Virtual Globes Using WebGL and Cesium

Tuesday, 10:30am-12:00pm. Room 203B

- Cesium State of the Union. Patrick Cozzi, Cesium
- Publishing Reality Meshes to Web from Bentley ContextCapture using Cesium 3D Tiles. Makai Smith, Bentley
- Baking AO in the glTF Pipeline. Gary Li, Cesium
- Making Drone Data Useful in Cesium. Chris Cooper, Propeller
- 3D Tiles and OGC's 3D Portrayal service standard. Ralf Gutbell, Fraunhofer
About Me

Started Cesium

Books on Virtual Globes, WebGL, OpenGL

Contribute to Open Standards and Formats

Teach Computer Graphics

Open-Source Geospatial Community Service

http://www.seas.upenn.edu/~pcozzi/
Cesium was born in Aerospace
What is Cesium?

An open-source JavaScript library for world-class 3D globes and maps

cesiumjs.org
Over 75 Cesium showcases

All Demos

- ALL INDUSTRIES
- DEFENSE
- GEOSPATIAL
- UAV AND FLIGHT PLANNING

CITISENS
Mobile application for reporting wildfires.

Paralog Performance Competition
Cloud-based platform to upload, share, and compare GPS tracks of wingsuit performance flights and for judging wingsuit performance competitions.

Flight Club
A simulator and trajectory visualizer for orbital rocket launches and landings.

http://cesiumjs.org/demos.html
### Fantastic Community

<table>
<thead>
<tr>
<th></th>
<th>SIGGRAPH 2015</th>
<th>SIGGRAPH 2016</th>
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</thead>
<tbody>
<tr>
<td>Forum members</td>
<td>701</td>
<td>1,034</td>
</tr>
<tr>
<td>Contributors</td>
<td>50</td>
<td>88</td>
</tr>
<tr>
<td>Past month contributors</td>
<td>15</td>
<td>17</td>
</tr>
</tbody>
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- +12 new monthly releases
## Fantastic Quality

<table>
<thead>
<tr>
<th></th>
<th>SIGGRAPH 2015</th>
<th>SIGGRAPH 2016</th>
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</thead>
<tbody>
<tr>
<td>Engine code</td>
<td>94K</td>
<td>106K</td>
</tr>
<tr>
<td>Test code</td>
<td>90K</td>
<td>103K</td>
</tr>
<tr>
<td>Tests</td>
<td>6,839</td>
<td>7,491</td>
</tr>
</tbody>
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- 93% code coverage
- Full test suite still runs in under a minute
- 3d-tiles branch
  - Engine code: 111K
  - Test code: 108K
  - Tests: 7,858
Major new features since SIGGRAPH 2015
KML Improvements

terrain clamping
network links
Terrain Fog

Default settings improve performance up to 35%

http://cesiumjs.org/2015/11/12/Fog/
Terrain Quantization

Reduces memory up to 40%

http://cesiumjs.org/2015/12/18/Terrain-Quantization/
WebVR / Google Cardboard
Shadows
Shadows

self-shadows
soft-shadows
sun position
Infinite 2D Scrolling
Infinite 2D Rotation
Cesium Android Apps with Cordova

http://cesiumjs.org/2016/05/18/An-Introduction-to-Cesium-Android-Apps-with-Cordova/
Cesium Desktop Apps with Electron

Sandcastle / GitHub Gist

http://cesiumjs.org/2016/04/14/Share-Sandcastle-Examples-Easily-with-GitHub-Gists/
Cesium now on npm

Cesium is a JavaScript library for creating 3D globes and 2D maps in a web browser without a plugin. It uses WebGL for hardware-accelerated graphics, and is cross-platform, cross-browser, and tuned for dynamic data visualization.

Get Started
Visit the Downloads page or use the npm module:

```
npm install cesium
```

Have questions? Ask them on the forum.
Interested in contributing? See CONTRIBUTING.md.

Mission
Our mission is to create the leading 3D globe and map for static and time-dynamic content, with the best possible performance, precision, visual quality, platform support, community, and ease of use.

http://cesiumjs.org/2015/12/14/Cesium-npm/
Continuous Integration

http://cesiumjs.org/2016/04/07/Cesium-Continuous-Integration/
Cesium Arcade Machine!
What’s next?
Features

- Label declutter
- Subsurface visualization
- WebGL 2

WebGL 2 Samples Pack – great reference!

https://github.com/WebGLSamples/WebGL2Samples
Multi-monitor Liquid Galaxy

Google Summer of Code project by Abhishek Potnis
Mentored by Andrew Leahy, Western Sydney University

https://youtu.be/P_OdDbV9lZE
glTF Pipeline

- glTF spec is now 1.0!
- glTF Pipeline: convert, optimize, visual quality

https://github.com/AnalyticalGraphicsInc/gltf-pipeline
Need to:
Finish the spec
Merge 3d-tiles into master
Validator

https://github.com/AnalyticalGraphicsInc/3d-tiles
We’re hiring!

Software Developers and Geospatial Data Wranglers

cesiumjs.org/jobs