L A N D C O N S U L T . D E

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Project List: https://landconsult.de/markus/bibliography.htm
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Qualification and capacity

landConsult is a consultancy group founded in 2001 and focused on Forestry and Land Use Planning, Geographic Information Management and Remote Sensing. We are working internationally with completed projects in Poland, Romania, Bulgaria, Turkey, Albania, South Africa, Nepal, Mongolia and Germany.

The office of landConsult.de is located in Buehl, Federal State of Baden-Wuerttemberg, Germany. It is equipped with the latest Remote Sensing and Geographic Information Systems (RS/GIS).

landConsult.de is specialized and interested in practical and operational Remote Sensing (RS) and GIS solutions for precision forestry based on individually detected trees from LiDAR and high resolution spectral aerial and satellite imagery (UltraCam, Worldview, etc.). We are advanced in stereo-matching and Object Based Image Analysis (OBIA) and see a possible benefit for the customer by delivering precise forest information in different scales. We are addressing regional forest administrations with more than 100.000 ha as well as community and private forests with less than 5000 ha.

Processing and classifying the latest Sentinel 2a imagery by means of Object Based Image Analysis (OBIA) and the software e.cognition is one of landconsult´s strength. Sentinel is freely available from the European Space Agency and perfectly suited to process and update forest maps on a national scale.

On a regional scale, very high resolution satellite imagery, such as Worldview 3 and 4, or aerial photographs, taken for instance with the UltraCam Eagle camera, are being used to process 3D Crown Models and detect and measure individual trees automatically. Since 2006 landConsult demonstrated the accuracy and completeness of automated individual tree counts in various practical applications in Germany and Poland as well as in South African plantations.

landConsult also has a profound expertise in Laser applications for forestry. From 2006 – 2008 landConsult was partner of the research project "MatchWood - Optimizing the Forestry - Wood Chain to Strengthen Sustainable Forest Management" (http://www.matchwood.uni-freiburg.de/), lead by the University of Freiburg. The project was focusing practical applications of the latest Airborne Laser Scanning (ALS), Remote Sensing and GIS technology for forestry.

Since 2007 landConsult is offering a digital 3D forest mapping and inventory service mainly based on laser scanning data and Color-Infrared Imagery (see http://3dgis.landconsult.de) using official LiDAR and geodata from the regional survey authorities. Since 2011 such precise 3D crown models are being processed not only from LiDAR data but also from aerial stereo-images which are commonly available from the national survey authorities or from commercial satellite imagery, such as Worldview.

In 2011 landConsult.de had been awarded with the innovation prize of the Ministry of Economics of Baden-Württemberg for the technological development of photogrammetrical tree crown models, processed from digital aerial photos.

landConsult also offers Training Courses for QGIS (including QGIS Server and Web Client) and the e.cognition software suite.

Selected Reference Projects

- Photogrammetrical generation of forest parameters from stereo images taken by an UAV (Unmanned Aerial Vehicle) and an aircraft equipped with an UltraCam in the Black Forest National Park (2016/17).
- REDD+ National Forest Inventory Project in Mongolia. Key expertise for Database (PostgreSQL and PostGIS) and Forest Atlas (QGIS WebClient) development (2015)
- 3D Forest Inventory based on LiDAR data and aerial stereo-photos (DMC and UltraCam) of 18.500 ha in the Black Forest mountain range in Baden-Württemberg, Germany to assess the wood volume in privately owned and community forests. Project funded by EU, national and private funds (2014).
- Assessment of Forest Cover Change in Gorce National Park (Poland) Using a GEOBIA Approach of CIR Aerial Orthophotos and 3D Tree Crown Modells Derived from Aerial Stereo Photos (2014).
- Photogrammetric Development and Application of 3D Tree Crown Models processed from digital Aerial Imagery. Awarded Innovation Project in co-operation with Joanneum Research Institute in Graz, co-financed by landConsult.de and the Ministry of Economics Baden-Württemberg (2011).
- contracted by the State Forest Administration Sachsenforst, Pirna, Germany: Processing Color-Infrared Orthophotos and Airborne and Terrestrial Laser Scanning Data to retrieve forest information on different test sites and to measure individual crown parameters on forest research plots in Saxony (2011 and 2012).
- 3D Forest Inventory of some 12.000 ha of private forests in Luxembourg (Ardennes mountain range) based on LiDAR DTM and aerial stereo models (2012).

