



THE IMAGING & GEOSPATIAL INFORMATION SOCIETY

~The Rocky Mountain Compiler~

Issue 1

Spring 2014

Issued Quarterly

Newsletter of the Rocky Mountain Region of ASPRS, serving Montana, Wyoming, Colorado, and New Mexico

President's Message

Dear Rocky Mountain Region of ASPRS,

I would like to thank everyone for voting me in as the 2014 Rocky Mountain Region President. I am very eager to serve as the Regional President and I am looking forward to an eventful year. We started off the year with a fantastic tour of Ball Aerospace in Boulder, Colorado, which gave us the opportunity to view the James Webb Space Telescope optics and the WorldView 3 Satellite. Look for the report on this tour later in this issue. More technical tours at different organizations are being scheduled, so please stay tuned for future announcements.

This is a very exciting time in Geospatial Technologies for the Rocky Mountain Region. On the temporal horizon we have two great events coming up later this year: 1) GeCo in the Rockies, September 22–26 in Grand Junction, Colorado (<http://www.gecointherockies.org/>), and 2) Pecora 19 ISPRS, November 17-20 in Denver, Colorado (<http://www.asprs.org/ASPRS-Conferences/blog.html>). See the websites for more information on these events and to register.

The Rocky Mountain Region has some new members on the Board of Directors and of course some returning members. Members of

the Board have maintained a geographic presence from New Mexico to Montana. In addition, the Board has a good mixture of representatives from Private Industry, Academia, and Government. All the current officers can be viewed on our website at <http://www.asprs-rmr.org> as well as in this issue.

In closing, I would like to state, with great pleasure, that the Rocky Mountain Region has won First Place in the annual National competition among Regions for the 2013 Region Newsletters. The hard work writing and compiling the newsletter was a team effort from everyone on the RMR Board. However, two main people come to mind for outstanding efforts on the newsletter and they are Mr. Mike Garner with help from Ms. Sheila Pelczarski.

Thank you,
Dr. Michael Tuffly
Rocky Mountain Region President

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Student Rebate Offer

ASPRS Rocky Mountain Region will reimburse \$25 of the \$50 cost of student membership, so your net cost is only \$25 for all the benefits of membership in the Society!

Download the Student Membership Rebate Form at <http://www.asprs-rmr.org> (on the News & Events page). Here's the best part: ***This offer from the Region is good for every year you are a full-time student!***

RockyMtn Region Election Results

The RMR Board of Directors is happy to welcome the following new officers in 2014:

President: **Mike Tuffly**

Vice President: **Harold Cline**

Treasurer: **Mike Vessel**

Regional Director (MT): **Catherine Maynard**

Regional Director (GISitRConf): **Mark Bowersox**

Continuing Officers in 2014:

Secretary: **Chris Sheil**

National Director: **Jeff Young**

Regional Director (GISitR Conf): **Tillman Saylor**

Regional Director (Newsletter): **Mike Garner**

Regional Director (NM): **Michaela Buenemann**

Past President: **Mark Stanton**

Contact information can be found on our website www.asprs-rmr.org on the Officers page.

The Board would also like to thank all past and outgoing officers for their support. It is important to recognize that our Region is dependent on all of our volunteers, whose efforts ensure the continued success of our organization.

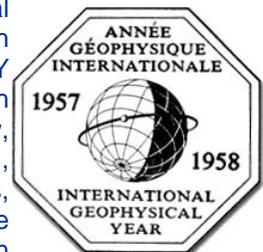
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National Director's Report

National Director's Report -- J.M. Young (portions of the discussion below were presented in the Big Data Session at the ASPRS Spring Meeting in Louisville, KY on March 25, 2014.

Humans as Change Agents ... Big Data, Big Science and Big Problems to Solve

My open question to our membership is ... What is our contribution? First let's gain some historical context to the role of our community. The International Geophysical Year (IGY) which began in July 1957 was an international scientific coordinated research initiative. The IGY encompassed eleven Earth sciences: aurora and airglow, cosmic rays, geomagnetism, gravity, ionospheric physics, longitude and latitude determinations (precision mapping), meteorology, oceanography, seismology, and solar activity (see <http://www.nas.edu/history/igy/> for a more extensive description provided by the National Academies). As per the National Academies, the IGY goals were " ... to observe geophysical phenomena and to secure data from all parts of the world; to conduct this effort on a coordinated basis by fields, and in space and time, so that results could be collated in a meaningful manner."



