

# Meridian NW

Newsletter for the Pacific Northwest Chapter of the Geospatial Information & Technology Association  
September 2006 Vol. 5, No. 2

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## PRESIDENT'S MESSAGE

Hello again to all the membership. I hope this finds you well. I've been contemplating for quite some time what topic would be interesting to talk about at this juncture of the year. Technologies are booming and we are looking forward to the upcoming Fall Conference at the Salishan Lodge, which I hope you plan to attend, but nothing was really popping with regards to a topic with a 'wow' factor. I am writing this on my vacation and as this is the third day of my annual week long bicycle trip with some old friends, I started to think about the technologies that are affecting this year's trip.

Yes, I have my laptop along with me on my vacation which some of you would scold me for, but it has come in very useful. Let me explain. This year I purchased a bicycle computer and GPS combo 'toy'. Well, it's a toy to me because we have been having so much fun with it. First of all, it really takes care of the end of the day babble amongst the seven riders as to whose computer is correct regarding mileage...you really can't argue with a satellite. This trip has been a very difficult ride when it comes to elevation so we are able to see a profile of the day and groan over what we've accomplished. Percentage of grade for each hill is of interest to many in our group so we are able to see how steep our climbs were and of course speed at every turn, pace and total mileage. Interestingly enough, many in my group are technology challenged and I won't use any names...Doug...but what's interesting is this little, yet amazing device has bridged a gap of how technology can benefit everyone.

The laptop allows us to download the information and review it...over and over and over again. Then we can really see what we've accomplished and feel a little better while walking funny when our legs aren't cooperating as they usually do. Working for a company that prides itself with map rendering and authoring, it is a little difficult to see the shortcomings from the mapping side, but the benefits and information you get to play with are amazing and has added just another aspect to the ride this year.

I hope you too are able to find new ways to better your life with technology and I hope to see you at this year's Fall Conference.

Keith Krall  
2006 PNW GITA Chapter President



## **BC Hydro: From Analytical to Softcopy – Stepping Into the Future.**

Les Giles, ASCT  
Photogrammetry Services Manager

In 2005 BC Hydro Photogrammetry Department embarked upon a process to analyze its requirements for keeping pace with present technology. Having gone to a fully analytical photogrammetric platform in 1990 at a cost of nearly \$750,000. the time was right to maintain our commitment to provide BC Hydro Engineering with high quality data. The lifespan of the 2 Zeiss P1 Analytical plotters was quickly coming to an end. They had served us well, providing our clients with state of the art stereo super imposition, in order to quickly assess the quality of contractor work, as well as providing a high degree of accuracy of transmission data, vegetation analysis, and traditional mapping. The instruments had been well maintained and had very little problems over their lifetime, but with increasing maintenance costs and no further provision for software or hardware support, we proceeded with an analysis of available technology that would be the basis for a decision to change over to a fully digital softcopy environment.

After many discussions with potential vendors, peers and industry experts and following numerous in-house demonstrations, BAE's Socet Set with VROne mapping technology

was the chosen platform to help carry out the Photogrammetry Department mandate to provide quality data to our numerous clients. The Department now has the ability to provide in-house Aerial Triangulation, Orthophoto compilation, as well as the traditional mapping and other photogrammetric analyses while continuing to ensure compliance of contractor data with quick and accurate Q.C. With the advent of this new technology we will be able to provide information to an increasing client base, as well as a variety of new products. The softcopy environment lends itself well to showing the client what can be done, (for example line-of-sight studies can be easily achieved and with the client watching showing results far faster than using older technologies) as well as maintaining required accuracies for transmission data. The department purchased two complete Softcopy workstations utilizing the VROne mapping platform, as well as an Ortho station and an AT station, thus providing even more abilities and products than ever before.

BC Hydro Photogrammetry Department has taken the next step into the future.



## Getting What You Need with Airborne Lidar

David Ward  
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Commercial airborne lidar has been available since the mid 1990's. In the last three to four years, it has become quite widespread as the number of providers and applications grows. There is still a fair amount of confusion about the technology, especially about how to specify lidar for a particular project. This brief paper will attempt to address some the main issues relating to this challenge.

