



**THE IMAGING & GEOSPATIAL INFORMATION SOCIETY**

*~The Rocky Mountain Compiler~*

**Issue 2**

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

**President's Message**

I hope all of you have been having a productive and busy summer season. This season will certainly have a need for Remote Sensing to monitor the extent of the drought that many are experiencing in record proportions from the Rockies throughout the Midwest. Our region has also seen a significant decrease in seasonal precipitation beginning last winter with the very low snowpack levels and continuing through today. Many of you may be working on monitoring the level of drought and others may be engaged in studies of the effects this drought may have. Interestingly, the National Drought Mitigation Center at the University of Nebraska produces maps that may use multiple sources of information, including those of remote sensing projects. Some of their more recent conclusions indicate the following, on a scale of Dry, Moderate, Severe, Extreme and Exceptional, for our four states within the Rocky Mountain Region of ASPRS:

Montana one year ago was 100% drought-free but this year a little over 80% of the state is experiencing Dry to Extreme Drought conditions.

Wyoming was only 3% Dry last year while the entire state is now experiencing Dry to Exceptional Drought conditions.

Colorado experienced drought conditions for 49% of the state last year and this combined with the extreme warmth and lack of precipitation this year has contributed to the entire state experiencing drought conditions that currently indicate 62% of Colorado is at the Extreme to Exceptional Drought categories.

Interestingly, New Mexico is seeing an improvement over last year of nearly 30%. Although New Mexico has seen 100% statewide drought conditions both years, this year the states Severe to Exceptional Drought categories have dropped from 89% of the state to 62%.

For more information about the NDMC-UNL, visit <http://droughtmonitor.unl.edu>

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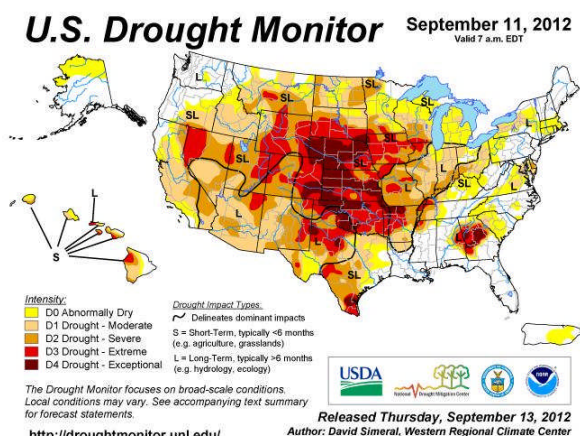
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The U.S. Drought Monitor is produced in partnership between the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration. Map courtesy of NDMC-UNL.

Come join us for the GIS in the Rockies Conference, Thursday and Friday, September 20<sup>th</sup> and 21<sup>st</sup> at the Cable Center on the University of Denver campus! It's never too late to sign up and there will be a keynote address by John Fielder, one of the Rockies greatest landscape photographers. I'm sure that we will be just as amazed by his work as he will be with the work that we do. There is a real marriage of photography and photogrammetry when it comes to the "art" and science of extracting measurements to make maps and interpret data from photographs and imagery. Come share your experiences and gain new insights from leaders in this fascinating art/science that we all call remote sensing! The ASPRS-RMR is offering a track of presenters under the theme "Monitoring and Assessing Our Changing World". Topics range from using General Land Office surveys to reconstruct vegetation and monitor changes in Dinosaur National Monument to a fast-paced tutorial of Satellite Geometry. Check out the many abstracts of the presentations at the GIS in the Rockies website, <http://www.gisintherockies.org/GISITR2012/Home/Default.aspx>.

This year we will be offering our Scholarship Application program to students beginning this month. Applications will be due by the end of October. This will help with student abstract preparation and not coincide with final exams and the hectic end of semester busy schedules. Look for details to arrive by e-mail soon!

