



Workshop on

**Mapping Surface Structure
and Topography by Airborne
and Spaceborne Lasers**

***Institute of Geophysics and Planetary Physics
Scripps Institution of Oceanography***
La Jolla, California

November 9-11, 1999

Presented by

**International Society for
Photogrammetry and Remote Sensing**
Working Group III/5 & III/2

Tuesday Nov. 9

REGISTRATION

9:00-10:00 AM

OPENING SESSION

10:00 AM-11:00 AM

Welcome address

Photogrammetry and laser altimetry

T. Schenk (*Department of Civil Engineering, The Ohio State University,
Columbus, OH*)

Commercial development of airborne laser altimetry

**– A review of the commercial instrument market and its
projected growth**

M. Flood (*Airborne Laser Mapping Consultants, Toronto, Ontario*)

Tuesday Nov. 9

TECHNICAL SESSION 1

11:30 AM-12:45 PM

**FOREST TOPOGRAPHY AND CANOPY
MAPPING I**

Chair: Bryan Blair (*NASA/GSFC, Greenbelt, MD, USA*)

**Progress in lidar altimeter remote sensing of stand
structure and composition in deciduous and coniferous
forests using SLICER data**

M. Lefsky, D. Harding, W. Cohen, G. Parker, S. Acker (*PNW Research
Station, Corvallis, OR, USA*)

**Interpolation of high quality ground models from laser
scanner data in forested areas**

N. Pfeifer, T. Reiter, C. Briese, W. Rieger (*Institute for Surveying, Remote
Sensing, and Land Information, University of Agricultural Sciences, Vienna,
Austria*)

**Measuring sub-canopy topography in a tropical wet forest
using laser remote sensing**

M. Hofton, R. Dubayah, B. Blair (*University of Maryland, College Park;
NASA/GSFC, Greenbelt, MD, USA*)

Tuesday Nov. 9

TECHNICAL SESSION 2

2:00 PM –3:15 PM

GEOLOCATION OF LASER FOOTPRINT

Chair: J. B. Minster (*Institute of Geophysics and
Planetary Physics, Univ. of California, San Diego, La
Jolla, CA, USA*)

**Analysis of satellite laser altimetry range measurements
over land topography using generalized attitude parameter
extraction**

J. Ridgway, J. B. Minster (*Univ. of California, San Diego, Scripps Institution
of Oceanography/IGPP, La Jolla, CA, USA*)

A novel approach for calibration of satellite laser altimeters

S. Filin, B. Csatho (*Byrd Polar Research Center, The Ohio State University,
Columbus, OH, USA*)

**A new approach for matching surfaces from laser scanners
and optical sensors**

A. Habib, T. Schenk (*Dept. of Civil Engineering, The Ohio State University,
Columbus, OH, USA*)

Tuesday Nov. 9

TECHNICAL SESSION 3

3:30 PM – 5:10 PM

**SURFACE RECONSTRUCTION BY USING
RETURN WAVEFORMS**

Chair: Michelle Hofton (*University of Maryland, College
Park, MD, USA*)

**Shuttle laser altimeter range and return pulse energy data
processing and products**

Claudia Carabajal, D. Harding, S. Luthcke, W. Fong, S. Rowton, J. Frawley
(*NVI, Inc.; NASA/GSFC; Raytheon ITS; Herring Bay Geophysics, Greenbelt,
MD, USA*)

Return echoes from medium-large footprint laser altimeters

B. Blair, M. Hofton, D. Rabine (*NASA/GSFC, Greenbelt, MD; University of
Maryland, College Park, MD; Science Systems and Applications, Lanham,
MD, USA*)

Segmentation of surfaces by a robust statistical estimator

B. Csatho, K. Boyer, S. Filin (*Byrd Polar Research Center, Dept. of Electrical
Engineering, The Ohio State University, Columbus, OH, USA*)

**Application of the Shuttle Laser Altimeter in an Accuracy
Assessment of Global 1-Kilometer Digital Elevation Data**

David J. Harding (*NASA/GSFC Center, Greenbelt, MD*), Claudia C. Carabajal
(*NVI, Inc.*), Scott B. Luthcke (*Raytheon*), Dean B. Gesch (*USGS EDC*)

