

# **THE CARTOGRAPHIC SIDE OF THE WEB**

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Raluca Nicola – Web Cartographer at Esri

# About me

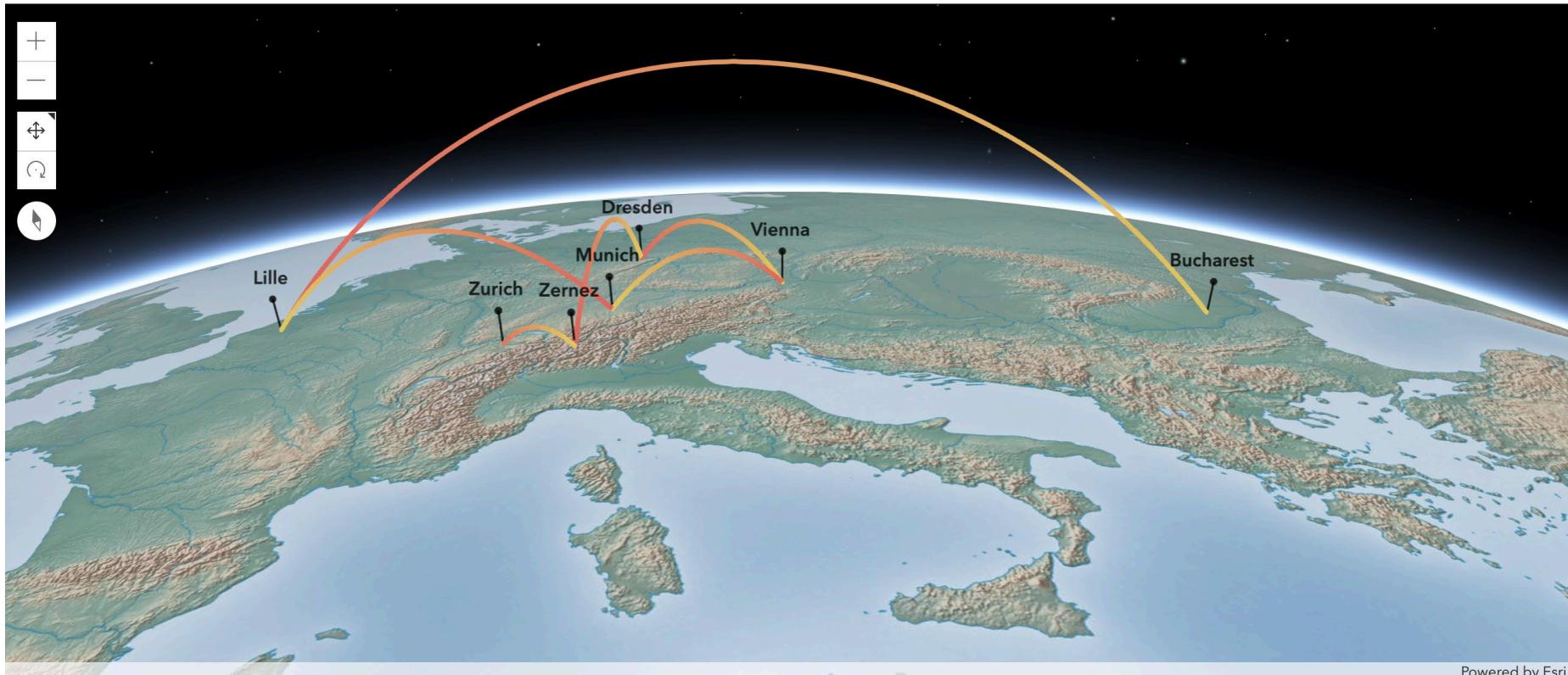
**Bachelor in Geography,**  
University of Bucharest  
Erasmus exchange, Lille Technical  
University

