Remote Sensing Course

Date: October 22-25, 2019
Location: University of Neuchâtel, Neuchâtel

Dr. Thomas Bahr (Senior Solutions Engineer) & Andrew McIntyre (Technical Trainer)

Description of the course

The aim of this 4-days, hands on course is to introduce approaches to analyse and processes hyperspectral and RGB data obtained by drones.

The first three days focus on hyperspectral image processing using ENVI. The steps required to process hyperspectral data are discussed, and numerous analysis techniques are introduced and employed. At the end of the course, participants will be capable of extracting geometrically and radiometrically corrected images, develop numerous skills such as generating classification maps and reflectance images using ENVI.

The 4th day of the training will focus on processing RGB data which are very useful when it comes to topography analysis, since they offer a true (physical)-colour representation of reality. The course will include training on how to derive accurate point clouds, digital surface models (DSMs) and orthomosaics by using the Pix4dmapper software from Pix4D, a world leading company in the era of photogrammetry.

Programme

22-24th of October 2019
ENVI Hyperspectral Analysis, Harris Geospatial Solutions GmbH
Trainer: Dr. Thomas Bahr (Senior Solutions Engineer)
9:00-17:00, 6 hours per day, 2 coffee breaks and 1-hour lunch break

Introduction to ENVI Analytics (0.5 days)

- **Mastering the Basics**
  - Setting preferences
  - Display management
  - ENVI image format
  - Working with buttons and sliders
  - Contrast stretching
  - Working with portals
  - Chipping and saving
- **Multispectral Classification**
  - Band animation
  - ROI tool
  - Scatter plot tool
  - Maximum likelihood classification
  - Post-classification cleanup

UNINE
FACULTÉ DES SCIENCES

CHYN
Centre d'hydrogéologie et de géothermie

Secrétariat
Rue Emile-Argand 11
CH-2000 Neuchâtel
Tél : +41 (0)32 718 26 02
Fax : +41 (0)32 718 26 03

Advanced Spectral Analytics with ENVI (2 days)

- **Data Preprocessing**
  - Radiometric calibration
  - Empirical methods for conversion to reflectance
  - In-scene method – QuAC
  - Model-based method – FLAASH
- **Image Transforms & Vegetation Indices**
  - Principal Components rotation
  - Vegetation indices with hyperspectral data
- **Hyperspectral Concepts**
  - Spectral profiles
  - Working with spectral libraries
- **Extracting Image Endmembers**
  - Minimum Noise Fraction
  - Pixel Purity Index
  - N-Dimensional Visualizer
  - SMACC endmember extraction
  - Spectral analyst
  - Material identification
- **Whole Pixel Analysis Techniques**
  - Spectral angle mapper classification
  - Spectral feature fitting
  - Multi-range spectral feature fitting
  - SAM target finder with BandMax
- **Sub-Pixel Analysis Techniques**
  - Linear Spectral Unmixing
  - Matched Filtering
  - Mixture Tuned Matched Filtering
  - Spectral Hourglass

Spectral Analytics of Your Own Data (0.5 Days)

25th of October 2019
Generate representations of reality with RGB images and Pix4Dmapper, Pix4D
Trainer: Andrew McIntyre,Technical Trainer
8:30-17:30, 2 coffee breaks and 1-hour lunch break

- Introduction to photogrammetry
- Introduction to capturing RGB images
- Introduction to collecting ground control points
- Open a Pix4Dmapper Desktop project
- Create a Pix4Dmapper Desktop project
- Calibrate the camera
- Georeference with the rayCloud
- Generate the dense point cloud
- Edit the dense point cloud
- Generate the orthomosaic
- Edit the orthomosaic

People wishing to participate have to register online:
https://www.unine.ch/phdschool-wes/home/programme.html

The course is limited to 10 participants.

Participation, registration, lunches and transport are covered only for the WES PhD school members.

Contact: school.earth-water@unine.ch