Visualization of 3D data in the web environment – Open Land Use and Yield potential use cases

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Idea

● **Extend HSLayers NG functionality** ~ by integrating CESIUM 3D module

● **Promote Open Data** ~ make them 3D using perspective view

● **Setting up a use case of DataBio agriculture pilot** ~ portraying detailed data from a farm
Data

- **Open Land Use** (SDI4Apps)
- **Open Transport Map** (OpenTransportNet)
- **Smart Points of Interest** (SDI4Apps)
- Global digital terrain model - **EU-DEM**, (30m px)
- **Sentinel2** imagery

- Local digital terrain model - **DMR 5G, © CUZK**
- Local digital surface model - **DMP 1G, © CUZK** (avg. point spacing 1 m)
- Yield potential, NDVI, CTI, machinery tracks **© Rostenice farm**
Software

- **HSLayers-NG (MIT License)** - web mapping library written in Javascript based on [OpenLayers 3](https://openlayers.org/) and [Cesium](http).

- **PostGIS, MapServer, ArcGIS. ...**
Approach

1. Integration of Cesium plugin to HS Layers NG

2. Visualization of Open Land Use on top of EU-DEM

3. Exploration of yield potential for selected Farm (Rostenice)
Results

- Cesium plugin to HS Layers NG integration
  - https://github.com/hslayers/hslayers-ng
  - examples/3d-olu
  - components/cesium
Results

**3D Open Land Use app**

- Visualization of **Open Land Use** on top of the EU-DEM terrain model
- Custom datasets can be added (as WMS in WGS 84)
Results

Rostenice farm
- Local DTM and local DSM
- Slope, aspect
- Compound topographic index
- Normalized difference vegetation index
- Yield potential
- Machinery tracks, working swath, ...
Future challenges

- **Large Data Analytics-as-a-Service**
  - *Yield potential calculation:*
    - NDVI series
    - CTI/TWI
    - Crop types
    - ...
  - *Machinery tracks:*
    - Analysis of realized tracks
    - Calculation of risk areas (steep gradients)
    - generation of recommended tracks related to particular vehicles
- (local, regional, national and EU wide legislation)
Potential business model

- Freemium
  - *Open access* to existing global data mashed-up with layers of user choice (3D OLU app)
  - *Low cost service* for online calculation of NDVI, TWI/CTI and yield potential from openly available data
  - *Regular cost service* for a farm willing to process its detailed data
Conclusions

● Acknowledgements - databio.eu

● Further reading
  ○ Description of project realization
  ○ Description of created applications

● 3D OLU

● Rostenice farm