
PROGRAM: MONDAY 22nd OCTOBER 2001

8:00 – 9:00 **Registration** (Governor Calvert House Conference Center, Historic Inns of Annapolis)
9:00 **Welcome note**

9:15 – 12:10	SESSION 1: System Overviews Chair: J. Bryan Blair (NASA/Goddard Space Flight Center, USA)
---------------------	--

9:15 – 9:45 **Lidar Activities and Research Priorities in the Commercial Sector** (*invited*)
M. Flood

9:45 – 10:15 **The Vegetation Canopy Lidar (VCL) Mission** (*invited*)
R. Dubayah

10:15 – 10:45 **The ICESAT Mission** (*invited*)
J. Zwally et al.

10:45 – 11:00 BREAK

11:00 – 11:20 **Design and Performance of an Airborne Multikilohertz Photon-Counting Microlaser Altimeter**
J. Degnan, J. McGarry, T. Zagwodzki, P. Dabney, J. Geiger, R. Chabot, C. Steggerda, J. Marzouk and A. Chu

11:20 – 11:50 **Optech's View on Future Directions for Commercial Scanning Laser Systems** (*invited*)
D. Carswell

11:50 – 12:10 **Wide-Swath Imaging Lidar Development for Air and Spaceborne Applications**
J. B. Blair, S. Luthcke and M. Hofton

12:10 LUNCH

14:00 – 17:10	SESSION 2: Surface Reconstruction I Chair: George Vosselman (Delft University of Technology, The Netherlands)
----------------------	--

14:00 – 14:30 **Advanced DTM Generation from Lidar Data** (*invited*)
K. Kraus and N. Pfeifer

14:30 – 14:50 **Creation of High Resolution, Precise Digital Elevation Models (DEM) of Ocean City and Assateague Island, MD**
B. Csatho, Y.-R. Lee, T. Schenk, W. Krabill, and J. McGarry

14:50 – 15:10 **3D Building Model Reconstruction from Point Clouds and Ground Plans**
G. Vosselman

15:10 – 15:30 **Reconstructing Textured CAD Model of Urban environment Using Vehicle-borne Laser Range Scanner and Line Camera**
H. Zhao and R. Shibasaki

15:30 – 15:50 BREAK

15:50 – 16:10 **Scanline Forced Delauney-TENs for Surface Representation**
E. Verbree and P.J. van Oosterom

16:10 – 16:30 **On the Use of Pulse Reflectance Data for Laserscanner Strip Adjustment**
H.-G. Maas

16:30 – 16:50 **3D Perceptual Organization From Laser Altimetry Data**
I. Lee and T. Schenk

16:50 – 17:10 **Comparing Probabilistic and Geometric Models on Lidar Data**
R. Fraile and S. Maybank

17:10 – 17:30 DISCUSSION

18:30 ICEBREAKER

PROGRAM: TUESDAY 23rd OCTOBER 2001

8:30 – 9:00 **Registration**

9:00 – 11:00 SESSION 3: Data Geolocation
Chair: Toni Schenk (The Ohio State University, USA)

9:00 – 9:30 **Aspects of Processing Extra-terrestrial Lidar Data: Clementine, NEAR, MOLA** (*invited*)
G. A. Neumann

9:30 – 9:50 **Spaceborne laser Altimeter Instrument Parameter Calibration from Integrated Residual Analysis**
S. Luthcke, D. Rowlands and C. Carabajal

9:50 – 10:10 **Determining the Mounting Bias of a Laser Altimeter System by a Hough Transformation Approach**
T. Schenk

10:10 – 10:40 **Simultaneous Determination of Calibration Parameters for an Airborne Lidar System**
(*invited*)
A. Borsa

10:40 – 11:00 **Recovery of Systematic Biases in Laser Altimeters Using Natural Surfaces**
S. Filin

11:00 – 11:15 BREAK

11:15 – 12:15 SESSION 4: Data Fusion
Chair: J.-Bernard Minster (University of California, San Diego, USA)

11:15 – 11:35 **Integration of Lidar and Landsat ETM Data**
A. T. Hudak, M. A. Lefsky, and W. B. Cohen

