OMApp – Cloud Application for Automatic Image Mosaicking and Georeferencing

Second training event in Montenegro - end-users

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OMApp – Open Mapping Application

- In precision agriculture, the acquisition of precise and timely information about crop conditions during the season is of crucial importance.
- Aerial color and spectral images provide spatial and spectrally derived terrain parameters that can be used in different applications.
  - Satellite - low spatial and spectral resolution and the large revisit time
  - By plane - are detailed enough, too expensive, sometimes impractical
  - Air vehicles (UAV)/Drones
    - practical, potentially lower cost,
    - limited payload capacity > light-weight cameras are required.
    - frequent image updates, which enable close monitoring of crop development.

OMApp – Open Mapping Application

- Cloud application for automatic mosaicking and georeferencing in aerial mapping applications

  http://www.omapp.ucg.ac.me/

- Simple, open source and gives enough information for ordinary user
- Application support several users, upload a set of captured images via a web interface, begin processing and preview already created maps.
- After processing, users receive an e-mail notification.
- Combines many opensource libraries :
  - web interface : Laravel, Vue.JS, Leflet.js
  - server side : OpenDroneMap, gdal libraries, python

OMApp – Outputs

```
<iframe src="www.omapp.ucg.ac.me/GetPMap/e7a4d300d2362b33df658d5dd06ff5e5" height="495" width="1140" frameborder="0" style="margin-top:5px;"> </iframe>
```

Imagery:

- GeoTIFF High quality image
- Georeferenced Digital Elevation (DEM)

3D Outputs

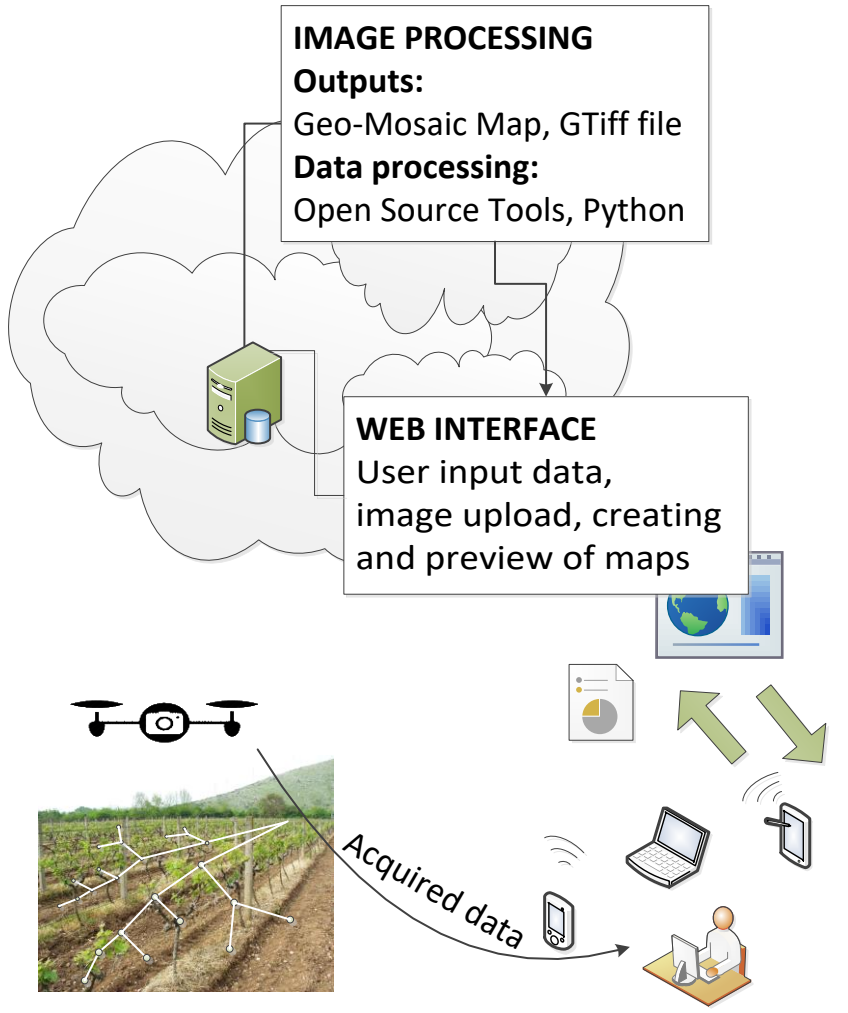
- Textured 3D Model (OBJ, MTL)
- Point Cloud and LAS outputs for compatiblity with CAD and GIS software

