



## 3D point cloud classification for mapping purposes

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**Target audience:** Staff of national mapping agencies, researchers, academic people, students, private companies

**Preconditions:** Familiarity with 3D point clouds and semantic concepts

**Course objectives:** the course will present the latest developments and solutions for aerial point cloud classification, with particular emphasis on mapping needs, activities and purposes. Various methods will be presented and evaluated, from Random Forest to neural networks, with theoretical and practical lectures, starting from 2D processing to better understand processes and ending with 3D segmentation solutions.

**Topics tackled:** pattern recognition, feature extraction, machine/deep learning, point cloud classification



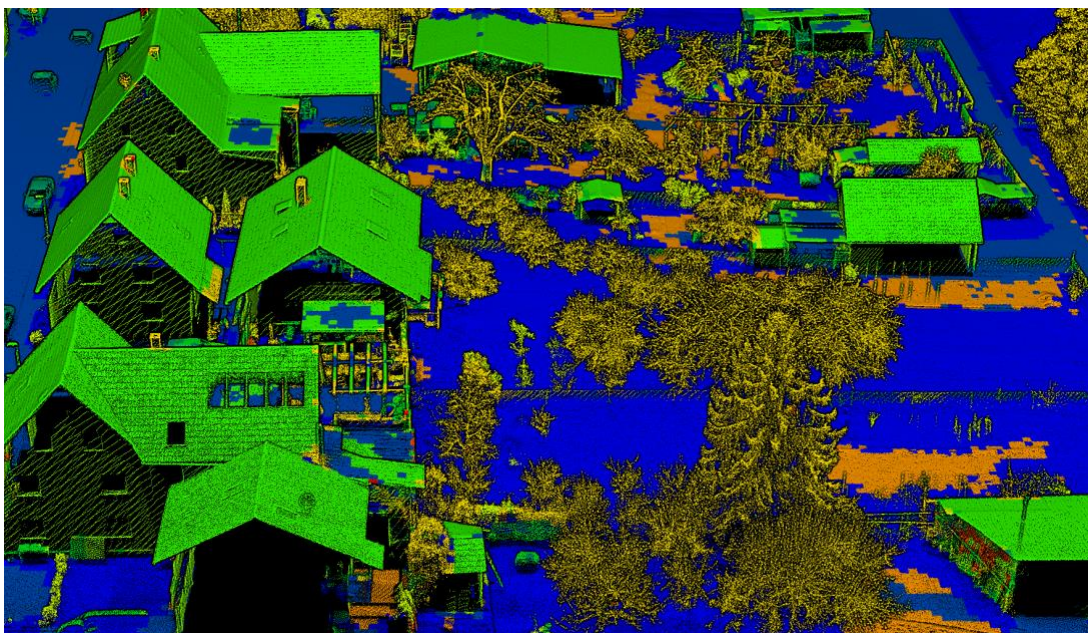
### Module 1: Recap on geodata acquisition and generation

The first module will shortly present the actual geospatial sensors (airborne camera, drone payload,

LiDAR instruments, etc.) and algorithms (e.g. Multi-View Stereo – MVS) to collect and generate geodata. The aim is to review actual technologies, highlight intrinsic characteristics and differences, useful to better shape 2D/3D classification methods.

### Module 2: Machine learning methods

The aim of the module is twofold: (i) to review pattern recognition and standard machine learning approaches (e.g. Random Forest) and (ii) to investigate feature extraction solutions to perform classifications / semantic segmentation actions. Three practical exercises will give participants more insight in methods, potentialities and open issues.



### Module 3: Deep learning methods

The third module will focus on more recent learning-based approaches (e.g. neural networks) for image segmentation and point cloud classification. Theoretical aspects will be coupled with two practical exercises to evaluate the performances of the different 2D/3D methods.

