The cutting edge of forest management

Innovative, yet fully operational cost-effective techniques for satellite image processing as a basis for digital modelling in support of the management of extensive forest areas.

Processing and modelling techniques have been developed for the retrieval of key relevant digital data for forest management. For the purpose, high resolution optic images - e.g. SPOT XS, LANDSAT TM - and Synthetic Aperture Radar (SAR) images - e.g. RADARSAT, ERS, JERS - are fused. The resulting image maps are fully GPS-compatible, geocoded and geo-referenced, and can be introduced in any modern geographical information system (GIS).

Forest management deals with natural and man-made changes in the woody cover of the earth's surface. Forest communities being complex ecosystems in it-self, managing changes thereof over vast tracts of wooded land is a pretty kettle of fish.

Monitoring and modelling are the keywords in the procedures involved, to the effect of gaining an understanding of forest dynamics and man's interference in biosystems, beit for forest conservation or timber production, Baseline surveys, while mandatory for modelling future developments, may equally serve to bridge any gaps in the archives of historic administration.

A future occurrence of natural or man-made changes, or of disasters, may be simulated in a GIS environment, in support of timely evaluating the results of any measures to be taken in the framework of sustainable forest management.

In the context of sustainable forest management, the following synergetic products of SAR and optic satellite image data fusion are particularly relevant.

• *Digital Elevation Model (DEM),* providing 3D topographic information on site classification or access to specific areas. Spatial accuracy in x, y and z alike, better than 20 meters*.

*) We do better than 2 meters when using very high accuracy satellite images, e.g. IKONOS.

• *Communication network map,* depicting rivers, water bodies, roads and logging tracks. Vectorized map, to be superimposed to a raster layer (e.g. DEM or thematic map) in the GIS environment.

• *Forest and land-use inventory map.* Identification of clearcuts, plantations, regrowth and agricultural areas, these being related to drainage conditions.

• *Biomass or timber volume map.* This top-notch digital map is of a very high accuracy - less than 15% error up to 200 m^3/ha; less than 20% error from 200 to 250 m^3/ha. An especially important tool this is in the context of e.g. forest fire risk assessment or management evaluation.

All products are fully GIS-compatible, such that any GPS-located phenomenon in the field, e.g. encroachment patterns, forest fires or timber felling practice, may be identified easily and accurately and vice versa.

Recommended for the mapping of extensive regions or countries, and for time series - e.g. every 3 years - for the purpose of change detection.

References

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