

EduServ 10
Distance elearning courses
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Course: Radiometric performance of Digital Photogrammetric Cameras and Laser Scanners

From:

Finnish Geodetic Institute and Vienna University of Technology

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Target audience: Staff from NMCA's, other public organisations and from academia, with a strong interest for understanding and applying radiometric correction to digital aerial images and/or laser scanning point clouds.

Education level of students:

MSc in a related subject (Geodesy, Geomatics, Remote Sensing, Photogrammetry, Electrotechnical Engineering, Forestry, Physical Geography)

Minimum number of students: 10

Course objective: The course will enable to judge the quality of radiometric measurements performed by digital aerial photogrammetric cameras and airborne laser scanners. Participants will learn the theoretical backgrounds and the practical steps necessary for radiometric correction. Radiometric aspects of aerial images and point clouds will be studied based on case studies, radiometric corrections will be carried out by the participants with provided programs and the effect of correction will be critically assessed.

The students will understand the methods for radiometric correction and calibration of aerial photogrammetric images and laser scanning point clouds. The students will know different physical quantities for describing radiometric properties. The students will be able to judge the radiometric quality of the data. The students will be able to execute radiometric corrections. The students will understand the benefit of radiometric correction.

Kick-off seminar: The pre-course seminar will make the students familiar with the e-learning platform and detail the motivation for the radiometric correction and introduce the main mathematical and physical concepts. Then the distance learning modules will be divided in four different modules.

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Module 1 (10 h): Radiometric correction of digital photogrammetric images – Practical aspects.

This module describes the underlying theory for radiometry of digital images. Central themes include: radiometric quantities, radiometric calibration of cameras in laboratory, vicarious calibration of imaging systems inflight and influences of sensor, object, atmosphere and illumination on the image radiometry.

Eija Honkavaara and Lauri Markelin, Finnish Geodetic Institute

Module 2 (10 h): Radiometric correction of digital photogrammetric images – Practical aspects.

In this module the radiometric correction of different photogrammetric sensors will be studied. Central topics include: radiometric characteristics of different airborne cameras, methods for atmospheric correction of photogrammetric images, BRDF correction, practical examples, and applications of radiometrically corrected images.

Eija Honkavaara and Lauri Markelin, Finnish Geodetic Institute

Module 3 (10 h): Radiometric correcton of laser scanning point clouds – Theoretical background.

Study of the underlying theory for radiometric calibration in airborne laser scanning exploiting Full Waveform measurement. Based on the given data-sets, students will have to compute the radiometric calibration for individual shots in examples of increasing complexity.

Christian Briese: Vienna University of Technology

Module 4 (10 h): Radiometric correcton of laser scanning point clouds – Empirical studies.

Applying the software OPALS (Orientation and Processing of Airborne Laser Scanning data) to radiometrically calibrate overlapping strips of airborne laser scanning data. The data before and after calibration will be compared visually and on statistical basis.

Christian Briese: Vienna University of Technology