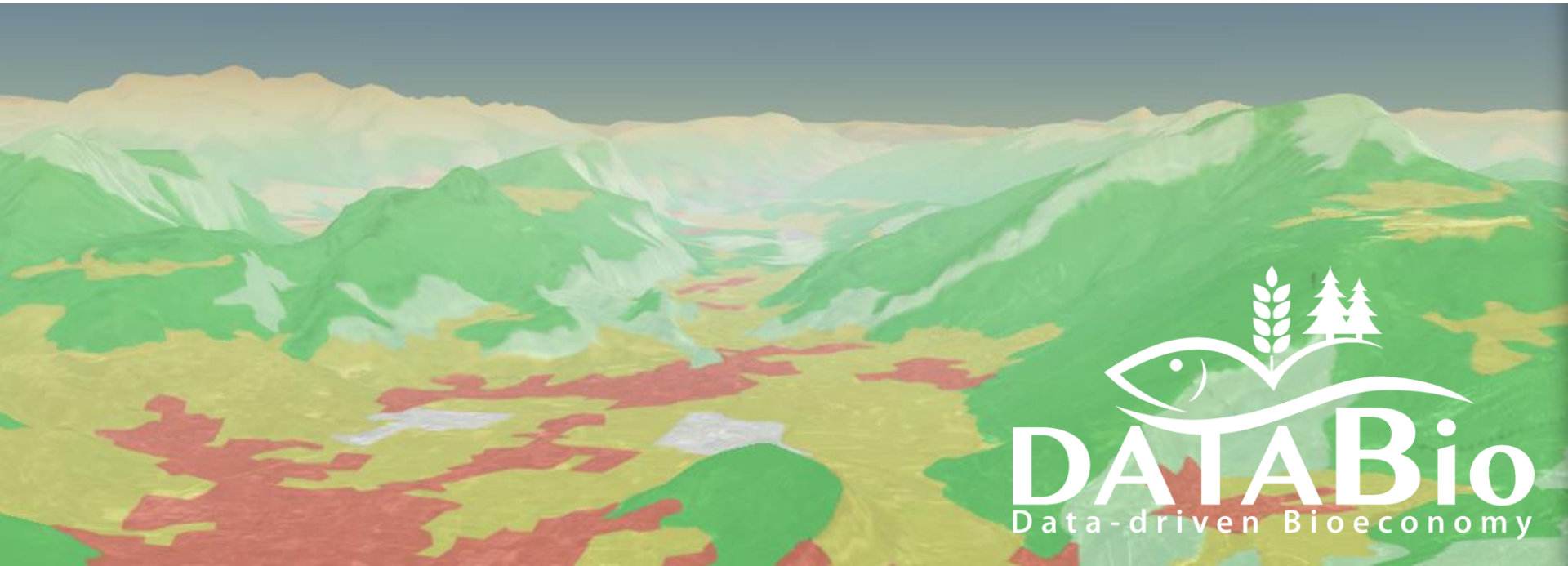


# Visualization of 3D data in the web environment – Open Land Use and Yield potential use cases

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Tomas Mildorf, Vojtěch Lukas*



# 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

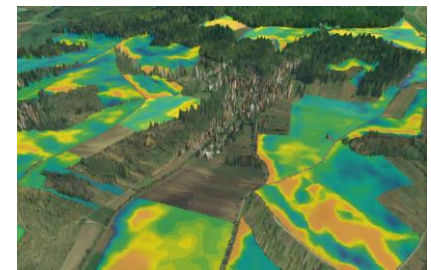
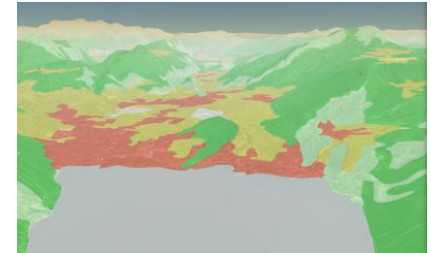
- [Open Land Use](#) ([SDI4Apps](#))
  - [Open Transport Map](#) ([OpenTransportNet](#))
  - [Smart Points of Interest](#) ([SDI4Apps](#))
  - Global digital terrain model - [EU-DEM](#), (30m px)
  - [Sentinel2](#) imagery
- 
- Local digital terrain model - [DMR 5G](#), © [CUZK](#)
  - Local digital 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](#) and [Cesium](#).
- [PostGIS](#), [MapServer](#), [ArcGIS](#). ...