11:35 – 11:55 **High Resolution Surface Geometry and Albedo by Combining Laser Altimetry and Visible Images**
R. D. Morris, U. von Toussaint and P. C. Cheeseman

11:55 – 12:15 **Accuracy Study of Airborne Laser Scanning Data with Photogrammetry**
S. Seo, T. Schenk and B. Csathó

12:15 LUNCH

14:00 – 15:00 SESSION 5: Data Modeling
Chair: Michelle Hofton (University of Maryland, College Park, USA)

14:00 – 14:20 **Modeling Lidar Waveforms in Heterogeneous and Discrete Canopies**
W. Ni-Meister and R. Dubayah

14:20 – 14:40 **Modeling Lidar Waveforms Using a Radiative Transfer Model**
B. Peterson, W. Ni, B. Blair, M. Hofton, P. Hyde, and R. Dubayah

14:40 – 15:00 **Evaluation of Geoscience Laser Altimeter System (GLAS) Waveforms For Vegetated Landscapes Using Airborne Laser Altimeter Scanning Data**
C. C. Carabajal and D. J. Harding

15:00 – 15:20 BREAK

15:20 – 17:10	SESSION 6: Forestry Applications Chair: Michelle Hofton (University of Maryland, College Park, USA)
----------------------	--

- 15:20 – 15:40 **Measuring Forest Canopy Height Using a Combination of Lidar and Aerial Photography Data**
B. A. St-Onge and N. Achaichia
- 15:40 – 16:00 **Investigation of Measuring Accuracy of Forest Area by Means of Airborne Laser Scanner**
M. Funahashi, M. Setojima, Y. Akamatsu, Y. Imai, M. Amano, T. Katsuki, M. Takahashi, and M. Fukuda
- 16:00 – 16:30 **Relationships Between Lidar Metrics and Above-Ground Biomass in Closed-Canopy Neotropical Forests (invited)**
J. Drake, R. Dubayah, R. Knox, and R. Condit
- 16:30 – 16:50 **Lidar Remote Sensing of Aboveground Biomass in Three Biomes**
M. A. Lefsky, W. B. Cohen, D. J. Harding, G. G. Parker, S. A. Acker, and S. T. Gower
- 16:50 – 17:10 **Characterization of Canopy Height with Proximity to Streams and Slope Using Lidar**
D. Gillespie, R. Dubayah, M. Hofton
- 16:50 – 17:30 DISCUSSION
17:30 END

PROGRAM: WEDNESDAY 24th OCTOBER 2001

8:30 – 9:00 **Registration**

9:00 – 12:15	SESSION 7: Mapping Geosurficial Processes Chair: Beáta Csathó (The Ohio State University, USA)
---------------------	---

9:00 – 9:30 **Analysis of a Data Set for ICESat Cal/Val**
W. B. Krabill, S Manizade, C Martin, J Sonntag, R Swift, and J Yungel

9:30 – 9:50 **Laser Monitoring of Ice Elevations and Sea-Ice Thickness in Greenland**
R. Forsberg, K. Keller and S. M. Jacobsen

9:50 – 10:10 **Quantifying River Bank Erosion With Scanning Laser Altimetry**
D. Thoma, S. C. Gupta and M. E. Bauer

10:10 – 10:30 **Landslide Delineation Using Airborne Laser Swath Mapping**
V. R. Schaefer, S. Burckhard, D. Bloomquist and R. L. Shrestha

10:30 – 10:45 **BREAK**

10:45 – 11:05 **Mapping the Surface of Sheet Flow Water in the Everglades**
W. E. Carter, R. L. Shrestha, D. Bloomquist, and M. Sartori

11:05 – 11:25 **Laser Pulse Correlation: A Method For Detecting Subtle Topographic Change Using Lidar Return Waveforms**
M. Hofton and J. B. Blair

11:25 – 11:55 **Precise Airborne lidar surveying for Coastal Research and Geo-Hazards Applications**
R. Gutierrez, J. Gibeaut, R. Smyth, T. Hepner, J. Andrews, C. Weed, W. Gutelius, and M. Mastin

11:55 – 12:15 **Use of LIDAR and Other Geospatial Technologies in Support of Rescue and Recovery at the World Trade Center**
W. Decker