Airborne LiDAR or Light Detection and Ranging is the integration of a scanning laser with positioning devices and mounted in an airplane. The positioning devices are Inertial Measurement Units or IMU's and GPS receivers. The scanning laser shoots near infrared light to ground from a moving aircraft and collects returns from those that bounce back to the receiver. There may be as many as five returns from a single laser shot. The IMU and GPS provide a way of deriving the position of each of these returns. The result is called a point cloud of individual points with an X,Y and Z value. Depending on the lidar unit used for the collection there will be many millions of points.

Once this point cloud is generated, the data needs to be processed into a useable finished product. As frequently happens with technology, the collection instruments have evolved at a faster rate than the processing software and techniques. Automated processing routines will put various points into the correct category about 90% of the time. The final 10% requires manual work to complete the classification. Is the cluster of points one meter above the ground a rock or is it a bush? The difference is frequently important. This final 10% of the processing is where a significant amount of the expense in a lidar project occurs. It is also an

area where corners can be cut which saves costs but reduces quality.

There are three important variables to any lidar project. These are the density of the points, the accuracy of the points, and the number of returns. I will address these items individually. In the early days of lidar, which is all of ten years ago, a point on the ground every meter was considered quite acceptable. Now with higher rate systems, 2-5 points per square meter are more typical and some projects require 9-12, depending on the application. Electric transmission line projects are at the high end of this scale because of the detail required.

The accuracy of individual points is the second important variable. Current lidar units can achieve accuracy in X, Y and Z of 15 centimeters or around six inches. This type of accuracy requires attention to proper placement of the GPS ground stations, attention to the GPS signals from the satellite, and proper calibration of the system. From a user standpoint, the important part of accuracy is being able to verify it. Many lidar providers will talk about relative accuracy from one lidar point to another. This is nice but of little value because it cannot be confirmed by the customer. Verifying the accuracy of lidar products by checking the values against an easily identifiable cultural feature is a much better method. Pick a road or a building and check it against the delivered data. Make it clear to the vendor in the beginning that this is your intention.

The third variable is the number of returns. Current lidar units typically provide up to 5-6 returns from each pulse. A pulse may bounce off the top of a tree canopy, two more returns may come from intermediate vegetation, and the last return will come from the ground. For projects that require characterizing complex areas such as forests or electric transmission lines these multiple returns are absolutely necessary to properly represent the characteristics of the site.

So what does this all mean to an organization who feels they need to procure lidar coverage of an area to generate a particular product? The main point is that there are a number of variables with lidar technology that need to be well defined for each project. Doing a good job of this on the front end of a project is well worth the effort and can help avoid unwelcome surprises at the end of a project. I will offer a few suggestions to follow as a guide to successfully approaching any lidar project.

Clearly define the goal of your project. Do you need to develop a DEM which will support two foot contours to certain map standards, or are you trying to model a complex stream channel? Each project will require different specifications for lidar data to support the project.

Determine what type of specification will be required to successfully complete the project. You will need a certain density of points at certain accuracy. There are several federal web sites with information on lidar as well as the professional organizations such as ASPRS. Because it is a maturing technology, there are not yet tried and true specifications for each type of lidar project as there are with aerial photography. Worry more about the finished product and less about how a vendor accomplished the task as long as you verify the accuracy in a well-defined manner. Provide a reasonable time frame for collection and processing of the data.

Make sure your budget has adequate money for the project. A well developed specification for an under-funded project may attract some lidar vendors but you may not be pleased with the result. Check with other agencies or groups who have recently done similar projects to see what the prevailing rate is for this type of work. Lidar is a competitive business and the unit costs for projects continue to decline. You still cannot do a three million dollar project with a one million dollar budget. Do not forget to budget for your accuracy assessment and complete this prior to accepting the product and releasing all the funds.

You have defined your project, developed a specification and budgeted an adequate amount of funds. Now you need to select a vendor. Make this a thorough process, but do not lose sight of the fact that it cost these companies hard dollars to respond to RFIs, RFPs and to attend presentations. A request for information may be a good way to narrow the field of vendors. It can also be a good way to fine-tune your specification. Ask each vendor how they would approach a particular task, such as the countywide DEM, and compare the results. Do not overlook vendors as a source of technical information but make sure to ask more than one.

Finally, make sure you check references on your finalist. Did they complete similar projects without problems? Were they on time? Most importantly, did the finished product meet the needs of the client? Would they use this company again?