Key scientific / technical personnel

Dr. Markus Weidenbach, owner of landConsult.de holds the Superior State Examination in Forestry and a doctoral degree in Forest Sciences (Dr. rer. silv.). After his studies at the Albert-Ludwig-University in Freiburg, he worked as a Junior Forester at the State Forest Administration of Baden-Württemberg and later graduated from the Ludwig-Maximilians-University of Munich in 1999 with a PhD Thesis about "Geographical Information Systems and New Digital Media in Land Use Planning". As a senior scientist he worked at the European Commissions Joint Research Centre in Ispra, Italy and in 2001 he was co-founder of the international landConsult group.

Later Dr. Weidenbach was team leader and short-term expert in several EU funded projects in eastern Europe. As a consultant he worked for StoraEnso Forestry Consulting, Finland,

International Union of Forestry Research Organisations IUFRO, Vienna, Food and Agricultural Organisation of the UN, Rome, German Agency for International Co-operation GIZ, Eschborn and Berlin, Forestry Consulting of Österreichische Bundesforste, Vienna and Montgomery Watson Harza (MWH), La Hulpe/Brussels.

Since 2001 Dr. Weidenbach is owner and managing director of landConsult.de and responsible for all landConsult.de projects, such as forest inventories by means of multi-spectral imagery and LiDAR data or the development of Web GIS and DB applications or various international research project proposals.

Dr. Weidenbach has long-standing professional experience in Geographic Information Management (including GIS, Remote Sensing, LiDAR and Photogrammetry), in Forest Management and Inventory, regional and land use planning, public administration, international research, project management and in public planning mediation including profound knowledge in ecology, forest sciences and planning methods.

He is executive member of the Forest Land Owner Association Northern Black Forest, member of the Baden-Württemberg Forestry Board (Forstkammer) and the German Forestry Society (Deutscher Forstverein).

Since 2017 Dr. Weidenbach is teaching GIS, environmental impact and regional studies at the University Freiburg in the scope of the international MSc Environmental Governance Programme (MEG) and the MSc degree programme Environmental Science.

Dr. Ing. Roeland de Kok is landConsult´s senior expert for Remote Sensing and Geospatial Analysis. In the project he is responsible for the processing of the Sentinel, Worldview and aerial imagery. Dr. de Kok holds a doctoral degree in Forest Sciences, studied at the University in Wageningen, the ITC in Enschede and graduated cum laude from the University of Munich with a PhD Thesis about automated mapping techniques in alpine forests. He first worked for the GAF consulting in Munich (part of Telespazio, Rome) and later held a postdoc position at the European Commission´s Joint Research Centre in Ispra for three years. He is a renown expert in Object Based Image Analysis and the e.cognition software suite.

Both CVs can be downloaded from https://landconsult.de/home/cv/

Selected publications (online on https://landconsult.de/markus/bibliography.htm)

- WEIDENBACH, M. 2015: 3D Forstinventur im Nordschwarzwald (3D Forest Inventory in the Black Forest).. In: AFZ - Der Wald 23/2015, S. 48 - 52.
- WEZYK, P., HAWRYLO, P., JANUS, B., WEIDENBACH, M., 2014: Assessment of Forest Cover Change in Gorce National Park (Poland) Using a GEOBIA Approach of CIR Aerial Orthophotos and nDSM Derived from Aerial Stereo Photos. Forestry: An International Journal of Forest Research. Paper Submitted. [Presentation at IUFRO Conference on Forest Change 2014 in Munich].
- TOMPALSKI, P., WEZYK, P., WEIDENBACH, M., de KOK, R., HAWRYLO, P., 2014: A Comparison of LiDAR and Image-derived Canopy Height Models for Individual Tree Crown Segmentation with Object Based Image Analysis. 5th Geobia Conference Thessaloniki. Publ. in South-Eastern European Journal of Earth Observation and Geomatics, Vol 3, No 2.
- WEIDENBACH, M., WEZYK, P., HOFFMANN, M., MARTENS, S., TOMPALSKI, P. 2012: Processing of LiDAR and digital Aerial Images to detect and measure individual crown parameters on selected forest research stands in Saxonia. Erfassung von Einzelbaumparametern mit Airborne-Laser-Scanning-Daten. Allgemeine Deutsche Forstzeitschrift – AFZ, publication in press.
- WEIDENBACH, M., GUTJAHR, H., SCHARDT, M. 2011: Photogrammetric Development and Application of 3D Tree Crown Models processed from ordinary digital Aerial Imagery. Awarded

Innovation Project in co-operation with Joanneum Research Institute in Graz, co-financed by landConsult.de and the Ministry of Economics Baden-Württemberg. Work Report.

