NewsLetter

ISPRS Student Consortium

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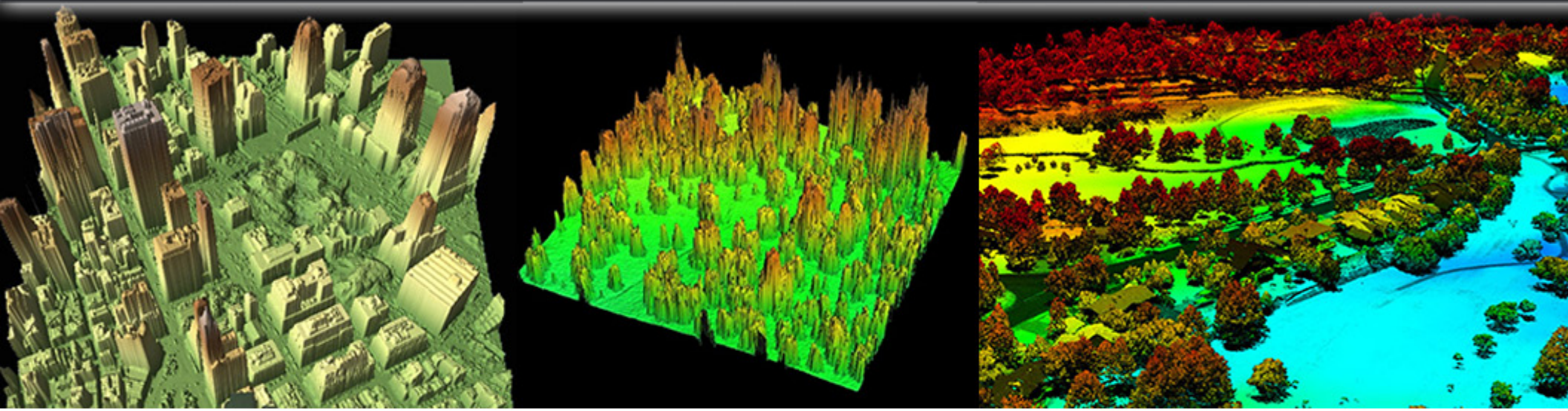

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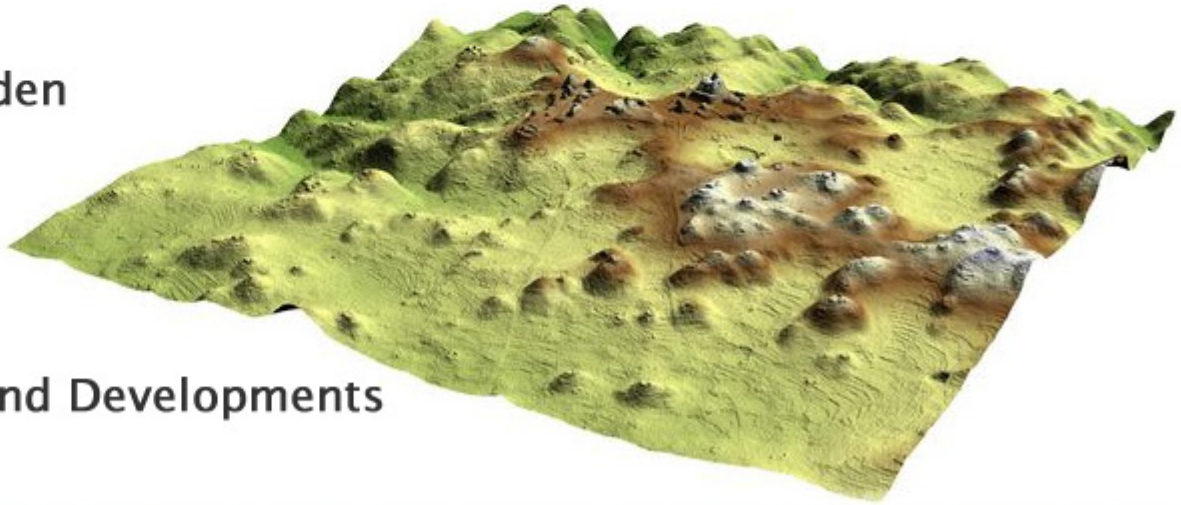

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ISPRS SC NewsLetter

SC Newsletter (ISSN Y506-5879) is published every three months by ISPRS Student Consortium.