Over sixty countries participated in IGY projects. Space-based observation of the earth became a reality during the IGY. The Soviet Union launched Sputnik 1 on October 4, 1957 and Sputnik 2 in November 3, 1957. The US launched Explorer 1 on February 1, 1958. So the space race had begun. NASA was formed shortly after on July 29, 1958. Interestingly, Explorer 1 was designed at the Jet Propulsion Laboratory by a team lead by **Dr. Wernher von Braun** that was completed in three months. Explorer 1 completed 58,000 orbits before returning to Earth in March 1970



(http://solarsystem.nasa.gov/missions/profile.cfm?MCode=Explorer_01 for more details on Explorer 1).

A commemorative stamp was issued by Japan in 1957 to mark the IGY. The illustration depicts the Japanese Research Ship Soya and a Penguin (see http://www.funokagakukan.or.jp/sc_01_en/soya_en.html for more details on the storied Soya).



The International Geophysical Year origins have been traced to the [International Polar Years](#), 1882–1883 and 1932–1933. Note the Russian Stamps commemorating the 1932–33 Polar Year illustrated below.

Notion of World Data Centers

The 1932 Polar Year was considered a success but World War II hampered any potential for data sharing. In response to such a situation, the IGY organizers established the World Data Center system. (See *An Assessment of the Impact of World Data Centers on Geophysics*, prepared by the National Academy of Sciences, March 1975.) The United States hosted World Data Center "A" and the Soviet Union hosted World Data Center "B." World Data Center "C" covered the remaining countries in Western Europe, Australia, and Japan. Each World Data Center archived a complete set of IGY data loss encountered during the International Polar Year of 1932. The IGY was truly the inauguration of the concept of global data management and dissemination conceived to support world-wide geophysical assessments of the earth and its atmosphere. Consider the challenge of measuring the earth from multiple perspectives. **William Blake**, English poet, painter and printmaker, wrote as excerpted from "[Auguries of Innocence](#),"

"To see a World in a Grain of Sand
And a Heaven in a Wild Flower,
Hold Infinity in the palm of your hand
And Eternity in an hour ..."



Big Data Today without borders or boundaries

I have noted in the past that our members live in a geospatial operational habitat where a "triple

convergence" is underway (see [The World is Flat](#) by **Thomas L. Friedman**; Farrar, Straus and Giroux; 2005). That is, first there are new geospatial "players;" second there is a new geospatial "playing field" — the internet; and third there are new processes for "horizontal" geo-collaboration which do not conform to the ways of the past, such as: crowd sourcing, volunteered geographic information, humans as sensors, profound role of standards, and responsibility of the scientific community to embrace data quality – accuracy, precision, completeness, comparability, and representativeness of this big data.

Just consider the global data management implications of the Working Groups of ISPRS COMMISSION VIII -- Remote Sensing Applications and Policies:

- [WG VIII/1 - Disaster and Risk Reduction](#)
- [WG VIII/2 - Health](#)
- [WG VIII/3 - Weather, Atmosphere and Climate Studies](#)
- [WG VIII/4 - Water Resources](#)
- [WG VIII/5 - Energy & Geological Applications](#)
- [WG VIII/6 - Cryosphere](#)
- [WG VIII/7 - Forestry, Natural Ecosystems & Biodiversity](#)
- [WG VIII/8 - Land Cover and its Dynamics, Including Agricultural & Urban Land Use](#)
- [WG VIII/9 - Coastal and Ocean Applications](#)

In many respects, we are blinded by our optical bias of x, y, z and time. Let's perhaps consider expanding our definitions of what and how we observe as an integrated experience – Will this integrated experience yield Big Data to include measurements of: sound, human sight, smell – sensible and not, taste, touch, temperature, humidity and atmospheric content.

Bigger Data -- The Intelligence Gathering Disciplines

A staggering amount of data is being collected for the purposes of National Security; most if not all has an implicit geographic component:

•HUMINT -- Human Intelligence—gathered from a person on the ground.

