LS SL 2007

ISPRS Workshop
Laser Scanning 2007 and SilviLaser 2007

Espoo, Finland
12 – 14 September 2007

Final Program

Organized by:

Finnish Geodetic Institute
Helsinki University of Technology

Sponsored by:

Academy of Finland
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<td>9.00 Opening: Risto Kuittinen, FGI; T. Koskinen, TKK Dipoli; Henrik Haggrén, TKK; J. Hyyppä, FGI</td>
<td>9.00 Session 3: Forest Information Extraction (Auditorium), Session 4: Lidar Simulation (Hall 4A)</td>
<td>9.30 Keynote 5: Prof. Norbert Pfeifer, TU Vienna</td>
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<td>9.15 Keynote 1: Arttu Soininen, TerraSolid Ltd</td>
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<td>10.15 Session 1: Data Analysis Techniques</td>
<td>11.10 Session 3 and 5 continues</td>
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<td>13.05 Lunch</td>
<td>15.00 Company presentations (Auditorium)</td>
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<td>14.20 Session 1 continues</td>
<td>15.30 Coffee break</td>
<td>14.50 Concluding Panel: Chair Prof. Barbara Koch, University of Freiburg</td>
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<td>15.00 Session 2: Intensity and Calibration</td>
<td>15.50 Poster Session (Hall 4A+4B)</td>
<td>15.30 Best Paper Award</td>
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<td>15.40 Coffee break</td>
<td>17.30 End</td>
<td>15.35 Concluding remarks</td>
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<td>16.10 Session 2 continues</td>
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<td>16.55 Panel on Calibration: Chair Prof. Wolfgang Wagner, TU Vienna</td>
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<td>17.30 End</td>
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<td>17.45 - Welcome Reception, TKK Dipoli</td>
<td>18.00 Busses leaving from TKK Dipoli</td>
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<td>19.00</td>
<td>19.30 Reception of the City of Espoo</td>
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WEDNESDAY, 12 SEPTEMBER, 2007
TOPIC: FEATURE EXTRACTION AND DATA ANALYSIS
Auditorium, 1st floor

8:00 Registration and coffee

9:00 Opening
Director General Risto Kuittinen, FGI
T. Koskinen, TKK Dipoli
Henrik Haggrén, TKK
Juha Hyyppä, FGI

9:15 Keynote 1
SOFTWARE FOR LASER SCANNING
Arttu Soininen, Terrasolid Ltd, Finland

9:45 Keynote 2
WAVEFORM ANALYSIS TECHNIQUES IN AIRBORNE LASER SCANNING
Wolfgang Wagner, TU Vienna, Austria

10:15 Session 1: Data Analysis Techniques
Chair: George Vosselman

PROCESSING FULL-WAVEFORM LIDAR DATA: MODELLING RAW SIGNALS
A. Chauve, C. Mallet, F. Bretar, IGN, France; S. Durrieu, UMR TETIS Cemagref/Cirad/ENGREF, France; M.P. Deseilligny, IGN, France; W. Puech, Laboratoire LIRMM, France

COMBINED TREE SEGMENTATION AND STEM DETECTION USING FULL WAVEFORM LIDAR DATA
J. Reitberger, P. Krzystek, Munich University of Applied Sciences, Germany; U. Stilla, Technical University of Munich, Germany

10:55 – 11:25 Coffee break

11:25 Session 1 continues
Chair: Hans-Gerd Maas

GENERALIZED LEAST SQUARES MULTIPLE 3D SURFACE MATCHING
D. Akca, A. Gruen, ETH Zurich, Switzerland

DETECTION AND RECONSTRUCTION OF FREE FORM SURFACES FROM AIRBORNE LASER SCANNING DATA
S. Filin, N. A. Akel, Y. Doytsher, Technion – Israel Institute of Technology, Israel
COMBINED FEATURE EXTRACTION FOR FAÇADE RECONSTRUCTION
S. Becker, N. Haala, University of Stuttgart, Germany