**International Master of  
Cartography,**  
Technical Universities of Munich,  
Vienna and Dresden

**GIS Internship,** Swiss National  
Park

**Teaching Assistant,**  
Cartography Institute ETH Zurich

**Cartographer,** Esri R&D Center  
Zurich



# My daily work

Build custom web mapping prototypes and demos as part

of the Application Prototype

Lab team

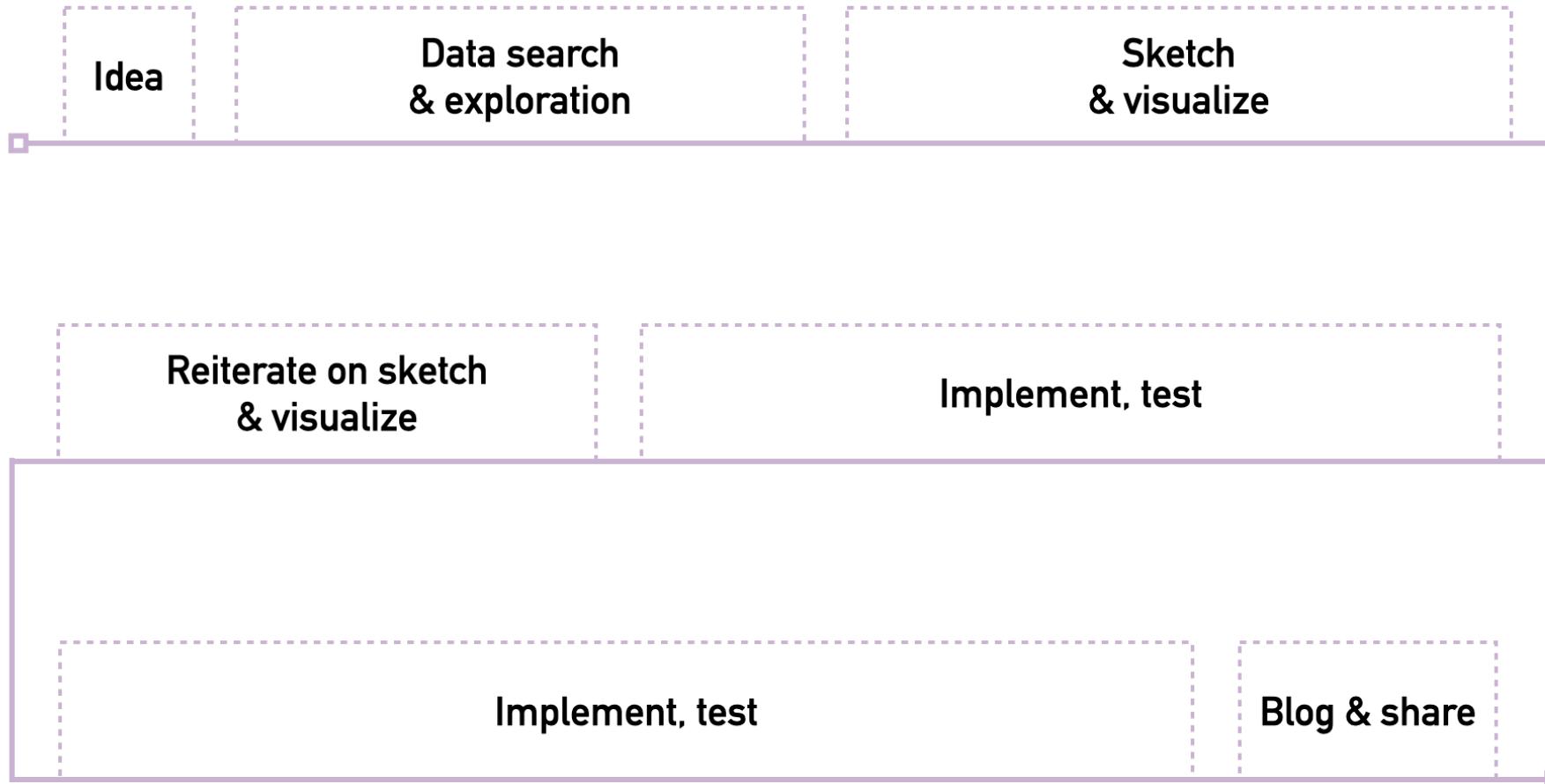


 <b>The Five Deeps</b> A 3D interactive web map of the deepest points in each of the five oceans. <a href="#">View item details</a>	 <b>Building Reach Analysis</b> Use Line-of-Sight analysis to calculate locations on building facades reached by various types of fire truck ladders. <a href="#">View item details</a>	 <b>Let's Go Shopping</b> Use JS API blendModes to dynamically display different basemaps over an area of interest calculated as a Service Area and list OSM shops within that area of interest. <a href="#">View item details</a>	 <b>Coastal eutrophication</b> Eutrophication is a harmful process driven by enrichment of water by nutrients and leading to increased biomass of algae and water quality degradation. This application displays the location... <a href="#">View item details</a>	 <b>Compare Land Cover Change</b> Display the land use/land cover timeseries layer derived from ESA Sentinel-2 imagery at 10m resolution, then compare the change between any two years from 2017-2021. <a href="#">View item details</a>	 <b>Dangermond Preserve Virtual Tour</b> Lidar provides a fascinating glimpse into the landscape of the Jack and Laura Dangermond Preserve. Virtually tour the preserve by travelling over pre-defined routes, interesting... <a href="#">View item details</a>	 <b>Atmospheric measurements</b> World map displaying atmospheric measurements of pressure and temperature. Dataset derived from radio occultation data acquired in 2019 by GeoOptics, Inc. <a href="#">View item details</a>
 <b>Satellite Explorer</b> Learn how we use satellites, discover major satellite constellations, and explore various types of orbits with this interactive 3D visualization of active satellites orbiting the Earth. <a href="#">View item details</a>	 <b>Stad Ship Tunnel</b> Visualizing in 3D the Stad ship tunnel in Vestland County, Norway using configured scene viewpoints. <a href="#">View item details</a>	 <b>HYCOM Flow</b> HYCOM provides five variables including Sea Surface Height as well as eastward velocity, northward velocity, in-situ temperature, and salinity at 40 vertical depth levels. <a href="#">View item details</a>	 <b>Benelux Tunnel</b> A fly through the Benelux tunnel in Rotterdam, Netherlands. Point cloud data of Schiedam provided by Cyclomedia. <a href="#">View item details</a>	 <b>Viewshed Overlays</b> Calculate viewshed overlapping areas by interactively setting observer locations in the view, and then toggle individual analysis results to gain further understanding. <a href="#">View item details</a>	 <b>CDC's Social Vulnerability Index 2018</b> Discover the CDC's Social Vulnerability Index 2018. Every community must prepare for and respond to hazardous events, whether a natural disaster like a tornado or a disease outbreak, o... <a href="#">View item details</a>	 <b>Future Heat Events and Social Vulnerability 2018</b> Overlay NOAA projected heat events and CDC's Social Vulnerability Index (SVI) which uses U.S. Census data to determine the social vulnerability of every county. The SVI ranks... <a href="#">View item details</a>
 <b>Street Trees in NYC</b>	 <b>Landsat Lens</b>	 <b>Blue Light Analysis</b>	 <b>Sketch the city</b>	 <b>Globe of extremes</b>	 <b>Earthquakes Visualization</b>	 <b>Global Temperature Anomaly</b>

# Agenda

1. Workflow when creating maps
2. Idea > Data > Design > Implement > Test > Share
3. Examples

# Workflow



# Idea

## Curiosities

Example: where is the highest internet speed connection in the world? How did my city expand in the last 50 years?

