asprs THE IMAGING & GEOSPATIAL INFORMATION SOCIETY

Confluence by the Bay — A Gathering of Geospatial Insights

ASPRS 2013 Annual Conference

March 24-28, 2013

Baltimore Marriott Waterfront Hotel

Baltimore, Maryland USA

Preliminary Program

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A MESSAGE FROM GOVERNOR MARTIN O'MALLEY

Dear Friends:

Welcome to the American Society for Photogrammetry and Remote Sensing Conference.

Since 1934, ASPRS has been fostering innovation in photogrammetry, remote sensing, and other geospatial technologies. Maryland is home to an estimated 2,000 or more geospatial professionals and has been named #1 in entrepreneurship and innovation by the U.S. Chamber of Commerce.

Your conference's theme, "Confluence by the Bay – A Gathering of Geospatial Insights" is especially appropriate given the partnership of Photogrammetry and Remote Sensing and our own ongoing efforts to protect the Chesapeake Bay. Here in Maryland, we rely on GIS to track our progress on meeting strategic goals, like reducing nutrient levels in our watersheds leading to the Bay. By using a data-based management approach we can ensure that our government remains transparent and accountable.

Best wishes for a successful event and enjoy your stay in Baltimore.

Sincerely,

Governor

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Sponsors

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ASPRS would like to Thank our Media Sponsors for continually supporting our organization, the conferences and our exhibitors. These partnerships are a valuable key to our success.

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GIM International	GISCafe.com
GISuser	GISuser.com
GPS World	Imaging Notes
LiDAR Magazine	LiDARnews.com
Point of Beginning	Professional Surveyor

The ASPRS Potomac Region and the 2013 Conference Planning Committee want to welcome you to the Annual Conference of the American Society for Photogrammetry and Remote Sensing (ASPRS) in Baltimore, Maryland. Our conference theme: "Confluence by the Bay – A Gathering of Geospatial Insights" was chosen to highlight the most recent advances in imaging and geospatial analysis through the synergy (i.e. "confluence" or "coming together") of researchers and practitioners to exchange ideas within the geospatial community. Our technical program, developed by David Johnson (USDA) and Claire Boryan (USDA), promises to address the imaging and geospatial confluence of the hydrologic, atmospheric, and terrestrial systems and their assessment via remotely sensed means. ASPRS members are encouraged to participate in ASPRS program development by attending the Division and Committee meetings, whose activities help shape the direction of the Society. The technical program contains over 400 technical presentations and Hot Topics that will address a myriad of topics including cutting edge applications such as cloud computing, object-based image analysis and accuracy assessment, and smartphone/mobile applications. The conference planning and execution is a big effort and we want to thank the entire organizing committee, the ASPRS Potomac Region, student volunteers, sponsors, exhibitors and presenters for their efforts in making this event outstanding.

John Iiames

Our Tuesday morning keynote address by Dr. Hans W. Paerl, a renowned professor from the University of North Carolina's Institute of Marine Sciences, will detail the current conditions of global estuarine systems with respect to excessive nutrient loadings. Dr. Paerl will comment on the combined system analysis of ground-based measurements and airborne/spaceborne remote sensing data collection to assess nutrient enrichment and hydrologic alterations on water quality and sustainability of inland, estuarine, and coastal waters. On Wednesday morning our keynote speaker for the second Opening General Session is Frank Kelly, EROS Center Director and U.S. Geological Survey Space Policy Advisor. Frank will update our geospatial community on the launch of the Landsat Data Continuity Mission (LDCM) and also the future direction for the National Land Imaging Program. In addition to these two quality keynote presentations, we also look forward to Wednesday's address by incoming ASPRS President Dr. Stephen D. DeGloria.

David Szymanski

In response to member suggestions, we have adjusted the conference schedule to allow an open night March 27 (Wednesday) for attendees to meet with colleagues/clients/friends. ASPRS National and the ASPRS Potomac Region have collaborated to provide a first night March 25 (Monday) welcoming social in Baltimore's charming Little Italy neighborhood at the award winning Da Mimmo's Italian Restaurant. Exquisite food, great music, and bocce competition will highlight this event in this historic district. The exhibitor's reception on Tuesday night March 26 also allows for an opportunity to reconnect and network.

Please fully participate in everything the conference has to offer, strengthen professional relationships with colleagues, and leave with a memorable, enriched experience. Best wishes and enjoy!

John Iiames
Conference Co-Director

Dave Szymanski
Conference Co-Director

PROCLAMATION

BY

MAYOR STEPHANIE RAWLINGS-BLAKE

DESIGNATING MARCH 24-28, 2013

AS

"AMERICAN SOCIETY OF PHOTOGRAMMETRY AND REMOTE SENSING DAYS"

IN RECOGNITION OF THEIR ANNUAL CONFERENCE IN BALTIMORE

WHEREAS, founded in 1934, the American Society for Photogrammetry and Remote Sensing (ASPRS) is a scientific association serving more than 7,000 professionals worldwide; and

WHEREAS, their mission is to promote the ethical application of active and passive sensors, the disciplines of photogrammetry, remote sensing, geographic information systems, and other supporting technologies; to advance the understanding of the geospatial and related sciences; to expand public awareness of the profession; and to promote a balanced representation of the interests of government, academia, and private enterprise; and

WHEREAS, this year's conference theme: *Confluence by the Bay – A Gathering of Geospatial Insights*, refers to the coming together of researchers and practitioners for the purpose of open dialogue with respect to the most recent advances in geospatial analysis; and

WHEREAS, the citizens of Baltimore encourage the attendees of ASPRS's Annual Conference to take advantage of all the wonderful things our city has to offer while learning the most up to date information on geospatial analysis. Welcome to our city!

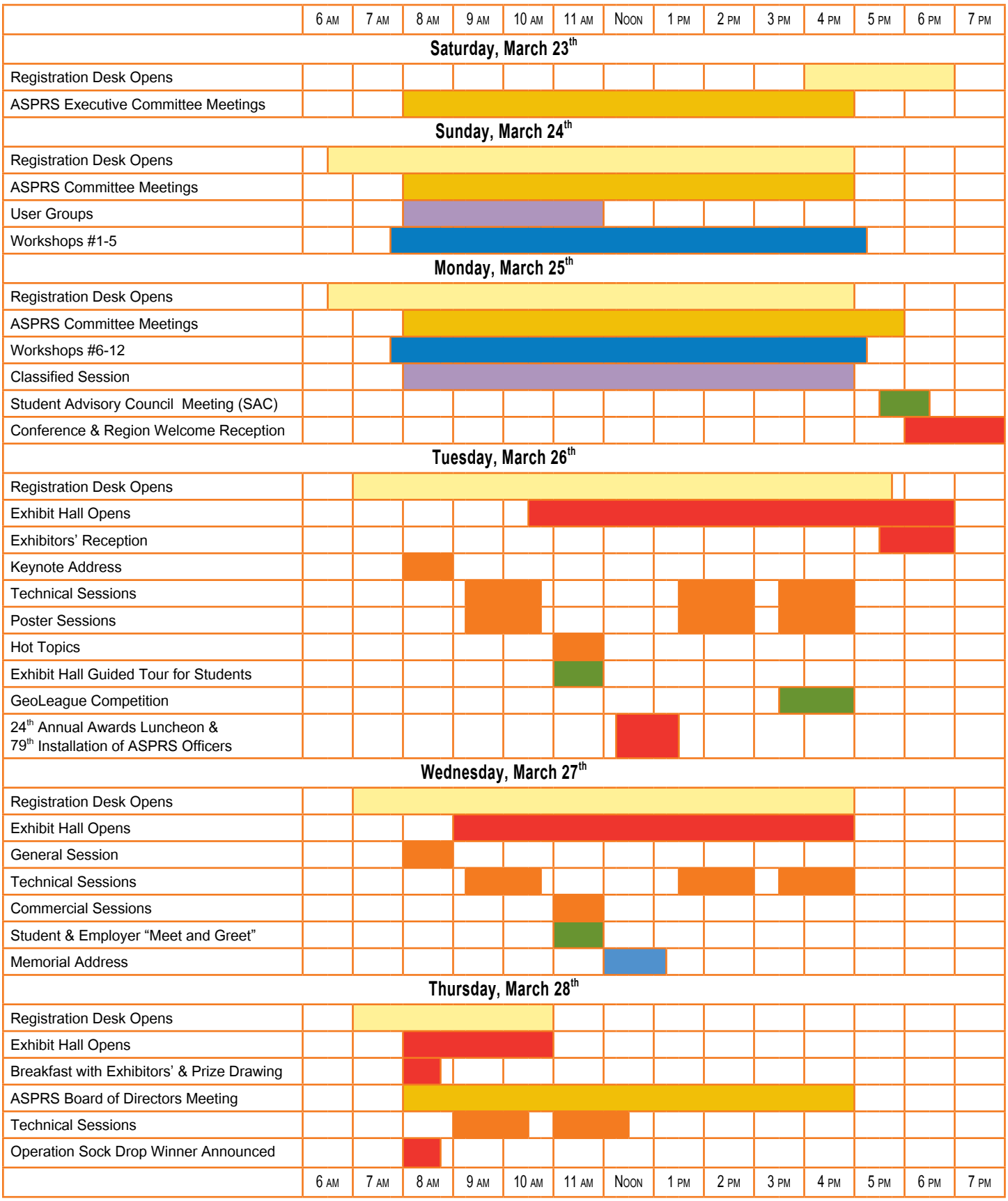
THEREFORE, I, STEPHANIE RAWLINGS-BLAKE, MAYOR OF THE CITY OF BALTIMORE, do hereby proclaim March 24-28, 2013, as "AMERICAN SOCIETY OF PHOTOGRAMMETRY AND REMOTE SENSING DAYS" IN BALTIMORE, and do urge all citizens to join in this celebration.

IN WITNESS WHEREOF, I have hereunto set the Great Seal of the City of Baltimore to be affixed this twenty-fourth day of March, two thousand thirteen.

Stephanie Rawlings-Blake

Mayor

Conference-at-a-Glance



Baltimore!

13 million visitors are drawn to Baltimore's world-famous Inner Harbor every year! Make sure you're the 13,000,001st. The ASPRS 2013 Annual Conference host hotel and all conference activities will be held at the **Baltimore Marriott Waterfront Hotel**, situated along Baltimore's Inner Harbor offering a large variety of attractions, restaurants, shopping and more - all within walking distance. Also, due to Baltimore's location within the U.S. Northeast corridor, it provides easy access to Washington, D.C., Philadelphia and New York. Attend the ASPRS 2013 Annual Conference and easily turn your business trip into a full family vacation!

One of the finest hotels in the Baltimore Inner Harbor, Baltimore Marriott Waterfront sits on the water's edge. You'll enjoy spectacular views from this Baltimore Inner Harbor hotel, as well as easy access to the city's finest shops and restaurants located in the Harbor East neighborhood, which boasts an array of top options within blocks of our Inner Harbor hotel. Easily set out on foot or water taxi to explore the National Aquarium, Maryland Science Center and more. Plus, the hotel's close proximity to the Convention Center and the short drive to BWI airport or Amtrak station make staying here more convenient.

With 732 ultra-flexible guest rooms, four on-site dining facilities, fitness center, and an indoor pool it's no wonder this hotel is highly regarded. This well-appointed Baltimore Inner Harbor hotel boasts luxury guest rooms and suites with picturesque water and city views and will surely please the most discerning guests.

- Experience the many museums including the Baltimore Maritime Museum, Museum of Industry, the USS Constellation Museum and the Civil War Museum.
- Historic sites and homes are located throughout Baltimore. No visit would be complete without seeing Fort McHenry National Monument, the inspiration for Frances Scott Key's composition of the *Star Spangled Banner* – Baltimore is so full of interesting and artful expressions.
- Explore Baltimore the wet way. Harbor taxis take you to 35 attractions and five eclectic neighborhoods around the Inner Harbor from Fells Point, where the Marriott Waterfront Hotel, the ASPRS Conference Headquarters is located, a historic area with original cobblestone streets, jazz and blues pubs and art galleries.
- Sports fans will want to visit the Baltimore Orioles Home at Camden Yards with year-round tours available. The Baltimore Ravens Stadium is next door to Camden Yards.
- The National Aquarium, the Maryland Science Center, Power Plant Live, shopping and nightlife all within walking distance of the Marriott Waterfront Hotel.
- Tempt your taste buds with world renowned Chesapeake Bay Cuisine. Baltimore boasts of having over 1,000 restaurants with something to satisfy every appetite.
- Baltimore's Little Italy and Greektown are just two of the well-known ethnic experiences waiting to welcome you.
- Getting to Baltimore is so easy. Baltimore/Washington International Airport (BWI) is just 15 minutes from the Marriott Waterfront Hotel – ASPRS Conference Hotel, and has direct service to over 60 U.S. and eight international cities. Numerous means of ground transportation are available from the airport. PLUS, Amtrak's ACELA train service makes Baltimore easily accessible to one-third of the U. S. population.
- Baltimore is only 35 miles from our Nation's Capital with sites too numerous to list – a great extension to your time at the ASPRS Annual Conference. Why not plan to bring your friends and family.




Benvenuti! Welcome!

Conference & Region Welcome Reception

Monday, March 25th, 2013

6:00 PM until 9:00 PM

Da Mimmo's Restaurant in Baltimore's Little Italy

NEW for 2013!

NEW for 2013 - The ASPRS Potomac Region and the Conference social events are joining together to start the conference week off with a few friends and a Conference & Region Welcome Reception!

Join your fellow conference attendees the night before the conference officially begins, **Monday, March 25th**, to eat, drink, and get to know each other in Baltimore's Little Italy at De Mimmo's Italian Restaurant! There is no better way to start your conference week than with friends, food, fun and laughter.

Little Italy is located in the heart of downtown renaissance Baltimore. Nestled between the Inner Harbor and historic Fells Point, you will find a cozy neighborhood of mostly Italian residents and Trattorias.

De Mimmo's is a neighborhood establishment serving award winning Italian cuisine with the hospitality of home cooking. A tented area will be arranged for the Conference & Region Welcome Reception with bocce ball, live music and refreshments. Each ticket holder will receive one complimentary beverage.

Little Italy and De Mimmo's is within walking distance of the Conference Host Hotel, less than a half-mile away. However, continuous complimentary bus transportation will be provided between Little Italy and the Baltimore Marriott Waterfront Hotel from **6:00 pm to 9:30 pm on Monday, March 25th, 2013**.

The evening reception is included in the registration fee for those paying the Full Registration rate. All others, including children, wishing to attend this event must purchase tickets in advance by using the registration form found on pages 57-58 of this program, or at the ASPRS Registration Desk in the Baltimore Marriott Waterfront Hotel no later than 10 am on Sunday, March 24th. Tickets will not be sold at the door. All children attending the event must be accompanied by an adult.

Buon Divertimento!

(Have a Good Time)

Exhibitors

Company	Booth #
American Aerospace Advisors, Inc.	UAV
American Surveyor and *LiDAR* Magazine	617
Applied Imagery	800
ASD, Inc.	410
Asian Surveying & Mapping	617
ASPRS	611
ASPRS Student Advisory Council	616
Astrium Services GEO-Information Division	215
BAE Systems	300
Beijing GEOWAY Software Co., Ltd.	514
Blue Marble Geographics	707
Cannon IV, Inc.	505
Cardinal Systems, LLC	201
Certainty 3D	412
Clark Labs, Clark University	213
Coordinates Magazine	217
DAT/EM Systems International	307
Directions	617
DMC International Imaging Ltd.	111
Dynamic Aviation	609
Earth Imaging Journal (EIJ)	617
EARTH magazine	617
Esri	301
Exelis	500/401
GEO:Connexion	617
GeoCue	515
GeoInformatics	617
GeoIntelligence, Geospatial Solutions, GPS World	617
GeoWorld	617
GIM	617
GISCafe.com	712
Imaging Notes	617
Intergraph Corp. / Leica Geosystems	101
ITRES Research Limited	614
KLT Associates	106/108
Lead'Air/Track'Air	600/602
LizardTech	701
Microsoft	207
MosaicMill Ltd.	709
NASA	509
National Geospatial-Intelligence Agency (NGA)	311
New Tech Services, Inc.	703
NorPix, Inc.	109
NovAtel Inc.	212
Optech Inc.	312
Panvion Technology Corporation	604
PCI Geomatics	406
Point of Beginning	617
Professional Surveyor	114
RapidEye AG	501
Riegl USA Inc.	208
SimActive, Inc.	503
Spectral Evolution	708
Surface Optics	710
Topcon Positioning Systems, Inc.	407
Trimble	601
VisionMap Ltd.	100

UAS Showcase

The ASPRS 2013 Annual Conference exhibit hall will feature a new addition this year, the UAS (Unmanned Aerial System) Showcase. This is a fantastic opportunity for UAS and UAV companies to exhibit and for conference attendees to see real-life UAS products.

The UAS technology will be highlighted with a workshop at the conference and a few special sessions throughout the week. With the addition of the "UAS Showcase" we are hoping to attract UAS/UAV manufactures that would otherwise might not attend the conference and are not currently members of ASPRS. This is a fantastic opportunity to show conference attendees real life examples of UAS products and touch a very eager audience.

Committee Meetings

Saturday, March 23th

ASPRS Executive Committee
8:00 AM to 5:00 PM

Sunday, March 24th

Anyone interested in the work of an ASPRS Division or Committee is welcome to attend these meetings. There is no registration required for attendance at the Division and Committee meetings. Your participation is encouraged and welcome.

Division Directors & Committee Chairs
(Joint Meeting - will focus upon the activities of each entity as they relate to the Strategic Plan of ASPRS.)
8:00 AM to 10:00 AM

Journal Policy & Publications Committee (Joint Meeting)
10:00 AM to 12 NOON

Bylaws Committee
10:00 AM to 11:00 AM

Awards Committee
11:00 AM to 12 NOON

Region Officers
1:00 PM to 2:00 PM

Remote Sensing Applications Division (RSAD)
2:00 PM to 3:00 PM

Photogrammetric Applications Division (PAD)
2:00 PM to 3:00 PM

Photogrammetric Applications Division (PAD)
Defense & Intelligence Subcommittee
3:00 PM to 4:00 PM

ASPRS Education & Professional Development Committee
3:00 PM to 5:00 PM

Remote Sensing Applications Division (RSAD)
Climate Change Subcommittee
4:00 PM to 5:00 PM

Monday, March 25th

Evaluation for Certification
8:00 AM to 9:00 am

ASPRS Membership Committee
9:00 AM to 10:00 am

Geographic Information Systems Division (GISD)
10:00 AM to 12:00 NOON

Electronic Communications Committee
1:00 PM to 2:00 PM

Lidar
Airborne Lidar Subcommittee
1:00 PM to 2:00 PM

Data Preservation & Archives Committee
2:00 PM to 3:00 PM

Convention Policy & Planning Committee (CPPC)
2:00 PM to 4:00 PM

Professional Practice Division (PPD)
3:00 PM - 4:00 PM

ASPRS Sustaining Members Council
4:15 PM to 5:15 PM

ASPRS Division Directors
5:00 PM to 6:00 PM

Student Advisory Council (SAC)
5:30 PM to 6:30 PM

Wednesday, March 27th

Public Forums:
Public Forums are meetings held to specifically engage conference attendees in the work of the ASPRS Divisions and are held at a time to be most advantageous for attendee participation. Everyone is welcome to attend.

Lidar
11:00 AM to 12 NOON

Primary Data Acquisition Division (PDAD)
11:00 AM to 12 NOON

Thursday, March 28th

ASPRS Board of Directors
8:00 AM to 5:00 PM

User Group Meetings

User Group Meetings are a wonderful chance for YOU to meet with exhibitors one-on-one.

User Group Meetings are four hour sessions which include a discussion or presentation from the exhibiting company about their new products, software or innovations. These sessions are designed for personal attention from the exhibitor and are **complimentary for all conference attendees**. You don't want to miss this opportunity!

Plan ahead and make time to attend the User Group Meetings at the ASPRS 2013 Annual Conference! All User Group Meetings will be held in the Baltimore Marriott Waterfront Hotel. Exact room locations will be posted online and in the Conference Final Program.

Sunday

MosaicMill Ltd

Sunday, March 24th, 1:00 PM to 5:00 PM

Please join the MosaicMill team for the EnsoMOSAIC image processing afternoon. Learn how to process UAV and medium format images in photogrammetric workflow into high-end orthomaps, dense point clouds and accurate uDSMs. MosaicMill will also demonstrate the first hyperspectral camera for UAVs. You can also bring your own aerial data into the meeting and start your first EnsoMOSAIC image processing project.

RapidEye

Sunday, March 24th, 1:00 PM to 5:00 PM

RapidEye Mosaic Product. We're proud to debut our newest product at the ASPRS User Group Meetings: RapidEye mosaic products consist of multiple RapidEye image takes that have been orthorectified and radiometrically color balanced to a uniform appearance. These image takes are then assembled to create a single, seamless area image. Product specifications for the RapidEye Mosaic will be discussed as well as which specific countries are available 'off-the-shelf'.

Session Level: Suitable for all levels.

Monday

BAE Systems

Monday, March 25th, 8:00 AM to 12 NOON

SOCET GXP software delivers end-to-end photogrammetric strengths with the added benefits of an intuitive and customizable user interface, advanced image processing, and improved workflow automation for ease-of-use and maximized productivity. Preview SOCET GXP v4.1 enhancements including the integration of ClearFlite, the SOCET GXP Xplorer connector, and the new Visual Coverage Tool (VCT), which replaces the existing VCT. And, get a sneak peek of GXP Web, which enables the viewing and analyzing of geospatially referenced imagery all within a Web browser.