Compatible with open source software:

- QGIS (.GeoTIFF), CloudCompare (.las), MeshLab (.obj, .ply)

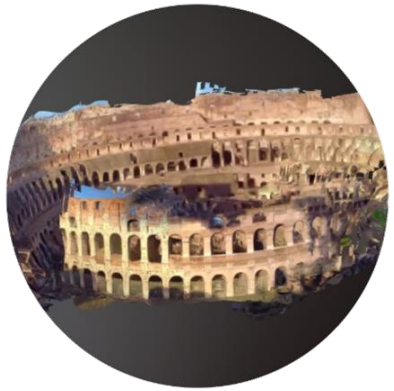
OMApp – Open Mapping Application

- Node configuration:
  - 20MB RAM
  - 12 cores x 2.9 GHz
  - 500 GB storage
- Currently the user interface and image processing are hosted on the same machine
- Image processing projects are sent to queue
- The most demanding processing tools use multiple cores to accelerate computations

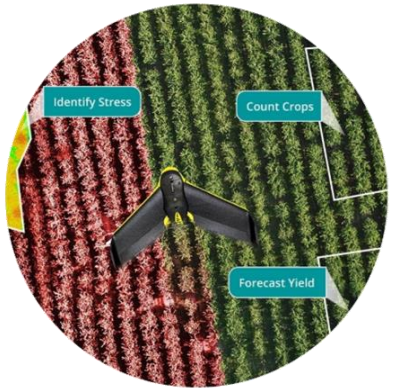


Potential applications

- Precise agriculture
  - Crop classification and crop condition monitoring, water stress detection and chlorophyll level monitoring
- Cultural heritage digitalization
  - 3D object reconstruction, mapping
- Environmental protection
  - National parks and forests monitoring, plant and animal species detection



CULTURAL HERITAGE DIGITALIZATION



PRECISE AGRICULTURE

ENVIRONMENTAL PROTECTION

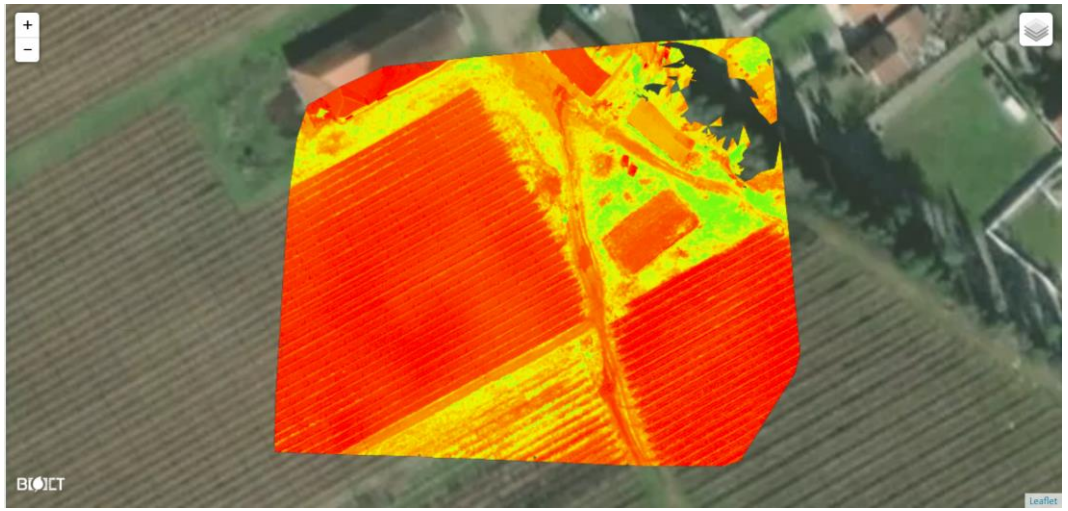
Comparison with other mapping software

- Commercial standalone (AgiSoft PhotoScan) and cloud-based solutions (MapsMadeEasy)