ICEBREAKER PARTY

6:30 PM

Munk Laboratory Conference Room

Wednesday Nov. 10

TECHNICAL SESSION 4

9:00 - 10:15 AM

**COMBINED APPLICATION OF LASER
SCANNING AND PHOTOGRAMMETRY**

Chair: Tony Schenk (*The Ohio State University,
Columbus, OH, USA*)

**Utilizing Airborne Laser Altimetry for the Improvement of
Automatically Generated DEMs over Urban Areas**

K. McIntosh, A. Krupnik, T. Schenk (*Department of Civil Engineering,
Technion – Israel Institute of Technology, Haifa, Israel; Dept. of Geodetic
Sciences, The Ohio State University, Columbus, OH*)

**Registration of airborne laser data to surfaces generated
by photogrammetric means**

Y. Postolov, A. Krupnik and K. McIntosh (*Dept. of Civil Engineering,
Technion – Israel Institute of Technology, Haifa, Israel*)

**Analysis of accuracy of airborne laser scanning over urban
areas**

D-C. Lee, B. Csatho, and S. Filin (*Dept. of Civil Engineering, Byrd Polar
Research Center, The Ohio State University, Columbus, OH, USA*)

Wednesday Nov. 10

TECHNICAL SESSION 5

10:30 AM – 12:10 PM

**INTEGRATION OF LIDAR WITH OTHER
SENSORS**

Chair: Bea Csatho (*The Ohio State University, Columbus,
OH, USA*)

**Integration of high resolution imagery with LIDAR and
IFSAR data for urban analysis application**

P. Gamba and B. Houshmand (*University of Pavia, Italy, Jet Propulsion
Laboratory, Pasadena, CA, USA*)

Integrating LIDAR with direct digital imagery

C. Toth and D. Grejner-Brzezinska (*Center for Mapping, The Ohio State
University, Columbus, OH, USA*)

**Integration of lidar, Landsat ETM+ and forest inventory data
for regional forest mapping**

W. Cohen, M. Lefsky, A. Hudak, S. Acker, and J. Ohmann (*PNW Research
Station, Corvallis, OR, USA*)

**Comparison of DEMs from STAR-3i Interferometric SAR and
Scanning Laser**

J. Bryan Mercer, S. Schnick (*Intermap Technologies Corp. Calgary, Alberta,
Canada*)

Wednesday Nov. 10

TECHNICAL SESSION 6

1:30 PM – 3:10 PM

**RECOGNITION AND RECONSTRUCTION OF
MAN-MADE OBJECTS**

Chair: Amnon Krupnik (*Israel Institute of Technology,
Haifa, Israel*)

**The use of laser altimetry data for the extraction of building
roof detail using standard elevation derived parameters**

Chilton, T., J. Jaafar and G. Priestnall (*Geography Department, University of
Nottingham, University Park, England*)

Laser data for virtual landscape generation

N. Haala, C. Brenner (*Institute for Photogrammetry, Stuttgart University,
Stuttgart, Germany*)

**The effect of grid resolution of Lidar DSMs on the
categorising of residential and industrial areas**

J. Jaafar, G. Priestnall, P. M. Mather (*School of Geography, University of
Nottingham, University Park, England*)

**Feature Identification and/or Extraction Applications
Development from Large Area Urban LIDAR Derived Data
Sets**

J. Hill, B. Henry (*TerraPoint and the Houston Advanced Research Center
(HARC), The Woodlands, TX*)

Wednesday Nov. 10

TECHNICAL SESSION 7

3:30 PM – 5:00 PM

MAPPING OF ICE SHEETS AND GLACIERS

Chair: Charles Toth (*Center for Mapping, Ohio State University, Columbus, OH, USA*)

Investigation of Canadian ice cap mass balances and their relationship to climate variability

W. Abdalati, W. Krabill (*Laboratory for Hydrospheric Processes, NASA/GSFC, Greenbelt, MD, USA*)

Surface morphology of the central West Antarctic ice sheet from airborne laser altimetry

D.D. Blankenship, S.D. Kempf, D.L. Morse, M.E. Peters, R.E. Bell, R.B. Arko (*Institute for Geophysics, The University of Texas at Austin, Austin, TX, USA; Lamont Doherty Earth Observatory, Columbia University, USA*)