As always, all are welcome to join our meetings held once per month. For information about getting involved contact any one of the Rocky Mountain

Region Board members listed at our award-winning website; <http://www.asprs-rmr.org>.

### Mark Stanton

Rocky Mountain Region, ASPRS, President  
[mstanton@premiergeospatial.com](mailto:mstanton@premiergeospatial.com)

## SWAAG Meeting 2012:

The Department of Geography at New Mexico State University invites anyone with an interest in geography to participate in the 2012 Meeting of the Southwestern Division of the Association of American Geographers (SWAAG), to be held in Las Cruces, NM, October 25-27, 2012. The meeting promises to deliver an exciting program, including paper and poster presentations, discussion panels, student paper and poster competitions, field trips, and keynote addresses by AAG President Dr. Eric Sheppard and Geographer and National Academy of Sciences Member Billie Lee Turner II. For more information or to register and submit an abstract, go to the conference website: [geography.nmsu.edu/swaag2012/](http://geography.nmsu.edu/swaag2012/).

## Scholarship Announcement

In its continuing efforts to support and build awareness for the Remote Sensing and GIS sciences, the Rocky Mountain Region of ASPRS is proud to announce its academic scholarships for the 2012-2013 academic year. The ASPRS-RMR offers scholarships to deserving undergraduate and graduate students every year. There will be at least one scholarship awarded (assuming sufficient applications are received) in the amount of \$500 to \$1000 each. The scholarships are intended for students throughout the Rocky Mountain Region (Colorado, Montana, New Mexico, and Wyoming) who demonstrate excellence while pursuing careers in the fields of Photogrammetry, Remote Sensing, and Geographic Information Systems (GIS) or related disciplines. Both undergraduate and graduate students of any third-level educational institution within the four-state region who are pursuing careers in these disciplines are encouraged to apply.

Applications should be submitted electronically by the October 31, 2012 deadline.

Download the application from the "News & Events" page at <http://www.asprs-rmr.org>

Student membership in ASPRS is not required to apply, but if selected, membership is required at time of scholarship award. Awards will be presented at the ASPRS-RMR Annual Dinner Meeting in January 2013. We've consistently offered thousands of

dollars in annual scholarships and this year will be no different! Preference will be given to those studies that apply sound scientific principles to practical applications and/or to those presenting their work at an ASPRS-sponsored conference. Awards at both the undergraduate and the graduate levels are based on academic merit; that is, the application form does not request any personal financial data. For more information, please contact **Ramesh Sivanpillai**, ASPRS-RMR Vice-President, at 307.766.2721 or at [sivan@uwyo.edu](mailto:sivan@uwyo.edu) (preferred).

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## Welcome New Members

Kevin Alexander  
 Michael Grossman  
 Brandon Hamilton  
 Toby Harp  
 Andrew Harrison  
 Charlie Jackson  
 Bill Kelley  
 Stefan Majeski  
 Roy Nelson  
 Frank Pabian  
 Allen Paton  
 Waqas Qazi  
 Brian Robbins  
 Juan Ridout  
 Rick Thalacker

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## Mobile Mapping – An Engineering Map Maker’s Perspective

Written by Curtis Clabaugh  
 Tuesday, 21 August 2012  
 Originally published in LiDAR News  
 Edited and used with permission

The Transportation Research Board Committee for Geospatial Data Acquisition Technologies in Design and Construction recently held its summer meeting in Philadelphia in late July. A portion of the meeting included presentations and discussions concerning mobile mapping. Typical of some forums, the discussion generated opinions and opportunities about this emerging technology. I personally find the discussion more genuine when both the advantages and disadvantages of a technology are discussed.

Stating that mobile mapping is an emerging technology might be an understatement. Lewis Graham with GeoCue reported there are roughly 265 mobile mapping units in the US, but only 15 would be considered metric quality units. Metric quality would be those units being used to support the engineering applications for design. The remaining units would

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be those more closely aligned with GIS and asset management.