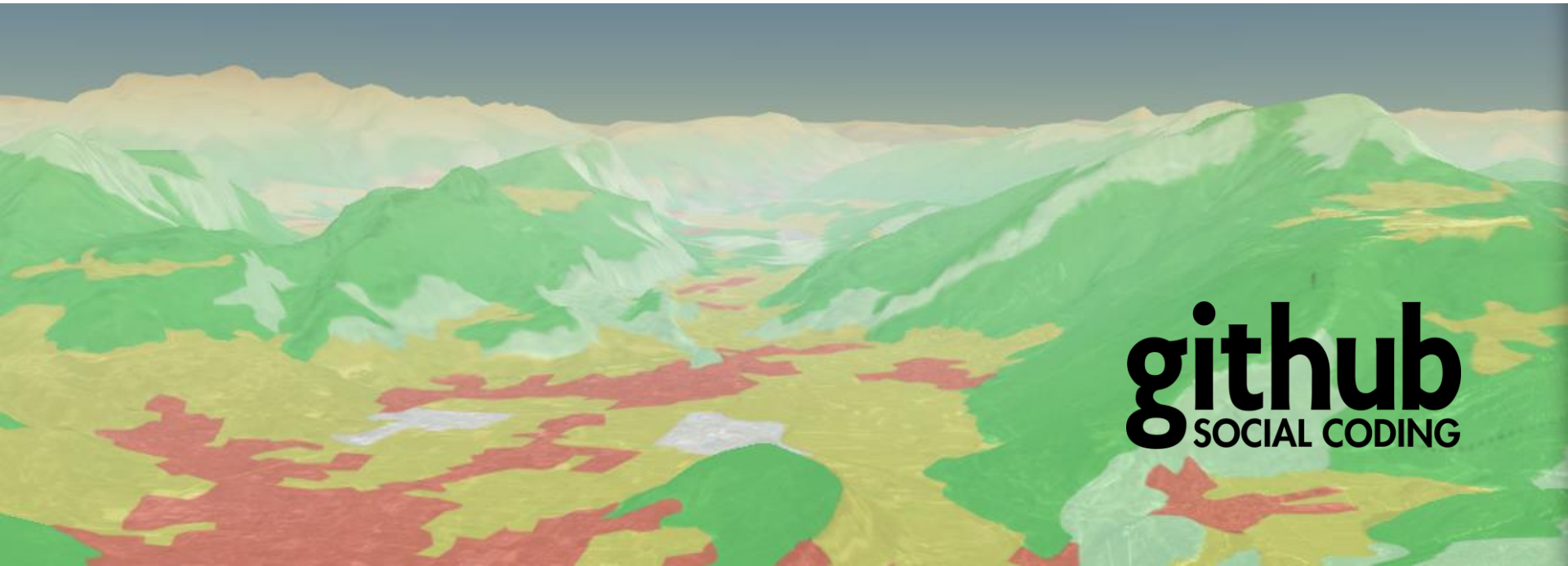
# Approach

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

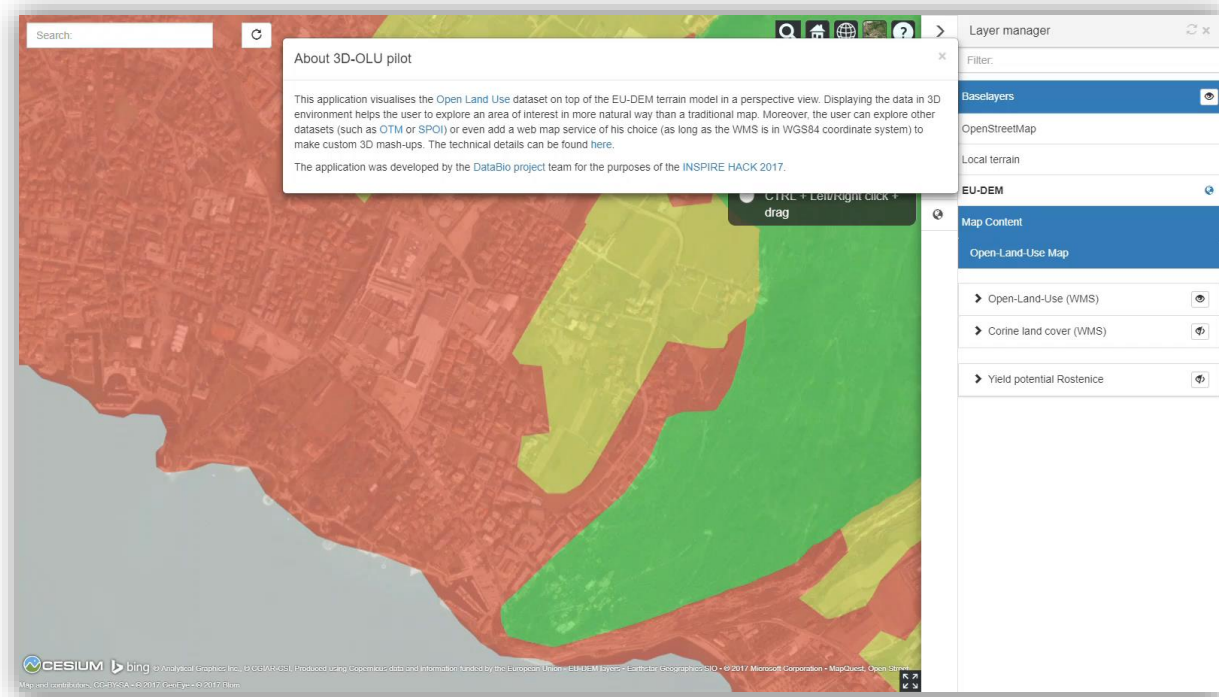
- Cesium plugin to HS Layers NG integration
  - <https://github.com/hslayers/hslayers-ng>
    - [examples/3d-olu](#)
    - [components/cesium](#)



