The Finnish and international calibration/validation activities of high-resolution Earth remote sensing instruments

E. Honkavaara, L. Markelin, J. Peltoniemi, T. Hakala, J. Suomalainen, E. Ahokas, K. Nurminen
Finnish Geodetic Institute, Geodeetinrinne 2, FIN-02430 Masala, Finalnd

Modern imaging techniques enable accurate assessment and monitoring of geometric and radiometric properties of the Earth surface. Important high-resolution sensors include the high-resolution multi-spectral satellite sensors (e.g. Ikonos and GeoEye), large-format airborne photogrammetric multi-spectral sensors (e.g. DMC from Intergraph and ADS40 from Leica Geosystems), medium-format photogrammetric multi-spectral sensors (e.g. DSS from Trimble), and hyper-spectral imaging systems (e.g. AISA from Specim).

Imaging sensors and systems should be radiometrically and geometrically calibrated, characterized and validated, in order to make reliable quantitative interpretations from the images and to make monitoring and change detections from imagery collected at different times and with different sensors. A feasible approach for the operational sensor/system validation is to utilize permanent test fields. Objectives of this presentation are to present the current activities of the Finnish Geodetic Institute (FGI) as well as international activities in the field on calibration, characterization and standardization of passive, high-resolution Earth remote sensing systems, to the Nordic remote sensing community.

FGI has a long tradition in building and maintaining test fields for radiometry and geometry; the most extensive achievement of the FGI is the world famous, permanent photogrammetric test field in Sjökulla, which has been in operation since 1994 [1]. Current important activities of the FGI include vicarious calibration/validation studies of various sensors and material studies of reflectance targets; FGI is also considering of constructing a new test field for high-resolution remote sensing instruments and participating international activities in this field. Important international calibration/validation activities include the work by the European digital aerial camera certification (EuroDAC) group established by the European Organization for Spatial Data Research (EuroSDR) [2], the International Society for Photogrammetry and Remote Sensing (ISPRS) [3], the Committee on Earth Observation Satellites (CEOS) [4, 5], the European Fleet for Airborne Research (EUFAR) [6], and the International Organization for Standardization (ISO) [7, 8].

REFERENCES

1. Honkavaara, E.; Peltoniemi, J.; Ahokas, E.; Kuittinen, R.; Hyyppä, J.; Jaakkola, J.; Kaartinen, H.; Markelin, L.; Nurminen, K.; Suomalainen, J. A permanent test field for digital photogrammetric systems. *Photogrammetric Engineering & Remote Sensing* **2008**, 74, 95-106.
2. Cramer, M. The EuroSDR approach on digital airborne camera calibration and certification. In *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, 37(B4), Proceedings of the XXI ISPRS Congress, Commission IV, Beijing, China, July 3-11, 2008.
3. Internet pages of the ISPRS: http://www.isprs.org (Last date assessed 11.8.2009)
4. Internet pages of the CEOS: http://www.ceos.org (Last date assessed 11.8.2009)
5. Internet pages of CEOS Reference test sites: http://calval.cr.usgs.gov/sites_catalog_ceos_sites.php (Last date accessed 11.8.2009)
6. Internet pages of the EUFAR: http://www.eufar.net (Last date assessed 11.8.2009)
7. Kresse, W. Standardization in photogrammetry and remote sensing. In *Int. Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, 37(B4), Proceedings of the XXI ISPRS Congress, Commission IV, Beijing, China, July 3-11, 2008.
8. Internet pages of ISO/TC 211: http://www.isotc211.org (Last date assessed 11.8.2009)