CLASSIFICATION TREE BASED BUILDING DETECTION FROM LASER SCANNER AND AERIAL IMAGE DATA
L. Matikainen, H. Kaartinen, J. Hyvärä, FGI, Finland

SINGLE-TREE FOREST INVENTORY USING LIDAR AND AERIAL IMAGES FOR 3D TREETOP POSITIONING, SPECIES RECOGNITION, HEIGHT AND CROWN WIDTH ESTIMATION

13:05 – 14:20 Lunch

14:20 Session 1 continues

Chair: Norbert Haala

IMPROVING THE MORPHOLOGICAL ANALYSIS FOR TREE EXTRACTION: A DYNAMIC APPROACH TO LIDAR DATA
A. Barilotti, F. Sepic, E. Abramo, F. Crosilla, University of Udine, Italy

HIERARCHICAL CLUSTERED OUTLIER DETECTION IN LASER SCANNER POINT CLOUDS
S. Sotoodeh, ETH Zurich, Switzerland

15:00 Session 2: Intensity and Calibration

Chair: Jouni Peltoniemi

RADIOMETRIC CALIBRATION OF ALS INTENSITY
S. Kaasalainen, J. Hyvärä, P. Litkey, H. Hyvärä, E. Ahokas, A. Kukko, H. Kaartinen, FGI, Finland

VALIDATION OF AIRBORNE LIDAR INTENSITY VALUES FROM A FORESTED LANDSCAPE USING HYMAP DATA: PRELIMINARY ANALYSES
D. S. Boyd, University of Nottingham, UK; R. A. Hill, Bournemouth University, UK

15:40-16:10 Coffee break

16:10 Session 2 continues

Chair: Sanna Kaasalainen

UTILIZING AIRBORNE LASER INTENSITY FOR TREE SPECIES CLASSIFICATION
H. O. Ørka, E. Næsset, O. M. Bollandsás, Norwegian University of Life Sciences, Norway

MODELLING CANOPY GAP FRACTION FROM LIDAR INTENSITY
C. Hopkinson, Nova Scotia Community College, Canada; L. Chasmer, Queen’s University, Kingston, Canada
RADIOMETRIC CALIBRATION OF ALS INTENSITY AND CALIBRATION OF ALS FOR FOREST MEASUREMENTS
Chair: Wolfgang Wagner, TU Vienna, Austria

Panelists:
Christopher Hopkinson, Nova Scotia Community College, Canada
Juha Hyyppä, FGI, Finland
Sanna Kaasalainen, FGI, Finland
Barbara Koch, University of Freiburg, Germany
Erik Næsset, Norwegian University of Life Sciences, Norway
Ross Nelson, NASA, USA

17:45-19:00 WELCOME RECEPTION, CONE LOBBY, TKK DIPOLI
THURSDAY, 13 SEPTEMBER, 2007  
TOPIC: FOREST INFORMATION EXTRACTION  
Auditorium, 1st floor  

8:30 Keynote 3  
EXPERIENCES AND POSSIBILITIES OF ALS BASED FOREST INVENTORY IN FINLAND  
Matti Maltamo, University of Joensuu, Finland  

9:00 Session 3: Forest Information Extraction  
Chair: Erik Næsset  

DEVELOPMENT OF A PROCEDURE FOR VERTICAL STRUCTURE ANALYSIS AND 3D SINGLE TREE EXTRACTION WITHIN FORESTS BASED ON LIDAR POINT CLOUD  
Y. Wang, H. Weinacker, B. Koch, University of Freiburg, Germany  

ASSESSMENT OF SUB-CANOPY STRUCTURE IN A COMPLEX CONIFEROUS FOREST  
N.R. Goodwin, N.C. Coops, C. Bater, S.E. Gergel, University of British Columbia, Canada  

TOWARDS THE ESTIMATION OF TREE STRUCTURAL CLASS IN NORTHWEST COASTAL FORESTS USING LIDAR REMOTE SENSING  
C. W. Bater, N. C. Coops, S. E. Gergel, N. R. Goodwin, University of British Columbia, Canada  

