OpenLayers 3 & Cesium Integration

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Camptocamp

- Open Source Service Provider
- Staff 49
- Switzerland, France & Austria
- Since 2001
Camptocamp: 3 divisions

**GEOSPATIAL**
- Webmapping
- Desktop & Web GIS
- Spatial Data Infrastructure (SDI)
- Mobile applications
- 3D Virtual Globes

**BUSINESS**
- Enterprise Resource Planning (ERP)
- Business Intelligence Reporting

**INFRASTRUCTURE**
- Virtualization, Cloud computing
- Automation of system administration
- Deployment of complex architectures

**CONSULTING, R&D**

**IMPLEMENTATION**

**SUPPORT**

**TRAINING**
2D OpenLayers 3

- Rich and high performance webmapping library
  - Lots of data sources (vector & raster), different projections
  - Draw, measure, edit, etc
- Support Canvas & WebGL Renderers
- Mobile first implementation
  - Geolocate
  - Map rotation according to heading
  - Touch events
- 3D Ready: camera
Geospatial 3D Web expectations?

- 3D Scenes
  - Aerial imagery and terrain
  - Buildings with textures
  - Label and marker
  - Rich interaction (Navigate, pick, popup, measure, usw.)
  - Global perimeter, higher local resolution

- Technology
  - Web (no plugin), Cross Platform and Cross Device
  - Open Standards and Formats
  - Open Source

- What's available? => Cesium

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3D Webmaps

- 2D – 3D
  - 2D for local projection, traditionnal webmap use cases
  - 3D if the user would like to tilt the view

- Toward
  - Feature parity
  - Navigation continuity
High quality terrain rendered with Cesium

- **Goal**: Test Switzerland's best data at a country-wide level integrated into
  - Cesium terrain server
  - Cesium virtual globe
- **Data**:
  - Aerial imagery
  - Terrain
  - Buildings
  - WMS Overlays
  - GeoJSON
Swissimage

- The orthophoto mosaic SWISSIMAGE is a composition of digital color aerial photographs over the whole of Switzerland and is updated every 3 years.
- Ground resolution: 0.25 m, 0.5 m (depending on the area) and 2.5 m
SwissALTI3D

- SwissALTI3D is an extremely precise digital elevation model which describes the surface of Switzerland without vegetation and development.

- Quality:
  - 2m grid based on laser points (less than 2000 metres above sea level): ±0.5 m 1σ
  - 25m grid stereo correlation (more than 2000 metres above sea level): 1 - 3 m average error
SwissBUILDINGS3d

- swissBUILDINGS3D 1.0 describes building volume bodies without roof shape across Switzerland and the Principality of Liechtenstein and corresponds to a simple 3D city model.
POC

- Backend
  - Setup an AWS Windows machine
  - Install the Cesium Terrain Server
  - Load the DEM into the Terrain Server

- Cesium Virtual Globe
  - Data sources
    - Terrain : Cesium Terrain Server
    - Imagery : Cached WMS
    - Buildings glTF files
Terrain rendering
Aerial Imagery
GeoJSON Terrain Overlay
WMS Terrain Overlay
Topographical catchment areas of Swiss waterbodies
Topographical catchment areas of Swiss waterbodies
Vector data source
Buildings

=> Streaming

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Open Challenges

- DTM vs DSM
- Man made structures
  - Bridge,
  - Damm,
  - Buildings
Navigation tool

- Hardened laptop inside defense trucks
- Local network between the chief and the driver stations

Use case
- Chief edits the route to follow and POIs
- Driver navigates with the map and the virtual globe

Technology
- Tiles offline storage
- OpenLayers 3 + Cesium
2D View
3D View
Conclusion

- Cesium Terrain Server is fast and stable.
- OpenLayers 3 integrates well with Cesium.
- => Need for a solid, generic and unique community binding library (2D-3D)
- A binding library is currently in development to help developers use the two projects into one webapplication
  - See OpenLayers GitHub Account.