Much of the discussion concerning mobile mapping centered on accuracy, precision and the associated costs. The difficulty with this technology is attempting to make sure end users understand the limitations in accuracy and precision involved with mobile mapping. Various techniques and technologies can lead the end user to erroneous conclusions. The massive amounts of data collected by the non-metric quality units typically produce the high precision but lower accuracy results. It is easy to view the data with the high precision and think high accuracy goes with it based on the massive amount of points collected. Lewis also expressed an opinion that lots of folks may be disappointed when they try to leverage GIS quality 3D data for high accuracy work.

One of the interesting bulleted points in a presentation by Lewis was that the lower accuracy data from these units may provide 75% of the geospatial information that users actually need. Related issues of data volumes and accuracy vs. precision were also identified. Such topics spawned lively discussion, as would be expected. Lewis pointed out that in his opinion, mobile LiDAR data collection for highways should be focused on collecting high-density data that, with the introduction of supplemental control, could support design applications. Mobilization, processing and supporting end-user applications are the costly components, not the collection time or data storage requirements.

These comments made me reflect back on many other geospatial technologies that I have been involved with during my career and the associated learning curves for each. I believe the debates will evolve over the mobile mapping technology the same way they did with prior geospatial technologies. Over time the educational aspects will result in the users becoming more aware of the related accuracies and tolerances. But this won't occur without some growing pains. As with many technologies, enhancements to the hardware and software will continue to improve collection and end user skillsets.

When digital aerial cameras were introduced, the issues about engineering quality and associated applications were hotly debated. We had the push broom sensor versus the digital frame type sensors. Along with this debate was whether digital imagery could match the quality of the film-based cameras. Some questioned if photogrammetry was about to be replaced with LiDAR. Many of those companies

involved in the original aerial sensor race have fallen by the wayside and digital cameras providing the higher quality outputs have seemly become king of the hill. Both airborne LiDAR and photogrammetry are now common tools of the trade.

With GPS we again had the misunderstanding about precision, accuracy, and cost between handheld, resource grade and geodetic receivers. Many learned there was no “easy button” and massive amounts of data failed to provide the information necessary for engineering design. I expect a whole lot of data was collected, and only a small portion of it became usable for engineering design applications. But without a doubt, persuasive cases will be made that, due to the density of the data and its associated precision, we can live with less accuracy.

There will also be persuasive arguments that bad data is better than no data. As with GPS, it is important to know how “good” or “bad” the data really is. This brings us back to the issue of accuracy vs. precision and perhaps to the need for a requirement that a statement accompany the data concerning its lineage and intended use. This metadata should include a specification of the accuracy and precision.

I believe as we work our way through the mobile mapping learning curves, this tool will be added to the arsenal of tools for the engineering map makers, but this time I hope we will be smarter about managing data quality.

As an engineering quality map maker, I find the need to deliver faster and better data unsettling. Little errors in measurement and position are so difficult to detect. Vertical differences of a few tenths of a foot blend so nicely into the mapping and the digital terrain models. Larger measurement differences are easily spotted and some corrective action taken. Best surveying practices will need to become standard for the data to be equal in quality. When users of the data understand the error budget with regard to the data, then we can decide if it is actually better data.

In transportation design, I often hear comments about the survey data being close enough for road building, and we don’t need the same accuracy as if we were building a piano. A couple of simple questions need to be asked of those with that opinion. What are the required standards for design and construction? Both design and construction have differing needs. However, if you are the contractor bidding and building a roadway project and want to use automated machine guidance

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(AMG), your requirements are going to be for great precision and accuracy for roadway projects.

Those contractors wanting to use automated machine guidance will have a completely different set of needs than the designer. The requirements for greater precision and accuracy are paramount when contractors are using AMG for both grading and surfacing. The quality of the data will be directly reflected in the estimated quantities being bid by the contractor. To gain the full benefits of automated machine control, contractors are keenly aware that time to complete the work, pavement smoothness incentives, and the estimated building material quantities for the project are major items of a contract.