- GEOINT -- Geospatial Intelligence gathered from satellite, aerial photography, mapping / terrain data.
- MASINT -- Measurement and Signature Intelligence
- OSINT -- Gathered from open sources.
- SIGINT -- Gathered from interception of signals
- TECHINT -- Gathered from analysis of weapons and equipment used by the armed forces of foreign nations, or environmental conditions.
- CYBINT -- Gathered from Cyber Space
- FININT -- Gathered from analysis of monetary transactions

Big Global Problems

High Noon: 20 Global Problems, 20 Years To Solve Them, authored by **Jean-Francois Rischar** and published in 2003, highlights several significant challenges. Many of the problems listed have explicit geographic components, or at least can be described in a geographic manner. The problems identified by Jean-Francois Rischar are grouped into three categories: Sharing our planet: Issues involving the global commons; Sharing our humanity: Issues requiring global commitment; and global regulatory approaches.

The physical sciences were not alone in the 1950's in the pursuit of a greater understanding of the relationship between humans and their environment and the associated Big Data requirements. The international symposium "Man's Role in Changing the Face of the Earth," organized by the Wenner-Gren Foundation for Anthropological Research and held at Princeton, NJ in June of 1955. The chairmen of the symposium were three of the distinguished scholars of the time: the geographer **Carl O. Sauer** of the University of California at Berkeley, a proponent of understanding the morphology of landscape; **Marston Bates** of the University of Michigan, a zoologist and pioneer environmental scientist; and **Lewis Mumford**, from the University of Pennsylvania who scrutinized technology and architecture's effects on urban life. Sauer invited **Clarence Glacken**, a Professor of Geography at the University of California, Berkeley to participate in the Princeton Symposium. He was later known for Traces on the Rhodian Shore (1967) where he demonstrated how perceptions of the natural environment shaped the course of human events over millennia. It is worthy to note that Glacken concluded in Traces on the Rhodian Shore that there had been three major ideas in the history of Western environmental thought: the idea of a divinely designed earth, the idea of environmental influence

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on people (similar to environmental determinism), and the idea of human influence on the environment. These frameworks of thought have had profound influence and detrimental consequences regarding our liberal interactions with the earth.

Modeling ... good data, quality data and good science

I leave you with the following thoughts: Sound scientific modeling of the globe requires good data, collected within quality tolerances and big data rigorously managed with agreed upon standards. Hopefully, practical and positive decisions will emerge. What is your global modeling contribution? Whatever your scientific endeavor is, be curious, be critical in your thinking, be kind and considerate in your judgments of your peers, and please be conscious of the ramifications of your conclusions.

Suggested background reading:

Man's Role in Changing the Face of the Earth (1956) and Traces on the Rhodian Shore (1967)

Jeff Young, RMR National Director

GeCo in the Rockies Conference: Abstracts Needed!

ASPRS RMR is promoting a presentation track at the GeCo in the Rockies conference this year. We need your help filling the track with interesting topics in remote sensing. Submit your abstract at: <http://www.gecointherockies.org/abstractsubmission/>

GeCo in the Rockies 2014 is a collaborative conference between GIS in the Rockies and Geospatial Conference of the West (GeCo West). GeCo in the Rockies will be the premier geospatial technology and information event of 2014. Geospatial professionals from various disciplines will gather to learn more about innovations and new advancements in our progressing geospatial world. Learn more at: <http://www.gecointherockies.org/>

The conference will be held September 22-26, 2014 in Grand Junction, Colorado at Two Rivers Convention Center.

If you would like to discuss potential topics and the abstract submission process, please contact Tillman Saylor or Mark Bowersox.

Region Wins National Awards!

Every year, a National ASPRS committee evaluates all Regions in three categories for the Region of the Year awards for their overall activity, their newsletters and their Websites during the previous year and selects the best to receive national recognition. **The Rocky Mountain Compiler** newsletter won the **2014 Region Newsletter of the Year Award**. The Rocky Mountain Region placed second in the **2014 ASPRS Region Website of the Year Award**. Presentation of the Region awards took place in late March during the ASPRS 2014 Annual Conference in Louisville, Kentucky. National Director Jeff Young was on hand to receive the framed award certificates. The Rocky Mountain Region has usually placed in the top three in at least one or two categories for several years running.

ASPRS-RMR Annual Dinner Report

Sandwiched between Chinese New Year and the Super Bowl, our Annual Dinner Meeting was held on Saturday evening, February 1st. Happy as we were with the Wellshire Inn, the site of many previous dinners, we decided to explore a new venue this year, something a little more appropriate to our areas of interest – an airport. About 30 of us gathered at The Perfect Landing Restaurant at Centennial Airport, on the SE side of the Denver Metro area. Those of us who arrived early congregated in the aviation-themed piano bar for drinks and conversation. [Take note for future reference: this is an excellent place to go for Happy Hour!] We then moved over to our secluded group of tables by the windows at the far end of the restaurant for the remainder of the evening. Since the entire wall facing the airport is made of glass, most tables afford good views of the small planes taking off and landing. Since this was a cold and snowy night, there were only a few planes coming and going. Everyone was happy with this new venue. Like the Wellshire Inn, the atmosphere was elegant and the food and service were excellent. The additional air traffic activity was the icing on the cake.