GeoCue Corporation

Monday, March 25th, 8:00 AM to 12 NOON

GeoCue Corporation is a software development and consulting services company specializing in geospatial production management solutions. We will be demonstrating our GeoCue product family of integrated solutions in booth #515 as well as during our annual user's group meeting on Monday, March 25th, 8:00 am to 12 noon. These products provide an integrated end-to-end processing framework that, when combined with industry leading production tools, significantly reduces production time from data acquisition to finished product.

Microsoft / Vexcel Imaging GmbH

Monday, March 25th, 8:00 AM to 12 NOON

Join the technical experts and business leaders from Microsoft's UltraCam product group in this half day presentation for an opportunity to learn firsthand about the company's latest aerial mapping sensor and software product advancements: UltraCam Eagle, UltraCam Falcon and UltraMap 3.0. Prizes will be raffled, refreshments will be served, and seating will be limited so be sure to arrive early.

Topcon Positioning Systems

Monday, March 25th, 8:00 AM to 12 NOON

Join Topcon for this informational workshop, as we present Map, Extract and Deliver; an understanding of mobile mapping systems technology and workflows. Technical aspects of the IP-S2HD will be presented including functionality of core components and available sensors.

An overview of data collection, processing, and calibration methods is explained. Software workflows for viewing and extracting data using point clouds and digital images as well as geospatial data management for a variety of applications will be presented.

User Groups Meetings

Monday

TopoFlight Mission Planner

Monday, March 25th, 8:00 AM to 12 NOON

TopoFlight/New Tech Services, Inc. sells a Flight Planning Program. Please download a demo. Current Version is 8. The "Navigator" is a Flight Management System to navigate the Aircraft and trigger the Camera at pre-defined positions. New Tech Services markets Pre-Owned Mapping Equipment and modified Planes. TopoFlight Products are marketed in over 20 countries. Credit Cards accepted.

Contact nts@nts-info.com. More information at www.nts-info.com, www.TopoFlight.com Call: 1-281-573-8029. Habla español. Llámenos. "TopoFlight - The Standard in 3d Flight Planning"

Esri

Monday, March 25th, 8:00 AM to 12 NOON

ArcGIS – A Comprehensive Imagery System

Join Esri for an interactive session about imagery. We'll be covering topics that will help you manage massive collections of imagery, learn the latest techniques for processing and analyzing imagery and how to jumpstart your projects with imagery from ArcGIS.

Certainty 3D

Monday, March 25th, 1:00 PM to 5:00 PM

This course will review the integration of LiDAR technology across survey, design, engineering and construction operations. The material covers topics of LiDAR technology, assessment of data, and extraction of features and 3D models. A case study is presented demonstrating the practical application and economic benefits of LiDAR technology within design and engineering processes.

Exelis Visual Information Solutions

Monday, March 25th, 1:00 PM to 5:00 PM

Join us at the ENVI User Group Meeting to learn how advances in the ENVI product family can help you turn imagery, LiDAR, and SAR data into the knowledge you need to make more informed decisions. This event will feature presentations by remote sensing and GIS professionals who will demonstrate how they use ENVI to solve real-world problems. And, get a sneak peak at what's coming soon in ENVI for desktop, cloud, and mobile environments.

Intergraph

Monday, March 25th, 1:00 PM to 5:00 PM

The world's most comprehensive and broadly-based manufacturer of geospatial software solutions, Intergraph has released the industry's ONLY united geospatial portfolio of products. Intergraph Geospatial 2013 incorporates photogrammetry, remote sensing, and GIS from the desktop, server, web, and the cloud. Using this revolutionary portfolio, you can exploit the wealth of information contained in data from any source, share it rapidly (and securely), and deliver it on demand as reliable and actionable information to drive smarter decisions.

Optech

Monday, March 25th, 1:00 PM to 5:00 PM

Optech Workflow Tools User Group Meeting. Optech presents its latest workflow tools to maximize production efficiency and collection confidence for lidar/camera surveys. The session discusses our innovative real-time point display capability, which moves data validation and decision-making into the air during the survey flight itself—immensely valuable for emergency and rapid response applications. Also included is an active demonstration of the Optech FMS Flight Management Suite, and a discussion of the differences between the Optech LMS Standard and Professional post-processing capabilities.

Trimble

Monday, March 25th, 1:00 PM to 5:00 PM

Trimble's Inpho & eCognition user group is your opportunity to explore the most recent versions of the popular software packages for aerial photogrammetry, laser scanning data production and object based image analysis (OBIA). Demonstrations include UAV/UAS photogrammetry and terrain modeling, dense matching for quality point clouds, and OBIA analysis of images and point clouds from land mobile sensors. Time has also been allocated to discuss the topics of interest to you: the members of the Inpho & eCognition community.

Workshops

Workshop #1

Georeferencing: State of the Art and New Trends

Joe Hutton, Director of Airborne Business, *Applanix Corporation*
Mohamed MR Mostafa, Chief Technical Authority, *Applanix Corporation*

Sunday, March 24th, 7:45 AM to 5:15 PM, CEU .8

FEES	ADVANCE (BY 3-22-2013)	ONSITE (AFTER 3-22-2013)
	Member - $235	Member - $260
	Nonmember - $335	Nonmember - $360
	Student Member - $125	Student Member - $140

INTERMEDIATE WORKSHOP

Georeferencing is defined as the science and art of referencing remotely sensed data to a local mapping frame of reference. Traditionally, this has been done using photogrammetry, ground truth and various forms of triangulation, resulting in the production of quality mapping products since as early as World War II. However, even at that time, there was speculation about the possibility of using onboard sensors to directly georeference images to improve the productivity of photogrammetric mapping. This concept was further discussed in the 1970s and 1980s, where the measuring sensors were labeled as "Auxiliary Sensors" by the photogrammetric community. However it was not until the advent GPS in the 1980's that a practical solution appeared possible. In 1984, the University of Calgary in Canada conducted the first experiment using GPS onboard a survey aircraft to measure the camera location at the moment of exposure, revealing the enormous potential of this new technology. The 1990s saw the use of Kinematic GPS with GPS-assisted Aerotriangulation (AT) become standard, and the appearance of the first GNSS-Aided Inertial systems being tested to augment or even replace AT altogether. By the late 1990s, GNSS-Inertial systems were themselves proven to be commercially viable methods of georeferencing, driven in part by the demands of new types of sensors such as lidar, digital line scanners and SAR where AT was not practical. Nowadays, direct georeferencing using GNSS-Inertial is a standard method of georeferencing data collected on mobile platforms.

This workshop will focus on the underlying concepts of georeferencing using different methods and sensors for different applications. Practical examples from real world projects are used extensively to illustrate the pros and cons of each method or sensor assembly. This workshop is intended for the ASPRS mapping professionals from either technical or business background. The topics will be covered in this workshop:

I. Photogrammetry: The Concepts
   - A. Basic geometry
   - B. Space resection/intersection
   - C. Collinearity & co-planarity
   - D. Relative & absolute orientation
   - E. Aerotriangulation

II. GNSS and Inertial Sensors
   - A. GNSS basics
   - B. Inertial basics
   - C. GNSS-Inertial integration
   - D. Accuracy aspects
   - E. Best practice for GNSS-Inertial data processing

III. Direct Georeferencing
   - A. Basic concepts
   - B. Applications to mobile sensors
   - C. Quality control
   - D. Best practice

IV. Applications in Mobile Mapping
   - A. Special airborne applications
   - B. Land applications
   - C. Marine applications
   - D. Data integration

V. Future Trends
   - A. GNSS
   - B. Inertial sensors
   - C. SLAM
   - D. Integrated sensor orientation - redux

Continuing Education Credits (CEU's)

ASPRS is pleased to announce that Continuing Education Units (CEUs) are awarded for the ASPRS workshops. This program is being offered in conjunction with George Mason University.

The Continuing Education Unit (CEU) is a nationally recognized unit of measurement for participation in non-credit continuing education programs. Adults who successfully complete George Mason University's approved programs will be awarded continuing education units. A permanent record of CEUs awarded will be maintained in the university database and will be easily accessible for certification and verification purposes.

The objective of the CEU is to:

- Provide a nationally established record of professional development learning activity
- Encourage adult students to utilize educational resources to meet their personal and educational needs
- Recognize individuals who continue their education and keep themselves current in their chosen professions
- Enable individuals to have an accurate source of their current CEU activity
- Provide a system to document continuing education experiences in meeting certification requirements.

George Mason University, Office of Continuing Professional Education is registered with the National Association of State Boards of Accountancy (NASBA), as a sponsor of continuing professional education on the National Registry of CPE Sponsors. State boards of accountancy have final authority on the acceptance of individual courses for CPE credit.

Workshop fees are <u>not</u> included in the cost of the conference registration.

Workshop #2

Object-Based Image Analysis

Jarlath O'Neil-Dunne, *University of Vermont*
Keith Pelletier, *University of Minnesota*

Sunday, March 24th, 7:45 AM to 5:15 PM, CEU .8

FEES	ADVANCE (BY 3-22-2013)	ONSITE (AFTER 3-22-2013)
	Member - $235	Member - $260
	Nonmember - $335	Nonmember - $360
	Student Member - $125	Student Member - $140

ADVANCED WORKSHOP

This full-day, advanced workshop is designed to help participants harness the true power of object-based image analysis (OBIA). It is recommended that participants have a strong foundation in remote sensing and GIS, and at least some exposure to OBIA. This workshop is particularly well suited to individuals who are finding it difficult to extract information from the latest generation of high-resolution imaging and LiDAR sensors using OBIA techniques. Specific emphasis in this workshop will be paid to moving beyond the standard "segment and classify" approach that is typically employed in most OBIA projects, to an iterative workflow that better mimics the type of mapping carried out by human analysts by fully incorporating the spectral, geometric, and contextual information present in an image. Through a series of lectures, demonstrations, and hands-on exercises, participants will be exposed to the methods that will enable them to build effective and efficient OBIA routines.

The workshop will be divided into four parts. In the first part, the theoretical foundation for the effective application of OBIA technology will be laid out by drawing from the remote sensing, neurobiology, and cognitive sciences literature. This will be followed by a review of the current approaches to OBIA, with particular attention to some of the pitfalls that often prevent OBIA technology from being applied to its full potential. The second part will focus on effective approaches to and best practices for object-based feature extraction, including a thorough review of segmentation algorithms. The third part will cover more advanced topics, including: 1) image object fusion, 2) pattern recognition, 3) morphological routines, and 4) context-based classification. The workshop will conclude with recommendations on how to design and deploy enterprise OBIA systems capable of processing of datasets containing billions of pixels.

Demonstrations and exercises will make use of a broad range of remotely sensed (e.g. imagery and LiDAR) datasets and a particular focus in the exercises will be integrating remotely sensed and thematic datasets in an OBIA context. Participants are encouraged to bring their own computers to use during the hands-on exercises. OBIA software will be provided (requires Windows XP, Vista, or 7).

INTRODUCTORY	8, 10, 12
INTERMEDIATE	1, 3, 4, 5, 6, 7, 9, 11
ADVANCED	2

Workshop #3

Lidar for Terrain and Vegetation Mapping

Qi Chen, *University of Hawaii at Manoa*

Sunday, March 24th, 7:45 AM to 5:15 PM, CEU .8

FEES	ADVANCE (BY 3-22-2013)	ONSITE (AFTER 3-22-2013)
	Member - $235	Member - $260
	Nonmember - $335	Nonmember - $360
	Student Member - $125	Student Member - $140

INTERMEDIATE WORKSHOP

This workshop is to introduce the basic concepts of Lidar, the popular and innovative methods for Lidar data processing and information extraction, with a focus on terrain mapping and forest studies. The attendants will learn 1) the principles of Lidar systems, 2) the typical Lidar systems, sensors, software, data, and applications, 3) the general procedure for processing airborne lidar data, 4) the popular and innovative methods for Lidar data filtering and terrain mapping for both urban and vegetated areas, 5) an overview of methods for extracting forest information at the stand and individual-tree levels, 6) an introduction of ground-based Lidar, 7) the application of satellite GLAS data for forest mapping, and 8) the remaining challenges of Lidar data processing and the advices of finishing your Lidar projects.

I. Introduction
   - A. Principle of lidar: discrete-return vs. waveform lidar
   - B. Lidar platforms
   - C. Current developments of lidar and applications.

II. Airborne Lidar Systems, Sensors and Data Formats
   - A. Key concepts of airborne lidar systems
   - B. ASCII format vs. .LAS binary format

III. The General Procedure of Lidar Data Processing and Information Extraction

IV. Filtering Point Cloud for Bare Earth Generation
   - A. Slope-based methods
   - B. Surface fitting methods
   - C. Morphological methods

V. Mapping 3D Vegetation Structure
   - A. Individual-tree information extraction
   - B. Stand-level forest information extraction
   - C. Data fusion with optical imagery
   - D. Discussions of airborne lidar data for regional forest inventory

VI. Ground-based Lidar

VII. Satellite Lidar (GLAS: Geoscience Laser Altimeter System)
   - A. Introduction to GLAS
   - B. Elevation retrieval from GLAS
   - C. Regional and global-scale forest mapping with GLAS

VIII. Tiffs: A Toolbox for Lidar Data Filtering and Forest Studies

IX. Case Studies
   - A. Wildlife-habitat analysis
   - B. Ecological modeling

Workshops

NEW!

Workshop #4

Earth Observation Time Series Analysis Using the Earth Trends Modeler

Ronald Eastman, Director, *Clark Labs, Clark University*

Sunday, March 24th, 7:45 AM to 12:15 PM, CEU .4

FEES	ADVANCE (BY 3-22-2013)	ONSITE (AFTER 3-22-2013)
	Member - $180	Member - $200
	Nonmember - $280	Nonmember - $300
	Student Member - $90	Student Member - $100

INTERMEDIATE WORKSHOP

Over the past 30 years a large number of Earth Observation platforms, instruments and products have been developed, resulting in a rapidly expanding archive of image time series. This workshop explores the analysis of these data using the Earth Trends Modeler (ETM) software system. ETM is a GIS extension that provides a wide range of space/time analysis and modeling tools. Topics to be covered include Trend Analysis, Seasonal Trend Analysis, Empirical Orthogonal Functions (EOF), Extended EOF, Multichannel Singular Spectrum Analysis (MSSA), Canonical Correlation, Fourier PCA, Wavelets, Empirical Orthogonal Teleconnections, Linear Modeling and Deseasoning/Denoising procedures. The workshop will be conducted as a live demonstration using a selection of environmental series such as TOPEX/Poseidon ocean heights, Sea Surface Temperature, Tropospheric and Stratospheric temperatures and NDVI Vegetation Index data. All participants will be given a 30-day trial version of the full software suite (GIS and the ETM extension) and the opportunity to purchase the software at a 50% discount.

Workshop fees are <u>not</u> included in the cost of the conference registration.

INTRODUCTORY	8, 10, 12
INTERMEDIATE	1, 3, 4, 5, 6, 7, 9, 11
ADVANCE	2

NEW!

Workshop #5

SpatialSTEM: A Mathematical/Statistical Framework for Understanding and Communicating Grid-Based Map Analysis and Modelling

Dr. Joseph Berry, *Berry and Associates* and Adjunct Professor at the *University of Denver* and *Colorado State University*

Sunday, March 24th, 7:45 AM to 12:15 PM, CEU .4

FEES	ADVANCE (BY 3-22-2013)	ONSITE (AFTER 3-22-2013)
	Member - $180	Member - $200
	Nonmember - $280	Nonmember - $300
	Student Member - $90	Student Member - $100

INTERMEDIATE WORKSHOP

This workshop provides experience with the concepts, underlying theory, data considerations, procedures, and practical considerations in applying advanced grid-based map analysis techniques. It investigates *Spatial Analysis* and *Spatial Statistics* operations using numerous hands-on examples from natural resources management, environmental assessment, precision agriculture and geo-business. The analytical tools are organized into a new and innovative *Spatial*STEM framework that relates them to quantitative analysis groupings familiar to science, technology, engineering and math/stat professionals.

Grid-based *Spatial Analysis and Spatial Statistics* form a powerful set of tools for quantitative analysis of mapped data that cuts across a multitude of disciplines and applications. At its foundation is the perspective that "*maps are numbers first and foremost, pictures later*" and that there is a comprehensive "map-*ematics*" extending traditional mathematics and statistics as a means to better understand spatial patterns and relationships that are inherent in mapped data.

For example, the calculation of slope and aspect in terrain analysis is actually a spatial extension of the mathematical derivative with numerous applications outside of traditional mapping, such as calculating the slope of a barometric surface to derive a map of wind speed (high winds where pressure is rapidly changing), while its aspect map identifies wind direction. Similarly, "localized correlation," maps the degree of dependency between two map variables by successively solving the standard statistical correlation equation within a roving window to generate a continuous map surface of the geographic distribution of the spatial dependency throughout a project area to identify where the map variables are highly correlated, and where they have minimal correlation.

The cross-cutting nature of the *Spatial*STEM framework for grid-based map analysis provides a common foundation in mathematics and statistics for analyzing spatial data that can assist in bridging disciplinary silos and stimulate interdisciplinary interaction and problem-solving. The workshop is intended for professionals and instructors wanting to better understand and communicate spatial reasoning and modeling concepts. Participants will develop an understanding of 1) the unique nature of grid-based spatial data, 2) the underlying concepts, considerations and procedures used in map analysis, and 3) the value of a math/stat framework for communicating these capabilities to potential users outside traditional GIS communities.

Specific topics covered include *1)* Nature of Grid-based Data (discrete spatial objects vs. continuous map surfaces), *2)* Spatial Analysis Operations (analysis tools for assessing "Geographical Context" within and among map layers), *3)* Spatial Statistics Operations (analysis tools for assessing "Numerical Context" within and among map layers) and *4)* Spatial Modeling Considerations (modeling structure, processing hierarchy and simulating alternatives).

Each participant receives a workbook with a CD containing lecture materials, related readings, references for further reading and software/exercises for hands-on experience as homework. Attendees should be comfortable with the basic concepts in GIS and math/stat procedures, as well as have a keen interest in quantitative analysis of mapped data. Participants are encouraged to bring a PC-compatible portable computer and take advantage of individual tutoring after the session and throughout the conference as arranged.

Workshop #6

Unmanned Aerial System (UAS) Fundamentals

Kevin Gambold, *Unmanned Experts LLC*
Ed Freeborn, *Unmanned Experts LLC*

Monday, March 25th, 7:45 AM to 5:15 PM, CEU .8

FEES	ADVANCE (BY 3-22-2013)	ONSITE (AFTER 3-22-2013)
	Member - $235	Member - $260
	Nonmember - $335	Nonmember - $360
	Student Member - $125	Student Member - $140

INTERMEDIATE WORKSHOP

The civilian aviation sector of unmanned aerial vehicles (UAV) and systems (UAS) is rapidly expanding, and is predicted to match the successful military application of UAVs. Recent studies have drawn up over 53 different mission types for civilian UAS, grouped into 5 mission sets of Survey, Law Enforcement, Border Patrol, Communications and Disaster Relief.

Companies are looking to this area to solve specific operational problems, using the traditional strengths of UAS over manned platforms, epitomized by the phrase 'the 3 Ds: Dull, Dirty and Dangerous'.

This UAS Fundamentals Workshop was designed to provide experienced airborne photogrammetry and remote sensing operators, technologists, and scientists with an understanding of UAVs / UAS that goes beyond an introductory level, and allows them to speak knowledgeably of this area to their management, customers, and peers.

This day-long instructional program includes:

I. Overview; UAS Terminology and Classification; UAS Roles and Mission Sets
II. Control Systems; Data Links; Hardware
III. Payloads: EO/IR/LLTV/SAR/GMTI/Hyperspectral
IV. Concept of Operations; Launch Recovery Systems; Communications
V. Deployment Considerations; Future Employment of UAS

Our instructors have extensive operational UAS experience and have delivered leading-edge UAS training materials to a wide spectrum of audiences.

This course assumes that attendees have an intermediate to advanced understanding of airborne operations, and a basic understanding of photogrammetric and remote sensing principles that have their equivalents in military intelligence, surveillance, and reconnaissance (ISR) fundamentals.

Workshops

NEW!

Workshop #7

Photogrammetric Processing: Surface Model and Orthophotograph Workshop

Jennifer Nix, *DigitalGlobe Inc.*
Jon Proctor, *DigitalGlobe Inc.*

Monday, March 25th, 7:45 AM to 5:15 PM, CEU .8

FEES	ADVANCE (BY 3-22-2013)	ONSITE (AFTER 3-22-2013)
	Member - $235	Member - $260
	Nonmember - $335	Nonmember - $360
	Student Member - $125	Student Member - $140

INTERMEDIATE WORKSHOP

This workshop is designed to walk the participants through a complete photogrammetric cycle while identifying issues, concerns, and successes in projects. This workshop is built around each of the major fundamental cycles of photogrammetry.

Image Collection- We will begin with the simple review of stereo imagery. Creating optimal stereo is easy once the three major stereo angles (Convergence Angle, Asymmetry Angle, and Bisector Elevation Angle) are acquired within a specified tolerance. We will show and describe each of the three stereo angles. We also discuss the effect of going outside the angle tolerance does to the parallax and accuracy of the end product.