Changes in the Antarctic ice sheet using laser altimetry

B. Spikes, B. Csatho, and I. Whillans (*Byrd Polar Research Center, The Ohio State University, Columbus, OH, USA*)

Recent results from the NASA Airborne Topographic Mapper Project

W. Krabill, C. Wright, R. Swift, S. Manizade (*Laboratory for Hydrospheric Processes, NASA/GSFC, Greenbelt, MD, USA*)

Thursday Nov. 11

ROUND TABLE DISCUSSION

9:00 AM - 10:40 AM

Summary of discussions and recommendations will be included in the proceedings

TECHNICAL SESSION 8

11:00 AM – 12:40 PM

FOREST TOPOGRAPHY AND CANOPY MAPPING II

Chair: D. Harding (*NASA/GSFC, Greenbelt, MD, USA*)

Estimating individual tree heights of the boreal forest using airborne laser altimetry and digital videography

B. A. St-Onge (*Department of Geography, Université du Québec à Montréal, Canada*)

Vegetation types, buildings and roads from laser scanner data within a forest enterprise

O. Eckmüllner, M. Kerschner, T. Reiter, W. Rieger, F. Rottensteiner (*Institute for Surveying, Remote Sensing, and Land Information, University of Agricultural Sciences, Vienna, Austria*)

Laser-scanning for derivation of forest stand parameters

T. Reiter, O. Eckmüllner, H. Müllner, W. Rieger (*Institute for Surveying, Remote Sensing, and Land Information, University of Agricultural Sciences, Vienna, Austria*)

Design, capabilities and user of small-footprint and large-footprint airborne scanning lidars: a comparison

J. Means (*Department of Forest Science, Oregon State University, Corvallis, OR, USA*)

CLOSING

12:40 PM – 1:00 PM

List of Participants

Abdalati, Waleed
NASA, GSFC,
Greenbelt, MD.
USA
waleed.abdalati@gsfc.nasa.gov

Blair, J. Bryan
NASA, GSFC
Greenbelt, MD
USA
bryan@eib2.gsfc.nasa.gov

Borsa, Adrian
IGPP, UCSD
La Jolla, CA
USA
aborsa@ucsd.edu

Calmes, Lonnie
Lite Cycles, Inc.
2301 N. Forbes Blvd., Suite 111,
Tucson, AZ 85745
USA
lcalmes@litecycles.com

Carabajal, Claudia
NVI, Inc.
NASA/GSFC
USA
claudia@stokes.gsfc.nasa.gov

Champion, Richard
USGS National Mapping Division
San Francisco, CA
USA
Rchampion@usgs.gov

CHE, Wentao
Kokusai Kogyo Co.,
Amagasaki, Hyoto
Japan
che-sha@kkc.ca.jp

Chilton, Tim
2 Sycamore Drive
Bishopdown
Salisbury
Wiltshire SP1 3GZ
United Kingdom
timchilton@wardrobe.u-net.com

Constance, Eric
USGS
Rolla, MO
USA
econstance@usgs.gov

Csatho, Bea
Byrd Polar Research Center
The Ohio State University
1090 Carmack Road
Columbus, OH 43210-1002
USA
csatho.1@osu.edu

Dutcher, Tom
Terra Point
The Woodlands, TX
USA

Englich, Markus
Institute Of Photogrammetry
Stuttgart University
Germany
Markus.Englich@ifp.uni-stuttgart.de

Filin, Sagi
Byrd Polar Research Center
The Ohio State University
1090 Carmack Road
Columbus, OH 43210-1002
USA
filin.1@osu.edu

Flood, Martin
Airborne Laser Mapping Consultants
Imot 2705-4 Forest Laneway
Toronto M2N5X8
Canada
martin@airbornelasermapping.com

Fricker, Helen
IGPP, UCSD
La Jolla, CA
USA
hafricker@ucsd.edu

Gamba, Paolo
Department of Electronics
University of Pavia
Via Ferrata, 1 27100 Pavia
Italy
gamba@ipvmw5.unipv.it

Gesch, Dean
USGS
EROS Data Center
Sioux Falls, SD
USA
gesch@usgs.gov

Graham, Lee
Houston Advanced Research Center
Environmental Information Systems
Laboratory
4800 Research Forest Drive
The Woodlands, Texas 77381
USA
lag@harc.edu

Gutierrez, Roberto
Bureau of Economic Geology
University of Texas at Austin
Austin, TX
USA
oskar@mail.utexas.edu