USING AIRBORNE LIDAR FOR THE ASSESSMENT OF CANOPY STRUCTURE INFLUENCES ON CO2 FLUXES  
L. Chasmer, Queen’s University, Canada; A. Barr, Meteorological Service of Canada; A. Black, University of British Columbia, Canada; C. Hopkinson, Nova Scotia Community College, Canada; N. Kljun, ETH Zurich, Switzerland; J. H. McCaughey, P. Treitz, Queen’s University, Canada  

GOING UNDERCOVER: MAPPING WOODLAND UNDERSTOREY FROM LEAF-ON AND LEAF-OFF LIDAR DATA  
R. A. Hill, University of Bournemouth, UK  

10:40 Coffee break  

11:10 Session 3 continues  
Chair: Ross Nelson  

ASSESSING EFFECTS OF LASER POINT DENSITY ON BIOPHYSICAL STAND PROPERTIES DERIVED FROM AIRBORNE LASER SCANNER DATA IN MATURE FOREST  
T. Gobakken, E. Næsset, Norwegian University of Life Sciences, Norway  

A METHOD OF DIRECTLY ESTIMATING STEMWOOD VOLUME FROM GLAS WAVEFORM PARAMETERS  
J. Rosette, P. North, University of Wales, UK; J. Suárez, The Agency of the Forestry Commission GB, UK
STATISTICAL PROPERTIES OF MEAN STAND BIOMASS ESTIMATORS IN A LIDAR-BASED DOUBLE SAMPLING FOREST SURVEY DESIGN
H.-E. Andersen, USDA Forest Service, USA; J Breidenbach, Forest Research Institute of Baden-Wuerttemberg, Germany

LIDAR-DERIVED SITE INDEX IN THE U.S. PACIFIC NORTHWEST - CHALLENGES AND OPPORTUNITIES
D. Gatziolis, USDA Forest Service, USA

ASSESSMENT OF LIDAR-DERIVED TREE HEIGHTS ESTIMATED FROM DIFFERENT FLIGHT ALTITUDE DATA IN MOUNTAINOUS FORESTS WITH POOR LASER PENETRATION RATES
T. Takahashi, Y. Awaya, Forestry and Forest Products Res. Institute, Japan; Y. Hirata, Shikoku Research Center, Japan; N. Furuya, T. Sakai, Forestry and Forest Products Res. Institute, Japan; A. Sakai, Japan Int. Research Center for Agricultural Sciences

RECOVERING PLOT-SPECIFIC DIAMETER DISTRIBUTION AND HEIGHT-DIAMETER CURVE USING ALS BASED STAND CHARACTERISTICS
L. Mehtätalo, M. Maltamo, P. Packalen, University of Joensuu, Finland

13:10-14:20 LUNCH

14:20 Session 3 continues
Chair: Barbara Koch

EXTRACTING STRUCTURAL CHARACTERISTICS OF DORMANT HERBACEOUS FLOODPLAIN VEGETATION FROM AIRBORNE LASER SCANNER DATA
M. Straatsma, H. Middelkoop, Utrecht University, The Netherlands

RAY TRACING FOR MODELING OF SMALL FOOTPRINT AIRBORNE LASER SCANNING RETURNS
F. Morsdorf, O. Frey, University of Zurich, Switzerland; B. Koetz, ESA-ESRIN; E. Meier, University of Zurich, Switzerland

15:00 Company presentations

15:30 Coffee break

15:50-17:30 Poster Session
Chair: Markus Holopainen
Halls 4A and 4B, 2nd floor

REGISTRATION OF TERRESTRIAL LASER SCANS VIA IMAGE BASED FEATURES
S. Barnea, S. Filin, Technion – Israel Institute of Technology, Israel

TREE DETECTION AND DIAMETER ESTIMATIONS BY ANALYSIS OF FOREST TERRESTRIAL LASER SCANNER POINT CLOUDS
A. Bienert, S. Scheller, Technical University of Dresden, Germany; E. Keane, F. Mohan, TreeMetrics, Ireland; C. Nugent, University College Cork, Ireland

APPLICATION OF TERRESTRIAL LASER SCANNING FOR SHIPBUILDING
K. Biskup, P. Arias, H. Lorenzo, J. Armesto, University of Vigo, Spain

