

ASPRS Annual Conference and International Lidar Mapping Forum 2019

Denver, Colorado, USA
28-30 January 2019

Volume 1 of 2

ISBN: 978-1-5108-8582-0

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2019) by American Society for Photogrammetry & Remote Sensing (ASPRS)
All rights reserved.

Printed by Curran Associates, Inc. (2019)

For permission requests, please contact American Society for Photogrammetry & Remote Sensing (ASPRS) at the address below.

American Society for Photogrammetry & Remote Sensing (ASPRS)
425 Barlow Place, Suite 210
Bethesda, Maryland 20814-2160
USA

Phone: (301) 493-0290

webmaster@asprs.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

VOLUME 1

SESSION 12D: APPLICATIONS OF LIDAR IN FORESTRY

Ground Filtering of Dense Lidar Point Clouds for Modeling Shrub Mangrove Canopies.....	1
<i>Travis Meyer</i>	
Opportunities and Challenges of Launching UAVs within Wooded Areas	18
<i>Ramesh Sivanpillai</i>	
A Machine Learning Framework for Modeling DEM Error from TLS in Wetlands.....	28
<i>Chuyen Nguyen</i>	
Leaf Area Index Prediction of Sorghum Using Wheel-Based and Airborne Discrete-Return Lidar Data.....	39
<i>Behrokh Nazeri</i>	

SESSION 12E: NEW CHALLENGES IN PHOTOGRAMMETRIC SENSOR CALIBRATION AND BLOCK ADJUSTMENT

Photogrammetric Extraction of Shallow Water Depths from Satellite Imagery.....	50
<i>Grzegorz Miecznik</i>	
New Challenges in Photogrammetric Sensor Calibration and Block Adjustment.....	56
<i>Christopher Comp</i>	
Block-Adjusted Solutions for Large-Area Mosaics Show Improved Absolute Map Accuracy Products.....	62
<i>Jon Proctor</i>	
Multi-View Large-Scale Bundle Adjustment Method for High-Resolution Satellite Images.....	68
<i>Rongjun Qin</i>	
Geometric Calibration and Validation of Digital Globe Space-Based High-Resolution Imaging Instruments	79
<i>Chris Comp</i>	
Reflectance-Based Calibration for the Digital Globe Constellation	88
<i>Michele Kuester</i>	

SESSION 12F: TOPOBATHY LIDAR METHODS AND APPLICATIONS

Lidar-Determined Wave Breaking Type and Morphometric Properties in the Surf Zone	97
<i>Andrea Albright</i>	
Development and First Flight of GTRI-Developed High-Performance Low-SWAP Airborne Lidar Bathymetry System.....	116
<i>Thomas Craney</i>	
Revealing Underwater Areas Using Bathymetric Lidar.....	123
<i>Jamie Young</i>	
Real-Time Topobathy Mapping Including Total Propagated Uncertainty Using Waveform-Resolved Airborne Lidar.....	131
<i>Thomas Craney</i>	

SESSION 12G: GEOSPATIAL DATA INTEGRATION AND ANALYTICS I

Measuring Irrigated Landscapes in California – A Systematic Approach to Moving from Land Cover to Land Use	141
<i>Andrew Brenner</i>	

SESSION 12H: LIDAR AND IFSAR PROJECT SHOWCASE

Producing Lidar Deliverables for Hurricane Supplemental Projects - A Case Study of Post-Irma.....	152
<i>Emily Klipp</i>	

Collecting and Producing Lidar Point Clouds from Geiger-Mode Systems in Real-World Environments	169
<i>Kristian L. Damkjer</i>	
Real-World Performance Evaluation of Linear and Geiger-Mode Lidar in Hillsborough County FL	176
<i>Mark Romano</i>	
Alaska - How the Last Frontier of America was Mapped with IFSAR	190
<i>David Maune</i>	

SESSION 13P: POSTER SESSION I

Using Orthophoto for Building Boundary Sharpening in the Digital Surface Model	199
<i>Xiaohu Lu</i>	
Applying Cloud-Based Computing and Emerging Remote Sensing Technologies in Vegetation Management Decisions	200
<i>Monica L Vermillion</i>	

SESSION 14D: RS ADVANCES IN GEOSPATIAL APPLICATIONS

Stockpile Quantity Estimation Based on UAS Imagery	201
<i>Omar E. Mora</i>	
Satellite Imagery and Pruning Management - A Revolutionary Approach	208
<i>Sirlene Magalhaes</i>	
Registration Using Probabilistic Planar Matching with Application in Indoor Mapping	217
<i>Arpan Kusari</i>	
Helping Construction From Above - Unmanned Systems Pave the Way for Renewable Energy Progression	228
<i>Brian Soliday</i>	
Incorporating Advances in Remote Sensing Virtual and Augmented Reality into Learning in the Geosciences	237
<i>Marguerite Madden</i>	
Atmospheric Correction Algorithms for Improved Settlement Mapping and Building Detection Performance	252
<i>Jeanette Weaver</i>	