Haala, Norbert
Institute Of Photogrammetry, Stuttgart
University
Stuttgart
Germany
Norbert.Haala@itp.uni-stuttgart.de

Habib, Ayman
Dept of Civil Engineering & Geodetic Science
The Ohio State University
Columbus OH 43210
USA
habib.1@osu.edu

Harding, David
NASA Goddard Space Flight Center
Greenbelt, MD
USA
harding@denali.gsfc.nasa.gov

Henry, Robert
Houston Advanced Research Center
The Woodlands, Texas
USA
rjh@harc.edu

Hill, John "Jack"
Houston Advanced Research Center
The Woodlands, Texas
USA
jhill@harc.edu

Hofton, Michelle
University of Maryland
College Park, MD
USA
mhofton@geog.umd.edu

Houshmand, Bijan
Jet Propulsion Laboratory
Pasadena, CA
USA
bh@athena.jpl.nasa.gov

Jaafar, Jasmee
School of Geography
University of Nottingham
Nottingham, NG7 2RD
United Kingdom
jaafar@geography.nottingham.ac.uk

Kelly, Kevin
The Keith Companies
22690 Cactus Ave.
Suite 300
Moreno Valley, CA
USA
kevin.kelly@keithco.com

Kling, Mike
USGS
Rolla, MO
USA

Krupnik, Amnon
Technion, Israel Institute of Technology
Haifa
Israel
Krupnik@tx.technion.ac.il

Lefsky, Michael
USDA Forest Service
Corvallis, OR
USA
lefsky@fsl.orst.edu

Liadsky, Joe
Optech Inc.
100 Wildcat Road
Toronto Ontario
Canada M3J 2Z9
joe@optech.on.ca

McIntosh, Kerry
Department of Geodetic Engineering
Technion, Israel Institute of Technology
Haifa 32000
Israel
kerry@tx.technion.ac.il

Manizade, Serdar
EG&G/ NASA/GSFC
Wallops Flight Facility
Wallops Island, VA
USA
manizade@osb.wff.nasa.gov

Means, Joseph
Department of Forest Science
Oregon State University
Corvallis, OR 97331-5752
USA
joe.means@orst.edu

Mercer, J. Bryan
Intermap Technologies Corp.
Calgary Alberta
Canada
bmercerc@intermap.ca

Miller, Scott
LH Systems LLC
San Diego, CA
USA
miller@LH-Systems.com

Minster, Bernard
IGPP
University of California –San Diego
La Jolla, CA
USA
jbminster@ucsd.edu

Nakane, Tatsuhide
Kokusai Kogyo Co.
Tokyo, Japan
t-nakane@kkc.co.jp

Price, Rob
Alberta Research,
Alberta
Canada
price@arc.ab.ca

Quinn, Katherine
Massachusetts Institute of Technology
Room 54-616
77 Massachusetts Avenue
Cambridge, MA 02139
USA
katyq@love.mit.edu

Reiter, Thomas
University of Agricultural Science
Vienna
Austria
treiter@ibmws1.ipf.tuwien.ac.at

Renslow, Mike
Spencer B. Gross, Inc.
Eugene, OR
USA
mike@sbgmaps.com

Ridgway, Jeff
IGPP/SIO,
UCSD
USA
ridgway@spot.ucsd.edu

Rieger, Wolfgang
University of Agricultural Science
Vienna
Austria
rieger@edv1.boku.ac.at

Sandwell, David
IGPP/SIO
La Jolla, CA
USA
dsandwell@ucsd.edu

Schenk, Tony
Dept of Civil Engineering & Geodetic Science
Ohio State University
Columbus OH 43210
USA
schenk.2@osu.edu

Skloss, Don
Terra Point,
The Woodlands, TX

Spikes, Blue
Byrd Polar Research Center
The Ohio State University
1090 Carmack Road
Columbus, OH 43210-1002
USA
spikes.2@osu.edu

St-Onge, Benoit
Universite au Quebec a Montreal
Montreal, Quebec
Canada
st-onge.benoit@uqam.ca

Toth, Charles
Center for Mapping
The Ohio State University
Columbus, OH 43210-1002
USA
toth@cfm.ohio-state.edu

Walker, Stewart
LH Systems LLC
San Diego, CA
USA

Yoder, Carrie
Geospatial Analysis and Modeling of
Ecological Systems Lab
University of Florida
Florida
cly07493@pegasus.cc.ucf.edu

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