USING AIRBORNE SMALL-FOOTPRINT LASER SCANNER TO ASSESS THE QUANTITY OF SEEDLINGS IN AN UNEVEN-AGED SPRUCE FOREST
O. M. Bollandsås, Norwegian University of Life Sciences, Norway; K. H. Hanssen, Norwegian Forest and Landscape Institute, Norway; S. Marthiniussen, E. Næsset, Norwegian University of Life Sciences, Norway

AUTOMATIC SEGMENTATION OF BUILDING FACADES USING TERRESTRIAL LASER DATA
H. Boulaassal, T. Landes, P. Grussenmeyer, F. Tarsha-Kurdi, Graduate School of Science and Technology INSA, France
A MIXED EFFECTS MODEL TO ESTIMATE STAND VOLUME BY MEANS OF SMALL FOOTPRINT AIRBORNE LIDAR DATA FOR AN AMERICAN AND GERMAN STUDY SITE
J. Breidenbach, Forest Res. Institute of Baden-Wuerttemberg, Germany; R. McGaughey, H.-E. Andersen, USDA Forest Service, USA; G. Kändler, Forest Res. Institute of Baden-Wuerttemberg, Germany; S. Reutebuch, USDA Forest Service, USA

SIMULATING SAMPLING EFFICIENCY IN AIRBORNE BASED LASER SCANNING FOREST INVENTORY
L. Ene, E. Næsset, T. Gobakken, Norwegian University of Life Sciences, Norway

ADAPTIVE FILTERING OF AERIAL LASER SCANNING DATA
G. Forlani, University of Parma, Italy; Carla Nardinocchi, University of Rome “La Sapienza”, Italy

ACCURACY OF FOREST PARAMETERS DERIVED FROM MEDIUM FOOTPRINT LIDAR UNDER OPERATIONAL CONSTRAINTS
C. Ginzler, J. Boehl, R. Boesch, L. T. Waser, WSL, Switzerland

EXTENDING GENERALIZED HOUGH TRANSFORM TO DETECT 3D OBJECTS IN LASER RANGE DATA
K. Khoshelham, Delft University of Technology, The Netherlands

TREE HEIGHT ESTIMATION METHODS FOR TERRESTRIAL LASER SCANNING IN A FOREST RESERVE
G. Király, G. Brolly, University of West Hungary

AUTOMATIC GLACIER SURFACE ANALYSIS FROM AIRBORNE LASER SCANNING
M. Kodde, Fugro-Inpark B.V., The Netherlands; N. Pfeifer, Vienna University of Technology, Austria; B. Gorte, Delft University of Technology, The Netherlands; T. Geist, FFG – Austrian Res. Promotion Agency; B. Höfle, University of Innsbruck, Austria

ROAD ENVIRONMENT MAPPING SYSTEM OF THE FINNISH GEODETIC INSTITUTE - FGI ROAMER
A. Kukko, C.-O. Andrei, FGI, Finland; V.-M. Salminen, TKK, Finland; H. Kaartinen, Y. Chen, FGI, Finland; P. Rönnholm, H. Hyypää, TKK, Finland, J. Hyypää, R. Chen, FGI, Finland, H. Haggrén, I. Kosonen, K. Čapek, TKK, Finland

ESTIMATION OF LAI USING LIDAR REMOTE SENSING IN FOREST

DECIDUOUS-CONIFEROUS TREE CLASSIFICATION USING DIFFERENCE BETWEEN FIRST AND LAST PULSE LASER SIGNATURES
X. Liang, J. Hyyppää, L. Matikainen, FGI, Finland

WAVEFORM FEATURES FOR TREE IDENTIFICATION
P. Litkey, FGI, Finland; P. Rönnholm, J. Lumme, TKK, Finland; X. Liang, FGI, Finland

FROM POINT CLOUD TO SURFACE: MODELING STRUCTURES IN LASER SCANNER POINT CLOUDS
P. Rodriguez Gonzálvez, D. González Aguilera, J. Gómez Lahoz, University of Salamanca, Spain

