

Operationalisation of Hyperspectral Remote Sensing in Finland

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In Finland, hyperspectral Remote Sensing was one of Geological Survey of Finland's interests in the early 2000s, but later since then, its activities (that were usually related with mining applications) have been limited. In the Finnish Geodetic Institute, spectrometry has been and is being developed. VTT, Specim Oy and HUT have developed e.g. the AISA imaging spectrometers. Certain spaceborne acquisitions have been conducted. Nevertheless, there has been no stable domestic hyperspectral aerial service provider in Finland. There are recognised needs, and the hyperspectral application field as a whole has been a promising solution, but the practises have taken a long time to become operational.

Some challenges of hyperspectral imaging (HSI) are

- atmospheric corrections
- that good conditions and many ground references are needed
- that in Boreal areas, dense vegetation cover hinders from mapping the ground
- taking reflectance anisotropy (the BRDF effects) into account
- that processing of hypersectral imagery may be specific and time-consuming
- management of localised spectral libraries

For the summer of 2008, Pöyry Environment Oy organised a hyperspectral campaign where especially a large area in the Rauma–Pori region was acquired with a 2.5 m spatial resolution. The area is globally one of the biggest continuous hyperspectral areas acquired, and the data can be used as a source and reference for various studies.

The campaign has brought new logistical and technical experience. Using foreign operators is possible also for large projects (lasting longer than a few days for which the weather forecasts are reliable). Domestic service providers would be more flexible to mobilise, but this time they weren't able or willing to setup hyperspectral instruments expect for very large projects.

Hyperspectral applications that are suitable for the Boreal region should be recognised and further developed. There are promising ones e.g. in the fields of forest inventory, vegetation health, water quality, and mining. There is a need to demonstrate what information is possible to extract from hyperspectral imagery – which is more than from using traditional instruments and methods! Combining HSI with airborne laser mapping projects is possible, too.

Costs of hyperspectral acquisitions can be cut down for example by developing the workflows during projects, calibration, and by benefitting from the synergy of common campaigns. For 2010, another campaign is being planned and implemented depending on the interests and available budgets. Pöyry Environment follows the availability of available operators, instruments and methodologies.