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Frontpage designed by Ayda Aktaş

Would you like to join SC Newsletter team? Do you want to make a difference? Want to learn new skills?

SC Newsletter is at a stage where getting broader and better demands more people to be involved in the process of it's formation. That's why SC Newsletter team is looking for the following volunteers:

- More **people who would be willing to prepare articles** for existing or new rubrics,
- Designers of Newsletter,
- **English native speakers** for proof reading.

If you can help us with any of the above, please let us know!

info@isprs-studentconsortium.org

And also...
If you **would like to publish your research work** in the SC Newsletter send us your abstract on email written above. We will soon contact you for further information.

Dear Follower,

The preparations for the 6th ISPRS Summer School is in the final stage and we are just counting down the days to the event. We planned a full schedule of activities; lectures in theory, computer labs, demonstrations and real hands on LiDAR data collection experiences and presentations of participant works are some of the highlights. Various social events are also planned by the volunteer students of the hosting university, Fayetteville State University NC.

SC will continue its activities in the next and last quarter of this year. Another summer school will be organized in Jhongli, Taiwan right after the 32nd Asian Conference on Remote Sensing "Sensing for Greener Asia". The topic of the 7th ISPRS summer school is also related to the conference with the title "Spatial Information Sciences for Environmental Monitoring." We believe that it will be an interesting opportunity for the participants to attend both events.

At last but not least, we have started detailed planning of the ISPRS Melbourne Congress 2012 youth activities. Furthermore, there will be a number opportunities for youth; special accommodation, travel grants and awards for best papers amongst many more things. You can get the second call available at the congress webpage for detailed information. The Congress will be another landmark in the history of ISPRS SC. We will be glad to hear your ideas and inputs for an enriched Congress.

Looking forward to having your contributions in SC,

With My Best Regards,
Cemal Özgür KIVILCIM
ISPRS SC Chair

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ISPRS Student Consortium

Let's Come Together to Make The World Smaller and Smaller, While Enlarging and Powering Our Student Consortium Network!!

JOIN US!!!

Interview
by Urša Kanjir

Professor Dr. Marguerite Madden

Prof. Dr. Marguerite Madden is the Director of the Center for Remote Sensing and Mapping Science (CRMS) in the Department of Geography at the University of Georgia (UGA), USA. She is also an associate profesor at UGA, and has published a wide range of publications focused on geographic information science (GIScience) and spatio-temporal landscape analysis with special emphasis on GIS, optical/LiDAR remote sensing, geovisualization and object-based image analysis. Her areas of application include mapping dynamic vegetation distributions, assessing landscape-level human impacts on natural environments, LiDAR analysis of vegetation structure, tracking animal behavior-navigation and ecological modeling of environment and disease. She has won several prestigious awards for her work during her research career.

Can you explain us what is your research field (what are you working on) at the moment?

My research for nearly 30 years has focused on geographic information science (GIScience) and spatio-temporal landscape analysis with special emphasis on GIS, optical/LiDAR remote sensing, geovisualization and object-based image analysis. I love applying geospatial techniques to real world problems, scientific investigations and ways to enrich our every day lives. For a long time I have worked with my colleagues at the University of Georgia's Center for Remote Sensing and Mapping Science (CRMS) mapping dynamic vegetation distributions in National Parks throughout the southeastern United States and assessing human impacts on natural environments. We recently finished a large project to acquire LiDAR and very high resolution digital orthoimages of forests in the Southern Appalachian mountains of Georgia, North Carolina and Tennessee. Today we are analyzing vegetation structure related to the invasion of exotic insects and hemlock defoliation, assessing tornado damage to the forests and investigating the urban-wildland interface using the LiDAR and orthoimagery. We are also looking at spatio-temporal patterns of drought and climate change indicators related to vegetation productivity in the southeastern United States and the Amazon region of Brazil. Other international research includes the study of capuchin monkeys in the Atlantic rainforest and dry cerrado of Brazil in terms of navitation patterns, route selection, efficient use of resources and tool use behavior. The technologies are always changing and there are endless possibilities for spatio-temporal analyses, so we will never run out of fascinating material for research.