## Inspiration

Example: a map you saw in a book or in a game

## Personal

Example: track my route to work/university, map my holiday

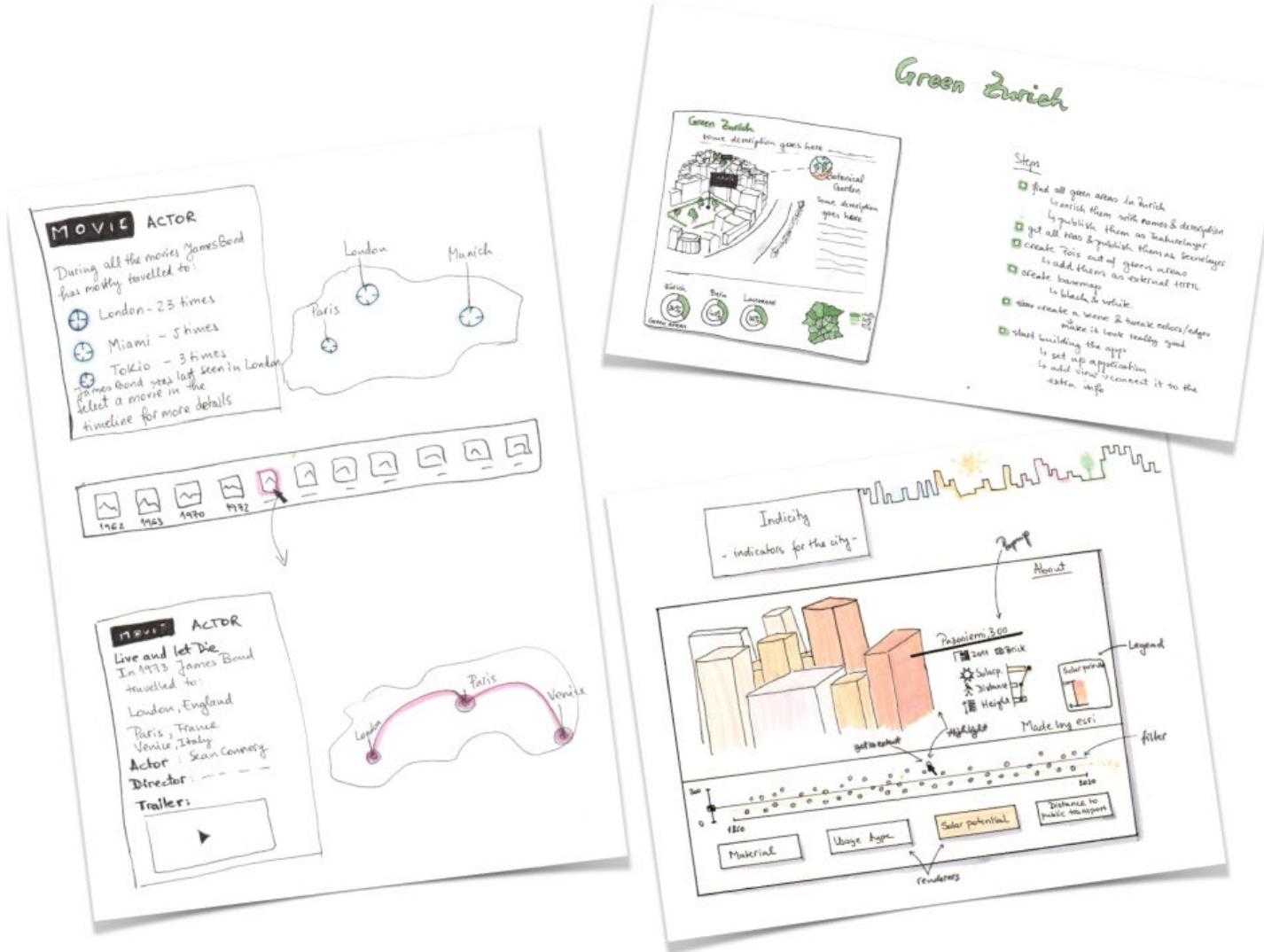
# Data search and exploration

Get data from open data portals/parse it from websites



Explore data in ArcGIS Pro, QGIS, Excel, R, ArcGIS Online, Mapbox Studio

# Sketch your ideas



# Mapping libraries



Leaflet



ArcGIS API for JavaScript



Mapbox GL JS



D3



deck.gl



CesiumJS



ThreeJS



Google Maps Platform – Maps JavaScript API



OpenLayers



HERE Maps API for JavaScript



General visualization purpose



Mapping specific

# Develop, test and share

code, code, , code

test, test

code, some more , code, code

show app to my colleagues and get feedback

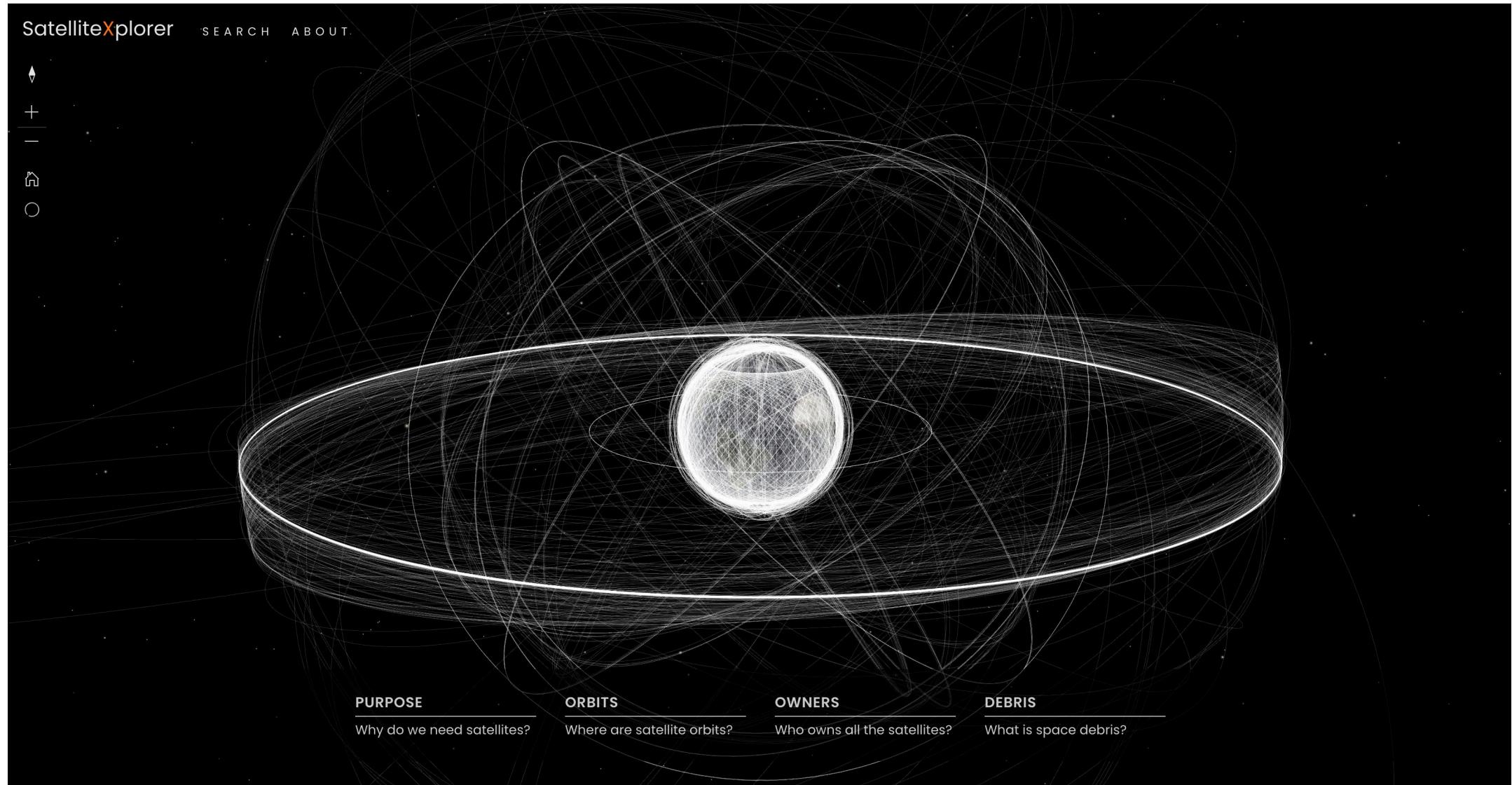
code, , code

some more feedback

some more code

deploy, write blog post and share with everyone  

# Space - satellite explorer



<https://geoxc-apps.bd.esri.com/space/satellite-explorer/>

# Satellite Explorer - idea

Requirements.rtf – Saved Share PDF for viewing or commenting Tell me Share Editing Comments

Home Insert Draw Design Layout References Mailings Review

Paste Font Paragraph Styles Dictate Sensitivity Editor Esri Icons Create and Share Adobe PDF Request Signatures

# REQUIREMENTS

Link to the app: <https://geoxc-apps.bd.esri.com/space/satellite-explorer/>

**REQUIREMENTS**

Main goal is to teach users about satellites:

- Where are they located in the atmosphere?
- How many satellites are in space?
- What are the various types of satellites? (ex. classification based on their orbit type)
- What are they used for?
- How much space debris is out there?
- Famous satellites – ISS, Chinese anti-satellite test ([Fēngyún 1C Debris](#)) – try to show the 3D model too, to give a feeling for what it looks like
- Famous constellations – GPS, Landsat, [Starlink](#)... - what are they used for, when were they launched.
- Oldest satellite still in orbit

The app should work on both desktop and mobile.

Nice to have:

- Animated satellites – probably need to use [ThreeJS](#)?
- Having deep links to specific satellites/constellations
- “Satellites in the News” section – how to add a news feed?
- Display satellites using a 3D model – NASA has 3D models for their satellites: <https://nasa3d.arc.nasa.gov/models>

UPDATE 28.04.2022

Page 1 of 9 1156 words Focus 170%



Climate Energy Transportation Food Nuclear Weapons Science & Democracy

REPORTS & MULTIMEDIA / FEATURE

## UCS Satellite Database

In-depth details on the 5,465 satellites currently orbiting Earth, including their country of origin, purpose, and other operational details.

Published Dec 8, 2005 | Updated May 1, 2022

- [Database \(Excel format\)](#)
- [Database \(text format\)](#)



Orbital Data ▾ Satellite Catalog ▾ SOCRATES Space Data ▾ Library ▾

Donate



### NORAD GP Element Sets Current Data

Current as of 2022 Sep 28 16:05:25 UTC (Day 271)

#### A New Way to Obtain GP Data (aka TLEs)

[TLE/3LE](#) [2LE](#) [OMM XML](#) [OMM KVN](#) [JSON](#) [JSON PP](#) [CSV](#)

#### Supplemental GP Data

##### Special-Interest Satellites

Last 30 Days' Launches

Space Stations

100 (or so) Brightest

Active Satellites

Analyst Satellites

Russian ASAT Test Debris (COSMOS 1408)

Chinese ASAT Test Debris (FENGYUN 1C)

IRIDIUM 33 Debris

COSMOS 2251 Debris

##### Weather & Earth Resources Satellites

Weather

NOAA

GOES

Earth Resources

Search & Rescue (SARSAT)

Disaster Monitoring

Tracking and Data Relay Satellite System (TDRSS)