Also, make sure to not only get delivery of your finished product but of a set of the lidar points involved. As processing methods continue to evolve it may be possible to generate other products of interest using this data. It costs nothing to keep it on the shelf for a year or two.

Lidar is a very useful and exciting technology that is evolving rapidly. The collection instruments are getting better each year, and the processing techniques and software are rapidly developing. [Optech](http://www.optech.ca) (www.optech.ca) one of the major vendors of lidar systems, recently announced a new system that will collect 25 cm accurate data from four kilometers above the ground. This will greatly improve collection efficiencies for large area coverages. Advances are being made in such areas as automatic feature extraction from lidar data (see [www.vls-inc.com](http://www.vls-inc.com).) Lidar intensity images can be used at softcopy photogrammetric workstations in much the same manner as photographs. These intensity images can be combined with various types of imagery, such as hyperspectral. These new tools will open the door to extracting more value from lidar data as well as making the processing faster and less expensive.

## Join us at our 7<sup>th</sup> Annual Fall Conference at the Oregon Coast in October

Mark your calendars! The 7th Annual PNW GITA Fall Conference will be returning to the beautiful Salishan Spa & Golf Resort on the central Oregon coast on October 23rd & 24th, 2006. We held a successful conference there in 2003. This facility was renovated extensively since we were last there and boasts full conference facilities including a large ballroom for our conference proceedings, spacious exhibit space, high-speed Internet access, and a full business center. All rooms feature a fireplace and private balcony, a perfect retreat! Please visit [www.salishan.com](http://www.salishan.com) (see pictures below) for more information about this property.



As always, we want to hear from you. Please let any of the board members know if you have suggestions on how we can continue to improve our conference offerings or if you are interested in presenting a paper or exhibiting at Salishan in October. We look forward to hearing from you.

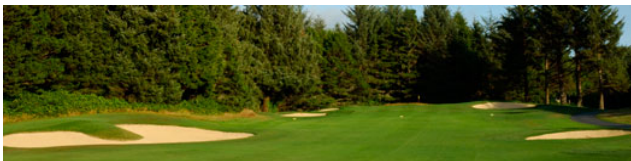
## Join GITA friends for golf at the Salishan Spa and Golf Resort



At Salishan Spa & Golf Resort, golf means so much more than 18 holes. It's an experience, to be savored and remembered. The ultimate in Scottish links-style golf.



An 18-hole, par 71 golf course carved out of the rugged Oregon coastline, a challenging 18-hole, 350-yard putting course, driving range and putting green, club storage and rental.



With old-growth timber or seaside bluffs at every turn, each hole provides a spectacular backdrop and a unique challenge. The golf course officially reopened June 1 after a multimillion-dollar restoration overseen by Oregon golf legend and PGA Pro Peter Jacobsen and

his design firm, Jacobsen-Hardy Golf Design. The restoration preserves the layout and the spirit of Salishan's fabled links while enhancing playability and opening the golf course to captivating ocean views.



When: Tuesday (10/24) immediately following the conference closing luncheon (around 1:30)

Rate: \$80, includes cart.



If you can't join us for golf, please enjoy the putting course near the hotel.

**To sign up or for more info, please contact: [sdsherer@bpa.gov](mailto:sdsherer@bpa.gov)**

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## **Upcoming Events**

**Sept. 26-29 URISA's 44<sup>th</sup> Annual Conference & Exposition  
Vancouver, British Columbia, Canada**

**Oct. 9-12 ESRI Electric and Gas User Group  
Albuquerque, New Mexico**

**Oct. 22-25 APPA Community Broadband Conference  
St. Louis, Missouri**

**Oct. 22-25 AMRA: Autovation 2006  
Nashville, Tennessee**

**Oct. 23,24 PNW Chapter GITA Annual Fall Conference  
Salishan, Oregon**

**October 23–26 ESRI Homeland Security GIS Summit  
Denver, CO**

**October 23–26 ESRI Health GIS Conference  
Denver, CO**

**January 9–11, 2007 ESRI Federal User Conference  
Washington, D.C.**

**May 21-24, 2007 Intergraph 2007  
Nashville, TN**

**June 18-22, 2007 ESRI International User Conference  
San Diego, California**

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