12:15 **LUNCH**

14:00 – 16:20	SESSION 8: Surface Reconstruction II Chair: Hans-Gerd Maas (Dresden University of Technology, Germany)
----------------------	---

14:00 – 14:20 **Digital Terrain Models in dense urban areas**
F. Dell'Acqua, and P. Gamba

14:20 – 14:40 **Filtering of Laser Altimetric Digital Surface Models**
A. Koch, K. Jacobsen, and P. Lohmann

14:40 – 15:00 **Filtering of Laser Altimetry Data Using a Slope Adaptive Filter**
G. Sithole

15:00 – 15:20 **Some Algorithms for Virtual Deforestation (VDF) of LIDAR Topographic Survey Data**
R. A. Haugerud and D. J. Harding

15:20 – 15:40 **BREAK**

15:40 – 16:00 **Terrain Modelling and Analysis Using Laser Scanner Data**
M. Elmqvist, E. Jungert, F. Lantz, Å. Persson, and U. Söderman

16:00 – 16:20 **Airborne Laser Scanning – Clustering in Raw Data**
M. Roggero

16:20 – 16:40 **Wavelet-based Algorithm in Segmentation of Airborne Laser Scanner Data**
M. Tokunaga and T.T. Vu

16:40 – 17:30 **DISCUSSION**

17:30 **CLOSING REMARKS**

List of Participants

Abshire, James B.
NASA/GSFC
Code 924
Greenbelt, MD 20771
USA
jabshire@pop900.gsfc.nasa.gov

Jeanne Anderson
University of New Hampshire
Complex Systems Research Center
Morse Hall
Durham, NH 03824
USA
jeanne.anderson@unh.edu

Barnard, Chris
EarthData International of Maryland
45 West Watkins Mill Road
Gaithersburg, MD 20878
USA
cbarnard@earthdata.com

Berglund, Judith
Lockheed Martin Space Operations –
Stennis Programs
John C. Stennis Space Center –
Bldg. 1210
Stennis Space Center, MS 39529
USA
Judith.Berglund@ssc.nasa.gov

Blair, J. Bryan
NASA/GSFC
Code 924
Greenbelt, MD 20771
USA
bryan@arthur.gsfc.nasa.gov

Boersma, Saskia
TerraImaging bv
Koningslaan 35
Amersterdam 1075 AB
THE NETHERLANDS
s.boersma@terraimaging.nl

Borsa, Adrian
Scripps Institution of Oceanography
9500 Gilman Drive, IGPP 0225
La Jolla, CA 92093
USA
aborsa@ucsd.edu

Carabajal, Claudia C.
NVI, Inc.
NASA/GSFC – Code 926
Greenbelt, MD 20771
USA
claudia@stokes.gsfc.nasa.gov

Carter, Bill
University of Florida
Department Civil & Coastal Eng.
345 Weil Hall
Gainesville, FL 32611
USA
bcarter@ce.ufl.edu

Csatho, Beata
Byrd Polar Research Center, OSU
1090 Carmack Road
Columbus, OH 43210
USA
csatho.1@osu.edu

Dabney, Philip
NASA/GSFC
Code 920.3
Greenbelt, MD 20771
USA
Philip.Dabney@gsfc.nasa.gov

Daniel, Carlton
U.S. Army Topographic Engineering
Center
7701 Telegraph Road
Alexandria, VA 22315
USA
daniel@tec.army.mil

Decker, Winfield
EarthData International of
Maryland, LLC
45 West Watkins Mill Road
Gaithersburg, MD 20878
USA
wdecker@earthdata.com

Degnan, John
NASA/GSFC
Code 920.3
Greenbelt, MD 20771
USA
John.Degnan@gsfc.nasa.gov

Drake, Jason
University of Maryland
Department of Geography
1158 LeFrak Hall
College Park, MD 20742
USA
jasdrak@geog.umd.edu

Dubayah, Ralph
University of Maryland
Department of Geography
1149B LeFrak Hall
College Park, MD 20742
USA
rdubayah@geog.umd.edu

Filin, S.
Delft University of Technology
Department of Geodesy
Thijssseweg 11
Delft, Zuid Holland 2629 J A
THE NETHERLANDS
S.Filin@citg.tudelft.nl