- **Triangulation**- Next we will review the importance of an accurate and successful triangulation report and how that applies to both surface modeling and the final Orthophoto. We will identify what makes a good ground control point and tie point and how to apply it in a photogrammetric bundle. Illustration will be presented on the effects of a bad bundle point and how it will skew the data and the accuracy of a project.
- **DEM Generation** - Once the stereo mates and an ample triangulation solution have been identified, an accurate Digital Elevation Model, Digital Terrain Model, Digital Surface Model, feature extractions, and 3D models can be created. We will discuss post spacing, contour intervals, and terrain enhancing techniques to aid in the rectification of the imagery. The end user will leave the workshop knowing the differences between Digital Elevation Models, Digital Terrain Models, and Digital Surface Models. We will talk about the pros and cons of each and how they apply to creating a successful and accurate orthophoto.
- **Orthophotography-** We will address the process of correcting imagery for distortion using elevation data and a camera model information so that the scale variation corresponds to a map projection throughout the image. Mosaic cutlines and cloud patching technics will be shared.
- **Ortho Accuracy Assessment** - We will also discuss terrain displacement, quality assurance, quality control, direct ranking, and troubleshooting techniques if areas need to be corrected. We will define the differences between accuracy vs. precision, RMSE vs. CE90, and RMSExy vs. RMSEr. We will talk about variation in sample size and how it will affect your accuracy reporting.

Each photogrammetric process will be described at a beginning to an intermediate level. The audience member should have some familiarity with the photogrammetric process. Many examples will be given to help emphasize and help visualize the photogrammetric process. Workshop examples are based on actual projects results. The audience will be encouraged to share their successes and lessons learned in their own Surface Modeling and Orthophoto experience.

Workshop #8

Aerial Surveillance of Oil Spills Training

David Salt and Stuart Gair, *Spillconsult Limited*

Monday, March 25th, 7:45 AM to 5:15 PM, CEU .8

FEES — THIS WORKSHOP IS UNDERWRITTEN BY BP. ATTENDANCE IS LIMITED TO 20 ATTENDEES

ADVANCE (BY 3-22-2013)	ONSITE (AFTER 3-22-2013)
Member - $75	Member - $100
Nonmember - $100	Nonmember - $125

Students are not eligible to attend

INTRODUCTORY WORKSHOP

In the event of a marine oil spill, individuals serving as aerial observers and spotters play a vital role in response efforts as they are the "eyes" for those responsible for the safe and effective implementation of both strategic and tactical response plans. The aerial spotter can provide a variety of data, such as information regarding oil slick location, sea and weather conditions, presence of wildlife, resources at risk, and other valuable data. Their skills are especially crucial during the initial response actions as the data aids responders in directing recovery operations. Those attending the class will receive training not only in surveillance techniques but also in effective documentation and communication of their observations.

The proposed full-day workshop is sponsored by BP America, Inc. The workshop will provide attendees with a well-rounded program of surveillance and spotting practices and will emphasize methods for oil slick location, characterization, documentation, and reporting procedures—in addition to communications between observers, the pilot, command, and other response personnel. Trainees will be instructed in a variety of surveillance techniques, including identification and documentation of ice conditions, shoreline contamination, and presence of wildlife. Instruction on spotting techniques will include guidance for both surface and aerial operations involving mechanical cleanup, dispersant application, controlled burning, and support for Special Monitoring of Applied Response Technologies (SMART) operations.

The workshop encompasses the theoretical and practical aspects of aerial observation and spotting, and includes the following training topics:

- Oil Properties, Spreading, and Transport
- Air Operations and Safety Procedures
- Oil Slick Location, Characterization, and Documentation
- Organization, Communications, and Backup Support
- Ice, Shoreline, and Wildlife Monitoring and Documentation
- Spotting for Mechanical, Controlled In-Situ Burning, and Dispersant Operations
- Introduction to the SMART Protocol

The workshop is designed to introduce attendees to the fundamental tenets of aerial observation and spotting in a marine oil spill response environment. This training class is recommended both for people working in the field and for personnel working in a response Incident Command Center. It can also serve as an initial training class for those preparing for more extensive aerial observation and spotting training.

Workshop #9

Calibrating Film and Digital Sensors for Today's Geo-Spatial Business

Dr. Qassim Abdullah, *Fugro EarthData, Inc*
Don Light, CP, *Rochester Institute of Technology*

Monday, March 25th, 7:45 AM to 12:15 PM, CEU .4

FEES	ADVANCE (BY 3-22-2013)	ONSITE (AFTER 3-22-2013)
	Member - $180	Member - $200
	Nonmember - $280	Nonmember - $300
	Student Member - $90	Student Member - $100

INTERMEDIATE WORKSHOP

The workshop introduces important topics related to the calibration process of film and digital sensors including the Mathematics and techniques for data acquisition.

Among the topics are:

- What is camera calibration and why is it necessary?
- An overview of different architectures for digital sensors and their geometry;
- Procedures and mathematical models employed in calibrating digital sensors;
- Self calibration techniques as practiced today in the aerial imaging industry;
- Design and illustration of indoor and in situ calibration fields;
- Typical sensor calibration reports;
- Agencies and companies providing sensor calibration;
- Commercially available software for sensor calibration.

INTRODUCTORY	8, 10, 12
INTERMEDIATE	1, 3, 4, 5, 6, 7, 9, 11
ADVANCED	2

Workshop fees are <u>not</u> included in the cost of the conference registration.

Workshop #10

Object Oriented Image Classification: From Feature Extraction to Land Cover Mapping

Ms. Kass Green, *Kass Green & Associates*
Dr. Russell Congalton, *University of New Hampshire*

Monday, March 25th, 7:45 AM to 12:15 PM, CEU .4

FEES	ADVANCE (BY 3-22-2013)	ONSITE (AFTER 3-22-2013)
	Member - $180	Member - $200
	Nonmember - $280	Nonmember - $300
	Student Member - $90	Student Member - $100

INTRODUCTORY WORKSHOP

This workshop introduces attendees to object oriented image classification. Unlike per pixel classifiers which rely only on the spectral characteristics of a feature, object oriented classifiers are capable of utilizing all feature characteristics including color, tone, texture, shape, height, and context. While powerful in the classification of moderate resolution data (e.g. Landsat), object oriented classification is pivotal for using high resolution (e.g. NAIP and commercial satellite imagery), because of the imagery's mixture of shadow and illuminated features, and the need to group pixels together to map land use land classes (e.g. a suburb or a forest) instead of individual features such as single trees. With the recent explosion in availability of high resolution imagery, knowledge of object oriented image classification is critical to map users and producers alike.

Topics covered by the course include:

- A brief summary of the basic concepts of image classification – common constructs of photo interpretation, per pixel classification and object oriented classification
- Objects verses per pixel classification – when to use what
- Principles of object (segment) creation – what's inside the black box
- Approaches to labeling objects including hierarchical, expert rule, and Classification and Regression Tree (CART) methods.
- Special considerations for the accuracy assessment of maps created from object oriented classifications.
- Overview and comparison of object oriented COTS software and tools.

Real life case studies will be interspersed throughout the workshop and will include using object oriented classification to map

- General land cover and land use for urban water run-off management
- Detailed vegetation associations of Grand Canyon National Park, and
- Benthic habitat and propeller scars in the Gulf of Mexico.

Workshop participants currently using object oriented classification are encouraged to discuss their projects and be prepared for a lively discussion on the pros and cons of different approaches.

Workshops

Workshop #11

Lidar Waveform: The Potential and Benefits for Topographic Mapping

Charles K. Toth, PhD, *Center for Mapping, The Ohio State University*
Nora Csanyi May, PhD, *Fugro EarthData, Inc.*

Monday, March 25th, 12:45 PM to 5:15 PM, CEU .4

FEES	ADVANCE (BY 3-22-2013)	ONSITE (AFTER 3-22-2013)
	Member - $180	Member - $200
	Nonmember - $280	Nonmember - $300
	Student Member - $90	Student Member - $100

INTERMEDIATE WORKSHOP

Intended audience:
In general, people are involved in all aspects of Lidar. The proposed workshop is primarily beneficial to LiDAR data providers, both who have already started to look into full waveform applications or those who are just about to explore this emerging technology. In addition, government program managers and decision-makers should also find this workshop valuable.

This workshop will provide an introduction to Lidar waveform data concepts and processing. Participants are expected to have basic understanding of Lidar technology. The structure of this workshop will be the following:

I. Introduction to Lidar Waveform Data
   A. What is liddar waveform data?
   B. Short history on the evolution of waveform data
   C. The characterization of waveform data
II. Acquiring Lidar Waveform Data
   A. Large footprint systems
   B. Small footprint pulsed lidar systems
III. Real-time processing of Lidar waveform data
   A. Return and intensity signal detection (advantage/ disadvantage of waveform vs. discrete returns)
   B. Compression of lidar waveform data
   C. Storing lidar waveform data
IV. Post-processing of Lidar Waveform Data
   A. General analysis of waveform data; typical waveforms
   B. Already existing applications using lidar waveform data
   C. Emerging applications, including land-cover (object) classification, better error characterization, etc.
V. Summary and Future Trends
   A. Existing systems
   B. Outlook on market developments

NEW!

Workshop #12

NHD Introduction and NHD Point Event Creation and Application Utilizing StreamStats

Pete Steeves, GIS Specialist, U*SGS Massachusetts Water Science Center*

Monday, March 25th, 12:45 PM to 5:15 PM, CEU .4

FEES	ADVANCE (BY 3-22-2013)	ONSITE (AFTER 3-22-2013)
	Member - $180	Member - $200
	Nonmember - $280	Nonmember - $300
	Student Member - $90	Student Member - $100

INTRODUCTORY WORKSHOP

The National Hydrography Dataset (NHD) serves as a framework for geospatial data representing the surface water of the United States. The features that make up the NHD have a basic set of attributes that describe these features and at the same time these features may have additional information linked to them describing other characteristics relating to hydrology, water quality, biology, regulations, and a host of other data. Is this linked information which contributes greatly to the power of the NHD to serve not just as spatial data, but also as an information system, and further as a base for analysis and knowledge.

This workshop introduces the NHD framework and how to use the HEM Tool to create events on the NHD. This can be performed on a case by case basis or by importing user databases. Attendees will also learn how to import these user-created events into StreamStats for analysis, including searches up and down the hydrography network, drainage area estimates, batch delineation of watersheds and more. New and improved tools will also demonstrate how to perform a variety of event searches on both the high resolution (1:24K) NHD data and the NHDPlus (medium resolution) data. The NHDPlus functionality will include linkages to a suite of EPA point-event datasets.

INTRODUCTORY	8, 10, 12
INTERMEDIATE	1, 3, 4, 5, 6, 7, 9, 11
ADVANCED	2

Workshop fees are <u>not</u> included in the cost of the conference registration.

Classified Session

The National Geospatial-Intelligence Agency (NGA) will be hosting an all-day classified session in conjunction with the 2013 ASPRS Annual Conference. The purpose of the classified session is to engage the attendees in exploring views, ideas, approaches, and research results for ***Advancements in GEOINT Analytics***.

The classified session will be held **March 25, 2013, 8 AM to 5 PM**. Note: Registration will be limited due to space constraints. All participants for the classified session must be pre-registered with ASPRS. There is a separate fee to attend the classified session.

We have available computing power undreamed of just a generation ago. New phenomenologies are now available. At the same time, the GEOINT community is dealing with problems qualitatively different from those confronted in years past. How can the GEOINT community bring these new capabilities to bear on traditional and emerging GEOINT issues? Which capabilities, new or old, can best help solve recently-arising GEOINT problems?

The concept of GEOINT Analytics includes, but is not limited to:

- Massive Geospatial Data
- New sources and sensors
- Visual Analytics
- Predictive intelligence
- Signature development & discovery
- Precision GEOINT
- Public Derived Data Analysis
- Improving access to, and use of GEOINT content and services
- Strategic indications and warning
- Surface, subsurface, and above surface GEOINT
- GEOINT tradecraft
- Human Activity Analysis
- Spatial and Temporal Analysis
- Data Fusion
- Computational Geo-Analytics
- Evidence Based Anticipatory Analysis

Call for Papers

NGA is soliciting research papers and presentations of twenty to thirty minutes. Papers should address aspects of Advancements in GEOINT Analytics.

For more information on how to submit topics, visit http://www.asprs.org/Conferences/Baltimore-2013/Program/Classified-Session.

Morning Session: Keynote presentation and cutting edge research presentations on Advancements in GEOINT Analytics.

Afternoon Session: Additional research presentations and in-depth round table discussions on Advancements in GEOINT Analytics.

NGA is soliciting topics for in-depth round table research discussions in the afternoon sessions that address key challenges and potential solutions on important issues and problems related to Advancements in GEOINT.

Topics should focus on problems related to Advancements in GEOINT Analytics; why it is important to the intelligence and operational community; who is involved; and, the key issues addressed. The goal of the deep-dive session is to offer solutions and innovative approaches that address the type of sensor or data needed to tackle the problem. Selection of topics will be based on significance of the problem(s) being addressed, creative problem formulations, state-of-the-art and practices elucidations, innovative ideas, ingenious approaches, and imaginative research or application alternatives.

We welcome your suggestions on new problem-focused or research-focused topics and/or your interest and willingness to lead or support specific round table discussion areas in GEOINT Analytics such as:

- Massive Geospatial Data
- Tracking Ground-Based Vehicles and Indicators
- Broadening and deepening GEOINT tradecraft
- Exploiting Video
- Characterizing and Understanding Human Activities
- Leveraging Open Source Information
- Putting GEOINT in the Hands of the User
- Anticipatory GEOINT and Intelligence

Call for Deep-Dive Discussion Topics

NGA is soliciting topics for in-depth round table research discussions in the afternoon session.

For more information on how to submit topics, visit http://www.asprs.org/Conferences/Baltimore-2013/Program/Classified-Session.

Important Registration Information for all Participants:

All attendees and speakers for the classified session must be **pre-registered with ASPRS by March 8, 2013** (http://www.asprs.org/Registration/2013-Baltimore-Registration.html). There is a separate fee of $100 to attend this session. Acceptance of paper or topic does not register you for this session.

Attendees and speakers must have their security office **submit clearance certification by March 11, 2013**. Clearance information and processes will be emailed to each participant as they register for the session.

For questions regarding this session, please contact Dennis Walker at dennis.t.walker@nga.mil or dennis.t.walker@nga.ic.gov.

Keynote Address

Tuesday, March 26th, 8:00 AM to 9:00 AM

Hans W. Paerl is Kenan Professor of Marine and Environmental Sciences at the University of North Carolina's Institute of Marine Sciences, located in Morehead City, NC. His research includes; microbially-mediated nutrient cycling and primary production dynamics of aquatic ecosystems, environmental controls and management of harmful algal blooms, and assessing the effects of man-made and climatic (storms, floods) nutrient enrichment and hydrologic alterations on water quality and sustainability of inland, estuarine, and coastal waters. His studies have identified the importance and ecological impacts of atmospheric nitrogen deposition as a new nitrogen source supporting estuarine and coastal eutrophication. He is involved in the development and application of microbial and biogeochemical indicators of aquatic ecosystem condition and change in response to human and climatic perturbations. He directs the Neuse River Estuary Modeling & Monitoring Program, ModMon (www.unc.edu/ims/neuse/modmon) and ferry-based water quality monitoring program, FerryMon (www.ferrymon.org), which employs environmental sensors and microbial indicators to assess near real-time ecological condition of the Albemarle-Pamlico Sound System, the USAs second largest estuary.

In 2003 he was awarded the G. Evelyn Hutchinson Award by the American Society of Limnology and Oceanography for his work in these fields and its application to interdisciplinary research, teaching and management of aquatic ecosystems. In 2011 he received the Odum Lifetime Achievement Award from the Estuarine and Coastal Research Federation for his work on the cause and consequences of eutrophication and harmful algal blooms in estuarine and coastal waters.

"Scaling Up": Assessing Aquatic Ecosystem Responses To Human- and Climatically-Induced Change By Coupling Ecological Indicators To Remote Sensing

Hans W. Paerl, ***University of North Carolina at Chapel Hill, Institute of Marine Sciences***

Nutrient and other contaminant pollution of freshwater, estuarine and coastal ecosystems is expanding in time and space. These ecosystem are simultaneously impacted by climatic perturbations and change, including warming, increasing frequencies and intensities of tropical cyclones and record droughts, sea-level rise; causing additional stresses, biogeochemical and ecological changes. There is a need to develop rapidly detectable, quantitative, and from a management-perspective, useful indicators of these changes over a range of scales (e.g., habitat, ecosystem, regional to global) that will facilitate taking appropriate steps to mitigate adverse effects of excessive nutrient and pollution and ensure sustainability of affected waters. A suite of environmental indicators that can be detected by autonomous optical and electrochemical sensors on ships, ferries, moorings and buoys can be coupled to aircraft and satellite-based remote sensing (SeaWiFS, MERIS, MODIS, LANDSAT, AVIRIS) in order to "scale up" to ecosystem and regional responses to these stresses. Relevant indicators include; water temperature, chromophoric dissolved organic matter (CDOM), diagnostic algal and higher plant photopigments, and turbidity. Using space-time intensive ship- and mooring-based data for calibration, remote sensing can be used as an early warning tool for delineating storm-water and other nutrient pollution plumes, harmful algal blooms on the ecosystem-scale and beyond. Examples from large lakes, estuaries and coastal waters will be used to demonstrate applicability of this approach. These combined technologies provide management with cost-effective and comprehensive means to rapidly assess the condition, safety and sustainability of affected waters that are not amenable to routine monitoring.

Awards Presentations

Honorary Members
Outstanding Technical Achievement Award
Photogrammetric (Fairchild) Award

9:15 AM to 10:45 AM

Agriculture — Irrigation

Satellite Mapping of Agricultural Water Requirements in California
Forrest Melton, *CSU Monterey Bay*, United States

Lee Johnson, Chris Lund, Andrew Michaelis, Lars Pierce, Alberto Guzman, Sam Hiatt, Adam Purdy, Carolyn Rosevelt, Ty Brandt, Petr Votava, and Rama Nemani

Global Croplands and their Water use for Food Security in the Twenty-first Century
Prasad Thenkabail, *U.S. Geological Survey*, United States

Remote Sensing-assisted Land Surface Phenology in the Northern Fertile Crescent: A Comparative Analysis of Agriculture
Brian Bunker, *Center for Advanced Spatial Technology, University of Arkansas*, United States

Jason Tullis

Sensitivity of Canopy Temperature in Response to Transpiration Under Fully Irrigated and Water Deficit Conditions using Thermal Imaging
Jamshid Farifteh, *Katholieke Universiteit Leuven*, Belgium

Raymond Struthers, Jonathan Van Beek, Rony Swennen, and Pol Coppin

Change Detection

Spatio-temporal Assessment of Climate Change Vulnerability in Georgia
Binita KC, *University of Georgia*, United States

Marshall Shepherd, Marguerite Madden, and Cassandra Johnson

Forest Disturbance Detection using Harmonic Regression and Quality Control Charts on Landsat Data
Evan Brooks, *Virginia Tech Department of Forest Resources and Environmental Conservation*, United States

Randolph Wynne, Valerie Thomas, Christine Blinn, John Coulston, Phillip Radtke, and Curtis Woodcock

Implementation of a Custom Outlier Detection Tool for Object-based, High-resolution Land Cover Change Mapping
Lisa Erickson, *Photo Science Inc*, United States

Andrew Brenner and Chad Evely

Geomorphological Change Detection using Multi-resolution Terrestrial Laser Scans
Reuma Arav, *Technion Israel Institute of Technology*, Israel

Sagi Filin

Big Data

An Automated HPC Implementation of the Metric Information Network (MIN)
Carolyn Johnston, *DigitalGlobe*, United States

C. Bleiler, O. Sjahputera, B. Bader, R. Ravi, and M. Karspeck

The Paradigm for Modern Imagery Access for Remote Sensing
Gerald Kinn, *Esri*, United States

Kurt Schwoppe

Harnessing Big Data and Models to Solve User Geospatial Problems and Challenges using IDEAS (Intelligent Data and Model Discovery and Access)
Charles Samuels, *The SI Organization, Inc.*, United States

Shawana Johnson

Street Factory: Photogrammetric 3D Urban Models
Frank Bignone, *Astrium GEO Information Services*, United States

Aerotriangulation

An Automated Approach for a Pluggable Multi-sensor Aerial Triangulation
Stephan Gehrke, *North West Geomatics*, Canada

Belai Beshah

Measuring Underground Tunnel Deformation using Photogrammetry
Ruijin Ma, *University of Redlands*, United States

Framework for Line Feature Matching Across Images
Mohammed Al-Shahri, *The Ohio State University*, United States
Alper Yilmaz

Realtime Georeferencing of Image Sequences using Fast Sequential Bundle Adjustment
Kyoungah Choi, *The University of Seoul*, South Korea

Impyeong Lee

*Moderators will be listed in the Final Program.