ARGOS Data Collection System

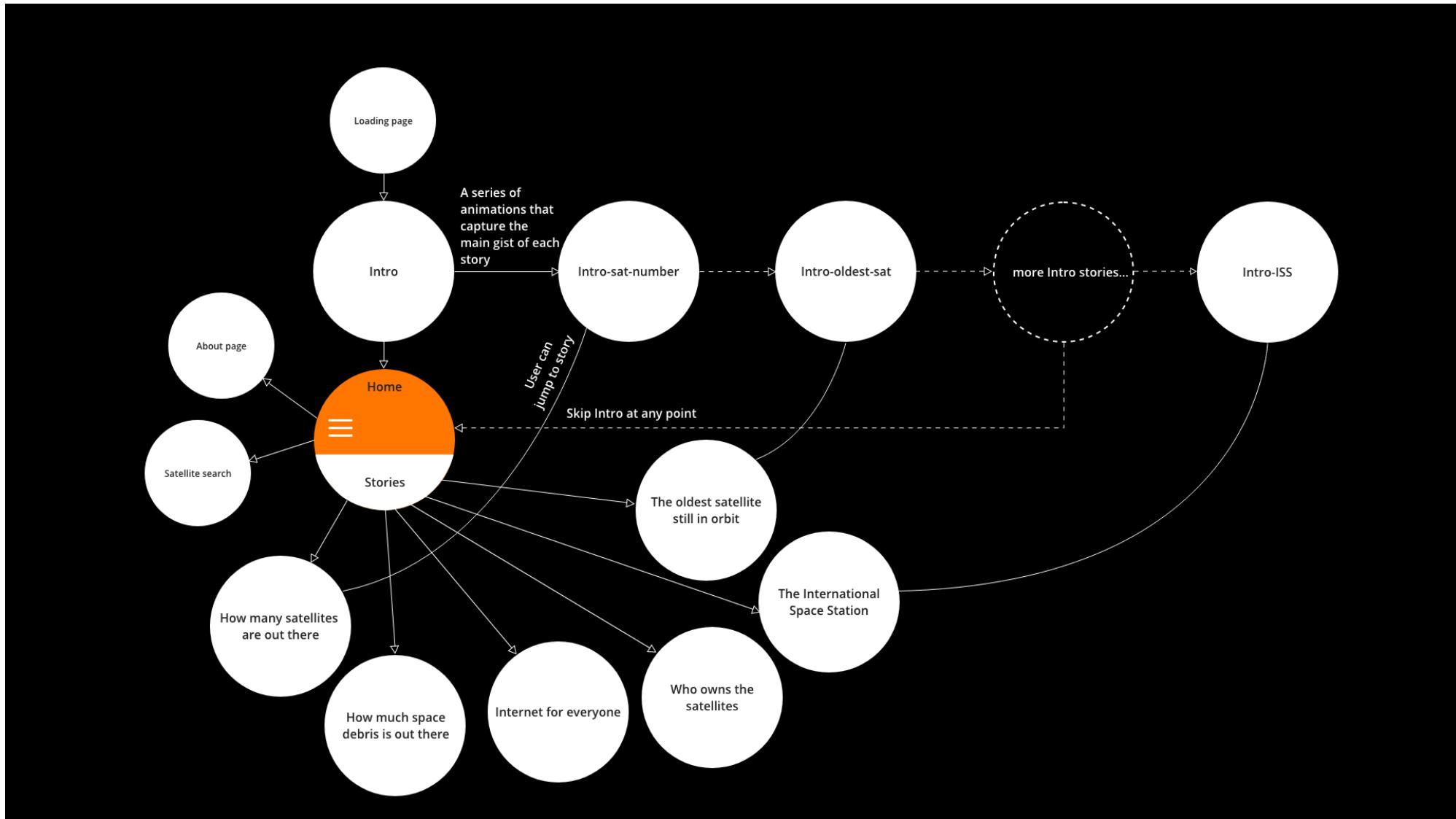
Planet

Spire

##### Communications Satellites

Active Geosynchronous

# Satellite Explorer - sketch



# Satellite Explorer - sketch

Loading



Intro



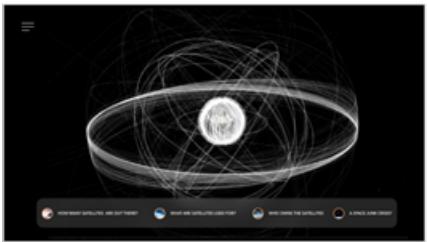
Intro = satellite = number



Intro = satellite = owners



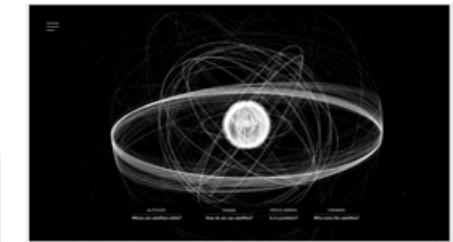
Home



Home - iPh...



Home - 1



Home - iPh...



Home, iPhone 12 - 1



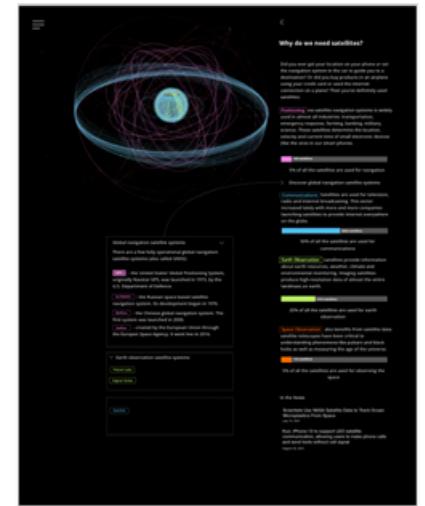
Search



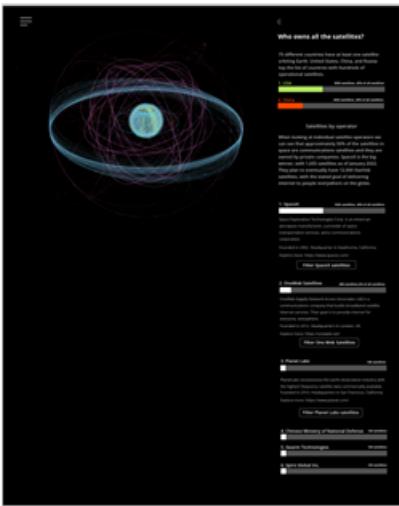
Satellite View



Story - satellite usage



Story - satellite owners

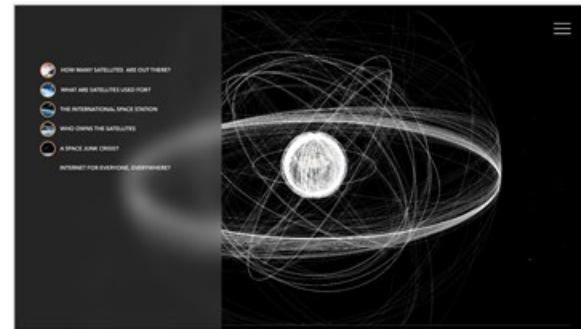


# Satellite Explorer - sketch

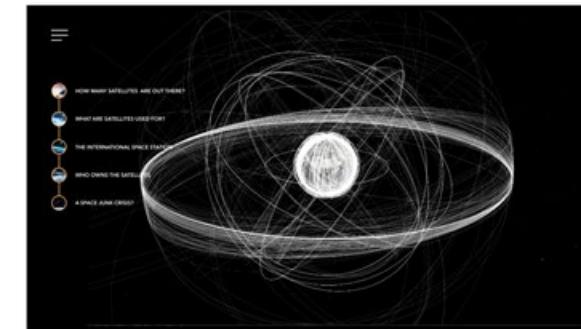
Home – version 1



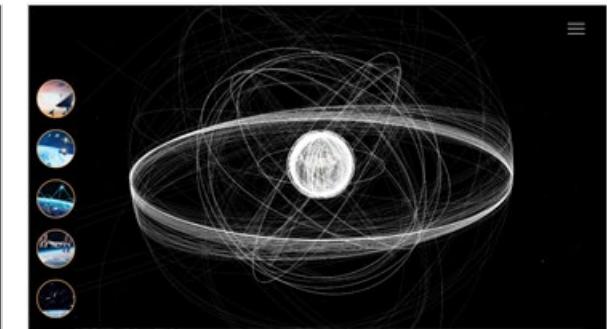
Home – version 2



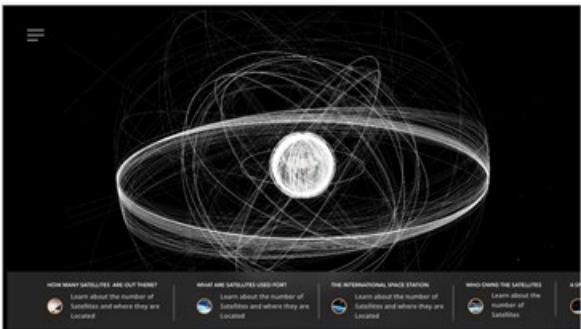
Home – version 2 – 4



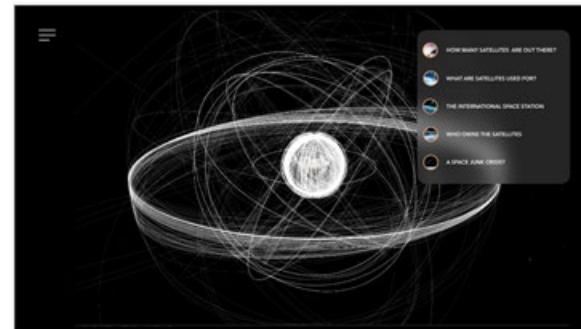
Home – version 3 – 2



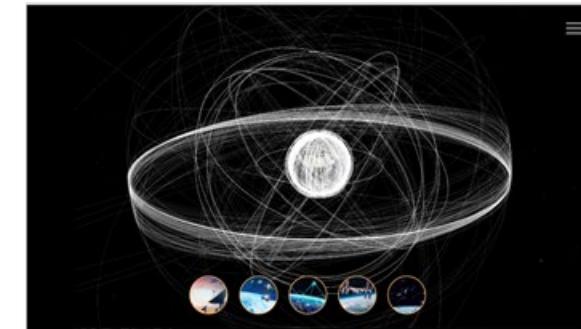
Home – version 2 – 1



Home – version 2 – 2



Home – version 3



Home – version 3 – 1



# Satellite Explorer - code

RalucaNicola / satellite-explorer Public

Code Issues Pull requests Actions Projects Wiki Security Insights Settings

main package.json Go to file ...