Flood, Martin
Airborne 1
5777 West Century Blvd., # 725
Los Angeles, CA 90045
USA
flood@airborne1.com

Forsberg, Rene
National Survey and Cadastre (KMS)
Rentemestervej 8
Copenhagen DK2400
DENMARK
rf@kms.dk

Fraile, Roberto
The University of Reading
Department of Computer Science
P.O. Box 225, Whiteknights
Reading RG6 6AY
UNITED KINGDOM
R.Fraile@reading.ac.uk

Friess, Peter
TopScan GmbH
Muensterstr. 19
Steinfurt 48565
GERMANY
FRIESS@TOPSCAN.DE

Funahashi, Manabu
Kokusai Kogyo Co., Ltd.
7F.12-1 Gobancho, Chiyoda-Ku
Tokyo 102-0076
JAPAN
manabu_funahashi@kkc.co.jp

Gambo, Paolo
University of Pavia
Department of Electronics
Via Ferrata, 1
Pavia 27100
ITALY
p.gamba@ele.unipv.it

Geiger, Jennifer
NASA/GSFC
Code 588
Greenbelt, MD 20771
USA
Jennifer.Geiger@gssc.nasa.gov

Gutierrez, Roberto
The University of Texas at Austin
Bureau of Economic Geology
10100 Burnet Road, Bldg. 130
Austin, TX 78758
USA
oskar@mail.utexas.edu

Haarbrink, Roland B.
EarthData Technologies
4409 Oak Creek Ct., #503
Fairfax, VA 22033
USA
rhaarbrink@earthdata.com

Harding, David J.
NASA/GSFC
Code 921
Greenbelt, MD 20771
USA
harding@core2.gsfc.nasa.gov

Haugerud, Ralph
U.S. Geological Survey
USGS at University of Washington
Department of Earth and Space
Sciences, Box 351310
Seattle, WA 98195
rhaugerud@usgs.gov

Hofton, Michelle
University of Maryland
Department of Geography
1151 LeFrak Hall
College Park, MD 20742
USA
mhofton@geog.umd.edu

Holekamp, Kara
Lockheed Martin
Building 1210
Stennis Space Center, MS 39529
USA
Kara.holekamp@ssc.nasa.gov

Andrew Hudak
USDA Forest Service,
PNW Research Station
3200 SW Jefferson Way
Corvallis, OR 97331
USA
ahudak@fs.fed.us

Hyde, Peter
University of Maryland
Department of Geography
1158 LeFrak Hall
College Park, MD 20742
USA
phyde@glue.umd.edu

Jungert, Erland
FOI
Swedish Defence Research Agency
Box 1165
Linlöping S-581 11
SWEDEN
jungert@foi.se

Kletzli, Robert
EnerQuest Systems, LLC
7500 Jefferson Street, NE
Courtyard II, Suite 101
Albuquerque, NM 87109
USA
bkletzli@enerquest.com

Koch, Andreas
Institute for Photogrammetry &
GeoInformation (IPI)
University of Hannover
Nienburger Straße 1,
30167 Hannover, Germany

Hannover, Lower Saxony 30167
GERMANY
koch@ipi.uni-hannover.de

Krabill, Bill
GSFC/Wallops Flight Facility
Wallops Island, VA 23337
USA
krabill@osb1.wff.nasa.gov

Kraus, Karl
Institute of Photogrammetry &
Remote Sensing of the Technical
University Vienna
Guâhausstraâe 27-29
Vienna, Austria A-1040
AUSTRIA
kk@ipf.tuwien.ac.at

Latypov, Damir
TerraPoint, LLC
4800 Research Forest Dr.
The Woodlands, TX 77381
USA
Damir.Latypov@transamerica.com

Lee, Impyeong
The Ohio State University
6068 Abbey Chapel Drive
Dublin, OH 43017
USA
lee1517@osu.edu

Lefsky, Michael
Oregon State University
Department of Forest Science
Corvallis, OR 97333
USA
lefsky@fsl.orst.edu

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

Lim, Kevin
Queen's University
Department of Geography
Kingston, Ontario K7L3N6
CANADA
9kk14@qsilver.queensu.ca

Luthcke, Scott B.
NASA/GSFC
Code 926
Greenbelt, MD 20771
USA
sluthcke@xyz.gsfc.nasa.gov