9:15 AM to 10:45 AM

Machine Learning

Feature Data Simulation for Evaluating Conflation Methods
Peter Doucette, *NGA* (Contractor), United States

John Dolloff, Rob Zuzelski, Michael Lenihan, and Dennis Motsko

GPU-based Manifold Learning Methods for Hyperspectral Image Processing
Xutong Niu, *Troy University*, United States

Lin Yan

Change Detection Between Existing Feature Data and New Imagery
Chris McGlone, *SAIC*, United States

Automatic Classification of ALS Data by Fusing Co-registered Image with Semi-supervised Learning
Jianwei Wu, *Wuhan University*, China

Land Surface Temperature

Downscaling Thermal Images for Assessing the Impact of Urbanization on Land Surface Temperature and Moisture
Yitong Jiang, *Indiana State University*, United States

Qihao Weng

Relationship Between Electrical Energy Consumption and Urban Heat Island using Multi-sensor Data
Zhu Gu, *Department of Environmental Resources and Forest Engineering, State University of New York College of Environmental Science and Forestry*, United States

Jungho Im

Modeling the Spatial-temporal Patterns of Urban Land Surface Temperature with Combined Datasets of MODIS and GOES Imagery
Peng Fu, *Center for Urban and Environmental Change, Department of Earth & Environmental Systems, Indiana State University*, United States

Qihao Weng

Land Surface Temperature Simulation in an Urban Environment
Hua Liu, *Old Dominion University*, United States

Qihao Weng

Poster Session #1:

Vegetation Mapping

Identifying Spatial and Temporal Patterns in NDVI to Better Characterize the Geographic Risk of Spotted Fever Group Rickettsial Disease in Kilimanjaro Region, Tanzania
R. Ryan Lash, *Department of Geography, University of Georgia*, United States

Sergio Bernardes, Marguerite Madden, John Crump, Venance Maro, Holly Biggs, and William Nicholson

The Role of Lidar in Volumetric Estimation of Invading Eastern Redcedar (Juniperus virginiana L.)
Johnny Bryant, *Kansas State University*, United States

David Burchfield, Kevin Price, Larry Biles, Ross Hauck, Sabina Dhungana, and Deon van der Merwe

Improving Urban Vegetation Classification Accuracy through Multi-sensor Data Fusion
Guinevere McDaid, *Texas State Geography Department*, United States

Jennifer Jensen

Estimating Green Leaf Area Index using MODIS Data: The use of Close Range Radiometers for Product Calibration
Anthony Nguy-Robertson, *University of Nebraska-Lincoln*, United States

Anatoly Gitelson, Donald Rundquist, and Timothy Arkebauer

Fusion of Satellite and Aerial Images for Identification and Modeling of Mountain Vegetation
Arnt Salberg, *Norwegian Computing Center, Section for Earth Observation*, Norway

Lars Erikstad and Maciel Zortea

Fine Scale Land Cover Classification of Urban Vegetation in Metropolitan Areas of Texas
Justin McCreight, *Texas State University-San Marcos*, United States

Jennifer Jensen

An Analysis of the Effects of Land Ownership Change on Forest Land Cover Dynamics: An Alachua County Case Study
Adam Benjamin, *University of Florida*, United States

Automated Detection of Pine Plantation Prone to Wood Wasp Infection in Central Chile
Maria Paz Herrera, *Universidad de Concepción*, Chile

Guido Staub and Rafael Gonzalez

Lidar-derived Metrics for Distinguishing Urban Natural Forests from Treescapes and Quantifying the Functional Integrity
Kunwar Singh, *University of North Carolina-Charlotte*, United States

Ross Meentemeyer

Investigating the Ethanol Industry Driven Land Cover Changes in Agriculture-based Farms using Multi-temporal LANDSAT Data Analysis
Thais Rosan, *USP*, Brasil

Rodrigo Affonso, Tadeu Tommaselli, and Luiz Augusto Manfré

Special Sessions

Special Session: Maritime Applications of Remote Sensing

Geography of Maritime Regions: A Systematic Approach to Delineation and Understanding
Thomas Morelli, *Thomas D Morelli LLC*, United States

UAS Remote Sensing Detection and Monitoring of Maritime Illicit Trafficking in Gulf of Guinea West Africa Implemented through Comprehensive Engagement Strategy
Thomas Morelli, *Sea Land & Air Technologies & Systems, Inc.*, United States

Bradley Niesen

Spatial Interpolation of Satellite-derived Salinity and Temperature Observations in the Chesapeake Bay: An Ecological Forecasting Application
Erin Urquhart, *Johns Hopkins University*, United States

Matthew Hoffman, Rebecca Murphy, and Benjamin Zaitchik

Remote Sensing of Cyanobacteria and Green Algae in the Baltic Sea
Stefan Riha, *German Aerospace Center (DLR)*, Germany

Harald Krawczyk

Special Session: Time Sensitive Remote Sensing #1

Mobile Image Analysis Tool (MIAT): A Mobile Application for Geospatial Data Collection and Situational Awareness
Bruce Davis, *DHS*, United States

Michael E. Hodgson and Duncan Buell

USDA Forest Service Rapid Response Remote Sensing Programs Providing Spatial Information on Forest Disturbances and Degradation
Robert Chastain, *U.S. Department of Agriculture Forest Service Remote Sensing Applications Center*, United States

Brad Quayle, Haans Fisk, Mark Finco, Everett Hinkley, Frank Sapio, Jim Ellenwood, Tony Guay, Jess Clark, Jan Johnson, and Vernon Thomas

Detection of Moving Objects through Rapid Succession Airborne Imaging
Douglas Stow, *San Diego State University*, United States

Lloyd Coulter, Yu Hsin Tsai, Christopher Lippitt, and Grant Fraley

Large Area, Slow Frame Rate Video using Nadir Viewing Frame Images Collected on a Single Moving Aircraft
Douglas Stow, *San Diego State University*, United States

Lloyd Coulter, Christopher Lippitt, and Grant Fraley

Special Session: Real Time Geospatial Data Capture through Implementation

Sponsored by the ASPRS Primary Data Acquisition Division
Moderator: Charles Mondello

Panelists:
Bruce Davis, *Department of Homeland Security*
Jim Green, *Optech*
Everett Hinkley, *USDA Forest Service Remote Sensing Applications Center*
Mike Hodgson, *University of South Carolina*

NGA Session #1

*Moderators will be listed in the Final Program.

HOT TOPICS Interactive Networking

Tuesday, March 26th, 11:00 AM to 12 NOON

These one-hour HOT TOPIC discussion groups, hosted by ASPRS Divisions and Committees, are a high point of every conference. This is an opportunity for all attendees to weigh in with their thoughts on the issues being discussed and network with your peers.

"Crowd Sourcing Data and Mapping"

Sponsored by the ASPRS Education and Professional Development Committee and the Primary Data Acquisition Division

Moderator: Larry Handley, *U.S. Geological Survey/MCGSC*

"Who are we?... Where are we going?"

Moderator: Steve DeGloria, *Cornell University, ASPRS President-Elect*

Join a spirited discussion to help chart a sustainable future for our community of practice. Discussion topics will focus on recommendations of the ASPRS Restructuring Task Force.

State Licensing, Professional Services, and the new Guidelines for Procurement of Commercial Geospatial Mapping Products

Sponsored by the Private Practice Division

Moderator: Becky Morton, *Towill, Inc.*

Please come and ask questions, get insight into the recently published Guidelines.

Laser Safety Regulations and Impact on Lidar Operations

Sponsored by the Lidar Division

Moderator: Chris Parrish

Guideline Development for Appropriate Use of Remote Sensing Data for Climate Change

Sponsored by the Remote Sensing Applications Division Climate Change Subcommittee

Moderator: David Szymanski

ASPRS Aerial Camera Calibration Guidelines

Sponsored by the ASPRS Primary Data Acquisition Division

Moderator: Dean Merchant, Professor Emeritus

We are looking for suggestions/questions about the proposed guidelines.

24th Annual Awards Luncheon & 79th Installation of ASPRS Officers

Tuesday, March 26th, 12:15 PM to 1:30 PM

Join your colleagues at this year's luncheon on Tuesday, March 26th, to honor current award recipients and participate in the installation of the 79th slate of ASPRS Officers.

The award winners will be given special honor and the annual business meeting of the Society will include installation of the new ASPRS Officers. To conclude the year, Bobbi Lenczowski, retiring ASPRS President, will give a summation of the past year's events.

Tickets for this Luncheon are required and are separate from the conference registration. Tickets may be purchased by completing the information on the Conference registration form found on pages 57-58 of this program. Cost is $65 per person.

On site ticket purchases are limited to availability. Limited seating in the rear of the room is available at no cost for conference registrants wishing to attend the ceremonies only.

1:30 PM to 3:00 PM

Agriculture — Orchards

On the Contribution of Background Effects in High Spatial Resolution Images for Detecting Stress in Pear Orchards
Jonathan Van Beek, *KU Leuven, Biosystems Department, Geomatics Lab*, Belgium

Laurent Tits, Pieter Janssens, Hilde Vandendriessche, Tom Deckers, Jamshid Farifteh, and Pol Coppin

Early Detection of Water Stress in Fruit Orchards using Hyperspectral Remote Sensing
Raymond Struthers, *KU Leuven*, Belgium

Jamshid Farifteh, Pieter Janssens, Rony Swennen, and Pol Coppin

Dynamic Light Distribution in Fruit Orchards and its Potential Impact on Fruit Production and Quality
Dimitry Van der Zande, *M3-BIORES Division, Biosystems Department, Faculty of Bioscience Engineering, Katholieke Universiteit Leuven,* Belgium

Jamshid Farifteh, Anouck Delaere, Laurent Tits, and Pol Coppin

Detection of Oil Palm Plantation Area using Object Based Classification in Sarawak, Malaysia
Hadi Fadae, *Japan Agency for Marine-Earth Science and Technology (JAMSTEC)*, Japan

Rikie Suzuki, Reiichiro Ishii, Hideki Kobayashi, Shin Nagai, Ram Avtar, Minaco Adachi, Kikuko Shoyama and Saigusa Nobuko

Vegetation – Monitoring

Estimating Canopy Fuel Properties in Sagebrush-steppe using Three-dimensional Vegetation Structure and Spectral Data
Nancy Glenn, *Idaho State University*, United States

Jessica Mitchell, Rupesh Shrestha, and Lucas Spaete

Biomass Estimation from Waveform Lidar using Gaussian Area Index Metrics
Wei Zhuang, *State University of New York, Environmental Science and Forestry*, United States

Giorgos Mountrakis, Colin Beier, and John Wiley

Assessing Vegetation Change from MODIS Data using Volcanoes as Climate Change Proxies
Harrison Bloom, *SUNY College of Environmental Science & Forestry*, United States

Giorgos Mountrakis

A Study into the Influence of Topographic Variation on Vegetation Structure in Two Woody Plant Communities: A Remote Sensing Approach
Sisira Ediriweera, *School of Environment, Science and Engineering, Southern Cross University*, Australia

Sumith Pathirana, Tim Danaher, and Doland Nichols

Open Source Software

Building Image Caches for OGC Web Services with GDAL
Christopher Morabito, *Woolpert*, United States

Prototyping the Open-source Collaborative Photogrammetric Sensor Modeling Didactic and Research Framework
Eugene Levin, *Michigan Technological University*, United States

Ioakeim Tellidis

Remote Sensing Image Processing using Java Advanced Imaging (JAI)
Rakesh Kumar Mishra, *Department of Geodesy and Geomatics Engineering, University of New Brunswick*, Canada

Yun Zhang

Using Open Source Datasets to Perform IMU Lever Arm Calculations
David Day, *Keystone Aerial Surveys*, United States

Imagery Enhancement

An Algorithm for Realistically Colorizing Historic Panchromatic Aerial Photographs
Zachary Bortolot, *James Madison University*, United States

The Plateau Hill Algorithm to Convert 16bps Images to 8bps Images
Rahul Rajkuma Dhamecha, *Stony Brook University*, United States

Parvatham Venkatachalam

Enhancing Spatial Resolution of MODIS FPAR using Downscaling Cokriging Method
Haixia Liu, *Department of Geography, The Ohio State University*, United States

Desheng Liu

Scalability of LAI Metrics
Keith Krause, *Rochester Institute of Technology*, United States

Jan van Aardt, David Kelbe, Paul Romanczyk, Thomas Kampe, and Kerry Cawse-Nicholson

*Moderators will be listed in the Final Program.

1:30 PM to 3:00 PM

Automation

Automated Matching Techniques for Planetary Mapping
Raad Saleh, *U.S. Geological Survey,* United States

Lidar QA/QC: An Automated Approach
Merinda Lobato, *Merrick & Company*, United States

An Implementation of Fully-automated, Real-time Georegistration of Video
Reuben Settergren, *BAE Systems Inc*, United States

Stewart Walker

Automatic Geometric Correction of Kompsat-2 Stereo Scenes using Dem
Kwan-Young Oh, *University of Seoul*, South Korea

Hyung-Sup Jung

Direct Volumetric Computations from Point Clouds
Lewis Graham, *GeoCue Corporation*, United States

Poster Session #2:

Data and Methods

Registration of Lidar with Imagery using Fourier and Fourier-Mellin Transforms
Donald Rudy, *The Aerospace Corporation*, United States

Patrick Johnson

Creating a High-resolution Digital Representation of the USGS Historic Aerial Collection
Ryan Longhenry, *U.S. Geological Survey*, United States

Donald Moe, Cynthia Fuhs, and John Faundeen

The Lidar Index File: A Quick Way to Your Data
Patrick Johnson, *The Aerospace Corporation*, United States

Donald J. Rudy

Metrics and Tracking of Movements
Zoltán Koppányi, *Budapest University of Technology and Economics*, Hungary

Tamás Lovas

Updating the National Hydrography Dataset (NHD) Using the NHDGeoConflation Tool
Elizabeth McCartney, *U.S. Geological Survey*, United States

ESA ExoMars Rover PanCam: Pre-Launch Geometric Modeling and Accuracy Assessment
Rongxing Li, *The Ohio State University*, United States

Ding Li, Gerhard Paar, Andrew Coates, Jan-Peter Muller, Andrew Griffiths, and Jürgen Oberst

A New Approach for the Testing, Understanding, and Demonstrating of New Algorithms
Gregg Petrie, *IEEE*, United States

P-CurB: Pixel Curve Based Hyperspectral Image Compression
Vipul Raheja, *IIT Hyderabad*, India

Ankush Khandelwal and KS Rajan

Spatial Pattern Identification for Different Accuracy Land Cover Maps
Luiz Manfré, *University of Sao Paulo*, Brazil

Rodrigo Nobrega, Charles O'Hara, and José Quintanilha

Impact Crater Modeling using Stereoscopic Depth Inpainting
Raghavendra Bhalerao, *IIT Bombay*, Mumbai

SS Gedam and A Almansa

Data Fusion Method Based on Kinect Depth Images
Tao Hu, *Wuhan University*, China

Xinyan Zhu and Wei Guo

Photo Survey Based Comparison and Verification of the Precision of Mobile UAV
ByungWoo Kim, *Pukyong National University*, South Korea

So Young Park, Ho Young Ahn, and Chuluong Choi

Spatial Distribution and Rating of Hotels Around Murtala Mohammed International Airport, Ikeja, Lagos State
Festus Olusola Olugbenga, *Geocard Data Solutions*, Nigeria

Doctor Olayiwola

Vertical Accuracy Assessment of X-band and P-Band Derived DTMs in Alaska
Lorraine Tighe, *Intermap Technologies*, United States

Marc Champlain and Michael Wollersheim

Modeling Lossy Compression of Ultraspectral Images
Rolando Herrero, *Northeastern University*, United States

Martin Cadirola

Special Sessions

Special Session: Disaster Monitoring Constellation

Evaluating the Coverage of the Disaster Monitoring Constellation for the Cropland Data Layer
Robert Seffrin, *U.S. Department of Agriculture*, United States

Making Available Multitemporal Coverages at Continental Scale: DEIMOS-1 Imaging Campaigns Over Sub-Saharian Africa
Francisco J. Lozano, *Elecnor Deimos Imaging,* Spain

M. Diez, J. Gil, C. Moclan, P. Pisabarro, A. Romo, and F. Pirondini

Selected Farming Services with Satellite Assistance: Optimizing Water-fertilizer Resources and Assessing Crop Status and Potential Stress
Alfonso J. Calera, *IDR*, Spain

F.J. Lozano

Evaluating the Classification Accuracy of Specialty Crops in California using 22m Disaster Monitoring Constellation Imagery Compared to 30m Imagery
Audra Zakzeski, *U.S. Department of Agriculture*, United States

Special Session: Climate Change

Variation in Coastline and Thermokarst Lake Conditions on the Arctic Coastal Plain from 1948 to 2012
Scott Arko, *University of Alaska Fairbanks*, United States

Kerri Crowder, Jennifer Jenkins, and Philip Martin

Geoinformatics and Coastal Vulnerability Modeling in North-Eastern NSW Australia
Clement Akumu, *Ontario Ministry of Natural Resources*, Canada

Pathirana Sumith

A Multi-sensor Approach to Mapping the Inland Expansion of Mangrove Forests in the Florida Everglades National Park: Utilizing UAVSAR, ALOS/PALSAR, MODIS, and Landsat TM for Improved Climate Change Oriented Mangrove Management Practices
Kristofer Lasko, *NASA Applied Sciences DEVELOP National Program*, United States

Brock Blevins, Melissa Oguamanam, Katrina Laygo

Shoreline and Shoreline Changes of Zhejiang Province, China with the Multi-temporal Satellite Datasets
Yang Shen, *University of Electronic Science and Technology of China*, China
Yong Wang

*Moderators will be listed in the Final Program.

Special Sessions

Special Session: Time Sensitive Remote Sensing #2

A Workflow for Automated Change Detection with High Spatial Resolution Imagery for Post-disaster Damage Assessment
Douglas Stow, *San Diego State University*, United States

Lloyd Coulter, Grant Fraley, Christopher Lippitt, and Richard McCreight

Tracking Satellite and Airborne Remote Sensing Assets for Emergency Response
Michael Hodgson, *University of South Carolina*, United States

Sarah Battersby, Bruce Davis, and Shufan Liu

A Preliminary Review of Time-sensitive Remote Sensing Methods
Christopher Lippitt, *University of New Mexico*, United States

The Influence of the Homeland Security Geospatial Concept-of-Operations on Remote Sensing at DHS
Robert (Chris) Barnard, *Department of Homeland Security*, United States

Special Session: Airborne Digital Mapping Camera Systems: Manufacturer's Perspective

Sponsored by the ASPRS Primary Data Acquisition Division
Moderator: Jon Christopherson

This is the 10th annual panel session hosting the leading digital mapping camera manufacturers in the world. Over the last decade significant advances in digital mapping cameras have continued to occur. Each manufacturer's representative will give a short overview presentation of their firm and system(s). Following the manufacturer's presentations there will be a question and answer session with the audience. The goal is to provide a dynamic forum to address current systems and future developments in this important and rapidly evolving mapping technology. System vendors will highlight their specific technologies in order to meet the demand for digital mapping images.

Panel Participants:
Representatives from major aerial imaging systems, including Leica, Z/I, Microsoft(Vexcel), and others.

NGA #2

3:30 PM to 5:00 PM

Hyperspectral

Spectral Characterization of Licit and Illicit Agricultural Crops
Mathew Voss, *U.S. Army Corps of Engineers*, United States

Stephen Newman, Michael Campbell, Bruce Blundell, Kathryn Kash, Rich Curran, Nick Kruskamp, and Shan Rammah, Kyle Smith

Hyperspectral Remote Sensing of Vegetation: Knowledge Gain and Knowledge Gap after 40 Years of Research
Prasad Thenkabail, *U.S. Geological Survey*, United States

Alfredo Huete

NEON Airborne Observation Platform Test Flights: Validation of Airborne Lidar and Hyperspectral Data
Keith Krause, *National Ecological Observatory Network*, United States

Vegetation — Dynamics

Interpretation of Phenological Responses of Vegetation in the Geographically Diverse Upper Colorado River Basin and a Phenological Decision Support System
Yuan Zhang, *University of Utah*, United States

George Hepner and Philip Dennison

The Relationship Between Biodiversity and Drought Resistance of Dune Ecosystems in the Netherlands: A Remote Sensing Approach
Wanda De Keersmaecker, *Katholieke Universiteit Leuven*, Belgium

Nils Van Rooijen, Ben Somers, Olivier Honnay, Jamshid Farifteh, Joop Schaminée, and Pol Coppin

Mapping and Monitoring Planned Development of Vegetation Cover in Desert Area using Temporal Remote Sensing Data
Jie Shan, *Purdue University*, United States

Ejaz Hussain, Serkan Ural, and Muhammad Usman

Data Dissemination

Landsat Data: How to See It, How to Get It, What's Coming?
Rachel Headley, *U.S. Geological Survey*, United States

Layth Grangaard and Kristi Kline

Statewide Publishing of Image Services
Vinay Viswambharan, *ESRI*, United States

Gerald Kinn

Data Compression

Efficient Lossless Compression for Hyperspectral Data Based on Integer Wavelets and 3D Binary EZW Algorithm
Kai-jen Cheng, *Ohio University*, United States

Jeffrey Dill

JPEG 2000 Standard – Compliant Lossy-to-Lossless Schema for Lidar Full Waveform Compression
Michelle Quirk, *NGA*, United States

Lossy Compression of Lidar Point Clouds
Peter Guth, *U.S. Naval Academy*, United States

Statistical and Visual Analysis of the ECW Compression Effects on Feature Extraction of Aster Data
Chuyen Nguyen, *Marshall University*, United States

James Brumfield, Ralph Oberly, and Randall Jones

Feature Extraction

Automatic Planar Matching through Octree-based Planar Segmentation
Arpan Kusari, *University of Houston*, United States

Craig Glennie

Spectral-angle Based Nonlinear Dimensionality Reduction of Hyperspectral Imagery: Applications on Mineral Mapping
Lin Yan, *Troy University*, United States

Xutong Niu

Tree Crown Delineation by Integration of Fuzzy Logic and Marker Controlled Watershed Method
Tao Liu, *SUNY College of Environmental Science & Forestry*, United States

Jungho Im

Robust Affine-invariant Lines Matching for High-resolution Remote Sensing Image
Min Chen, *Wuhan University*, China

Zhenfeng Shao

*Moderators will be listed in the Final Program.