RalucaNicola update api to version 4.23 Latest commit 6bf38fb on 22 Apr History

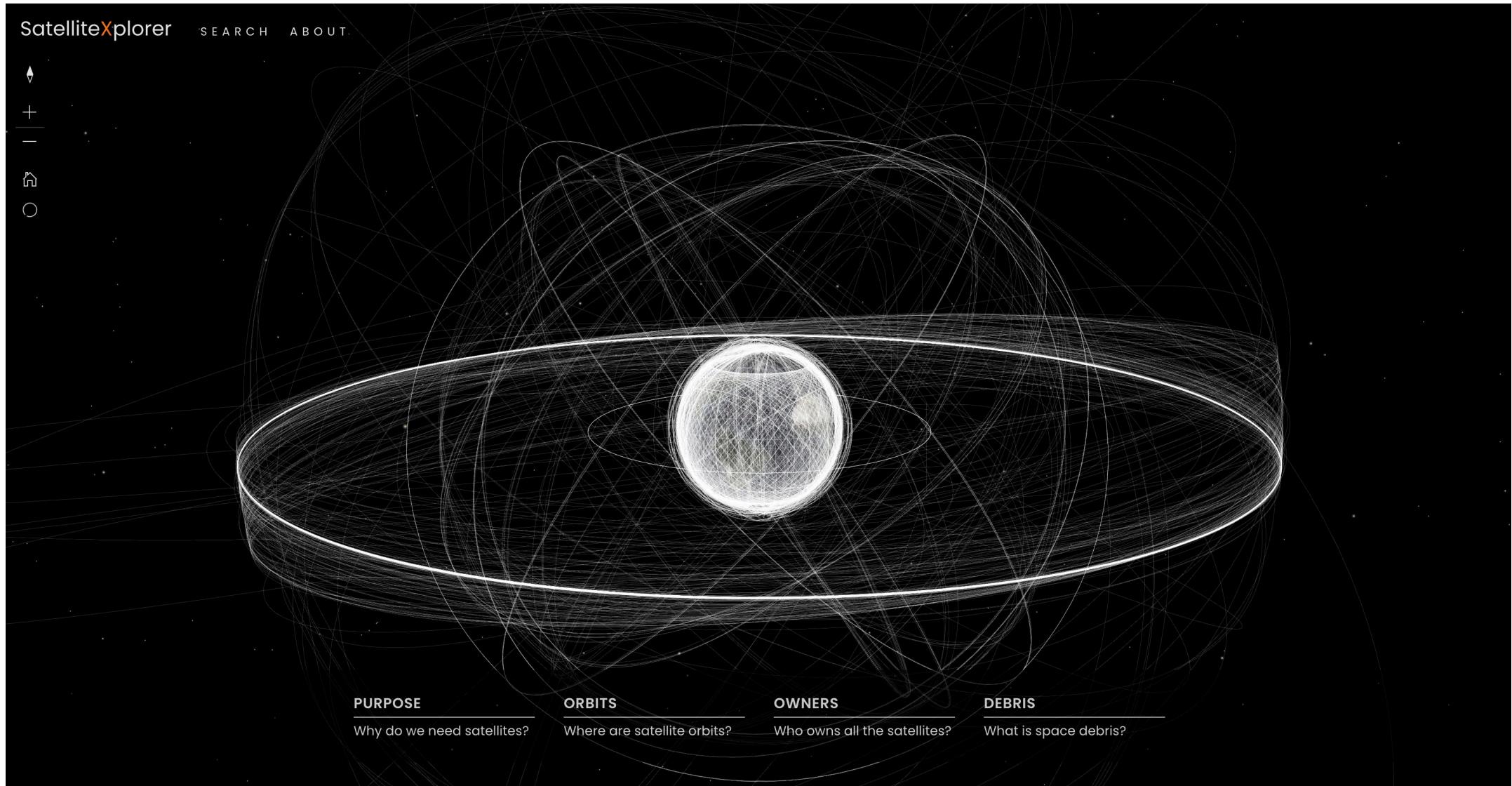
1 contributor

31 lines (31 sloc) | 642 Bytes Raw Blame ⌂ ⌂ ⌂

```
1  {
2    "name": "satellite-explorer",
3    "version": "1.0.0",
4    "description": "Explore and learn about satellites",
5    "scripts": {
6      "dev": "vite",
7      "build": "vite build"
8    },
9    "keywords": [
10      "arcgis-js",
11      "satellite",
12      "3D"
13    ],
14    "author": "Raluca Nicola",
15    "license": "MIT",
16    "devDependencies": {
17      "@vitejs/plugin-react": "^1.1.4",
18      "vite": "^2.7.13"
19    },
20    "dependencies": {
21      "@arcgis/core": "^4.23",
22      "d3-array": "^3.1.1",
23      "d3-scale": "^4.0.2",
24      "mobx": "^6.4.1",
25      "mobx-react": "^7.3.0",
26      "papaparse": "^5.3.1",
27      "react": "^17.0.2",
28      "react-dom": "^17.0.2",
29      "satellite.js": "^4.1.3"
30    }
}
```

<https://github.com/RalucaNicola/satellite-explorer/>

# Satellite Explorer - demo



<https://geoxc-apps.bd.esri.com/space/satellite-explorer/>

## A happiness map

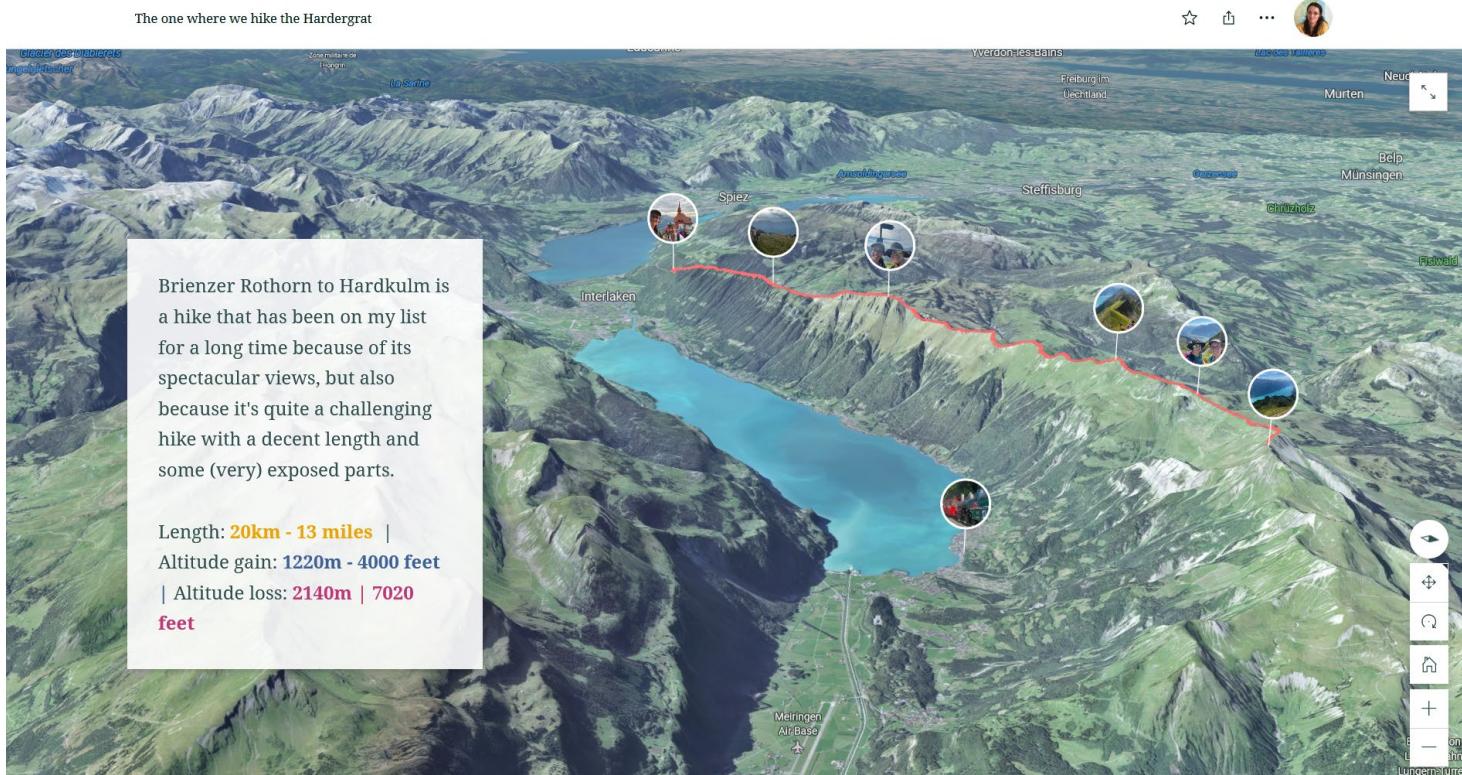
### What makes us happy?

In 2017 Mechanical Turk users shared 100,000 happy moments for a research project that tried to classify and understand what makes people happy in their daily lives. You can explore them on a globe below or read about how to make such a map in [this blog post](#).