USING AIRBORNE LASER-SCANNER-DATA IN FORESTRY MANAGEMENT: A NOVEL APPROACH TO SINGLE TREE DELINEATION
J. Rossmann, M. Schluse, A. Bücken, P. Krahwinkler, RWTH Aachen, Germany

MAPPING DEFOLIAITION WITH LIDAR
Svein Solberg, Norwegian Forest and Landscape Inst.; E. Næsset, Norwegian University of Life Sciences,
ESTIMATION OF CARBON STOCKS IN NEW ZEALAND PLANTED FORESTS USING AIRBORNE SCANNING LIDAR

HOUGH-TRANSFORM AND EXTENDED RANSAC ALGORITHMS FOR AUTOMATIC DETECTION OF 3D BUILDING ROOF PLANES FROM LIDAR DATA
F. Tarsha-Kurdi, T. Landes, P. Grussenmeyer, Graduate School of Science and Technology INSA, France

TERRESTRIAL LASER SCANNING VERSUS TRADITIONAL FOREST INVENTORY: FIRST RESULTS FROM THE POLISH FORESTS
P. Wezyk, K. Koziol, M. Glista, M. Pierzchalski, Agricultural University of Krakow, Poland

HIERARCHICAL WATERSHED SEGMENTATION OF CANOPY HEIGHT MODEL FOR MULTI-SCALE FOREST INVENTORY
K. Zhao, S. Popescu, Texas A&M University, USA

THURSDAY, 13 SEPTEMBER, 2007
TOPIC: LIDAR SIMULATION AND APPLICATIONS
Hall 4A, 2nd floor

9:00 Session 4: Lidar Simulation
Chair: André Samberg

LASER SCANNER SIMULATOR FOR SYSTEM ANALYSIS AND ALGORITHM DEVELOPMENT: A CASE WITH FOREST MEASUREMENTS
A. Kukko, J. Hyyppä, FGI, Finland

GENERATING LIDAR DATA IN LABORATORY: LIDAR SIMULATOR
B. Lohani, R. K. Mishra, Indian Institute of Technology Kanpur, India

9:40 Session 5: Miscellaneous and Applications
Chair: André Samberg

PROBLEMS RELATED TO THE GENERATION OF TRUE-ORTHOPHOTOS WITH LIDAR DDSMS
L. Barazzetti, M. Brovelli and M. Scaioni, Politecnico di Milano, Italy

CLASSIFICATION OF BUILDING DAMAGES BASED ON LASER SCANNING DATA
M. Rehor, Karlsruhe University, Germany

QUALITY ANALYSIS OF 3D ROAD RECONSTRUCTION
S. Oude Elberink, G. Vosselman, ITC, The Netherlands

10:40 Coffee break

11:10 Session 5 continues
Chair: Henrik Haggrén

SUPERVISED CLASSIFICATION OF WATER REGIONS FROM LIDAR DATA IN THE WADDEN SEA USING A FUZZY LOGIC CONCEPT
A. Brzank, C. Heipke, University of Hanover, Germany
GLACIER SURFACE SEGMENTATION USING AIRBORNE LASER SCANNING POINT CLOUD AND INTENSITY DATA
B. Höfle, University of Innsbruck, alps – Centre for Natural Hazard Management, Austria; T. Geist, FFG – Austrian Research Promotion Agency, Austria; M. Rutzinger, University of Innsbruck, alps – Centre for Natural Hazard Management, Austria; N. Pfeifer, Vienna University of Technology, Austria

AN IMPLEMENTATION OF THE ASPRS LAS STANDARD
A. Samberg, AVAPROedu/Consulting and Training, Finland

ICESAT FULLWAVEFORM ALTIMETRY COMPARED TO AIRBORNE LASER ALTIMETRY OVER THE NETHERLANDS
H. Duong, R. Lindenbergh, Delft University of Technology, The Netherlands; N. Pfeifer, Vienna University of Technology, Austria; G. Vosselman, ITC, The Netherlands