- WEIDENBACH, M., DE KOK, R. 2008: Large Scale Forest Taxation based on Single Tree Measurements using Airborne Laser Scanning Data and Spectral Information from Quickbird Satellite Imagery and Digital Orthophotos. Paper presented at ICAS Conference: "Sustainable Forest Management in a Changing Environment Context". Bucharest 2008
- WEIDENBACH, M., DE KOK, R. 2008: Developing Strategies for Large Scale Forest Inventories Combining LiDAR Data, Satellite Imagery and Regional Yield Models. Poster presented on the SilviLaser 2008 conference in Edinburgh
- DE KOK, R., WEZYK, P., WEIDENBACH, M., 2008: The Role of Edge Objects in Full Autonomous Image interpretation. Paper presented at the international GEOBIA conference 2008 in Calgary, Canada
- WEIDENBACH, M., KOCH, B., WEINACKER, H., BALIC, N., STRAUB, C., WANG, Y. 2006: Stakeholder and User Participation to develop LiDAR and Internet based forest information exchange platform. Beteiligung der MatchWood Praxispartner an der Entwicklung eines Verfahrens zur Laser gestützten Erfassung und zum Internet basierten Austausch forstwirtschaftlicher Inventur- und Planungsdaten

landConsult´s Customers and Project Partners

(c) contracting authority

- PC Consulting Österreichische Bundesforste AG, Purkersdorf, Austria (c),
- UNIQUE Landuse and Forestry GmbH, Freiburg, Germany (c)
- South African Pulp and Paper Industries, Pietermaritzburg, South Africa (c)
- Waternet / Sector Onderzoek & Projecten, Amsterdam, Netherlands (c)
- CSIR Satellite Applications Centre, Pretoria, South Africa (c)
- Staatsforstbetrieb Sachsenforst, Pirna, Germany (c)
- Albert-Ludwigs-University, Institute for Remote Sensing and Landscape Information Systems, Freiburg i. Br., Germany (c)
- Montgomery Watson Harza (MWH), La Hulpe / Brussels, Belgium (c)
- Balkan Software Consult srl, Bucharest, Romania
- Ministry of Agriculture, Forests and Rural Development, Bucharest, Romania
- ROMSILVA, State Forest Administration, Bucharest, Romania
- Ministry of Agriculture and Forestry, Sofia, Bulgaria
- Ministry of Regional Development and Public Works, Sofia, Bulgaria
- BELDA Ltd., Ankara, Turkey
- State Planning Organization, Ankara, Turkey
- Ministry of Agriculture and Forestry, Ankara, Turkey
- Ministry of Environment, Ankara, Turkey
- Deutsche Gesellschaft für Int. Zusammenarbeit (GIZ), Eschborn, Germany (c)
- ProGea Consulting, Cracow, Poland (c)
- Ministry of Environment, Warsaw, Poland
- Bayerisches Staatsministerium für Umwelt, Munich,Germany
- AGL Arbeitsgruppe für Landnutzungsplanung, Institut für ökologische Forschung, Etting-Polling, Germany (c)
- Black Forest Nature Park Administration, Seebach, Germany
- International Union of Forest Research Organisation (IUFRO), Vienna, Austria (c)
- Food and Agricultural Organisation of the UN (FAO), Rome, Italy
- Ministry of Environment, Tirana, Albania
- StoraEnso Forestry Consulting, Helsinki, Finland (c)
- Bayerisches Staatsministerium für Landwirtschaft und Forsten, Munich, Germany
- Centro de Investigación y Extensión Forestal Andino Patagónico CIEFAP, Esquel, Argentina
- Ludwig-Maximilians-University (LMU), Institute for Landscape Planning and Nature Conservation, Munich, Germany (c)