<https://ralucanicola.github.io/happy-moments/>

# Personal maps - hiking



<https://storymaps.arcgis.com/stories/46eafe55d96b43de97fbdd2dc6b6b433>



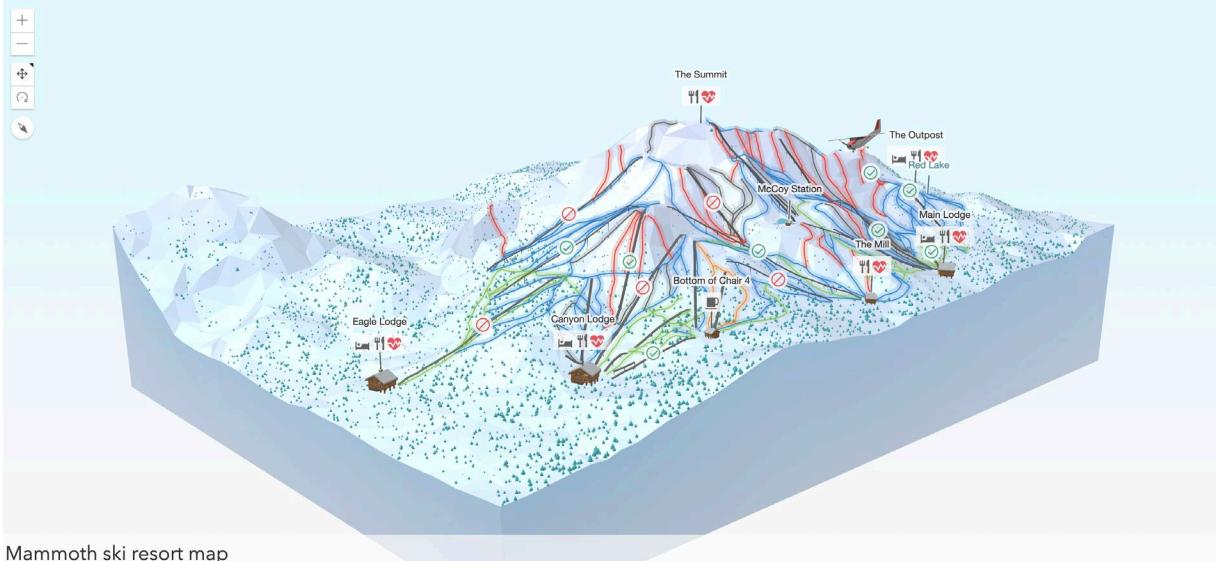
<https://www.visualcinnamon.com/portfolio/map-norway/>

## THE FIVE DEEPS

Over 80% of the ocean remains uncharted and unexplored. The United Nations' Seabed 2030 project aims to map the entirety of the ocean floor by the end of this decade.

Explore the deepest point in each of Earth's oceans

# Games



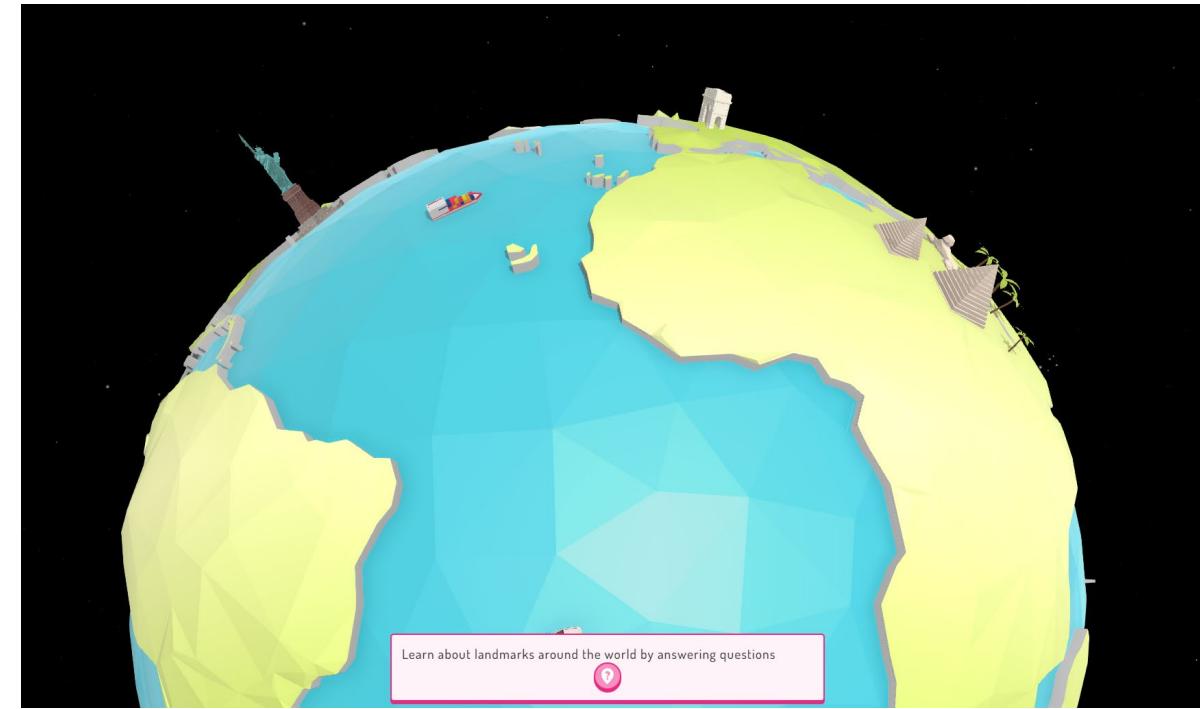
Mammoth ski resort map

This is an interactive map of the Mammoth ski resort, built for demo purposes only. Some fun things you could do: [fly the plane](#) or [make it snow](#). Ski slopes are colored based on their difficulty: [easiest](#), [easy](#), [difficult](#), [very difficult](#), [adventure parks](#). Some ski lifts are open: and some are closed: .

Application built with ArcGIS for JavaScript. Credits to Philip Mielke for the trees, ski trail and ski lifts data. Inspired by Skiguide Zermatt and the official Mammoth ski resort map. 3D models from Google Poly: Chalet and Small airplane.