Why did you decide for this profession in the first place (maybe you can tell us something more about your first steps)?

I majored in Biology as an undergraduate student and like many young women I know, wanted to be a veterinarian because of my love of science and animals. But when I took my first ecology and geography courses, I knew these were the fields I wanted to study. My passion for natural environments came from being raised in the Adirondack Mountain region of northern New York. My mother was a math and physics major in college and my father was an engineer and land surveyor, so I was exposed to science and math in my early years and they were wonderful role models for me. My first work study job at the university in 1976 was assisting two professors, one and ecologist and one a geographer specializing in remote sensing on a grant to use aerial photographs to map the wetlands surrounding Lake Champlain and determine the environmental impacts of a proposal to regulate the lake level. I was paid to canoe in the wetlands to help them identify the aquatic vegetation species in the wetlands, fly in the small Cessna airplane to take the small format aerial photographs and work in the remote sensing laboratory to interpret and map the wetlands using a modified Kelsh stereoplotter. It was a wonderful experience and it led to my career in geographic analysis of natural and human-impacted environments.

What advices would you give to students and young professionals regarding successful career?

I would say think carefully about your interests and passions combined with a realistic assessment of your strengths and skills. Do some research to fully understand the background of the subject, the pioneers who performed the initial research and developed the techniques and tools. Study the current status of the discipline and think about the future direction of the area you are considering. Ask yourself many questions about your career and life choices. Do you see yourself contributing to this area and enjoying the work 5, 10 or 20 years in the future? Do you like to work with people on a daily basis, work in a team or by yourself? Where in the world would you like to live? How much time and resources are you willing to invest in your studies, training and apprenticeship? Do you want to work for someone or do you want to be the boss? Do you want to work inside, outside or both? Do you like to travel or prefer to stay close to home? Will there be times in your life when you will need to balance family and work responsibilities? Are you able to share those

duties with a partner or family members? All of these considerations enter into the decisions you will be making as you select a career, conduct your studies and seek employment. The best advice I can offer is talk to many people who are working in the careers you are considering. How did they make their choices? What would they have done differently? Sometimes their stories are amazing and always you will learn a bit about how opportunities present themselves and even luck may be a factor in career paths.

In your opinion how important is participation of young people to international professional events like Summer schools, Congresses, workshops, etc? What do you think are the benefits of such activities to youth and to profession?

I have always promoted the involvement of students in professional societies because it enriches both the students and the profession. I owe my career, in part, to my involvement in the American Society for Photogrammetry and Remote Sensing (ASPRS) and the International Society for Photogrammetry and Remote Sensing (ISPRS). My major professor, Roy Welch, provided me with the chance to be involved in ISPRS at an early stage of my career and it proved to be invaluable to me personally and professinally. Much of my work in ASPRS and ISPRS lately has been working with the societies to advance opportunities for students within the organizations to be involved in the activities, planning and execution of the conferences. Our hope is this will lead to connections and exchanges between students, young professionals, leaders in industry and faculty at universities that will, in turn, lead to lifelong relationships between research institutions, companies and individuals. Be confident and introduce yourself to the person who just made a presentation that you particularly enjoyed. Join a panel or attend a round table session that allows you to ask questions and contribute your opinion. Present your work as a poster or oral presentation. Join the activities of the student organization of the society. Talk to the exhibitors in the Exhibit Hall of conferences and let them know if you are finishing your studies and looking for a job. Many of my students have found excellent positions this way. You will also form friendships that will last the rest of your life.

