3D remote sensing technology
in mapping of forests resources

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Advanced SAR project

- EU FP7-SPACE-2013-1, Collaborative project
- Coordinator: FGI
- Beneficiaries: Svenska Lantbruksuniversitet (SLU), Technische Universitaet Wien (TU WIEN), Treemetrics Ltd (TM) and Chalmers Tekniska Hogskola (CHALMERS).
- Budget: 2,2 Million Euros
- 255 person months
- Duration: October 2013 - September 2017
- www site: http://www.fgi.fi/advancedsar
- More info: EU space research, Into Space, project catalog
Analysis of Remote Sensing products in forest resources mapping: current and potential technology
We aim at improved forest resources mapping by integrating various 3D remote sensing techniques from terrestrial to satellite systems.
Terrestrial Laser Scanning and Mobile Laser Scanning

- Next breakthrough in forest inventories: automated field surveys, better accuracy with remarkably reduced costs
- We are leading the EuroSDR comparison in the use of TLS in forest inventory (coordinated by Dr. Xinlian Liang, FGI)

Forest Inventory:
- Tree height
- DBD
- Stem volume
- etc..
Airborne technology

- Laser scanning, aerial images, profiling radar
Wide area 3D mapping using satellites

**INSAR**
- Phase difference, relative elevation differences
- Baseline of hundreds of meters
- Simultaneous imaging

**Stereo-radargrammetry**
- Stereoscopic measurement (automatic image matching), absolute elevation measurements
- Baseline of hundreds of kilometers
- Similar conditions

ALS, TDX INSAR, TSX Radargrammetry
TanDEM-X Satellite-based forest map of Sweden
Possible success stories
Thoughts related to Copernicus

- Forests are in a state of continuous change, therefore satellites play an important role in the forest mapping task
- Current satellites; Sentinel-1 and Sentinel-2 are possibly suitable for forest area mapping, not for Above Ground Biomass estimation
- Based on our findings, bistatic INSAR derived 3D models are good for mapping forest resources (ESA Earth Explorer 9 proposal)
- However, in-situ data is always required in forest inventories to train and calibrate the estimation model
- By combining satellite, airborne, and terrestrial based 3D data, we may enable enhanced Copernicus Land service, and create new European success stories and new business in the forest sector globally
More information

www.fgi.fi/advancedsar