Special Sessions

Special Session: GeoLeague Challenge

Currently there are nine teams competing in this year's GeoLeague Challenge. They will present their projects during this technical session.

Special Session: Extreme Weather

Assessing Vegetation Disturbance Resulting from an Extreme Windthrow Event in the Great Smoky Mountains National Park
Sergio Bernardes, *Center for Remote Sensing and Mapping Science-UGA*

Christopher Strother, Thomas Jordan, and Marguerite Madden

Support to Environmental Emergencies with DEIMOS-1: Examples of 2012 Floods in Australia and Forest Fires in Spain
Alfredo Romo, *Elecnor DEIMOS Imaging*, Spain

FJ Lozano and R Lees

Environmental Disaster Damage Assessment: Hurricane Katrina Case Study
Reza Khatami, *SUNY College of Environmental Science & Forestry*

Giorgos Mountrakis

Landslide Hazard Detection from Lidar Data
Charles Toth, *The Ohio State University*, United States

Omar More and Dorota Brzezinska

Special Session: Fundamental Topics in Kinematic Laser Scanning

Lidar Waveform: A Practical Perspective
Christopher Parrish, *NOAA*, United States

The Language of Lidar
Lewis Graham, *GeoCue,* United States

Segregating Lidar Calibration from Project Geometric Correction
Nora May, *Fugro*, United States

Assessment and Reporting the Overall Geometric Quality of Lidar Data
H. Karl Heidemann, *U.S. Geological Survey,* United States

Special Session: UAS Sensors and Analysis Tools Overview

Sponsored by the ASPRS Primary Data Acquisition Division
Moderator: Jeff L. Sloan, *U.S. Geological Survey*

NGA #3

Poster Session #3:

Environmental Applications

Elevation Change Detection in the Southern WV Coalfields
Jessica DeWitt, *West Virginia University*, United States

Tracking Watershed Drainage Network Changes During Watershed Development with Sequential Lidar DEMs
Daniel Jones, *University of Maryland, Baltimore County*, United States

Matthew Baker and Andrew Miller

The Heat Island New Orleans: Determining the Impacts of Hurricanes Katrina and Isaac on an Urban Phenomenon
Aram Lief, *University of New Orleans*, United States

Landscape Ecology and Land use Dynamics Across A Vulnerable Freshwater System
Firooza Pavri, *University of Southern Maine*, United States

Abraham Dailey and Paul Bourget

Using WorldView-2 Multispectral Bands for Bathymetric Survey Near Golovin, Alaska
Jacquelyn R. Smith, *University of Alaska Fairbanks*, United States

Nicole E.M. Kinsman and Debasmita Misra

Mapping of Lunar Aluminum and Magnesium Distributions Based on Chang'E-1 Data and SELENE Data
Mingshu Wang, *Department of Geography, University of Georgia*, United States

Yunzhao Wu

Analysis of Urban Expansion of Chengdu, China since the Economic Boom of late 1980s Using Multi-temporal Satellite Datasets
Yong Wang, *University of Electronic Science and Technology of China*, China

Yuanyuan Yang

USGS National Hydrography Dataset and Linear-Referenced Coastal Geomorphology for the US
Cynthia Miller-Corbett, *U.S. Geological Survey*, United States

Jeffrey Simley

Lake Volume Monitoring for Water Resources: Combining Water Level and Surface Area Measurements
Charon Birkett, *ESSIC/UMD*, United States

Robert Brakenridge

Use of Google Earth Historical Imagery on Dynamics of Aquatic Invasive Plants Along Ohio River
Ming-Chih Hung, *Northwest Missouri State University*, United States

Yi-Hwa Wu and Jamie Patton

LR Measurement of Cirrus Cloud based on Rotational Raman-Mie Scattering Lidar
Binglong Chen, *Beijing Institute of Technology*, China

Chen He, Zhang Yin-chao, Chen Si-ying, and Guo Pan

Investigating the Spatio-temporal Patterns for the Dynamics of Environmentally-sensitive Areas in Sao Paulo-Brazil
Luiz Manfré, *University of Sao Paulo*, Brazil

Rodrigo Nobrega and José Quintanilha

Mapping Seagrass Meadows in Texas Coast with High Spatial Resolution Satellite Imagery
Lihong Su, *Texas A&M University-Corpus Christi*, United States

James Gibeaut

Exhibitors' Reception

A highlight of the ASPRS Annual Conferences is this gathering of exhibitors the night the Show officially opens, as ASPRS says "Thank You" to its exhibitors for bringing all the innovative new products and creative displays that are the main attraction.

The Exhibitor Reception
5:30 p.m. until 7:00 p.m., Tuesday, March 26th, 2013
Baltimore Marriott Waterfront Hotel, Exhibit Hall

All the extraordinary displays of the latest innovations in imaging and geospatial technology remain the star attraction of the ASPRS Annual Conference Exhibit Hall year after year.

Join us for this fun way to say "Thank You" to all of our supporting exhibitors! The Exhibitor Reception is also a terrific way for exhibitors to connect with each other, "shop" the Show floor themselves and do business with other exhibitors, as many do.

"The strength of the ASPRS Exhibit Hall, and its ability to draw professional business people in our industry from around the world comes from the ingenuity in the imaging and geospatial technology these companies will bring to Baltimore," said Jim Plasker, ASPRS Executive Director. "At ASPRS, we work hard and smart to produce a fantastic exhibit hall, but it's the exhibitors and their fine displays that put our industry buyers in the exhibit aisles every year, and we thank them for all their efforts and support."

*Moderators will be listed in the Final Program.

General Session 2

Wednesday, March 27th, 8:00 AM to 9:00 AM

Dr. Frank P. Kelly has served as the USGS EROS Center Director and USGS Space Policy Advisor since January 2012. Dr. Kelly came to the USGS EROS from Anchorage, Alaska, where he served as the NOAA National Weather Service (NWS) Regional Director. Prior to being stationed in Anchorage, Dr. Kelly served in several senior leadership positions at NWS Headquarters in Silver Spring, Maryland, including a key leadership role in the implementation and activation of the national deployment of inter-agency capability to transmit time-sensitive information of all hazards, including weather, hydrologic, environmental and homeland security threats.

He started his professional career in the U.S. Air Force, where he served in several capacities, including Headquarter U.S. Air Force Satellite Acquisition Manager for the Defense Meteorological Satellite Program. After retiring from the Air Force in 1994, he worked in the private sector as Senior Staff Scientist and later as Vice-President at Atmospheric and Environmental Research, Inc. Dr. Kelly holds a PhD, Colorado State University, Atmospheric Science (with focus on satellite meteorology, statistics, and environmental forecasting applications), an MS, Colorado State University, Atmospheric Science, and a BS, Montana State University, Earth Science.

Stephen D. DeGloria is Professor of Resource Inventory and Analysis, and Director, Institute for Resource Information Sciences, Department of Crop and Soil Sciences, at Cornell University in Ithaca, New York. He teaches undergraduate and graduate courses in geographic information systems, environmental information science, GPS, and spatial modeling and analysis. His research focuses on improving the resource inventory process through the application of aerospace imagery, mapping land cover conditions and trends using digital imagery and geospatial databases, and integrating resource inventory data for use in spatially-explicit predictive models of agro-environmental processes in temperate and tropical landscapes.

He joined ASPRS in 1979. He became actively involved in the Society as a member of the Central New York Region

USGS and Landsat: Building a Future on 40 Years of Success

Frank P. Kelly, PhD, *U.S. Geological Survey, USGS EROS Center Director* and *U.S. Geological Survey Space Policy Advisor*

The U.S. Geological Survey (USGS) and NASA celebrated the 40-year anniversary of the Landsat program last year. As the world's longest-running Earth-observing satellite program, the 40-year Landsat record provides global coverage at a scale that shows large-scale human activities. This presentation will discuss the next 40 years, beginning with the Landsat Data Continuity Mission (LDCM) launch in 2013, the role of USGS Earth Resources Observation and Science Center, and availability of enhanced data information products. Building on these accomplishments, the work now begins on the path for the next 40 years — not only for Landsat, but for the future of land imaging.

Presidential Address: "Relevancy of ASPRS in a Geospatial World"

Stephen D. DeGloria, PhD, *Cornell University*

The purpose of ASPRS is to advance the principles of our profession, address the interests of individuals and organizations engaged in a wide spectrum of geospatial technologies, and serve the public interest in matters of imaging and geospatial information. To be relevant to our members and our profession, we provide opportunities to learn, mentor, and network with our fellow professionals and students. The relevancy of ASPRS is based on our ability to provide practical solutions to a range of problems from routine to complex, to offer useful connections that can be limited or extensive that enhance professional development and satisfaction, and to generate an awareness and understanding of geospatial data and information for addressing a range of environmental and societal issues. The degree to which we are successful in this endeavor will dictate the growth and sustainability of our organization.

Awards Presentations

ASPRS Fellows
Paul R. Wolf Memorial Scholarship
BAE Systems Award
ASPRS Conference Management Award

9:15 AM to 10:45 AM

Agriculture — Cropland

Environmental Assessment of Bioenergy Crops in the Midwest with Remote Sensing Data and SWAT Model
Susan Wang, *University of Missouri*, United States

Characterizing Agricultural Landscape Patterns in the Mid-Western USA During 2000-2010
Yang Shao, *Virginia Tech*, United States

MODIS-based Modeling of Corn and Soybean Yields in the US
David Johnson, *U.S. Department of Agriculture*, United States

Mapping Tillage Practices using Multi-temporal Landsat Imagery in the United States
Baojuan Zheng, *Virginia Tech*, United States

Guy Serbin, James B. Campbell, and Craig S.T. Daughtry

Forestry — Monitoring

Estimating Age of Even-aged Loblolly Pine Plots from GeoSAR and Landsat ETM+ data
Valquiria Ferraz Quirino, *Virginia Polytechnic Institute and State University*, United States

Randolph H. Wynne, Harold E. Burkhart, Valerie A. Thomas

Hyperspectral Prediction of Foliar Isotopic Nitrogen
Laura Lorentz, *Department of Forest Resources and Environmental Conservation, Virginia Tech*, United States

Valerie Thomas and Brian Strahm

Remotely Monitoring Forest Cover Change in Yosemite National Park by Mapping Z-score Values
Karla King, *Towson University*, United States

John Morgan III

Spectral Signatures of Bhutan National Forest Inventory
Maung Moe Myint, *Mapping and Natural Resources Integration*, Switzerland

Multi-sensor Analysis

3D Urban Reconstruction using Lidar and EO Sensors
Qian Xiao, *Woolpert, Inc.*, United States

Mapping Impervious Surfaces in Guangzhou, China using a Hyperion Image by Integrating the WorldView-2 Dataset
Bingqing Liang, *University of Northern Iowa*, United States

Optimal Airborne Lidar and Hyperspectral Combination Methods for Improved Quantification of Sparse, Low Height Vegetation Cover
Jessica Mitchell, *Idaho State University*, United States

Lucas Spaete, Peter Olsoy, Rupesh Shrestha, and Nancy Glenn

Multisensor Network for Planetary Application
Raad Saleh, *U.S. Geological Survey*, United States

Data Fusion Method Based on Kinect Depth Images
Tao Hu, *Remote Sensing Information Engineering Surveying And Mapping State Key Laboratory, Wuhan University*, China

Xinyan Zhu and Wei Guo

Bathymetry

Improving the Ability of Airborne Bathymetric Lidar to Detect the Seafloor in Shallow and Turbid Waters
Joong Yong Park, *Optech*, United States

Viktor Feygels, Vinod Ramnath, Jennifer Aitken, and Brant Smith

Performance Assessment of an Underwater Topographic Reconstruction Method
Amin Sarafraz, *University of Miami*, United States

Brian K. Haus

Analyzing Multi-year Hyperspectral Imageries for Detecting Submerged Aquatic Vegetation in Shallow Black Water
Roshan Pande-Chhetri, *University of Florida*, United States

Amr Abd-Elrahman and Charles Jacoby

*Moderators will be listed in the Final Program.

9:15 AM to 10:45 AM

Positional Accuracy

Pleiades Positional Accuracy
David Nale, *eMap International*, United States

Comparative Analysis of Different Approaches for Automated Image Coordinates Measurement for Camera Calibration
Zahra Lari, *University of Calgary*, Canada

Hussein T. Attya and Ayman Habib

Assessing the Positional Accuracy of OpenStreetMap Roads Using Vectorgrammetry
Roberto Canavosio-Zuzelski, *George Mason University*, United States

Peggy Agouris and Peter Doucette

Long-Strip Georeferencing of Quickbird Imagery with Minimal Ground Control
Clive Fraser, *CRC for Spatial Information*, Australia

Mehdi, Ravanbakhsh

Cryosphere

Arctic Region Environmental Orthomosaics and 3D Models from Airborne Imagery
Jessica Cherry, *University of Alaska Fairbanks and Northern Science Services*, United States

Continuity of VIIRS/MODIS Radiometric Measurements: Simultaneous Nadir Overpass and Pseudo-Invariant Site Comparisons for Reflective Solar Bands
Slawomir Blonski, *University of Maryland*, United States

Changyong Cao, Sirish Uprety, and Xi Shao

About the Correlation Between Ice Shelf Front Variations and Temperature Anomalies — Case Study At George VI Ice Shelf
Guido Staub, *Universidad de Concepción*, Chile

Andreaw Rifo

MODIS Snow Cover Validation for River Basin in NW Himalaya
Chelamallu Hari Parasad, India

Project Planning

Applying PMI Project Management Principles to Geospatial Projects
Robert Crawford, *Intermap Technologies, Inc.*, United States

Planning a Successful Lidar Project
Chris Guy, *AeroMetric*, United States

Opportunities for Growth within the Guidelines for Procurement of Geospatial Professional Services, Technical Services, and Products
Paul Pope, *Global Geomatics Inc*., United States

Dave McBride

Special Sessions

Special Session: Environmental Remote Sensing — Applications for the Oil and Gas Industry

Detection of Methane, Carbon Dioxide, and Water Vapor Plumes using Airborne Imaging Spectrometry: Potential for Oil and Gas Industry
A. K. Thorpe, *University of California- Santa Barbara*, United States

P.E. Dennison, D.A. Roberts, E.S. Bradley, and C.C. Funk

Use of Hyperspectyral Remote Sensing to Detect Plant Stress and Monitor Recovery from the Macondo Oil Spill in the Gulf of Mexico
Shruti Khanna, *University of California - Davis,* United States

Alexander Koltunov, Maria J. Santos, Paul J. Haverkamp, Mui C. Lay, Susan L. Ustin

Accounting From Above: Toward Sustainable E&P Environment Performance Standards
Chris Baynard, *University of North Florida*, United States

New Trends in Remote Sensing Research

Sponsored by the ASPRS Student Advisory Council

Data Processing and Analytics
Charles Samuels, *The SI Organization, Inc*

Lidar
Charles Olson, *Michigan Tech Research Institue*

Lidar
Sonja Ellefson, *Aerometric*

Visualization and Animation
Matt Bethel, *Merrick & Company*

Cloud Computing
Gerald Kinn, *ESRI*

Disasters
Michael Hodgson, *University of South Carolina*

NGA #4

Special Session: Location-Based Services Privacy Issues

Sponsored by the ASPRS GIS Division

The revolutionary changes in geo-spatial technologies have enabled collection and generation of a large amount of geospatial data. Recently there has been an explosion of location-based services (LBS), which use these spatial data to provide location information about an individual's or vehicle's location accurately and precisely. Location-based services singularly do not violate personal information but by coordinating location with other types of information, such as an individual's address, these services can provide personal information to a third party, thereby leading to location privacy violation. Given the recent popularity of location-based services (e.g., smart phones, Twitter's location API, Google Latitude, etc.), it is imperative to understand the causes and consequences of location privacy violation both in terms of research advancements and legal implications.

Panelists:
Lea Shanley
Rick Crowsey
Francis Harvey
Nancy Obermeyer

Commercial Special Sessions

11:00 AM to 12 NOON

Strategies for Conducting Remote Sensing in the Cloud

Sponsored by the ASPRS Remote Sensing Applications Division
Moderator: Kurt Schwoppe, *Imagery Solutions*

This panel of leading experts will discuss how the cloud has the potential to fundamentally change the field of remote sensing. Traditionally, image processing has been a file based linear workflow conducted by an image processing expert. By combining Content-as-a-Service (CaaS) and Software-as-a-Service (SaaS), in the cloud, the potential now exists for end-users to directly access remote sensing services that provide answers for a specific need. These services appear to the end-users as easy to operate, low cost Apps. Types of users that could benefit from this mobile approach include those involved with precision agriculture, forestry management, and emergency response just to name a few. Panelists will present their vision as to how this future can be realized and how the remote sensing community must evolve to take full advantage of these emerging technologies.

Panelists:
Lawrie Jordan, *Esri*
Greg Keoln, *MDA Information Systems*
Mladen Stojic, *Intergraph*
Jaye Lampe, *Exelis Visual Information Systems*

*Moderators will be listed in the Final Program.

Commercial Special Sessions

11:00 AM to 12 NOON

Special Session: Digital Image Quality Assurance Panel

Sponsored by the ASPRS Primary Data Acquisition Division
Moderator: Gregory L. Stensaas, *U.S. Geological Survey*

Satellite and aerial imaging are in a period of rapid growth and change with new technologies, new customers, and new missions requirements. Digital airborne sensors have matured over the last few years and have been gaining acceptance by the mapping community. This is evidenced by: 1) the enhancement of current remote sensing systems by the manufacturers; 2) the manufacturers introducing new sensors into the marketplace that address the needs of a particular sector of the user market not previously addressed; 3) and the amount of data being collected. In many cases, the collection system may have methods that are designed to help the data collectors and current owners of the data may be able to obtain enough information to use the data. However, the quality and long term usefulness of the acquired data in comparison to other data types may be an issue. This session will have four panelists with short presentations and discussions. All information will be made available on the PDAD web site.

The Importance of Data Quality and Need for Standards
Qassim Abdullah, *Woolpert*

Imagery QA Processes and Tools
Chuck O'Hara, S*patial Information Solutions, Inc.*

User QA Needs and QC Processes
David Davis, *USDA*
George Lee, *U.S. Geological Survey*

Data Fusion and Integration Requirements
Ayman Habib, *University of Calgary*

Commercial Sessions

11:00 AM to 12 NOON

Airborne Imagery

The iOne STKA - Foundation for the Iris One Sensor Family
Armando Guevara, *Visual Intelligence, LP*, United States

Wei Wang

News from the UltraCam Camera Line-Up
Alexander Wiechert, *Microsoft*, Australia

Pushing the Boundaries on Sensor Performance
Ruedi Wagner, *Hexagon Geosystems*, Switzerland

Patrick Steinmann, Tauno Saks, and Klaus Neumann

The Leica RCD30 Medium Format Camera - One Camera, Many Applications
Ruedi Wagner, *Leica Geosystems*, Switzerland

Klaus Neumann

Software

A Disruptive Innovation for Managing Massive Lidar Datasets
Matt Bethel, *Merrick & Company*, United States

In-database Image Processing in Oracle Spatial Georaster
Qingyun (Jeffrey) Xie, *Oracle Corporation*, United States

Chen Fengting, Zhang Zhihai, and Lucena Ivan

How Express Server Software Improves Geospatial Image Delivery
Jon Skiffington, *LizardTech*, United States

UltraMap — Details and Results from the Digital Photogrammetric Workflow
Michael Gruber, *Microsoft*, Australia

Future Spaceborne Sensors

The DMC Constellation, Sensors and Next Generation Satellites
Gary Holmes, *DMC International Imaging Ltd*, United Kingdom

Paul Stephens

The WorldView-3 Multi-spectral Commercial Imaging Satellite
Milan Karspeck, *DigitalGlobe*, United States

Smallsat Solutions Can Yield BIG Results
Darrel Williams, *Global Science & Technology, Inc.*, United States

Samuel Goward and Bryant Cramer

The COSMO-SkyMed X-band SAR Constellation
Luca Pietranera, *e-GEOS SpA*, Italy

Memorial Address

Wednesday, March 27th, 12 NOON to 1:15 PM

A special presentation will be given by Raymond Kreig honoring Donald Belcher as the 2013 Memorial Addressee. Belcher will be honored for his lifetime of accomplishments and service to the geospatial industry. Join us for this spectacular presentation followed by a luncheon.

Professor Donald Belcher had a career that spanned time at Purdue University and Cornell University. Don's lifelong exploration of the practical engineering applications of aerial photography – a discipline that became known as aerial photographic interpretation and, more recently, remote sensing – placed him as the foremost pioneer in this field. Among his distinguished colleagues were Professors Ta Liang and Arthur J. McNair. Don Belcher distinguished himself as an educator, scholar, innovator, and consultant.