Jeff Young, our National Director, served as Master of Ceremonies again (because he is so good at it!). We had two special guests from afar in attendance: **Gar Clarke**, Geospatial Program Manager at the New Mexico Dept. of Information Technology, our guest speaker for the evening, and **Dr. Michaela Buenemann**, Assistant Professor at New Mexico State University and ASPRS-RMR Regional Director. After so many Region Board meetings via

teleconference, it was great to finally meet Michaela in person. After dinner, **Gar Clarke** spoke to us about the evolution of the geospatial and broadband programs in New Mexico and how he got involved in the field, peppered with amusing anecdotes from his own experiences in Hawaii and elsewhere.



Some of our Student Scholarship winners were able to be there to receive their awards. **Matt Cross**, Ph.D. candidate at the University of Colorado–Denver and winner of our 1st Place Ph.D. award, summarized his research interests in the geospatial aspects of industrial forest production of paper, pulp, and biofuels in the western hemisphere, especially in developing countries. **Greg** and **Diane Ambrose**, students at Colorado Mountain College and Pueblo Community College were our 3rd Place winners. They spoke to us about their work with the search-and-rescue service at Yosemite National Park and also their volunteer efforts to bring GIS to the Red Cross for more efficient emergency response to natural disasters. **Dr. Roger Hoffer**, former National ASPRS President and retired Professor at Colorado State University, has also been volunteering for the Red Cross along with his wife Connie since his retirement from teaching. Dr. Hoffer spoke of his experiences and was on hand to induct the new ASPRS-RMR Board of Directors for 2014.



Outgoing Region President Mark Stanton then presented Sheila Pelczarski with a special

recognition award plaque in appreciation for her many years of “dedication and commitment” to the Region as an officer and volunteer. Described as “the glue that holds the Region together,” her work on the Compiler newsletter and the website have contributed to their award-winning status for several years running. Outgoing officers Roger Hanson, Linda Vance, and Niki Noon were recognized and thanked for their service to the Region. Jeff Young was acknowledged for arranging the dinner venue, inviting the guest speaker, and for being a terrific Master of Ceremonies. Another annual dinner meeting resulted in a fun evening for all, a great networking opportunity, and a chance for all of us to get to know each other better. It was well worth the long drive in the snow to get there and back.



A Rare Look Inside Ball Aerospace

On a cold, rainy Friday morning in early March, a cadre of ASPRS members gathered in Boulder for another in our series of technical tours, this time at Ball Aerospace & Technologies Corporation. A few of us commented on the irony of the steady rain outside, since this tour had originally been scheduled for last September 13, 2013 but had to be postponed after the extreme flooding event left the nearest major intersection under water. This time, the rain led to snow by mid-day.

The Ball tour was even more interesting than expected. **Kenneth Hutchison**, our tour guide, has been the company photographer for 26 years. He began with a summary of the colorful history of the company. He then led us through a series of massive areas where instruments and spacecraft they build are tested for extreme variations in sound waves, vibration, temperature and electromagnetic fields to ensure that these objects will be able to withstand the forces they will be subjected to once deployed in space. We were shown the optics and mirror system that Ball is building for the [James Webb Space Telescope](#). This large infrared telescope is a

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collaboration of 17 countries led by NASA, with significant involvement by the European Space Agency and the Canadian Space Agency. Ball is the principal subcontractor to Northrop Grumman for the optical technology and lightweight mirror system. Ball Aerospace also developed the secondary mirror, tertiary mirror and fine-steering mirror. The telescope is expected to be launched in 2018. It will be a successor to the Hubble Space Telescope and will be the primary observatory for the next decade, to be used by thousands of astronomers worldwide to study the origins of the Universe. Check out the [NASA](#) and [Ball Aerospace](#) websites for more information and pictures of this fascinating project.

