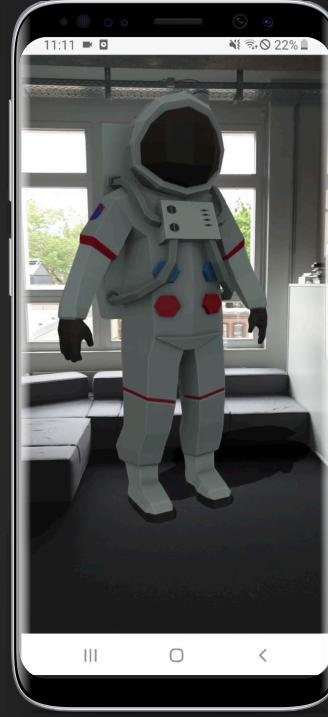
```
<!DOCTYPE html>
<html>
<head>
    <title>Our next stop: WebAR</title>
</head>
<body>
    <a href="./stratocaster.usdz" rel="ar">
        
    </a>

</body>
</html>
```





APPLE QUICK-LOOK  
USDZ-FORMAT



ANDROID AR CORE  
GLB-FORMAT

```
<!DOCTYPE html>
<html>
<head>
  <title>Our next stop: WebAR</title>
  <script type="module" src="https://unpkg.com/@google/model-viewer/dist/model-viewer.js"></script>

</head>
<body>
  <model-viewer src="./Astronaut.glb"
    ar
    ios-src="./Astronaut.usdz" >
  </model-viewer>

</body>
</html>
```

**WEB-AR**  
**NO APPLICATIONS**  
**FOR ANYONE**  
**FRictionless**  
**EASY**  
**EVERWHERE**



CONTACT ME:

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  @AnastasiiaaaaM

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# LIVE DEMO