Presenter
Raymond A. Kreig is the President of RA Kreig & Associates of Anchorage, Alaska. Ray was closely associated with Don Belcher as a teaching assistant.

Awards Presentations
Presidential Citations
Region of the Year Award
Region Newsletter Award
Region Website Award
GeoLeague Awards

1:30 PM to 3:00 PM

Agriculture — Cropland Classification

An Automated Cropland Classification Algorithm (ACCA)
Prasad Thenkabail, *U.S. Geological Survey*, United States

Zhuoting Wu

The Development of Crop Specific Covariate Data Based on the NASS Cropland Data Layer For Stratification of an Area Sampling Frame
Claire Boryan, *U.S. Department of Agriculture/NASS*, United States

Zhengwei Yang

Evaluating Three Sample Based Methods on Spatial Classification Quality
Shiguo Jiang, *The Ohio State University*, United States

Desheng Liu

Forestry — Mapping

Delineating Ground and Forest Canopy in Simulated ICESat-2 Data Exhibiting Diverse Terrain, Vegetation Conditions, and Noise Levels
Ryan Sheridan, *Texas A&M University*, United States

Sorin Popescu

Application of Landsat-derived Landcover Maps in Assisting U.S. Nationwide Forest Management
Sheng Yang, *SUNY College of Environmental Science & Forestry*, United States

Giorgos Mountrakis

Investigation of Spatiotemporal Patterns of Forest Carbon Stock According to Urban Land Use Changes using Remote Sensing
Jungho Im, *Ulsan National Institute of Science and Technology*, South Korea

*Moderators will be listed in the Final Program.

1:30 PM to 3:00 PM

Soils

Extracting Sub-pixel Information from Agricultural Areas through Alternating Least-Squares Unmixing
Wanda De Keersmaecker, *Biosystems Department, Geomatics Lab*, Belgium

Ben Somers, Wouter Saeys, Jamshid Farifteh, Pol Coppin, Laurent Tits

Using Worldview-2 Data and Hyperspectral Processing Approaches to Map Ferric Iron-Bearing Minerals and Materials
William Farrand, *Space Science Institute*, United States
Rachana Ravi

Prospects of Biophysical Remote Sensing for Studying Soil Microbial Community Biogeography
Yuki Hamada, *Argonne National Laboratory*, United States

Jack Gilbert

A Multispectral Index to Estimate Bare Soil Wetness
Michael Campbell, *Topographic Engineering Center*, United States

Kevin Caillouet and Mark Rider

Lidar — Accuracy Assessment

FOCUS — Lidar QA and Data Exploitation Tool
Mark E. Meade, *Photo Science*, United States

Ortho & Lidar Accuracy
Mike Tully, *Aerial Services, Inc.,* United States

Chuck O'Hara

QC Methods for Delivering a Quality Lidar Project
Sonja Ellefson, *Aerometric*, United States

Accuracy Analysis of a Low Cost, Kinematic Lidar Scanner
Darren Hauser, *The University of Houston*, United States

Craig Glennie, Benjamin Brooks, and Todd Erickson

Infrastructure — Buildings

Options for Medium-accuracy Architectural Facades Mapping From Terrestrial Photogrammetry
Hussein Attya, *University of Calgary*, Canada

Ayman Habib

Creation and Use of Benchmark Imagery for Validating Facility
Paul Pope, *Los Alamos National Laboratory*, United States

Travis White, John Goforth, Lucinda Gaines, Randy Roberts, and Ian Burns

Automatic Detection and Reconstruction of Complex Buildings with Right-angled Corners
Eunju Kwak, *University of Calgary*, Canada

Ayman Habib

Extracting Building Features from Lidar and Optical Data
Cherie Muleh, *Exelis Visual Information Solutions*, United States

Coasts

Coastal Flooding and Marsh Resource Monitoring
Amina Rangoonwala, *Five Rivers Services LLC*, United States

Elijah Ramsey III

Where's the Reef? An Inexpensive Method for Mapping Nearshore Marine Habitats
Kelly Kingon, *Florida State University*, United States

Overview of NOAA's Continually Updated Shoreline Product
Douglas Graham, *National Oceanic and Atmospheric Administration*, United States

Airborne Remote Sensing of Coastal Features and Processes
Victor Klemas, *University of Delaware*, United States

Theoretical Concepts

Is Accuracy Necessary?
Charles Olson, *Michigan Tech Research Institute*, United States

Implications of Provenance-aware Remote Sensing Process
Jason Tullis, *University of Arkansas*, United States

Xuan Shi and Jackson Cothren

Array Algebra Expansion of 4-D Photogrammetry to Unified Relativity and String Theory
Urho Rauhala, United States

A Novel Approach of Building Specific Ontology for Remote Sensing Image
Xiran Zhou, *Wuhan University*, China

Zhenfeng Shao

Special Sessions

Special Session: Applied Remote Sensing

Hyperspectral Remote Sensing as a Monitoring Tool for Geologic Carbon Sequestration
Gabriel Bellante, *Montana State University*, United States

Scott Powell, Rick Lawrence, Kevin Repasky, and Tracy Dougher

Mapping and Analyzing Conservation Reserve Program Enrollment Patterns from 1991 to 2011 in Nelson County, North Dakota, Using Remote Sensing and GIS Techniques
Nicholas Roehrdanz, *University of North Dakota*, United States

Bradley Rundquist

Using Spatial Models with Remote Sensing to Map Invasive Species Distributions: A Case Study of Tamarix Along the Arkansas River, Colorado
Amanda West, *Colorado State University*, United States

Paul Evangelista, Nicholas Young, Lane Carter, Nicholas Young and Catherine Jarnevich

Evaluating Worldview-2 Imagery for Forest Cover Type Mapping in Complex New England Forests
Jenna Kovacs, *University of New Hampshire*, United States

Russell Congalton

Special Session: SAC #2 — Strategies and Application Processes for Winning an ASPRS Award or Scholarship

Sponsored by the ASPRS Student Advisory Council

Panelists:
Jesse Winch, ASPRS Program Administrator
Stephen D. DeGloria, ASPRS President
A. Stewart Walker, BAE Award Representative
Adam Benjamin, Past Award Recipient

Special Session: Big Data #1

Sponsored by the ASPRS GIS Division

High-resolution National Elevation Dataset: Opportunities and Challenges for High-performance Spatial Analytics
Yan Liu, *U.S. Geological Survey*, United States

Michael Finn, Babak Behzad, and Eric Shook

Big Data from the Long-tail of Biological and Ecological Sciences Perspective
Mike Frame, *U.S. Geological Survey*, United States

Towards Rapid Validation of Climate Models Through Integrated Testbeds and Data Fusion
Galen Shipman, *NASA*, United States

Special Session: Mobile Mapping and Geospatially-Enabled Smart Devices

Sponsored by the ASPRS Photogrammetric Applications Division
Moderator: Todd E. Johanesen

Starting in the 1990s, direct georeferencing techniques and multi-sensor integration developed into what is now commonly referred to as mobile mapping technology (MMT). The conditions that made this possible--the integration of digital imaging devices and robust navigation solutions such as GPS and IMUs, are now readily found in our day-to-day "smart" devices, representing the next iteration of MMT. Your phones and tablets started off with providing basic geolocation services, i.e., map-based services, but are becoming increasingly sophisticated in the functions they can support. Today, we see these expanded functions in a variety of areas that include shopping, GIS field collects and 3D scene reconstruction.

This session will explore the concepts of MMT and how they apply to smart devices and the human as a platform. Submitted and invited briefings will focus on applications developed to support first responders (i.e., police, fire and rescue), consumer activities, military, and 3D scene reconstruction. Of particular interest are those applications that deliver timely, accurate and reliable geospatial information, based on the intended use of the collected data.

Presenters:
Ron Benziger, *Purdue University*, United State
Isaac Zaworski, *Urban Robotics*, United States
Christopher Ashabranner, *National Geospatial-Intelligence Agency*, United States
David W. Lilley, *Army Geospatial Center*, United States

*Moderators will be listed in the Final Program.

3:30 PM to 5:00 PM

Land Cover/Land Use Change

Improving the Accuracy of NLCD Impervious Surface Characterization with Multi-date Nighttime Light and Landsat Images
George Xian, *ARTS/ U.S. Geological Survey EROS*, United States

Collin Homer and Brain Granneman

Spectral Analysis of Civil Conflict Induced Forced Migration On Land Use/Land Cover Change: The Case of a Primate and Lower Order Cities in Sierra Leone
Cyril Wilson, *University of Wisconsin-Eau Claire*, United States

Land Cover Assessment in Mongolia by Principal Component Analysis of Phonological Parameters using MODIS Imagery
Narumasa Tsutsumida, *Graduate School of Global Environmental Studies, Kyoto University*, Japan

Izuru Saizen

Analysis of Modeled and Observed Surface Areas of Three Gorges Reservoir at Different Water Levels
Ao Du, *School of Resources and Environment ,University of Electronic Science and Technology of China*, China

Yong Wang

Forestry — Disturbances

Hyperspectral Assessment of Fire Hazard within the Wildland Urban Interface
James Lein, *Ohio University*, United States

Predicting Woody Invasive Species Presence Using a New Fragmentation Program: PolyFrag
Meghan MacLean, *Babson College*, United States

Russ Congalton

Analyzing Ash (Fraxinus spp.) Tree Response to Emerald Ash Borer (Agrilus planipennis Fairmaire) Infestations using Multispectral Imagery
Laura Calandra, *SUNY College of Environmental Science & Forestry*, United States

Hydrology

Watershed-scale Characterization of Riparian Vegetation as Potential Filter Strips using Multi-source Remote Sensing
Henrique Momm, *Middle Tennessee State University*, United States

Ronald Bingner

Application of Remote Sensing and Surface Energy Based Algorithms in Estimating Evapotranspiration in the Southeastern US
Nishan Bhattarai, *SUNY College of Environmental Science and Forestry*, United States

Lindi J. Quackenbush and Stephen B. Shaw

Continuous Detecting of Growing of Middle River Islands and the Negative Effects to the River by using Remote Sensing Techniques
Omar al-Jarrah, *Jordan University*, Iraq

Mico Watershed Characterization and Analysis of a Rainfed Watershed Using Geo Spatial Technologies
A Siva Sena Reddy, *Indian Institute of Technology- Bombay*, India

M. Janga Reddy

Lidar — Methods

Automatic Selection of Overlapping Strip Pairs/Regions for Optimized Lidar System Calibration
Essam Hamza, *University of Calgary*, Canada

Ayman Habib

Background Noise Removal of Single Photon Counting Lidar Data
Joshua Gluckman, *Woolpert*, United States

Multispectral Full-Waveform Lidar Analysis for Target Identification
Preston Hartzell, *University of Houston*, United States

Craig Glennie and David C. Finnegan

High Spatial Resolution Automated Three Dimensional Vegetation Structure Mapping using Computer Vision
Jonathan Dandois, *UMBC*, United States

Erle Ellis

An Accurate Airborne Lidar Data Strip Adjustment Method with Semi-parametric Model
Jianwei Wu, *Wuhan University*, China

Infrastructure — Transportation

Identification of Unpaved Roads in a Regional Road Network using Remote Sensing

Colin Brooks, *Michigan Tech Research Institute*, United States

Andrea VanderWoude, David Dean, Richard Dobson, Justin Carter, Christopher Roussi, Tim Colling, and Caesar Singh

Using Close Range Photogrammetry to Develop a 3D Optical Bridge Evaluation System (3DOBS)

Richard Dobson Dobson, *Michigan Tech Research Institute*, United States

Colin Brooks, Chris Roussi, Robert Shuchman, Theresa Ahlborn, and David Dean

On the Use of Off-the-shelf Digital Cameras for Civil Engineering Fatigue Testing

Ivan Detchev, *University of Calgary*, Canada

Ayman Habib and Mamdouh El-Badry

Monitoring of Cracks in Asphalt Pavement using Laser Scanners and Cameras of Mobile Mapping System

Yoshiyuki Yamamoto, *Aichi Institute of Technology*, Japan

Eiji Nakamura, Masayuki Okugawa, Tomohito Asaka, and Keishi Iwashita

Unmanned Aerial Vehicles

Characterization of Unpaved Road Conditions Through the Use of a UAV Helicopter

Colin Brooks, *Michigan Tech Research Institute*, United States

Chris Roussi, Tim Colling, Richard Dobson, Brian White, Joe Garbarino, Jack Kelly, Colleen Sain, and Caesar Singh

A Little UAV Grows Up

George Southard, *Trimble Navigation Limited*, United States

Creation of a Remote Sensing Unmanned Aerial System (UAS) for Precision Agriculture and Related Mapping Applications

Dimitrios Stefanakis, *University of the Aegean*, Greece

John Hatzopoulos, Margaris Nikolaos, and Danalatos Nikolaos

High-resolution Ecosystem Monitoring in Both Time and Space by Unmanned Aerial Vehicle (UAV) Based Sensing System

Kaiyu Guan, *Department of Civil and Environmental Engineering, Princeton University*, United States

Lyndon Estes, Adam Wolf, Kelly K. Caylor, Ming Pan, Peter Oudemans, and Rick Lathrop

Human Geography

Characterization of Villages in Rural Afghanistan

John Irvine, *Draper Laboratory*, United States

Janet Lepanto,Natasha Markuzon,John Regan, Edward Vaisman,Mon Young, Fotini Christia, and Roger Petersen

Looking Beneath: Geophysical Remote Sensing at the Colonial Town of Martinville, North Carolina

Roy Stine, *University of North Carolina- Greensboro*, United States

Jacob Turner and Stacy Curry

Developing A Land Information System for Poverty Alleviate Through Geographical Information System and Community Remote Sensing

Matthew Adepoju, *National Space Research and Development Agency*, Nigeria

Taslim Alade

A Subjective Assessment of the Suitability of SCIAMACHY Total Column CO Measurements to Interpolate Reliable Concentration Estimates Over a Low-latitude Region

Mofoluso Fagbeja, *National Space Research and Development Agency*, Nigeria

Jennifer Hill, Tim Chatterton, James Longhurst, and Joseph Akinyede

*Moderators will be listed in the Final Program.

Special Sessions

Special Session: Education/Outreach in Remote Sensing

Helping Educators to Educate with Geospatial Technologies
John McGee, *Virginia Tech*, United States

Tammy Parece and James Campbell

Place-based and Event-based Learning using Geospatial Technologies; The TexasView Earth Observation Day Program
Rebecca Dodge, *Midwestern State University*, United States

Paul R. Blackwell

Satellites: A K-12 STEM Education Project for the 21st Century
Kevin Czajkowski, *AmericaView*, United States

Rick Landenberger, Todd Ensign, and Rick Sharpe

Earth Observation Day: An Outreach Event to Increase the Use of Geospatial Science and Technology in K-12 and Higher Education
Tom Mueller, *AmericaView*, United States

Rick Landenberger

Introducing Land Cover Classification in Middle and High School Classrooms
Allison Howard, *University of Georgia*, United States

Sergio Bernardes, Chris Strother, Taylor Johnson, Patrick Lines, Larry Biehl, Rick Landenberger, and Marguerite Madden

Special Session: SAC #3 — Advice on How to Successfully Write an NSF Grant (Graduate Fellowship/Doctoral Dissertation Improvement Grant)

Sponsored by the ASPRS Student Advisory Council

Panelists:
Charlotte E. Smith, *Appalachian State University*
Dr. Marguerite Madden, *University of Georgia*
Raechel A. Bianchetti, *Penn State University*

Special Session: Big Data #2

Sponsored by the ASPRS GIS Division
Moderator: Todd Johanesen

In general the size is the primary definition of Big Data. Alternatively, the "big" in Big Data can refer to the number of useful permutations of sources that makes useful querying difficult (like the sensors in an aircraft) and the complex interrelationships between sources that makes purging difficult. In this case, "Big" refers to data complexity rather than volume.

The purpose of this session is to increase awareness of Big Data usages in the geospatial community; specifically, developments and evaluations of technologies and tools for data collection, management, visualization, and data analytics. Understanding how to interact with Big Data will lay the foundations for U.S. competitiveness for many decades to come.

Panelists
Representatives from the National Geospatial-Intelligence Agency

Urban Mapping

Overcoming Challenges of Urban Classification using PolSAR
Donald Atwood, *University of Alaska Fairbanks/Geophysical Institute*, United States

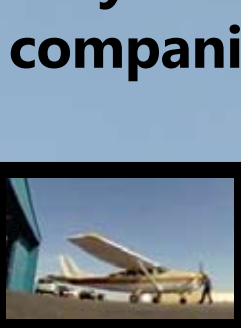
Integration of Urban Growth Prediction Models to Image-based Urban Change Classification
Huiran Jin, *State University of New York College of Environmental Science and Forestry*, United States

Giorgos Mountrakis

Remotely Sensed Analysis of the Urban Sprawl of Istanbul for Supporting Decision Making for a Sustainable Future
Orhan Altan, *Istanbul Technical University*, Turkey

Gerhard Kemper

Why do leading aerial mapping and surveying companies, worldwide, fly with UltraCam?



Blue Skies Consulting
United States

UltraCamLp

GeoAir
Mexico

UltraCamD

GEODIS
Czech Republic

UltraCamXp & Eagle

FMM
Austria

UltraCamD, X, Xp, & Eagle

AEROmetrex
Australia

UltraCamD & X

You've seen Microsoft's international "I Fly UltraCam" video series featuring UltraCam customers explaining, in their own words, why they chose award-winning UltraCam photogrammetric digital aerial sensor systems. But they weren't the only proud UltraCam users eager to share their experiences. Check out the new "I Fly UltraCam" videos that were personally created and submitted by UltraCam customers from around the world.

Visit www.WeFlyUltraCam.com to see their video testimonials!

ULTRACAM Microsoft

Breakfast with Exhibitors & Prize Drawing

Thursday, March 28th, 8:00 AM to 8:45 AM

A special continental breakfast, open to all conference attendees, will be held on Thursday, March 28th, in the Exhibit Hall from 8:00 am to 8:45 am. Before the Technical Sessions begin, take some time to leisurely view the exhibit hall and continue discussions with the exhibitors. Be sure to include this event on your calendar.

Also taking place in the Exhibit Hall on Thursday, March 28th is the **Prize Drawing** for the winners of the **Exhibit Hall Passport Contest**! Don't miss this opportunity to win some great prizes. *Winners must have completed the Exhibit Hall Passport Contest game card and be present to win.*

Admission to this event is included with most registrations.

Exhibit Hall Passport Contest

Win an iPad Mini at the ASPRS 2013 Annual Conference!

Play the Exhibit Hall Passport Contest at the ASPRS 2013 Annual Conference and YOU could win one of many great prizes, including the Grand Prize an iPad Mini, just for walking around the exhibit hall.

All registered attendees will receive a game card with your registration packet. Each game card lists the participating booths with company logos and booth numbers. All you need to do is visit each booth listed on the game card, receive their specific stamp and answer a fun trivia question! Fill your entire game card and enter for a chance to WIN!

It's that Easy and Fun.

This is a great opportunity to speak with exhibitors, learn about some of their great new products, technology and services, while participating in a fun and interactive game!

Play today for a chance to win the Grand Prize, an iPad Mini! Prize drawing will take place on Thursday, March 28th at 8:30 a.m. in the Exhibit Hall. *Must be present to win. Only one entry per registered attendee will be accepted.*

9:00 AM to 10:30 AM

Geoinformatics

Web Mapping Metro Rail Services in Los Angeles County
Bin (Owen) Mo, *LACMTA*, United States

WMS-T Service: Disseminating the Content of Mobility Datasets. Case Study of the Fredericton Transit System
Adegoke Lawal, *University of New Brunswick*, Canada

Emmanuel Stephanakis and Monica Wachowicz

Urban Situated Simulation Interface: Design & Development of a Tablet-based Solution
Benoit Duinat, *Université Laval*, Canada

Sylvie Daniel

Web Service-based Vegetation Condition Monitoring System - VegScape
Zhengwei Yang, *U.S. Department of Agriculture*, United States

Genong Yu, Liping Di, Bei Zhang, and Rick Mueller

Hazards — Mapping

Destruction and Reconstruction of the Village of Birek: Tsunami 2004
Paul Baumann, *SUNY*, United States

Continuous Assessing for the Recovery and Reconstruction of Post-tsunami Disaster of Rikuzentakata City in Ria Coast by using Time Series High-resolution Satellite Images
Hideki Hashiba, *College of Science and Technology, Nihon University*, Japan

Landscape Epidemiology: West Nile Virus in the US
Sean Young, *Center for Advanced Spatial Technologies*, United States

Jason Tullis

Assessing the Probability of High Floods in Potential Mangrove Plantation Sites along the Saudi Arabian Red Sea Coast
Ayman S. Aguib, *King Saud University*, Saudi Arabia

Scot E. Smith, Hesham El Monsef

GEOBIA — Methods

Integrating GEOBIA and Multisensor Fusion in the Undergraduate Remote Sensing Curricula — Opportunities and Challenges
Jitendra Sharma, *Gainesville State College*, United States

Object Based Image Analysis: A New Paradigm in Remote Sensing?
Thomas Blaschke, *University of Salzburg*, Australia

Comparative Analysis of Object-domain and Parameter-domain Lidar Segmentation Results
Zahra Lari, *University of Calgary*, Canada

Mohannad Al-Durgham and Ayman Habib

Investigating the Effectiveness of Data Fusion on Image Segmentation in Rapid Mapping Workflows
Chandi Witharana, *University of Connecticut Storrs*, United States

Thomas Blaschke and Asela Bandara

Lidar — Forestry

Analyzing Changes in the Forest Structural Parameters and Plot-level Biomass using Multi-temporal Terrestrial Lidar Datasets
Shruthi Srinivasan, *Texas A&M University*, United States

Sorin C. Popescu, Ryan D. Sheridan, and Nian-Wei Ku

Classification of Tree Species in Indianapolis using Lidar and High-resolution IKONOS Data
Yuanfan Zheng, *Indiana State University*, United States

Qihao Weng

Elements Contributing to Accuracy of Forest Leaf Area Density and Leaf Area Index Calculations using Terrestrial Lidar Data
Jonathan Van Beck, *Biosystems Department*, *KU Leuven*, Belgium

Dimitry Van der Zande, Christian Salas Eljatib, Jamshid Farifteh, Pol Coppin and Renato Cifuentes La Mura

Analyzing Vertical Canopy Structure using A Multi-layered Voxel Approach From Discrete Return Lidar Data
Nicholas Kruskamp, *U.S. Army Corps of Engineers*, United States

Bruce Blundell, Michael Campbell, Richard Curran, Kathryn Kash, Matthew Voss, Harry Puffenberger, and Christopher Gard

*Moderators will be listed in the Final Program.