Next, we got a close-up view and demonstration of the innovative lightweight telescope lenses that Ball has built. These lenses are made from a polymer membrane material that can break up light into its component wavelengths almost as efficiently as glass lenses can, yet they weigh much, much less. We each got to hold a framed lens up to the light to see the rainbow effect and to feel just how lightweight they are. The Membrane Optical Imager for Real-Time Exploitation (MOIRE) program is a technology demonstration for the Defense Advanced Research Projects Agency (DARPA) that will provide persistent, real-time, tactical video for military intelligence gathering. To accomplish this capability, MOIRE is incrementally demonstrating the technologies needed to develop a large lightweight space-based telescope for geosynchronous orbit using advanced diffractive membrane optics. MOIRE is demonstrating the manufacturability of large collection area telescopes (up to 20 meters or ~66 feet), large structures to hold the optics tight and flat, and is also demonstrating the additional optical elements needed to turn a diffraction-based optic into a wide bandwidth imaging device.

The telescope concept that Ball developed employs thin (less than 1/1000th of an inch) transparent membranes etched with a diffraction pattern as the primary optical element used to focus light. The Ball-built lightweight optics reduce the mass of large aperture telescopes by nearly an order of magnitude compared to those with conventional optics. Since costs scale roughly with spacecraft mass, one key to affordability is minimizing the mass of future space optics. This technology could lend itself to easily stowed configurations for launch within a payload shroud that could be deployed on orbit. Ball completed the first phase of MOIRE in 2011, when it successfully demonstrated the ability to create a diffracted optical element on a membrane. Now in phase 2, Ball completed in 2013 construction and testing of one-eighth of a 5-meter (~16 ft.) -diameter annular segmented telescope and verified functionality of the MOIRE design. There are five

additional risk reduction options in phase 2 before the program will build a flight demonstration. For more really interesting information, pictures, and video, see the [DARPA website](#) and a recent [news release](#).

Next we got to peer through a window into one of Ball's clean rooms, where the WorldView 3 satellite is being built for DigitalGlobe. This was perhaps the most exciting part of the tour. As we watched, several Ball employees were busy assembling components of the satellite. We were all wishing we could take photos or shoot video, but this was not allowed. Some of the other clean rooms had their windows covered due to the sensitive nature of the classified projects going on inside.

Ball Aerospace provided its Ball Configurable Platform (BCP) 5000 spacecraft bus for the WorldView series of satellites. The powerful BCP 5000 spacecraft is able to handle next-generation optical and synthetic aperture radar remote-sensing payloads. For higher spacecraft agility, Ball Aerospace provides its advanced Control Moment Gyroscopes (CMGs), which provide rapid retargeting capability while supplying stability. The BCP 5000 also easily accommodates future optical, scientific and Synthetic Aperture Radar remote sensing payloads.

The WorldView-3 spacecraft has the ability to collect eight-band, short-wave infrared (SWIR) imagery. This will allow the satellite to sense not only the visible spectrum but deeper into the infrared spectrum, providing a rich dataset for precisely identifying manmade and natural materials. WorldView-3 will offer 31-centimeter (~1 foot) resolution panchromatic and 1.24-meter (~4 foot) resolution eight-band multispectral imagery in addition to the 3.72-meter (~12 foot) resolution SWIR imagery. WorldView-3 builds upon the WorldView-2 and WorldView-1 technology by carrying forward the satellite's advanced CMGs. The CMGs reorient a satellite over a desired collection area in four to five seconds, compared to 30 to 45 seconds needed for traditional reaction wheels. The satellite is expected to launch this year.

Next we were taken into a large conference room upstairs with windows overlooking an observation and control room for monitoring and adjusting deployed spacecraft. Then we saw where spacecraft and components are packaged and shipped out to their destinations. We also saw a metal shop where metal components are designed and built. Ball has developed a lightweight metal "sandwich" material consisting of an aluminum alloy wafer insulation (about an inch in depth) encased in aluminum sheets on both sides. This material is

used to construct strong yet lightweight frame structures for telescopes and other spacecraft. The scraps are cut up into small pieces. We each received a piece of this unique material as a souvenir of our tour experience. Visit the [Ball Aerospace website](#) for more information on their multiple projects.

After the tour, a smaller group met nearby at Zolo Grill for lunch and a lively discussion of what we had seen on the Ball Aerospace tour.