With all the survey requirements necessary to meet the design requirements and the movement toward three-dimensional design, mobile mapping will clearly emerge as a desired technology tool. But to me, it seems that the mobile mapping folks are not as acutely aware of the issues regarding design quality data. I suspect this is from a lack of understanding about the requirements for design. I believe this is supported by knowing there are so few metric quality units being used. The best solution always seems to circle back to an earlier point about collecting it once, getting high quality data, and using it as you need. With quality data, the user’s ability to use the data repeatedly for other applications may result.

Another benefit provided with metric mobile mapping units is having color imagery, color associated with LiDAR point data, and quality measurement data as deliverables. All of these products are key elements associated with advantages of 3D design. Point clouds in a two-dimensional CADD environment or a three-dimensional stereo system enhance the designers visualization of the design. To further illustrate understanding design considerations, I point to a portion of Americans with Disabilities Act (ADA). Color of signals, placement and color of pedestrian buttons, slope and dimensions at crossings and in front of pedestrian buttons, and crosswalk slopes and roadway grades are all features needing to be surveyed.

It may take some time to work out all of the details and standard operating procedures, but LiDAR point clouds from either a static or mobile platform appear to be the tools of choice for many transportation survey applications.

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## GIS in the Rockies Conference

**“25 Years of Geospatial Collaboration”  
September 20-21, 2012  
Cable Center at the University of Denver**

Join us September 20 & 21 for the best GIS in the Rockies Conference ever, including:

- Professional development: learn skills for advancement, including GISP certification points
- Latest trends and industry developments: new open forum discussions by industry's leading geospatial professionals
- Networking with GIS colleagues from throughout the Rocky Mountain region
- Social event with geography quiz and prizes
- Keynote speech by photographer John Fielder
- Student Breakfast with Scholarship Information
- Poster Contest
- Job Fair

The Conference Schedule is available online at <http://www.GISintheRockies.org>.

2012 GIS in the Rockies features an outstanding content-rich schedule.

### Track themes:

- The next 25 years of geospatial technology
- Working together: efforts to achieve transparency, participation and collaboration
- Monitoring and assessing our changing world
- Get It Surveyed: The basis for precision and accuracy
- Educating the Next 25 Years of GIS Professionals
- Emerging Technologies
- Mobile GIS
- USGS National Map Data
- GIS in government
- Emergency Response / Preparedness
- Vendor Showcase

Check out the conference schedule and visit [GISintheRockies.org](http://GISintheRockies.org) for more conference information or to register to join us in Denver September 20 & 21 for GIS in the Rockies 2012.

### Pre-Conference Workshops on September 19th:

Applied Spatial Statistics using "R" and ArcGIS  
Introduction to LiDAR  
Introduction to Image Processing with ENVI  
LandSat Data for Monitoring and Assessing Natural Resources  
Asset Management Systems (at DU, through RM-URISA)  
Esri Dev Meetup (at Lodo's Bar and Grill)

### Exhibit Hall Vendors

The conference will features a full slate of outstanding exhibitors that will display their latest tools and applications, including:

American Sentinel University  
Blue Marble Geographics  
Bohannon Huston  
CAD-1  
Cartograph  
Colorado Cartographics  
Compass Tools  
EI Technologies  
ESRI  
Frontier Precision  
GeoSearch  
Intergraph  
Latitude Geographics  
LizardTech  
Photo Science  
Pictometry  
Premier Geo  
TerraGo Technologies  
United Reprographics  
University of Denver  
U.S. Geological Survey

GIS in the Rockies 2012 is jointly sponsored by ASPRS Rocky Mtn. Region, GIS Colorado, PLSC, and Rocky Mtn. URISA

GIS in the Rockies 2012 is a great value and the only conference of its kind!

**DON'T MISS IT!**