9:00 AM to 10:30 AM

Precision Mapping

Utilizing Geospatial Technologies to Detect and Monitor Foreign Objects and Debris on Airport Runways and Vicinities
Frederick Wilson, *Morgan State University*, United States

Judy Jackson-Pringle

High-resolution Geospatial Data Conflation for Efficient 3D Visualization and Decision Support
Kevin Takala, *Michigan Technological University*, United States

Riccardo Tortini and Eugene Levin

Moving Target Detection using Single Pass WorldView-2 Satellite
Rakesh Kumar Mishra, *University of New Brunswick*, Canada

Yun Zhang

Target-free Automated Image Orientation and Camera Calibration in Close-Range Photogrammetry
Christos Stamatopoulos, *CRC for Spatial Information*, Australia

Clive Fraser

Surface Modeling

Comparing Lunar Surface Roughness at 5m and 500m Scales
Prasun Mahanti, *LROC Science Operations Center, ASU*, United States

Mark Robinson and Aaron Boyd

Point Cloud Creation and Exploitation with Geospatial Applications
Joe Mostowy, *Intergraph*, United States

Steve DuPlessis

Geospatial Semantics from Raster Data
E. Lynn Usery, *U.S. Geological Survey*, United States

Wetlands – Coastal

Fusion of Lidar and Multi-spectral Data to Quantify Carbon Stocks in Galveston Saltmarshes
Ranjani Wasantha Kulawardhana, *Texas A&M University*, United States
Sorin C. Popescu and Rusty A. Feagin

Coastal Change Detection in the Lower Mississippi River Delta Region using NDWI and MNDWI Comparatively
Matthew Ramspott, *Frostburg State University*, United States

Michael Keating

Mapping South Atlantic Coastal Wetlands with Multisensor Object-oriented Image Classification
Aditya Singh, *East Carolina University*, United States

Continuous-time Modeling of Streamwater Nutrient Loading from Forested Watersheds in the Chesapeake Bay using MODIS and Meteorological Data
Aditya Singh, *University of Wisconsin-Madison*, United States

Philip A. Townsend and Keith Eshleman

Special Sessions

Special Session: Alaska — Mapping America's Last Frontier

Alaska Statewide Digital Mapping Initiative (SDMI)
Tom Heinrichs, United States

Alaska Geospatial Strategic Plan
Nick Mastrodicasa, United States

Alaska Mapping Rountable and Alaska Federal Mapping Executive Committee
Kevin Gallageher, United States

Status of Alaska Statewide Digital Orthophotos
Tony Follett, United States

Status of Alaska IFSAR DTMs, DSMs and ORIs
David Maune, *Dewberry,* United States

Satellite Image Acquisition Strategies

Optimization of Satellite Image Acquisition Planning for Disaster Response
Shufan Liu, *University of South Carolina*, United States

Michael E. Hodgson

Exploiting the DMC Satellite Constellation for Applications in Agriculture, Forest Monitoring and Disaster Response
Gary Holmes, *DMC International Imaging Ltd*, United Kingdom

Paul Stephens

A Satellite System Designed for Mapping the Globe at 1:50,000- Scale, Part I
Don Light, *Rochester Institute of Technology*, United States

A Satellite System designed for Mapping the Globe at 1:50,000- Scale, Part II
Don Light, *Rochester Institute of Technology*, United States

Special Session: UAS Capabilities Overview

Sponsored by the ASPRS Primary Data Acquisition Division
Moderator: Michael E. Hutt

Panelists will be representatives from:
AeroVironment
Trimble-Gatewing
Dragonfly Pictures

11:00 AM to 12:30 PM

Special Session: Geostatistics

Exploring Spatial Relationship Between Coastal Population Density and Inland Distance
Bandana Kar, *University of Southern Mississippi*, United States

Shahdad Naghspour

Applications of the USDA NASS CDL Based Automated Stratification Method for the NASS Area Sampling Frames
Kevin Hunt, *U.S. Department of Agriculture*, United States

K-color Join Count for Categorical Map Comparison
Melissa Rura, *UMNC*, United States

SpatialSTEM: A Mathematical/Statistical Framework for Understanding and Communicating Grid-based Map Analysis and Modeling
Joseph Berry, *Berry and Associates/Spatial Information Systems*, United States

*Moderators will be listed in the Final Program.

11:00 AM to 12:30 PM

Disasters — Mapping

Terrestrial Laser Scanning and Discontinuity Plane Characterization for Landslide Hazard Assessment
Abdullah Al-Rawabdeh, *University of Calgary*, Canada

Ayman Habib and Hussein Attya

Urban Landslide Activity at La Paz, Bolivia from Traditional and Advanced Remote Sensing Methods
Nicholas Roberts, *Simon Fraser University*, Canada

Reginald L. Hermanns, Bernhard Rabus, John J. Clague, and Marco Antonio Guzmán

GEOBIA — Applications

A Comparison of Five Segmentation Methods for Forest Mapping with Historical Aerial Photographs
Zhouxin Xi, *The Ohio State University*, United States

Xiaolin Zhu and Desheng Liu

Acquisition and Update of Road Data Based on Multiple Models
Christian Heipke, *Leibniz Universitaet Hannover*, Germany

Marcel Ziems, Uwe Breitkopf, and Franz Rottensteiner

Object-based Feature Extraction of Poppy Fields in Afghanistan
Richard Curran, *U.S. Army Engineer Research and Development Center*, United States

Bruce Blundell, Michael Campbell, Kathryn Kash, Nicholas Kruskamp, Stephen Newman, Matthew Voss, Shan Rammah, and Kyle Smith

A New Way of Extracting Building Information from the Aerial Urban Image
Lv Fenghua, *Fenghua*, China

Lidar — Applications

Vegetation Reflectance and Lidar Returns
Charles Olson, *Michigan Tech Research Institute*, United States

A Study of Signal Attenuation Due to Canopy in Small-footprint Waveform Lidar
Keith Krause, *Rochester Institute of Technology*, United States

Jan van Aardt, Paul Romanczyk, David Kelbe, Kerry Cawse-Nicholson, and Thomas, Kampe

Comparison of the Measurements of Woody Plant on Rangelands Between Airborne Lidar Remote Sensing and A Global Canopy Height Map
Nian-Wei Ku, *Texas A&M University*, United States

Sorin C. Popescu

3D Analysis using Lidar in a GIS Environment
Lindsay Weitz, *ESRI*, United States

Water Monitoring

Trophic State Determination by Multispectral Satellite Images: Chapala Lake, Mexico
Alejandra-Selene Membrillo-Abad, *Posgrado en Ciencias de la Tierra. UNAM*, Mexico

Marco-Antonio Torres-Vera and Rosa-Maria Prol-Ledesma

Satellite Remote Sensing and GIS to Assess Water Storage in the Duhok Dam
Yaseen Mustafa, *University of Zakho, Duhok*, Kurdistan Region-Iraq

Noori Mohammed Jalal

Combination with Multi-scale Remote Sensing and Spatial Data Warehouse Technology for Immediately Evaluating Sediment Disaster of the Typhoons Event in the Reservoir Watershed
Chun-Kai Chen, *Disaster Prevention Technology Research Center, Sinotech Engineering Consultants, INC.*, Taiwan

Cheng-Yang Hsiao and Bor-Shiun Lin

Terrain Modeling

A Study on Accuracy and Fidelity of Terrain Reconstruction after Filtering DSMs produced from Digital Aerial Images and Airborne Lidar Surveys
Ricardo Passini, *BAE SYSTEMS GP&S*, United States

David Day and Karsten Jacobsen

Space-based InSAR for Monitoring Land Subsidence along a Low-relief Barrier Island
Michael Starek, *Harte Research Institute for Gulf of Mexico Studies*, United States

James Gibeaut

Extraction of Levee Components for Riparian Zone Management using Lidar Data and Multispectral Orthoimages
Yunjae Choung, *The Ohio State University,* United States

Fusing Terrain Elevations into Sensor Imagery
Roger Brown, *U.S. Army Topographic Engineering Center,* United States

Wetlands — Inland

Multitemporal Landsat Change, Harrison County, MS: Monitoring Wetland Changes from the Ground to the Crowd
Mary Latiolais, *MDA Information Systems, Inc.*, United States

Mary Latiolais, Jon Dykstra, Adam Estrada, David Cunningham, Greg Koeln, and Bill Wilen

Wetland Mapping in Three Different Ecological Regions in Minnesota: An Object-oriented Approach to Integrate Lidar Data and Multispectral High-resolution Imagery
Lian Rampi, *University of Minnesota*, United States

Joseph Knight

Mapping Wetlands and Determining Shallow-lake Depths using Topographic and Bathymetric Lidar and High-resolution Imagery on the Alaskan North Slope
Kutalmis Saylam, *University of Texas at Austin*, United States

John Andrews, Aaron Averett, Tiffany Caudle, Jeffrey Paine, Thomas Tremblay, Michael Young, Petter Kullenberg, and Daniel Andersson

Special Sessions

Special Session: Best Practices and Preservation of Imagery and Geospatial Data

International Perspective
Lluis Colomer, *Institut Cartografic de Catalunya*, Spain

Private Industry Perspective
Jeff Young, *Lizard Tech, a Calartem Company*, United States

Federal Perspective
John Faundeen, *U.S. Geological Survey*, United States

Lluis Colomer, Cindy Clark, Jeff Young, and Bob Pope

Legal Perspective
Bob Pope, *Waterstone Environmental, Inc.* , United States

Special Session: Operational Space Imaging Systems, Advances, Calibration, and Standards

Converting space imagery into meaningful datasets is a process that varies from one imaging system to the other. This requires the development of complete "camera model" and related set of software tools that are compatible for downstream analyses and cartographic production. The lack of consistent information about space imaging systems presents a major bottleneck, on both developing analysis tools as well as cartographic production, with measureable cost consequences. The panel will address the most advanced space imaging systems, including the Landsat Data Continuity Mission (LDCM), data quality, and imaging system calibration requirements, and standards. The panel would also discuss standardized reporting of pre-launch camera calibration procedures, technical specifications, and geometric properties. Such standards would potentially facilitate development of complete "camera models" required for image analysis, developments of processing tools, software compatibility, and cartographic production.

Panelists will include satellite operating companies, such as GeoEye and DigitalGlobe; government, such as EROS and NASA; as well academia and the user community.

*Moderators will be listed in the Final Program.

Special Sessions

Special Session: Dense 3D Point Cloud Reconstruction from Imagery

Sponsored by the ASPRS Photogrammetric Applications Division and the Defense and Intelligence Committee
Moderator: John Marshall, *Integrity Applications Incorporated*

Readily accessible digital cameras, coupled with advances in computing power that allow a high level of automation in feature extraction and pixel matching, have resulted in exciting new developments in the application of photogrammetry. Through various automated operations on imagery (e.g., feature extraction, pixel matching, etc.), imagery from both metric and non-metric digital cameras can be used to generate highly detailed descriptions of the 3D object scene (e.g., 3D point clouds, surface models, voxel models) similar to what might be achieved with high density lidar systems. These capabilities are largely platform agnostic; potential platforms may include satellites, manned or unmanned aircraft, vehicle mounted, tripod mounted or handheld mobile mapping devices. As this technology continues to evolve, an increasing number of applications will be developed, ranging from survey accuracy feature extraction to general 3D visualization. This session will provide an overview of the applications, accuracies and potential implementations of this technology from the perspective of a cross section of developers, researchers and commercial providers.

Special Session: K-12 Geospatial Education and Citizen Science

Sponsored by the Education and Professional Development Committee
Moderator: Lawrence R. Handley

The Education & Professional Development Committee sponsored session includes papers that focus on the ASPRS response to K-12 education, the development of citizen scientist programs for place-based learning, GIS program development for K-12 curriculum, and geospatial pre-service education.

The Emergence of Geospatial Technology in K12
Stan Hovey, Retired, United States

A Citizen Scientists' Crowd Sourcing Mechanism for Inventory and Monitoring
Catherine Lockwood, *CNL World*, United States

Driving Big Results in Geospatial Learning through Pre-service Education
Vivek Ratna, *Digital Learning Solutions*, United States

Giving Back

"OPERATION Sock Drop" –

A Sock Drive for the Homeless

Each morning we put on a clean pair of socks with hardly a thought. But for our community's homeless men, women and children this simple act is often a luxury.

At this years' annual conference, we are excited to help support a local Baltimore homeless shelter, St. Vincent de Paul of Baltimore, through **OPERATION SOCK DROP**.

We are asking for your help. All that is needed is a small donation of at least one brand-new pair of men's, women's or children's socks (wool or cotton tube socks work best). Place your donation in the Drop Box for your ASPRS Region and participate in the Region competition! Help your Region receive the most donated individual pairs of socks.

Operation Sock Drop is an easy and inexpensive way to have a big impact on the comfort, health and safety of the homeless men, women and children in the Baltimore community.

And to make giving back even easier, the ASPRS Student Advisory Council will be assisting with this project by selling socks at their booth #616 in the Exhibit Hall for you to donate. If you forgot to bring a donation, don't worry, stop by the SAC booth and purchase a pair!

Why?

- Socks are easy to pack for those traveling to Baltimore.
- Giving back to the community leaves a lasting impact.
- Inexpensive, a pair of socks cost only a few dollars.
- You want your Region to win, right? Each ASPRS Region will be in competition for the most socks donated. The winning Region will be announced Thursday, March 28th in the Exhibit Hall.
- Socks are a simple yet necessary luxury.

Warm Feet, Warm Hearts.

Students & Young Professionals

Please join the Student Advisory Council (SAC) for some activities designed just for YOU!

Student Advisory Council Meeting (SAC)
Monday, March 25th, 5:30 PM to 6:30 PM

Get together with the other Students and Associate members of ASPRS and learn what the SAC has been working on and what is planned for the coming week. They would love to meet you and hear any ideas you may have to make your conference experience enjoyable. All are welcome to attend.

Exhibit Hall Guided Tour for Students
Tuesday, March 26th, 11:00 AM to 12:00 NOON

The ASPRS Sustaining Members Council is hosting a guided tour of the exhibit hall for students. This is your opportunity to meet the exhibitors, up close and personal. Exhibit halls can be intimidating, but not after this personal tour. Meet at the main exhibit hall entrance doors to participate in this fun tour. See you there!

GeoLeague Competition
Tuesday, March, 26th, 3:30 PM to 5:00 PM

The teams competing in the GeoLeague Challenge will be presenting their projects during this technical session. Students should attend and support the teams. Judging will take place following the session and prizes will be awarded during the Memorial Address on Wednesday, March 26th.

Student & Employer "Meet and Greet"
Wednesday, March 27th, 11:00 AM to 12:00 NOON

This great event is designed to connect students looking to apply for jobs in the digital mapping industry and employers looking to hire! Bring your resume, a business card, or just a smile and a handshake, and expand your job network at the conference. It's also an opportunity to meet other students and young professionals from all over the world who are attending the conference. Don't miss out on this great event!

Operation Sock Drop

Support the local Baltimore community and donate a pair of new socks for Operation Sock Drop. The SAC will be helping to support this service project by selling socks to donate. Stop by the SAC booth (#616) in the exhibit hall and purchase a pair of socks! Net sales of the socks will be used by the SAC to underwrite a future SAC-sponsored Summer School.

Student Advisory Council Booth #616

The SAC will have a booth in the exhibit hall at the Conference this year! Be sure to drop by to get information about the SAC, how to participate in next year's GeoLeague Challenge, Student Activities going on throughout the conference, and more. Also, don't forget to buy socks to donate for Operation Sock Drop. Stop by the SAC booth #616.

Social Activities:

Your SAC Networking Coordinator will arrange relaxed social gatherings after each of the day's conference activities. These events will allow you to get to know more of the students and young professional members of ASPRS. Attendees are welcome to join in on the fun. To find out about all the activities, visit the conference web page at www.asprs.org/Conferences/Baltimore2013 and click on the Presenters & Students tab. Or stop by the Message Board onsite – activities will be posted.

We guarantee that your participation in these activities will make your conference experience more enjoyable!

Hotel/Travel Information

Baltimore Marriott Waterfront Hotel

700 Aliceanna Street
Baltimore, Maryland 21202 USA
1-410-385-3000 * Fax: 1-410-895-1900 * Toll-free: 1-800-228-9290

Located on the edge of Baltimore`s historic Inner Harbor and steps from downtown sits our spectacular Baltimore Marriott Waterfront Hotel. A part of Baltimore, Maryland`s newest neighborhood, Harbor East, our premier Inner Harbor location features a swimming pool, fitness center and stunning Inner Harbor views.

Each guestroom and suite features luxurious bed linens and hi-tech business amenities so guests can work or play in comfort. Our downtown Baltimore, hotel is just steps from restaurants and shops at the Inner Harbor, the National Aquarium, Maryland Science Center and USS Constellation. Guests also enjoy the hotel`s close proximity to Camden Yards and the M&T Bank Stadium. This hotel has a smoke-free policy.

All ASPRS Conference activities will be held in the Baltimore Marriott Waterfront Hotel.

ASPRS 2013 Annual Conference Rates are
$159 single/double occupancy (Plus applicable taxes)

A limited number of government rate rooms have been reserved and are available at the prevailing government rate. Appropriate identification will be required at check-in.

Reservations should be made directly into the ASPRS 2013 Annual Conference room block through the following web site:

http://www.asprs.org/Conferences/Baltimore-2013
Reservations are also available by calling
1-800-228-9290 or 1+410-385-3000

Early reservations are strongly advised since we have a very limited number of rooms available at the Conference rate. **Reservations must be made by March 1, 2013 to take advantage of the special room rate.**

ASPRS regrets that children 13 years of age and younger are not permitted in the exhibit hall or at any sessions at any time due to safety and insurance regulations.

For more conference information, please visit the conference web site at www.asprs.org/Conferences/Baltimore2013.

ASPRS thanks you for staying at Baltimore Marriott Waterfront Hotel!

ASPRS is obligated to fill a certain number of hotel rooms at our conference hotels. If we fail to meet this obligation, we pay a hefty penalty at the end of the conference, which means we will have to raise our future conference registration fees. If you make a hotel reservation, please be certain that you plan to occupy the room. In many cases, conference attendee find that the hotel is sold out well in advance because reservations are made and then cancelled at the last minute by those who reserved early with only a slight chance of attending. Please help us avoid this problem.

Frequently Asked Questions

How do I register for the conference?
Please register on-line or by using the registration form in this Program on pages 57-58. The form may be duplicated as needed. Complete the form (type, print clearly, or attach a business card). Your name badge will reflect this information. Payment in U.S. Dollars will be accepted by Visa, MasterCard, Discover, American Express, checks made payable to ASPRS 2013 Annual Conference, and signed government purchase orders or training orders. Registrations received without payment will not be processed. Please do not mail your registration form after you have registered by fax or online.

Online: www.asprs.org/Conference/Baltimore2013
(Visa, MasterCard, Discover, or American Express)

Mail To: ASPRS 2013 Annual Conference Registration
5410 Grosvenor Lane, Suite 210
Bethesda, MD 20814
Phone: 301-493-0290 x109
All Forms of Payment

Fax To: ASPRS 2013 Annual Conference Registration
301-493-0208 (fax)
(Visa, MasterCard, Discover, American Express/purchase orders only)

Will I receive confirmation of my registration?
Your registration will be confirmed by e-mail. A registration is not considered complete until all registration fees are received by the Meeting Registrar. Please notify the Meeting Registrar at 301-493-0290 x109 if you have not received your confirmation within two weeks of submitting your registration, or if you have any questions. Your registration packet will be available at the ASPRS 2013 Annual Conference Registration Desk, in the Baltimore Marriott Waterfront Hotel, during the registration hours noted on pages 57-58 of this program.

What is the cancellation/refund policy?
To qualify for a full refund, a written cancellation must be received by the ASPRS 2013 Annual Conference Meeting Registrar by February 22, 2013. For cancellations received by March 8, 2013, a 50 percent refund will apply. No refunds will be made after March 8, 2013. This policy applies to all fees paid for the conference. All refunds are subject to a $50.00 processing fee and will be issued one month after the conference concludes.