Maas, Hans-Gerd
Dresden Technical University
Helmholtzstr. 10
Dresden D-01062
GERMANY
hmaas@rcs1.urz.tu-dresden.de

Mallama, Anthony
Raytheon ITSS
4400 Forbes Blvd.
Lanham, MD 20706
USA
Anthony_Mallama@Raytheon.com

Manizade, Serdar
EG&G/NASA Airborne Topographic
Mapper Group
Bldg. N-159, Wallops Flight Facility
Wallops Island, VA 23337
USA
manizade@osb.wff.nasa.gov

Martin, Chreston
EG&G Technical Services
900 Clopper Road, Suite 120
Gaithersburg, MD 20878
USA
martin@wasc2.wff.nasa.gov

McGarry, Jan
NASA/GSFC
Code 920.3
Greenbelt, MD 20771
USA
Jan.McGarry@gsfc.nasa.gov

Minster, Bernard
Scripps Institution of Oceanography
9500 Gilman Drive, TGPP 0225
La Jolla, CA 92093-0225
USA
jbminster@ucsd.edu

Neumann, Gregory A.
NASA/GSFC
Code 920
Greenbelt, MD 20771
USA
neumann@tharsis.gsfc.nasa.gov

Ni-Meister, Wenge
University of Maryland
Department of Geography
1149 LeFrak Hall
College Park, MD 20742
USA
wenge@geog.umd.edu

Morris, Robin
USRA – RIACS
NASA Ames Research Center
Mail Stop 269-2
Moffelt Field, CA 94035-1000
USA
rdm@email.arc.nasa.gov

Ohring, Samuel
Raytheon
NASA/GSFC - Code 971
Greenbelt, MD 20771
USA
ohring@icesat2.gsfc.nasa.gov

Peterson, Birgit
University of Maryland
Department of Geography
1158 LeFrak Hall
College Park, MD 20742
USA
bpeterso@geog.umd.edu

Prince, Stephen D.
University of Maryland
Department of Geography
College Park, MD 20742
USA
sp43@umail.umd.edu

Roggero, Marco
Politecnico di Torino
CP 38
Santhià, VC 13048
ITALY
roggero@atlantic.polito.it

Santana, Jairo
Raytheon ITSS
3209 Shepherd Street
Mount Rainer, MD 20712
USA
Santana@terra.stx.com

Schaefer, Vernon R.
South Dakota State University
Civil & Environmental Engineering
Department
Box 2219
Crothers Engineering Hall 118
Brookings, SD 57007
USA
vernon_schaefer@sdsstate.edu

Tony Schenk
The Ohio State University
2070 Neil Avenue
Columbus, OH 43210
USA
schenk.2@osu.edu

Senftle, Josph
Advanced Power Technologies
1250 Twenty-Fourth Street
Suite 850
Washington, DC 20037
USA
jsenftle@apti.com

Seo, Suyong
The Ohio State University
2070 Neil Avenue
Columbus, OH 43210
USA
seo.43@osu.edu

Shrestha, Ramesh L.
University of Florida
345 Weil Hall
P.O. Box 116580
Gainesville, FL 32611
USA
rshre@ce.ufl.edu

Shuman, Christopher A.
NASA/GSFC
Code 971
Greenbelt, MD 20771
USA
christopher.shuman@gsfc.nasa.gov

Sithole, G.
Delft University of Technology
Department of Geodesy
Thijssseweg 11
Delft, Zuid Holland 2629JA
THE NETHERLANDS
G.Sithole@citg.tudelft.nl

Söderman, Ulf
Swedish Defence Research Agency
P.O. Box 1165
Linköping SE-58111
SWEDEN
ulf.soderman@foi.se

Sonntag, John C.
NASA WFF/EG&G Technical Services
900 Clopper Road, Suite 120
Gaithersburg, MD 20878
USA
sonntag@osb.wff.nasa.gov

St-Onge, Benoît
Université de Québec à Montréal
C.P. 8888 succ. Centre-Ville
Montréal Province, QC H3C 3P8
CANADA
st-ongebenoit@uqam.ca

Sun, Guoqing
University of Maryland
Department of Geography
College Park, MD 20742
USA
gsun@glue.umd.edu