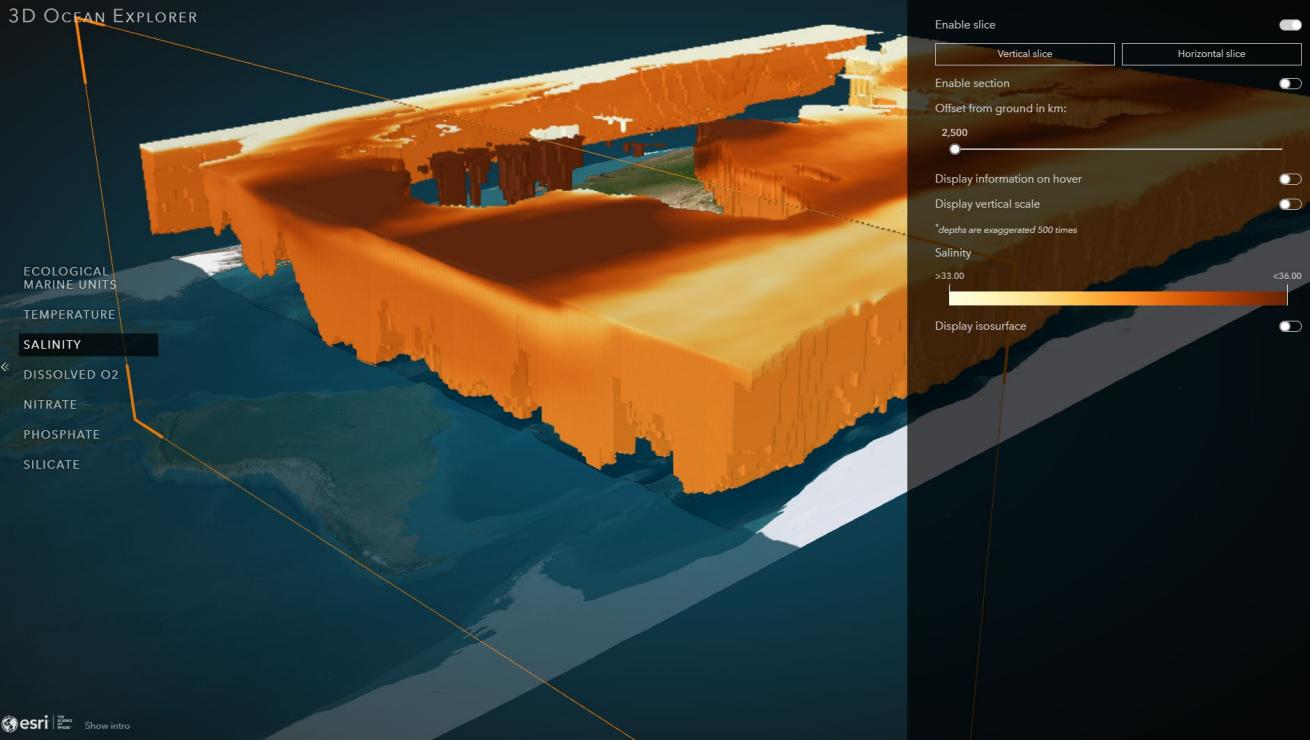
Powered by Esri

<https://ralucanicola.github.io/ski-resort-map/>

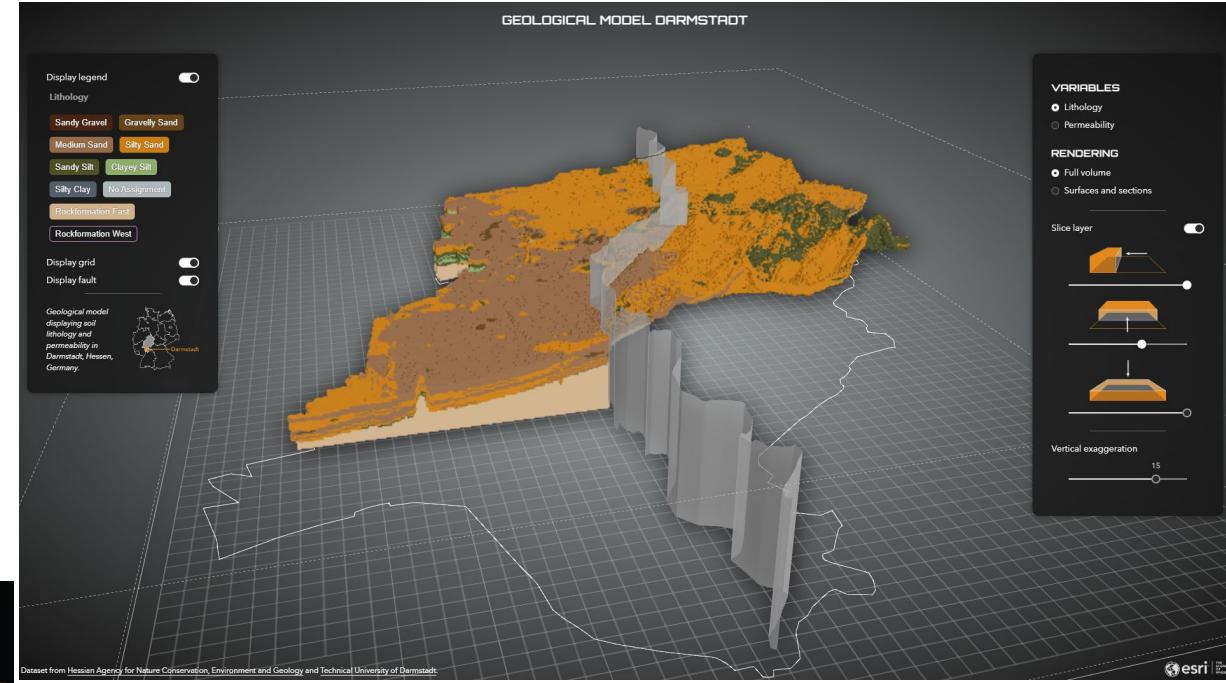


Work In Progress...