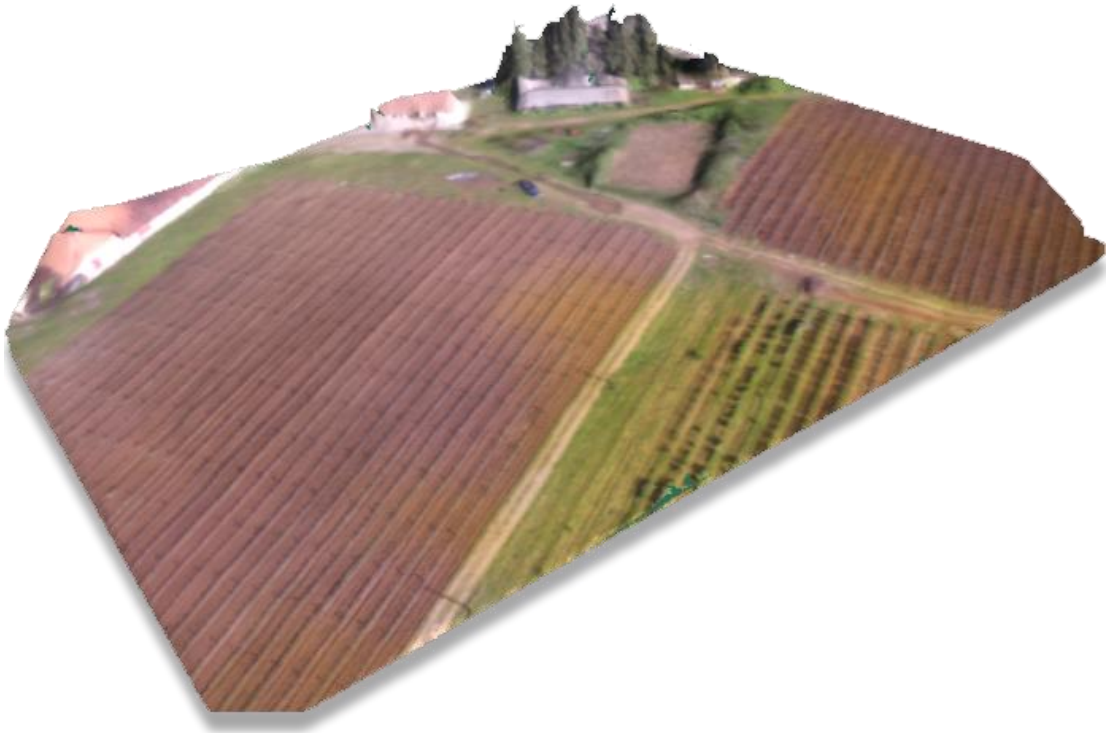
Software	OMApp	MapsMadeEasy	PhotoScan
Number of images	65	65	65
Processing time	10 min	1h 10min	3h 20min

Software	OMApp	MapsMadeEasy	PhotoScan
Number of images	180	180	180
Processing time	35min	5h 10min	8h 40min