Thoma, David
University of Minnesota
Department of Soil, Water & Climate
1991 Upper Buford Circle
St. Paul, MN 55108
USA
dthoma@soils.umn.edu

Tippen, Jeff
EarthData International of Maryland
45 West Watkins Mill Road
Gaithersburg, MD 20878
USA
jtippen@earthdata.com

Todd, Kent
University of Toronto
467 Atlas Avenue
Toronto, Ontario M6C 3R1
CANADA
kent.todd@utoronto.ca

Treitz, Paul
Queen's University
Department of Geography
Kingston, ON K7L3N6
CANADA
pt6@qsilver.queensu.ca

Verbee, E.
Delft University of Technology
Thijssseweg 11
Delft, Zuid Holland 2629 JA
HOLLAND
E.Verbee@geo.tudelft.nl

Vosselman, M.G.
Delft University of Technology
Department of Geodesy
Thijssseweg 11
Delft, Zuid Holland 2629 JA
THE NETHERLANDS
G.Vosselman@geo.tudelft.nl

Wicks, Donald E.
EnerQuest Systems, LLC
1991 Broadway, Suite 3200
Denver, CO 80202
USA
dwicks@enerquest.com

Zagwodzki, Thomas
NASA/GSFC
Code 920.3
Greenbelt, MD 20771
USA
Thomas.Zagwodzki@gsfc.nasa.gov

Zhao, Huijing
University of Tokyo
Institute of Industrial Science
4-6-1 Komaba, Meguro-ku
Tokyo 153-8505
JAPAN
chou@skl.iis.u-tokyo.ac.jp

Zwally, Jay
NASA/GSFC
Code 971
Greenbelt, MD 20771
USA
jay.zwally@gsfc.nasa.gov

Author Index

Achaichia N.....	131	Jungert E.....	219
Acker S.A.....	156	Katsuki T.....	139
Akamatsu Y.....	139	Keller K.....	163
Amano M.....	139	Knox R.....	147
Andrews J.....	185	Krabill W.....	31
Bauer M.E.....	169	Kraus K.....	23
Blair J.B.....	17, 121, 181	Lantz F.....	219
Bloomquist D.....	67	Lee I.....	57
Carabajal C.....	81, 125	Lee Y.-R.....	31
Carter W.E.....	175	Lefsky M.A.....	95, 155
Chabot R.....	9	Luthcke S.....	17, 81
Cheeseman P.C.....	105	Maas H.-G.....	53
Chu A.....	9	Marzouk J.....	9
Cohen W.B.....	95, 155	Mastin M.....	185
Condit R.....	147	Maybank S.....	67
Csatho B.....	31, 113	McGarry J.....	9, 31
Dabney P.....	9	Morris R.D.....	105
Degnan J.....	9	Neumann G.A.....	73
Dell'Acqua F.....	195	Ni W.....	121
Drake J.....	147	Parker G.G.....	155
Dubayah R.....	121, 147	Persson X.....	219
Elmqvist M.....	219	Peterson B.....	121
Filin S.....	85	Pfeifer N.....	23
Flood M.....	3	Roggero M.....	227
Forsberg R.....	163	Rowlands D.....	81
Fraile R.....	67	Sartori M.....	175
Fukuda M.....	139	Schenk T.....	31, 57, 113
Funahashi M.....	139	Seo S.....	113
Gamba P.....	195	Setojima M.....	139
Geiger J.....	9	Shrestha R.L.....	175
Gibeaut J.....	185	Sithole G.....	203
Gower S.T.....	155	Smyth R.....	185
Gupta S.C.....	169	St-Onge B.A.....	131
Gutelius W.....	185	Steggerda C.....	9
Gutierrez R.....	185	Söderman U.....	219
Harding D.J.....	125, 155, 211	Takahashi M.....	139
Haugerud R.A.....	211	Thoma D.....	169
Hepner T.....	185	Van Oosterom P.J.....	45
Hofton M.....	17, 121, 181	Verbree E.....	45
Hudak A.T.....	95	von Toussaint U.....	105
Hyde P.....	121	Vosselman G.....	37
Imai Y.....	139	Weed C.....	185
Jacobsen S.M.....	163	Zagwodzki T.....	9