ESTIMATION OF THE LIDAR HEIGHT OFFSET IN COASTAL VEGETATED AREAS
J. Goepfert, U. Soergel, Leibniz University of Hanover, Germany

REIN ALGORITHM AND THE INFLUENCE OF POINT CLOUD DENSITY ON NDSM AND DEM PRECISION IN A SUBMEDITERRANEAN FOREST
A. Kobler, P. Ogrinc, Slovenian Forestry Institute, Slovenia

13:10 LUNCH
FRIDAY, 14 SEPTEMBER, 2007
TOPIC: TERRESTRIAL LASER SCANNING, GEOMETRY, REGISTRATION
Auditorium, 1st floor

9:00 Keynote 4
INTEGRATION OF LASER SCANNING AND PHOTOGRAMMETRY
Petri Rönnholm, Helsinki University of Technology, Finland

9:30 Keynote 5
GEOMETRICAL ASPECTS OF ALS AND TLS
Norbert Pfeifer, Vienna University of Technology, Austria

10:00 Session 6: Terrestrial Laser Scanning, Geometry, Registration
Chair: Norbert Pfeifer

ON-SITE SELF-CALIBRATION USING PLANAR FEATURES FOR TERRESTRIAL LASER SCANNERS
K.-H. Bae, D. Lichti, Curtin University of Technology, Australia

AUTOMATIC RELATIVE ORIENTATION OF TERRESTRIAL LASER SCANS USING PLANAR STRUCTURES AND ANGLE CONSTRAINTS
C. Brenner, C. Dold, Leibniz Universität Hannover, Germany

10:40 Coffee break

11:10 Session 6 continues
Chair: Derek Lichti

REGISTRATION OF AGIA SANMARINA LIDAR DATA USING SURFACE ELEMENTS
W. von Hansen, FGAN-FOM, Germany

AUTOMATIC CO-REGISTRATION OF TERRESTRIAL LASER SCANNER AND DIGITAL CAMERA FOR THE GENERATION OF HYBRIDS MODELS
D. González Aguilera, P. Rodríguez Gonzálvez, J. Gómez Lahoz, University of Salamanca, Spain

INTEGRATED BUNDLE ADJUSTMENT WITH VARIANCE COMPONENT ESTIMATION - FUSION OF TERRESTRIAL LASER SCANNER DATA, PANORAMIC AND CENTRAL PERSPECTIVE IMAGE DATA
D. Schneider, H.-G. Maas, Dresden University of Technology, Germany

PLANAR FEATURE EXTRACTION IN TERRESTRIAL LASER SCANS USING GRADIENT BASED RANGE IMAGE SEGMENTATION
B. Gorte, Delft University of Technology, The Netherlands

EXTRACTING WINDOWS FROM TERRESTRIAL LASER SCANNING
S. Pu, G. Vosselman, ITC, The Netherlands
12:50 LUNCH

14:00 Session 6 continues
Chair: Claus Brenner

CHANGE DETECTION VIA TERRESTRIAL LASER SCANNING
R. Zeibak, S. Filin, Technion – Israel Institute of Technology, Israel

TERRESTRIAL LIDAR MEASUREMENTS FOR ANALYSING CANOPY STRUCTURE IN AN OLD-GROWTH FOREST
S. Fleck, University of Goettingen, Germany; N. Obertreiber, Zoller+Froehlich GmbH, Germany; I. Schmidt, M. Brauns, H. Jungkunst, C. Leuschner, University of Goettingen, Germany

14:40 Small break

14:50-15:30 Panel 2

CONCLUDING PANEL
Chair: Barbara Koch, Univ. of Freiburg, Germany

Panelists:
Claus Brenner, Leibniz Univ. Hannover, Germany
Henrik Haggrén, TKK, Finland
Ross Hill, Bournemouth University, UK
Derek Lichti, Curtin Univ. of Technology, Australia
Hans-Gerd Maas, Dresden Univ. of Tech., Germany
Norbert Pfeifer, TU Vienna, Austria
Georg Vosselman, ITC, The Netherlands

15:30 Best Paper Award
15:35 Concluding remarks
15:45 End