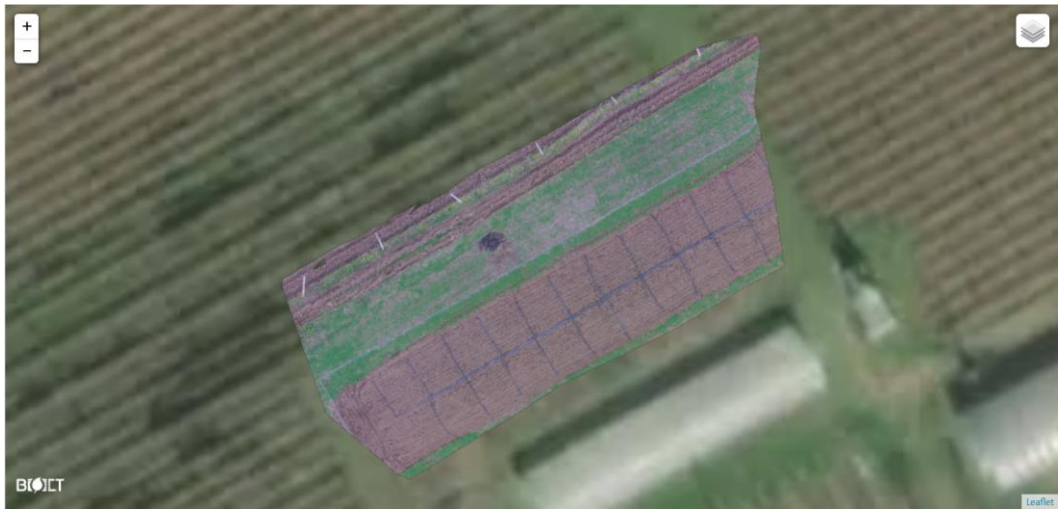
OMApp – example 1

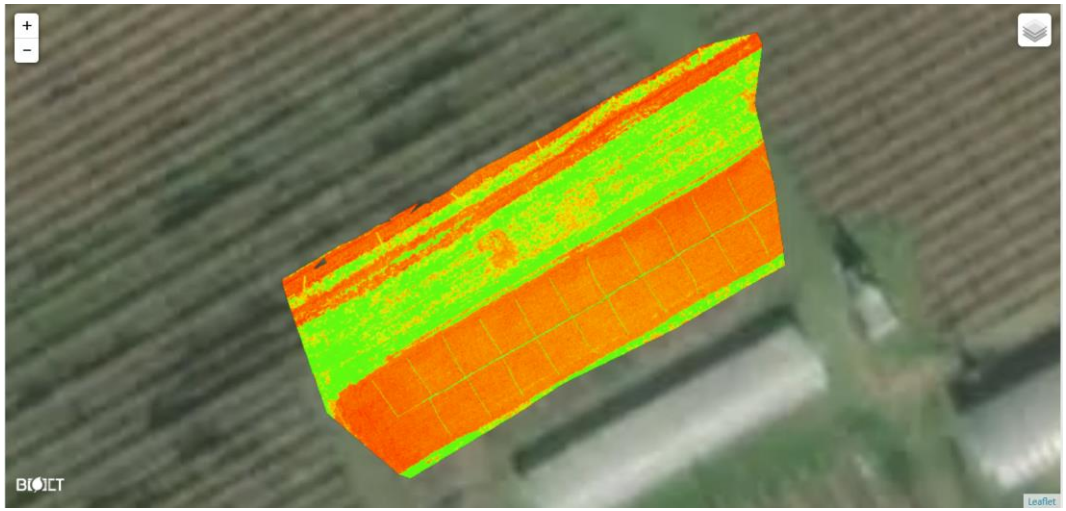


Podgorica, Montenegro
41 images
DJI Phantom 4, 12.6Mpx camera,
Altitude 100m

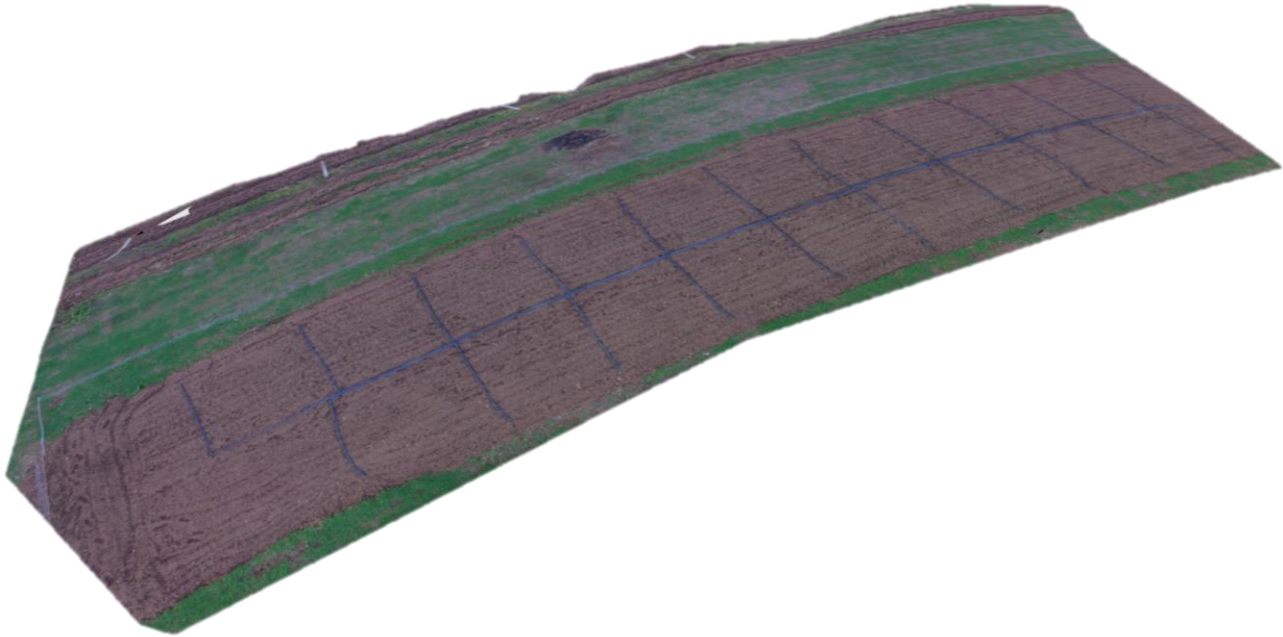


OMApp – example 2





Podgorica, Montenegro
70 images
DJI Phantom 4, 12.6Mpx camera,
Altitude 50m



Thanks for your attention!