Cancellations for medical emergencies after March 8, 2013, will be considered on an individual basis and will require a physician's signed letter.

What is the location of the Conference?
All ASPRS sponsored Conference activities will be held in the
Baltimore Marriott Waterfront Hotel
700 Aliceanna Street
Baltimore, MD 21202

What is the Moderator's Registration Policy?
All Moderators are REQUIRED TO PRE-REGISTER at the appropriate registration rate. **There are no rebates for Presenter Daily, Moderator Daily or Student registrants.**

When must Technical Paper and Poster Presenters register?
For a paper/poster presenter's name and paper title to appear in the final conference program, their registration must be received within 60 days of their receiving notification of the paper/poster acceptance.

As a student, presenting either a Technical Paper or Poster, what registration fee do I pay?
All students attending the conference, whether they are presenting a paper or poster or not, are eligible for the student registration fee.

I am a part-time student at an accredited institution. Do I qualify for student registration fee?
Anyone who is currently enrolled as a full or part-time student at an accredited college or university may register at the student registration rates if they have not previously held an ASPRS membership in another category, e.g., someone who previously held full membership then returned to college cannot now register as a student. As a non-member student, you register online or use the paper form. ALL students are required to fax a copy of their student identification to qualify for the student registration fee.

Must I pre-register for the conference?
No. On-site Registration will be located in the Baltimore Marriott Waterfront Hotel. However, a deep discount is available to everyone registering at least 30 days prior to the conference start date.

Are Daily Registrations permitted for all categories?
Yes. Daily registrations may be done in advance or on-site. However, a deep discount is available to those who register at least 30 days prior to the conference start date.

Is there a charge to attend the User Group Meetings?
No, the User Group Meetings are free of charge, however some require advanced reservations. See pages 12-13 of this program for details.

May I bring a Guest to the conference?
Yes, we welcome adult guests. This is a professional conference and *children under age 13 are not permitted to attend any sessions or visit the Exhibit Hall*. A separate registration fee has been set for all guests. (Please see Registration Form on pages 57-58 of this program). This fee includes admission to the Exhibit Hall and the Exhibitors' Reception. Admission to the general and technical sessions is not included with this registration. If guests wish to attend any of these sessions, they must register at the appropriate rate.

Is there an additional charge for the Social Events?
If you are registered with a Full Registration, the Exhibitors' Reception, and the Conference & Region Welcome Reception are included in the registration (see chart on page 58 of this program). All daily and child registrants must purchase tickets if they wish to attend the Conference & Region Welcome Reception. The ticket cost for children under 13 is $35 each. Children over 13 years of age must purchase an adult ticket. All tickets must be purchased in advance no later than 10 am on Sunday, March 24, 2013.

I am not a US citizen and am coming from outside the United States, how do I get a Letter of Invitation to obtain a visa?
You must first register for the conference following the procedures outlined above and pay the appropriate registration fee. Within the online registration form you will have an option to request a Letter of Invitation. If you prefer, you may submit a written request for a Letter of Invitation to:

Mrs. Sokhan Hing
ASPRS Membership Manager
5410 Grosvenor Lane, Suite 210
Bethesda, MD, 20814 USA
sokhanh@asprs.org

Frequently Asked Questions

How do I get into the Exhibit Hall if I am not registered for the conference?
Daily Exhibit Hall badges may be purchased at the Conference Registration Desk in the Baltimore Marriott Waterfront Hotel. Everyone entering the Exhibit Hall must have a name badge, including children 13 years of age and older. *Children under 13 years of age are not permitted in the Exhibit Hall at any time due to insurance and safety regulations.*

Are Workshops included with the registration fees?
No. Workshops require individual registration and a separate fee in addition to the general conference registration fees. Availability is based on space. We do not reserve spaces without full payment in advance and there is no waiting list. Workshop registrations must be received by February 22, 2013. ASPRS reserves the right to cancel any workshop if the minimum number of registrations is not received by February 22, 2013. On-site registration will be available for confirmed workshops with available space. Register early as many workshops will sell out prior to February 22, 2013.

As a Technical Paper or Poster Presenter, whose presentation has been accepted, when do I submit my work to be included in the proceedings?
You will need to register for the conference using the methods described above and submit your complete paper or poster (not an abstract) as directed in the e-mail instructions you received previously no later than January 14, 2013.

Does ASPRS provide laptops during Technical Sessions?
No, ASPRS does **not** provide laptops or desktop computers for Presenters during Technical Sessions. *All Presenters must provide their own laptop computer.*

What does ASPRS provided in each Technical Session room?
Each technical session room will be equipped with a LCD projector and screen. A microphone will be provided when necessary. *ASPRS does **NOT** provide internet access, laser pointers, or laptop computers for the technical sessions.*

Do Presenters have a Preparation Room?
Yes. A room will be available on a first come basis March 26th through 28th. This room will be equipped with an LCD projector and screen. All presenters must bring their own laptops for their presentations. The location of this room will be announced in the Final Program that will be included with the on-site registration materials. We encourage all presenters to review their materials prior to their presentation.

What are Technical Paper Presenters expected to do when they arrive?
All Technical Paper Presenters should check in at the Conference Registration Desk to pick-up their registration packets **and initial the Master Final Program next to their name including either a hotel room number or cell phone number.** A Master Final Program will be posted at the Conference Registration Desk so the session moderators can check if each presenter has arrived and can contact them if necessary.

What are Poster Presenters expected to do?
ASPRS provides to each Poster Presenter one side of a fabric covered poster board that measures eight feet wide by four feet high, and push pins. All Poster Presenters should plan to arrive between 7:30 am and 10 am on Tuesday, March 26th to affix their work to any available board. All posters must be removed by 12 noon on Thursday, March 28th. All poster packaging must be removed from the poster area once posters are hung. ASPRS is not responsible for posters that are not removed. Poster Presenters must also check in at the Conference Registration Desk to pick-up their registration packets and **initial the Master Final Program next to their name including either a hotel room number or cell phone number**.

May I volunteer to assist with the Conference activities?
Yes, if you are a student at an accredited college or university, you are welcome to apply for service as a conference volunteer. Please see full details at the Conference web page under the Presenters & Students tab.

Is Disability Assistance Available?
If you have special needs, please contact ASPRS Headquarters at 301-493-0290 ext. 106. A written statement will be required outlining your particular needs. Please submit all requests for assistance by February 22, 2013, so that appropriate arrangements can be made.

Why do I need a badge?
Your badge is verification of your paid registration and must be visible for admission to all sessions and the Exhibit Hall.

What if I forget or lose my badge?
A charge of $5 will be made for replacement of lost badges.

Why do I need tickets for certain events?
Your tickets are proof of payment for certain events and must be presented at the collection point. Lost tickets will not be replaced.

Will it be possible to post resumes and job openings?
Yes, posting boards will be provided for resumes and job openings. Please bring multiple copies of all postings to allow interested parties to take one and check the board frequently for new materials.

How do I get a copy of the Proceedings?
All registrants, except for those registered as Spouse/Guest, will receive access to the online proceedings are of the conference website. Access for additional people can be ordered with the Conference Registration Form or purchased on-site for $20.

What are the Conference Registration Desk Hours?

Saturday, March 23	4:00 pm to 7:00 pm
Sunday, March 24	6:30 am to 5:00 pm
Monday, March 25	6:30 am to 5:00 pm
Tuesday, March 26	7:00 am to 5:45 pm
Wednesday, March 27	7:00 am to 5:00 pm
Thursday, March 28	7:00 am to 11:00 am

Conference Registration materials are available only during the above hours.

What are the Exhibit Hall Hours?

Tuesday, March 26	10:30 am to 7:00 pm
Exhibitors' Reception	*5:30 pm to 7:00 pm*
Wednesday, March 27	9:00 am to 5:00 pm
Thursday, March 28	8:00 am to 11:00 am

ASPRS 2013 Annual Conference Registration Form

Baltimore, Maryland, USA • March 25-29, 2013

Register on-line at www.asprs.org/Conferences/Baltimore2013/ or complete this form (type, print clearly, or attach a business card) and return to ASPRS 2013 Annual Conference Registration, 5410 Grosvenor Lane, Suite 210, Bethesda, MD 20814. Phone: 301-493-0290, ext. 109 (all forms of payment accepted by mail) or fax: 301-493-0208 (Visa, MasterCard, Discover, and American Express or purchase orders only).

Personal Information

Preferred first name on badge: _____ Registrant's Birth Country: _____

Name (please print): _____
First Name *M.I.* *Last Name/Family Name* *Suffix*

Organization Name (if applicable): _____

Street Address: _____

City: _____ State/Province: _____

Zip Code/Postal Code: _____ Country: _____

Business Phone: _____ Cell Phone: _____

Business Fax: _____ *Optional* Email: _____

Emergency Contact Name: _____ *If attending* Emergency Contact Phone: _____

Spouse/Guest Name: _____

❑ Please check this box if you would like the above Personal Information updated in your ASPRS membership profile.

❑ ASPRS Member (# _____) ❑ Non-member

Are you Currently certified by ASPRS? ❑Photogrammetrist (# _____) ❑ Technologist (# _____)

❑ Mapping Scientist — GIS/LIS (# _____) ❑ Mapping Scientist — Remote Sensing (# _____)

❑ Provisional Certification (#_____)

please check the appropriate boxes

ASPRS Member	Advance	On-site After 3/22/13
❑ Full Registration	$710	$810
❑ Daily		
❑ Tuesday 3/26	$365	$414
❑ Wednesday 3/27	$295	$336
❑ Thursday 3/28	$295	$336
❑ Speaker Full	$710	$810
❑ Speaker Daily		
❑ Tuesday 3/26	$365	$414
❑ Wednesday 3/27	$295	$336
❑ Thursday 3/28	$295	$336
❑ Student Full	$150	$168
❑ Student Daily		
❑ Tuesday 3/26	$80	$90
❑ Wednesday 3/27	$65	$90
❑ Thursday 3/28	$65	$72
❑ Spouse/Guest	$180	

Non-Member	Advance	On-site After 3/22/13
❑ Full Registration	$840	$960
❑ Daily		
❑ Tuesday 10/30	$440	$504
❑ Wednesday 10/31	$385	$438
❑ Thursday 11/01	$385	$438
❑ Speaker Full	$840	$960
❑ Speaker Daily		
❑ Tuesday 10/30	$440	$504
❑ Wednesday 10/31	$385	$438
❑ Thursday 11/01	$385	$438
❑ Student Full	$210	$240
❑ Student Daily		
❑ Tuesday 10/30	$1110	$126
❑ Wednesday 10/31	$75	$84
❑ Thursday 11/01	$75	$84
❑ Spouse/Guest	$180	

Exhibit Hall Only (This registration type is for entrance to the Exhibit Hall ONLY and does NOT include entrance to any of the Technical Sessions or Plenary Sessions.)

❑ Tuesday	$80	❑ Wednesday	$50	❑ Thursday	$50
❑ Tuesday and Wednesday	$125	❑ Wednesday and Thursday	$90	❑ All Three Days	$150

Please see the chart below for a breakdown of the items included with your registration type.

	Full Member/Non-member	Presenter Full Member/Non-member	Student Member/Non-member	Spouse/Guest	Daily, all registration categories
General & Technical Sessions	*	*	*		*
Exhibit Hall	*	*	*	*	*
Exhibitors' Reception, Tuesday Evening	*	*	*	*	*
Conference Proceedings	*	*	*		*
Conference & Region Welcome Reception	*	*	*	*	

$ _____
Subtotal

Workshops

	#	Title	Type	Time	Date	CEU	Member		Non-Member		Student	
							Advanced	Onsite	Advanced	Onsite	Advanced	Onsite
❑	1	Georeferencing: State of the Art and New Trend	Inter	F/D	3/24	.8	$235	$260	$335	$360	$125	$140
❑	2	Object-Based Image Analysis	Adv	F/D	3/24	.8	$235	$260	$335	$360	$125	$140
❑	3	Lidar for Terrain and Vegetation Mapping	Inter	F/D	3/24	.8	$235	$260	$335	$360	$125	$140
❑	4	Earth Observation Time Series Analysis Using the Earth Trends Modeler	Inter	H/D AM	3/24	.4	$180	$200	$280	$300	$90	$100
❑	5	SpatialSTEM: A Mathematical/Statistical Framework for Understanding and Communicating Grid-Based Map Analysis and Modelling	Inter	H/D AM	3/24	.4	$180	$200	$280	$300	$90	$100
❑	6	Unmanned Aerial System (UAS) Fundamentals	Inter	F/D	3/25	.8	$235	$260	$335	$360	$125	$140
❑	7	Photogrammetric Processing: Surface Model and Orthophotograph Workshop	Inter	F/D	3/25	.8	$235	$260	$335	$360	$125	$140
❑	8	Aerial Surveillance of Oil Spill Training (ASSIST)	Intro	F/D	3/25	.8	$75	$100	$100	$125	N/A	N/A
❑	9	Calibrating Film and Digital Sensors for Today's Geo-Spatial Business	Inter	H/D AM	3/25	.4	$180	$200	$280	$300	$90	$100
❑	10	Object Oriented Image Classification: From Feature Extraction to Land Cover Mapping	Intro	H/D AM	3/25	.4	$180	$200	$280	$300	$90	$100
❑	11	LiDAR Waveform: The Potential and Benefits for Topographic Mapping	Inter	H/D PM	3/25	.4	$180	$200	$280	$300	$90	$100
❑	12	NHD Introduction and NHD Point Event Creation and Application Utilizing StreamStats	Intro	H/D PM	3/25	.4	$180	$200	$280	$300	$90	$100

**Students must provide a valid student ID when they register. Students will be allowed to attend workshops at the reduced price on a space available basis. All student registrations for workshops that are received before February 22, 2013, will be held until that date. If there are spaces available at that time the student will be notified that their registration has been accepted. If a student workshop registration is not accepted, their workshop fee will be refunded in full.

NOTE: Individual workshops are subject to cancellation if the minimum number of required registrations are not received by February 22, 2013.
Workshops are limited to a maximum of 40 attendees per workshop. Popular workshops sell out early and we do NOT keep a waiting list.

F/D = Full Day Workshop
Inter = Intermediate

H/D AM = Half Day Morning Workshop
Adv = Advance

H/D PM = Half Day Afternoon Workshop
Intro = Introductory

Social Events

Conference & Region Welcome Reception

Monday, March 25th, 6:00 pm to 9:00 pm.

❑ Adult Ticket quantity _____ @ $85 each
❑ Children's* Ticket quantity _____ @ $35 each

*Children 13 years of age and younger

Awards Luncheon

❑ Tuesday, March 26th quantity _____ @ $65 each

Classified Session

❑ Monday, March 25th quantity _____ @ $100 each

Attendees for this session must be U.S. citizens and possess a minimum SECRET clearance to attend.

Additional Proceedings

❑ On-line Access to Proceedings quantity _____ @ $20 each

Each Full, Student, and Daily registrant will receive one copy of the conference proceedings as part of their registration.

ASPRS is offering a special **New Member Promotion** to non-member attendees at the ASPRS 2013 Annual Conference. Your Conference registration at the Non-Member rate entitles you to a complimentary 1-year ASPRS membership. This offer applies only to those who have not been a member of ASPRS within the past three (3) years.

We are also offering a **New Student Member Promotion** to student non-members. Your ASPRS 2013 Annual Conference registration at the Student Non-Member rate entitles you to a complimentary 1-year ASPRS Student membership. This offer applies only to those who are currently enrolled as a full or part-time student at an accredited college or university and who have not previously held an ASPRS membership in another category or have not been a member of ASPRS within the past three (3) years.

Once your paid conference registration has been confirmed, we will provide you with a membership application and instructions for completing and returning it, if you choose to accept the complimentary membership. Students must provide proof of current status with their application.

To qualify for a full conference registration refund, a written cancellation must be received by the ASPRS 2013 Annual Conference Meeting Registrar at registrar@asprs.org by close of business on **February 22, 2013**. For cancellations received by close of business **March 8, 2013**, a 50 percent refund will apply. **No refunds will be made after March 8, 2013**. This policy applies to all fees paid for the conference. All refunds are subject to a $50.00 processing fee and will be issued one month after the conference concludes.

Cancellations for medical emergencies after the above deadline will be considered on an individual basis and will require a physician's signed letter.

In the unlikely event ASPRS finds it necessary to cancel this entire conference, 100 percent of the registration fees paid will be refunded. ASPRS assumes no liability for any penalty fees on transportation tickets, deposits for hotel accommodations or any other fees, charges, penalties, or other incidental costs that a registrant might incur as a consequence of this conference being canceled.

Please direct all registration related questions to the ASPRS 2013 Annual Conference Meeting Registrar at registrar@asprs.org.

Method of Payment (Full payment must accompany this form.)

❑ Check (make payable to ASPRS 2013 Annual Conference, print attendee name on check)

❑ Visa ❑ MasterCard ❑ Discover ❑ American Express

Name on Credit Card

Billing address of Credit Card Holder

Contact phone and email address for Credit Card Holder if other than registrant.

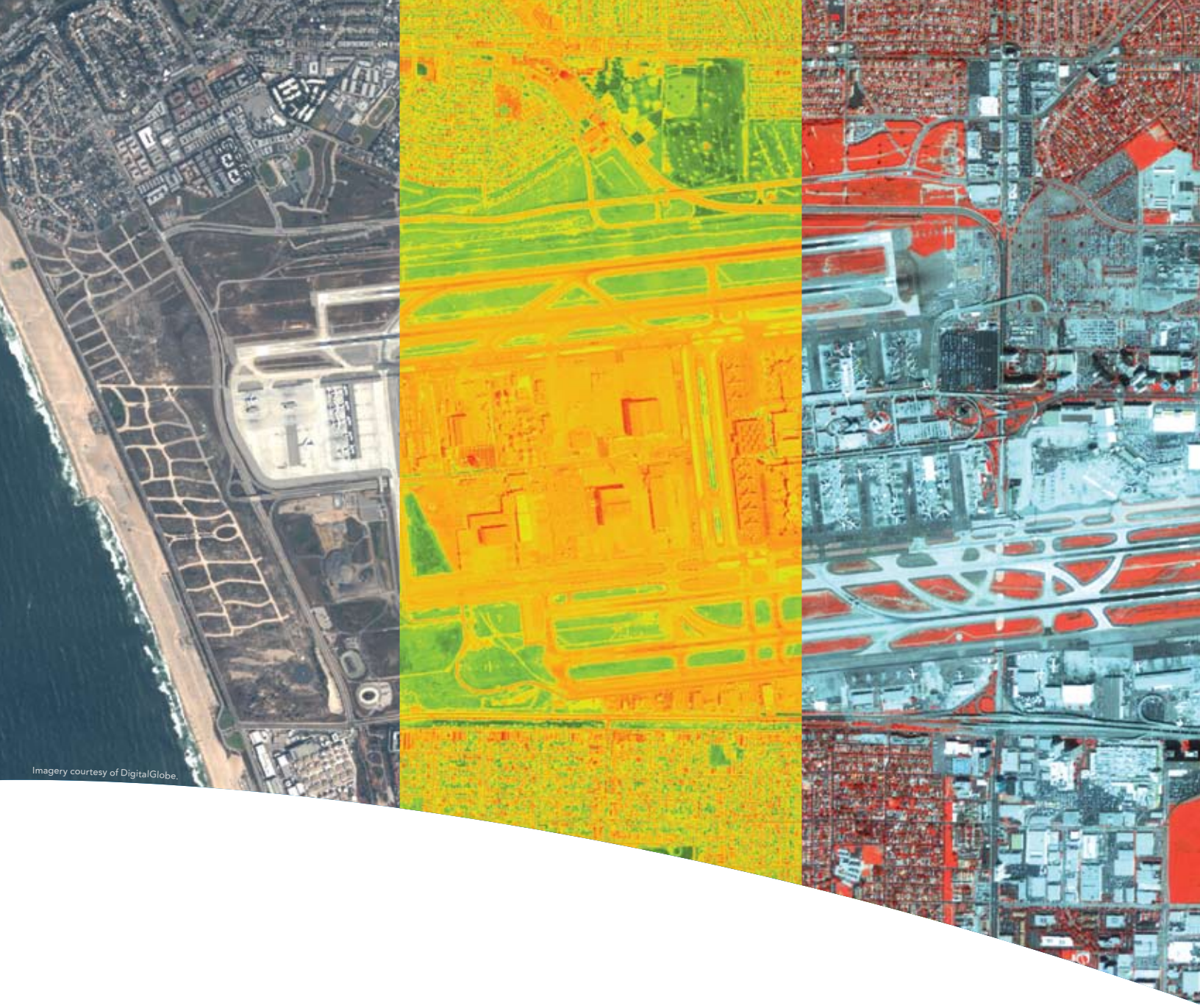
Credit Card Account Number Expires (Month/Year)

Cardholder Signature Date

❑ Purchase Order #_____ (government and university only)

Payments must be made in U.S. dollars drawn on a U.S. bank or appropriate credit card. Make checks payable to ASPRS 2013 Annual Conference and print attendee name on check.

$_____ $ _____
Subtotal from front of form Total amount enclosed



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Confluence by the Bay — A Gathering of Geospatial Insights

ASPRS 2013 Annual Conference
March 24-28, 2013
Baltimore Marriott Waterfront Hotel
Baltimore, Maryland

Preliminary Program

www.asprs.org/Conferences/Baltimore2013