Can you tell us something about recent development of remote sensing and GIS in United States of America? In which domain there is an emphasis at the moment?

This is a very large question that deserves many pages for a response! I will only highlight a few areas that I see are emerging, exciting and leading to jobs and opportunities for my students. There is a rising awareness and interest in LiDAR remote sensing in the United States. As the data become more available and costs decrease, we are seeing applications of LiDAR explode in many different disciplines. This is leading to research areas as the need for efficient data management, analysis and applications increases. Data integration of LiDAR with optical, microwave and thermal data, as well as temporal change analysis, will lead to further applications to help solve global problems in energy, environmental degradation, security and societal needs. With advancements in LiDAR comes the development of true 3D GIS and this opens up another world of opportunities for development and research. How do we manipulate vast quantities of three dimensional data? How do we visualize the data and analyze the fine-scale 3D structures? What spatial questions are best asked using terrestrial, airborne and/or satellite 3D/4D data? How do we use GIS to assess interiors and exteriors? Can I use a GIS to analyze the objects in this landscape? What if I want to focus on the negative space and move objects through the interior or the landscape? Students today must be equally strong in remote sensing and GIS because one provides the data for analysis and display for the other. Ultimately, the technology must be accessible to users on a variety of platforms for use in our daily lives within the workplace, home, governance and disaster response. There is ample room for discovery, innovation and exciting careers in both remote sensing and GIS.

End...

North American Airborne Lidar Trends and Development

by Mike Renslow, ISPRS Treasurer

Capturing lidar data from airborne platforms and developing commercial products began in North American about 15 years ago. At first, the process was slow, unpredictable, and often difficult to integrate into traditional mapping technologies. Today, the mapping community and the spatial data product users consider airborne lidar to be a standard solution to mapping and measuring the Earth and its natural landscapes and cultural features. In fact, the use of lidar data and its native 3D applications has fundamentally changed mapping processes and the type of products expected by the user community.

As airborne lidar became acceptable, a few milestone efforts solidified using lidar as a preferred mapping solution. In the late-1990s, the US Federal Emergency Management Agency (FEMA) determined that lidar technology was a preferred solution for digital terrain models to support a new effort to accurately map flood-prone areas. To compliment this lidar-based solution, FEMA published guidelines for data acquisition, product development, and accuracy evaluation. In 2007, the National Academy of Science convened a committee of national experts to consider the best solution for accurately producing an elevation model for the US and recommended airborne lidar for nearly all the terrain classes. And, at about the same time, the USGS in developing the Elevation for the Nation Program, recommended lidar as the most efficient solution and published the "Lidar Guidelines and Base Specification" (currently version 13) defining data acquisition, quality assurance, product development, metadata, and a base product specification to support the program.

Of further significance is the capability of the modern, mature lidar systems which can collect extremely dense data. Several application areas, for example forestry, can now be mapped in 3D for reliable bare earth terrain models and individual trees representations for forest measurement parameters never before available. For engineering applications, high performance lidar on a helicopter platform can fly low and slow for ultra-dense data and provide engineering-grade 3D map products.

As the development and applications of lidar have matured, the support industry for data processing, storage, visualization, and quality assurance has kept pace. Today, there are several commercial and open source software solutions and tools for the user community at every level to manage, manipulate process, visualize, classify, and evaluate lidar data. Additionally, most of the major GIS and CAD software providers now have plug-ins and separate modules specifically for lidar data. On the commercial side, TerraScan is widely used by the commercial lidar vendors for the initial processing, and others include eCognition, LP360 (by QCoherent), ArcGIS (Esri), QuickTerrainModeler (Applied Imagery), Lidar 1 CuePac (by GeoCue), EarthEye Viewer (by EarthEye), and MARS (by Merrick). The lidar system developers (Leica GeoSystems, Optech, Regal, etc.) all provide custom software for lidar processing. Open Source and free software include the NOAA viewer, GRASS 6 GIS, FUSION (US Forest Service) and Polyworks (US Army Corps of Engineers). (Note that my mention of firms and brand names is not an endorsement or recommendation of these software)