## Scientific data

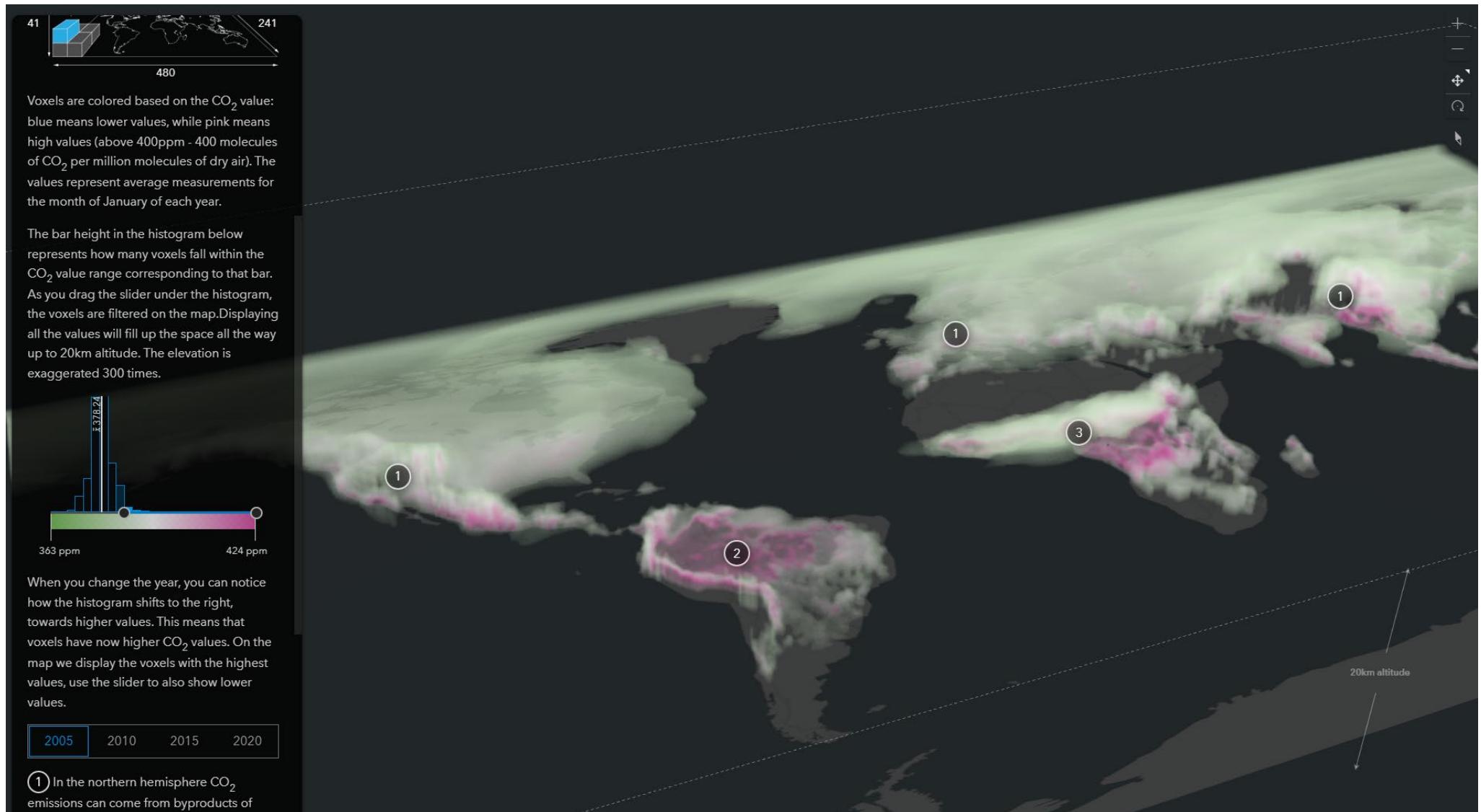


<https://geoxc-apps4.bd.esri.com/ocean-explorer/>



<https://geoxc-apps4.bd.esri.com/geology-darmstadt/>

## Scientific data – part II



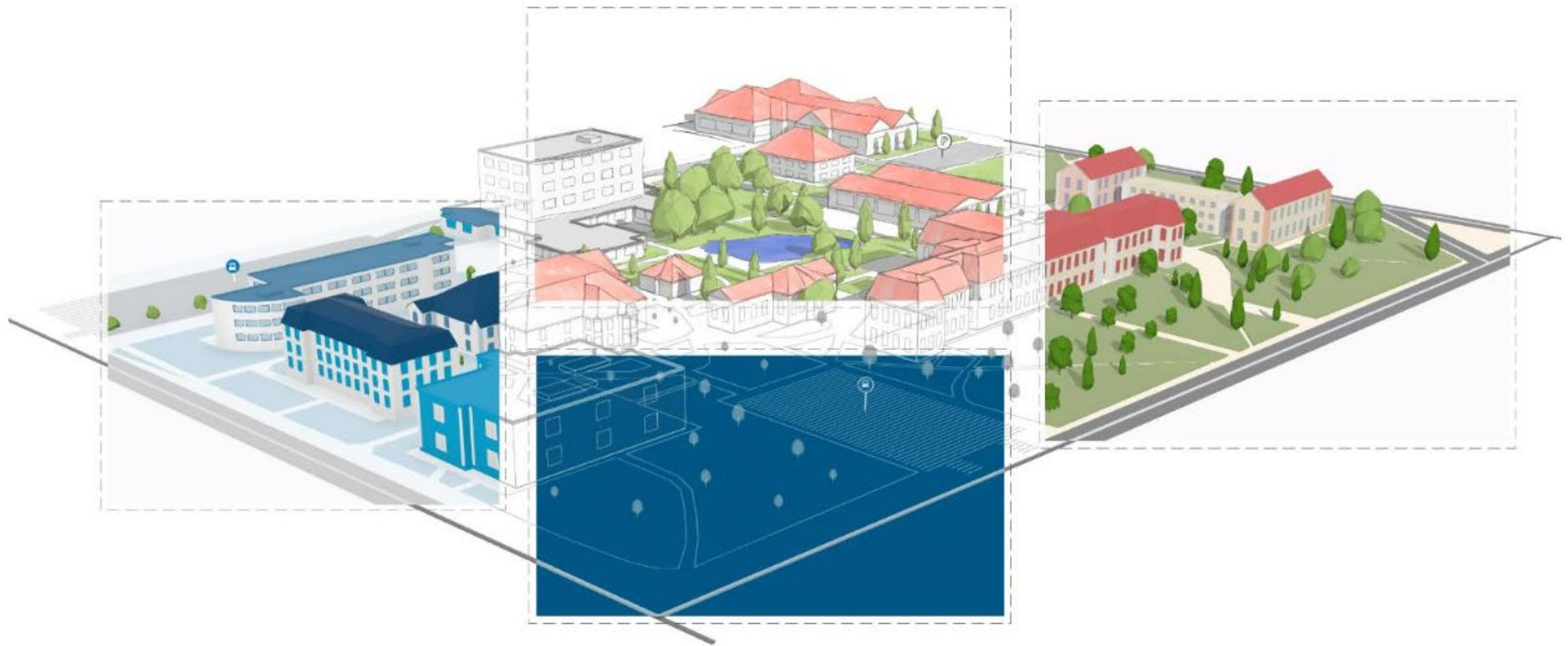
## Maps and music



<https://www.youtube.com/watch?v=cWZrt8OAxRw>

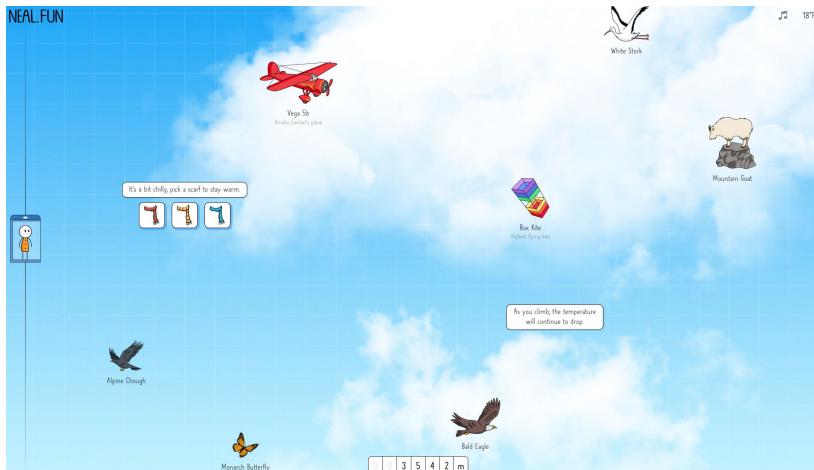
[https://ralucanicola.github.io/JSAPI\\_demos/winter-landscape/](https://ralucanicola.github.io/JSAPI_demos/winter-landscape/)

## Map styles

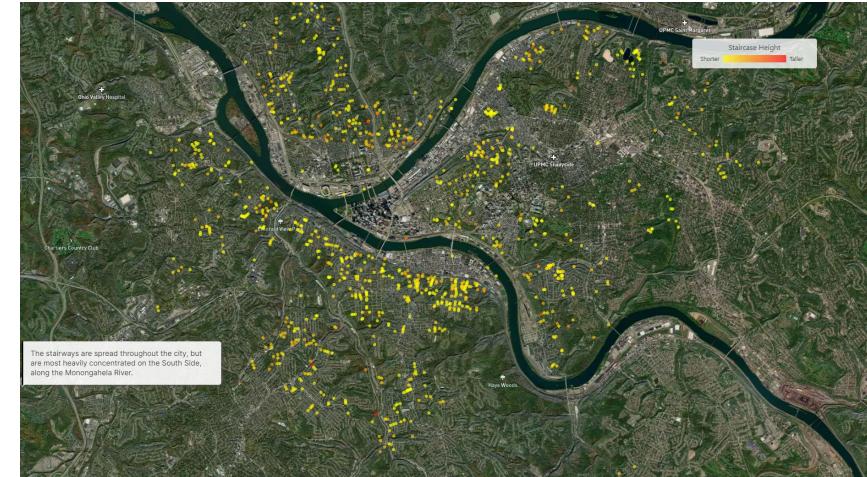


<https://storymaps.arcgis.com/stories/8692e3a5c1c049ae8727e4a218eac928>

## Some more inspiration



<https://neal.fun/space-elevator/>



<https://pittsburgh-steps.samlearner.com/>



<https://newworld-preview-0521.dev.60fps.fr/>

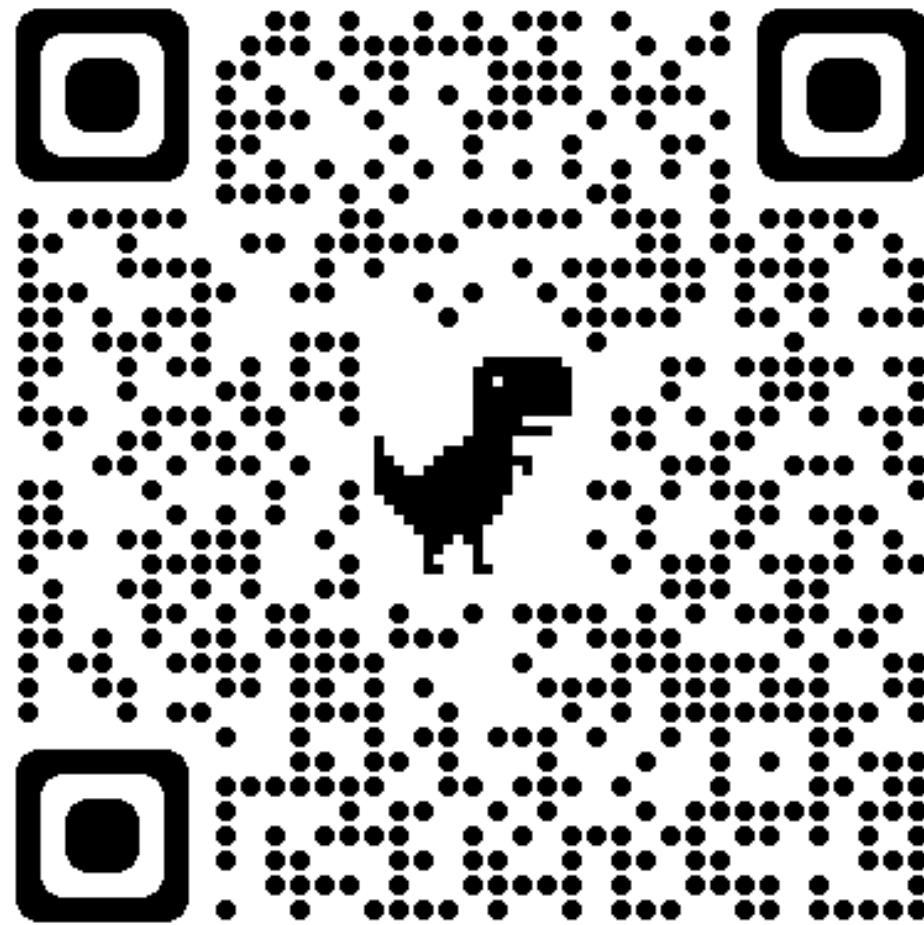
<https://www.informationisbeautifulawards.com/showcase>

## Idea - keep a blog of your project and what you're learning

Examples:

- <https://fabacademy.org/2021/labs/waag/students/nadieh-bremer/blog/>
- <https://www.rauljimenez.info/docs/digital-brain>
- <https://maggieappleton.com/basb> (building a second brain)

Link to this presentation



<https://github.com/RalucaNicola/hslu-presentations/tree/hslu-2023>