SESSION 14E: MACHINE LEARNING AND IMAGE ANALYTICS

Towards Seamless Outdoor and Indoor Mapping	259
<i>Zoltan Koppanyi</i>	
A Comparison of Stereo-Matching Cost Between a Convolutional Neural Network and Census for Satellite Images	270
<i>Rongjun Qin</i>	
Investigation on the SegNet Deep Neural Network for Aerial Image Segmentation and Classification	277
<i>Zoltan Koppanyi</i>	
A System-Agnostic Global Lidar Normalization Approach	285
<i>Alexander Fafard</i>	

SESSION 14F: HIGH-RESOLUTION MAPPING OF COASTAL AND NATURAL RESOURCES

Mapping and Monitoring of Coastal Habitats on Sapelo Island Georgia	295
<i>Thomas Jordan</i>	
Improving Elevation Models and Wetlands Mapping with OBIA and UAS Imagery in Coastal Environments	307
<i>Whitney Broussard</i>	
Assessing Separability of UAS-Derived Vegetation Indices for Detecting Plant Stress Due to Iron Chlorosis	324
<i>Isabel Garcia</i>	
Landsat Images Reveal a History of Algal Blooms on Utah Lake	340
<i>Shanae Tate</i>	

High-Resolution Mapping of Coastal and Natural Resources	352
<i>Tommy Jordan</i>	
NOAA C-CAP Transition to National High-Resolution Coastal Land Cover	366
<i>John McCombs</i>	

SESSION 14G: GEOSPATIAL DATA INTEGRATION AND ANALYTICS II

Demonstration of Using a GeoOntology for Simulated Image Generation in Support of GEOBIA	377
<i>Paul Pope</i>	
The Trusted Pixel Approach for Automatic In-Season Crop Type Classification with Landsat Images	389
<i>Liping Di</i>	
Rapid and Accurate Georegistration of Still and Motion Imagery on a 3D Foundation	396
<i>Barry Tilton</i>	

SESSION 14H: NATIONAL SPATIAL REFERENCE SYSTEM MODERNIZATION OF 2022

Implementation of the New American Datums for the National Flood Insurance Program	403
<i>Paul Rooney</i>	
Planning for Change - Implementation of Future Standards at Blue Marble Geographics	408
<i>Sam Knight</i>	
Esri Prepares for 2022	412
<i>Melita Kennedy</i>	
National Spatial Reference System Modernization of 2022	416
<i>Qassim Abdullah</i>	
Trimble Prepares for 2022	433
<i>Jeff Blanton</i>	

SESSION 15D: ADVANCES IN REMOTE SENSING TECHNOLOGY

Photogrammetric Calibration of the Phase One iXU-RS1900 Camera System	437
<i>David Day</i>	
The 4K Monitor as Zoom Stereoscope	451
<i>Glen Gustafson</i>	
A New High-Performance Airborne Lidar System with Gateless MPiA Algorithms	457
<i>Zhigang Pan</i>	
Laying the Foundation for Improved Night Lights Time Series from the VIIRS DNB	467
<i>Robert E. Ryan</i>	

VOLUME 2

SESSION 15E: MODELING APPLICATIONS USING HIGH RESOLUTION IMAGERY

Use of GIS in Assessing the Potential Impact of Hurricane Frequency Scenarios Relating to Climate Change	486
<i>Yaw Twumasi</i>	
If You Can Map It Here You Can Map It Anywhere	493
<i>Jarlath O'Neil-Dunne</i>	

SESSION 15F: TERRESTRIAL AND CLOSE RANGE PHOTOGRAMMETRY APPLICATIONS

An Adaptable Hybrid Fingerprinting System for Indoor Localization and Fingerprint Map Updating	508
<i>Yuan Yang</i>	
Calibration and Stability Analysis for a Multi-Camera System Onboard a High-Vibration Platform	519
<i>Mohammed D. Aldosari</i>	
Enabling Ground-Based Materials Analysis and Identification Using Reflectance Spectroscopy	532
<i>Brian Curtiss</i>	

SESSION 15G: LIGHTNING TALKS

Street View Housing Survey and Sentinel 2 Green Space Inventory To Evaluate Gentrification In Atlanta	539
<i>Amanda D Aragon</i>	
Image Sharpening Effects on Photogrammetric Product Quality	544
<i>Richard Massaro</i>	
Mobile GIS and Remote Sensing App for Small-Scale Farming - A Case Study of Machakos County in Kenya	552
<i>Yaw Twumasi</i>	
A Birds Eye View of the World	562
<i>Harsh Govind</i>	
Workflows for Image Orthorectification in Desktop Cloud and Web Environments	566
<i>Peter Becker</i>	

SESSION 22D: NASA DEVELOP I

Science Advisors Involved in NASA DEVELOP National Projects is Win-Win-Win	570
<i>Marguerite Madden</i>	
Experience as a Participant and Team Leader in NASA DEVELOP National Projects	579
<i>Amanda D Aragon</i>	