# 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)

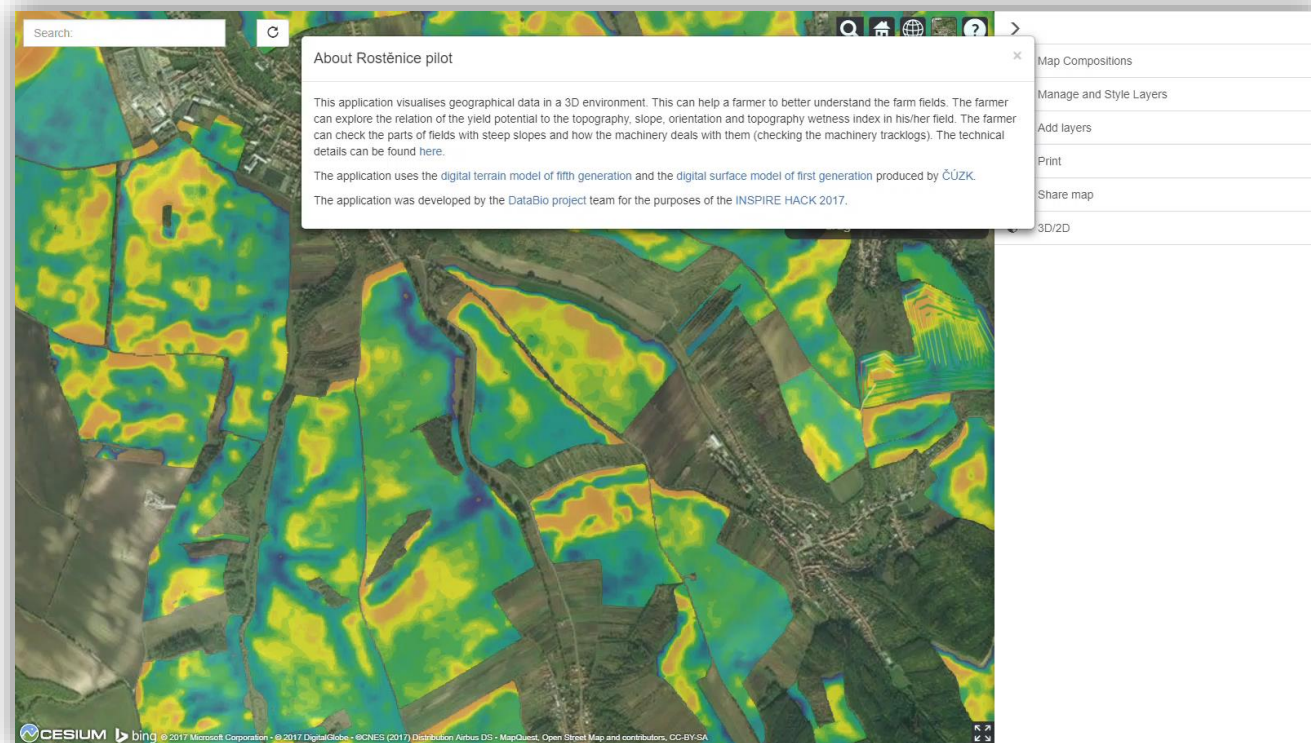




# Results

## 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](http://databio.eu)
- Further reading
  - [Description of project realization](#)
  - [Description of created applications](#)
- [3D OLU](#)
- [Rostenice farm](#)

