EuroSDR project Radiometric Aspects of Digital Photogrammetric Images

October 2007

EuroSDR project sketch
Radiometric Aspects of Digital Photogrammetric Images

Objective

- Improve knowledge on radiometric aspects of digital photogrammetric cameras
- Review existing methods and procedures for radiometric image improvements
- Compare and share operative solutions through a comparison of these techniques on a same test data set
- Analyse the benefit of radiometric calibration in order to open new applications (classification, quantitative remote sensing, change detection etc.)

Project Stages

Phase 1 – Review

Focus on the methodology itself. Report will be compiled based on literature research and query to sensor manufacturers, image providers, image users. The investigations / report should focus on the following topics:

- Definitions
- Absolute radiometric calibration
- Radiometric correction of images (or radiometric improvement)
- Radiometric quality indicators
- Exemplarily radiometric processing chains

It is planned to send the questionnaire in March 2008. Feedback is expected till June 2008. The phase 1 report compilation then will be done till December 2008.

Phase 2 – Empirical study

Based on the results from phase 1 analyses the empirical phase 2 investigations will focus on the processing of real data by test participants. The acquisition of empirical data sets will become necessary, i.e. strong image blocks preferable flown in different flying heights and covering several acquisition days to improve robustness of results. Additional equipment like reference targets has to be supported. To enable absolute radiometric calibration, either airborne hyperspectral data by e.g. CASI or AISA (radiance based method) or field radiance and atmospheric data (reflectance based method) should be collected simultaneously during flights.

The later empirical studies by test participants can focus on many interesting issues. All the tests are not performed with all the data sets and all the participants. Rather large number of participants making some processing, i.e.

- Sensor radiometric calibration
- Default processes of sensor post-processing software
- Image radiometric correction (reflectance image calculation, relative correction, restoration, pan-sharpening, tonal transformations, enhancement)
- Applications (e.g. automatic classification)

Final analysis by FGI and ICC will then work on the radiometric image quality and the adaptability of processed data to various applications (visual, classification)
The aspired schedule for phase 2 investigations should be like follows:

- Data set creation/acquisition: 6-12/2008
- Data delivery: 1/2009
- Results back: 6/2009
- Preliminary analysis by 12/2009
- Workshop 1/2010 (e.g. EuroCOW)
- Final report 6/2010

Project leadership

The project will be headed by Eija Honkavaara and Lauri Markelin, Finnish Geodetic Institute (FGI) and Roman Arbiol, Institut Cartogràfic de Catalunya (ICC).
All activities in the project are also aligned with the EuroSDR project “Medium Format Digital Cameras” under leadership of Görres Grenzdörffer, University of Rostock and the EuroDAC² initiative on digital camera certification, headed by Michael Cramer.