SESSION 22E: REMOTE SENSING OF NATURAL FEATURES

Evaluating Seasonal Effect on Mapping Forest LAI Using Multiseasonal Pleiades Satellite Imagery	588
<i>Ruiliang Pu</i>	
Estimating Long-Term Lake Dynamics with Landsat Imagery and Topography Datasets	600
<i>David Weekley</i>	
Developing Alternative Fuel Models with WorldView-3 to Estimate Fire Behavior in a Semi-Desert Grassland	607
<i>Holly Eagleston</i>	

SESSION 22F: UAS CALIBRATION AND ACCURACY ASSESSMENT I

Camera Self-Calibration in UAS Photogrammetry - When is it Viable	613
<i>Clive Fraser</i>	
sUAS Payload Calibration for Remote Sensing Applications	630
<i>Mary Pagnutti</i>	
Advances in Lidar Technology	655
<i>Megan Ritelli</i>	

SESSION 22H: ADVANCES IN LIDAR TECHNOLOGY

Information vs Points - Towards a Better Assessment of Product Information and Interpretability	669
<i>Kristian L. Damkjer</i>	
Advances in Lidar Technologies - Status of Commercial Linear Geiger and Single Photon Lidar Systems	678
<i>Qassim Abdullah</i>	

SESSION 23D: NADA DEVELOP II

Using NASA EO to Forecast Forest Risk to Beetle Attack for a Forest Bioenergy Feasibility Assessment	703
<i>Jillian LaRoe</i>	

Using NASA Earth Observations to Inform Resource Management at Glen Canyon National Recreation Area	713
<i>Max Stewart</i>	

SESSION 23F: UAS CALIBRATION AND ACCURACY ASSESSMENT II

An Evaluation of Reflectance Calibration Methods for UAV Spectral Imagery.....	727
<i>John Anderson</i>	
Stereographic Compilation from UAS - An Accuracy and Feasibility Study.....	733
<i>Christian Stallings</i>	
UAS-Based Mapping and Surveying Without GNSS Reference Stations and Ground Control Points.....	744
<i>Srdjan Sobol</i>	
Evaluation of UAS Lidar vs UAS SfM - A Case Study	753
<i>Michael Starek</i>	

SESSION 23G: NATIONAL PARK SERVICE VEGETATION MAPPING INVENTORY PROGRAM

Maintaining National Park Service Vegetation Databases Using Emerging Geospatial Techniques	764
<i>Marguerite Madden</i>	
Future Techniques Supporting NPS Inventory - UAS, Structure from Motion, and Lidar	789
<i>Thomas Jordan</i>	
Integrating Machine Learning into Vegetation Mapping to Increase Accuracies and Lower Costs.....	800
<i>Kass Green</i>	

SESSION 24P: POSTER SESSION II

Lidar Analysis to Evaluate Relationships Between Heir's Properties and Bio-Fuel Buildup	810
<i>Amanda Aragon</i>	
Point Cloud Sampling and Resampling Strategies.....	811
<i>Kristian L. Damkjer</i>	
Biomass Estimation Using Lidar Data in North Carolina.....	812
<i>Asmamaw Gebrehiwot</i>	

SESSION 25D: STUDENT PAPERS

A Novel Structured Light Reconstruction Method Using Combined Circular and Column Phase Shifting Patterns	813
<i>Yujia Zhang</i>	
Implementation of GNSS/INS-Assisted Structure from Motion for a Thermal Camera Onboard a UAS.....	840
<i>Seyyed Meghdad Hasheminasab</i>	
Assessing Human-Elephant Conflict using GPS Tracking and High-Resolution Imagery	853
<i>Nick Meng</i>	
Deep Learning for the Extraction of Impervious Surfaces from High Resolution Imagery.....	862
<i>Mihir Datta</i>	

SESSION 25F: UAS PRODUCTION PHOTOGRAMMETRY

Developing sUAS Based Optical and Thermal 2D and 3D Mapping Applications at the University of North Georgia	879
<i>J.B. Sharma</i>	
A Workflow for a Successful Drone Photogrammetry Mapping Project.....	902
<i>Connie Krampf</i>	
Photogrammetric Data Classification for the Creation of Virtual Environments and Simulations	911
<i>Meida Chen</i>	
Combining Nadir and Oblique Imagery to Address Distortion in UAS Data.....	928
<i>Sabina Bastias</i>	

SESSION 25G: IMPROVING REMOTE SENSING DATA QUALITY AND DATA MANAGEMENT

From 2D Map to 3D World - When Obliques and Modeling Merge 938
Guy Meiron

On-Orbit Geometric Calibration of a SkySat - Methods and Results 945
Byron Smiley

Atmospheric Scattering in Satellite Imagery - An Investigation into Haze Mitigation Techniques 960
Byung H. Park

Oriented Imagery - A Data Model for all Other Imagery N/A
Peter Becker

Author Index