Int'l. LiDAR Mapping Forum Report

The annual International LiDAR Mapping Forum (ILMF), held February 17-19 in Denver at the Hyatt Regency Hotel, attracted ~800 professionals from 30 countries who attended to learn about the latest advances in technology and hear about changes and developments first-hand from industry experts. The three-day conference and exhibition focused on airborne, terrestrial and bathymetric LiDAR used to support transport, urban modeling, coastal zone mapping, utility asset management, 3D visualization and GIS applications. These sectors are widely employed to improve mapping and imagery for customers across a wide range of industries from federal, state and local governments to commercial enterprises.

ILMF 2014 included a technical program of 60 technical papers, technical workshops and ASPRS "Hot Topics" sessions, as well as an exhibition of more than 50 organizations showcasing the newest technologies and services for the LiDAR market, some of which was launched at ILMF. Additionally, new research coming out of academic institutions was on display in the new university pavilion. Mobile mapping rigs were also available for demonstrating the latest in mobile data capture.

ILMF opened with ASPRS "Hot Topics" sessions. After an introduction by **Lewis Graham**, President and CTO of GeoCue Corporation, **Dr. Michael Hauck**, the new executive director of ASPRS, delivered a presentation on the future of LiDAR, titled "From Galileo to Radiohead and Beyond ..." In it, he posed the idea of certification for LiDAR professionals. A poll of the audience showed overwhelming support for the idea. Dr. Hauck's presentation was followed by two additional "Hot Topics" presentations and a Q&A session.

That afternoon, **Alastair MacDonald**, ILMF Advisory Board member and Managing Director of TMS International Ltd., welcomed delegates and kicked off the ILMF programming. The keynote featured

Z+F's **Sven Kurz** and Euclidean's CEO **Bruce Dell**, who spoke about new technologies and their ability to open new business opportunities for the scanning industry.

Following the keynote, LiDAR experts participated in a Plenary Panel Discussion led by Mr. MacDonald. Participants were **Lewis Graham**, GeoCue; **Amar Nayegandhi**, Dewberry; **Matt Bethel**, Merrick & Co.; **Roy Nelson**, Ball Aerospace; and **Layton Hobbs**, Woolpert. The discussion covered game-changing technologies, including flash mode LiDAR and Small Unmanned Aerial Systems (SUAS).

ILMF programming then continued with break-out sessions and technical workshops. ILMF tracks included Data Acquisition, Coastal Zone & Bathymetric LiDAR, Recent Projects, Recent Projects/Emergency Response, Recent Projects/Challenging Environments, Forestry, GIS/Data Handling/Point Clouds, and Mobile Mapping.

Lisa Murray, ILMF Director, said that her team will continue to work with key members of the LiDAR community to shape the event as the market evolves and grows. "With the recent report by MarketsandMarkets that the global LiDAR market will grow by more than 15% annually over the next five years to reach \$551.3 million by 2018, opportunities are abundant for those in the market."



Rocky Mountain Region volunteers staffed the ASPRS booth in the exhibit hall. Because it had a round table and chairs, this booth became a major meeting place for National and RMR ASPRS officers, committee members, and colleagues, including **Michael Renslow**, **Stewart Walker** and our new Executive Director, **Michael Hauck**. It was a great opportunity for us to get to know these folks better. Visitors to the booth were very interested in the LiDAR and DEM manuals, as well as the professional certification that ASPRS offers.

Save the date for the next ILMF, taking place February 23-25, 2015 in Denver!

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Credit: Much of the material for this report was gleaned from the [ILMF website](#). See also [Dan McGovern's blog on the SPARPointGroup website](#). In particular, be sure to read "[ILMF 2014 reveals future for LiDAR](#)" and "[Busting UAS Myths](#)."

Unmanned Aircraft Systems Testing Opportunity

The CU Denver Geomatics & GIS program is now operating Unmanned Aircraft Systems (UAS) with authorization from the Federal Aviation Administration and has a test site in SE Colorado with control points established for the geospatial community. The program is accepting proposals from vendors, developers, companies and organizations interested in UAS testing, research, sensor and solution development.

If you have a research project you have been hoping to "get off the ground," graduate-level students are available to participate in funded research projects.

Contact [Apostol Panayotov, PhD](#) for more information.

Upcoming ASPRS Webinars

Registration and Additional Information can be found on the [ASPRS website](#).

Welcome New Members!

Jorge Aguayo
Amanda Aragon
Dwight Chapman
Harold Cline
Saundra Daras
Curtis DeVault
Andy Dinville
Suzanne Irwin
Dr. Catherine Maynard
Brittaney Murphy
Linda Root
Jennie Sturm