The current user interest is to combine lidar with imagery (fusion) to take advantage of lidar's 3D capability and the interpretation of georeferenced imagery, especially multispectral and hyperspectral. The resource community (forestry, wildlife management, agriculture, hydrology, geology, etc.) now has a tool to analyze situations and accurately measure and quantify the results. Another common application is to use the lidar intensity data to create pseudo-scopic stereo pairs and provide breaklines enhancing the bare earth surface model. Plus, having the data digitally, offers an efficient method to analyze multiple-year lidar data sets for change detection. The lidar/imagery solution for emergency or disaster response is becoming the technology solution of choice for its speed and development of meaningful data for response.

In summary, airborne lidar has become the technology of choice for most mapping solutions. Even when some difficult projects require photogrammetry, lidar is acquired first to map the bare earth. Furthermore, since nearly all modern mapping is destined for GIS or CAD applications, lidar is a natural fit.

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North Carolina - The Land of the Sky

The United States of America, location of the 6th ISPRS Student Consortium and WG VI/5 Summer School, is the world's third largest country in terms of size and population. Over the last 235 years, the United States has developed from the original 13 British colonies to 50 states and commonwealths, as well as six overseas territories- Puerto Rico, Guam, and the Virgin Islands to name a few. The U.S. is widely described as a "melting pot" of ethnicity, religion, language, and other cultural traits. Pop culture in the United States consists of fashion, theater, film and television, dance, music, and sports and is a very large representation of the American culture. The United States is also known for its architecture, such as cities full of skyscrapers like New York City, as well as sculptures like the Statue of Liberty and Mount Rushmore.

Throughout history, the United States has invested a lot of resources in science and technology and has been known for many discoveries and expeditions. One of the country's founding fathers, Benjamin Franklin, discovered electricity. Lewis and Clark explored the Pacific Northwest of the U.S. and recorded many plant and animals species. In 1969, the U.S. landed on the moon, and starting around 1972, the United States began developing global positioning satellites, or GPS. Telecommunications have also developed over the last 80 years with the light emitted diode (LED), transistors, computer operating systems, personal computers, and the world-wide-web. Also on the technical side, the United States is home to many remote sensing software companies such as ESRI, ERDAS IMAGINE, and IDRISI. The United States Geological Survey is coordinating efforts toward a National LIDAR Dataset and currently, 21 states have developed, or are in progress of developing, statewide LIDAR datasets- North Carolina has completed their statewide LIDAR dataset, and is also the location of Fayetteville State University, sponsor of the 6th summer school.

North Carolina is widely known for its diverse climate and topography with elevations ranging between sea level and 2037 meters. The beaches of the Outer Banks of North Carolina attract many visitors from all over the country. Boating and saltwater fishing is very common in these areas and provides much entertainment for spectators and participants alike. North Carolina was one of the original 13 British Colonies in the United States, so there are also a lot of historic markers such battlefields of the Revolutionary War and American Civil War, as well as old original settlements. In the early 1900's, Orville and Wilbur Wright were credited with building the first successful airplane, and in 1903 made the controlled, powered, and sustained flight near Kitty Hawk, North Carolina in the Outer Banks. Fayetteville State University is located in central North Carolina and is proud to sponsor the 6th ISPRS Student Consortium and WG VI/5 Summer School.

Looking Glass Falls in North Carolina Mountains

Wright Brothers 1903

North Carolina Beach

Mount Rushmore

Sad stories on spaceborne lidar

by Vasilis Kalogirou,
RS Project Analyst - Forester (RSAC c/o ESA)

Laser scanning with airborne devices has proved to have a large potential for many environmental applications, including vegetation structural analysis and biomass estimation. The carbon stored in forests has a three-dimensional nature (with tree height and diameter being the most important independent variables), therefore only three-dimensional measurements of the vegetation can provide accurate biomass quantification. Certainly, other empirical approaches (e.g. the use of reflectance, vegetation indices or SAR backscattering as a proxy for biomass) have some limited potential which has been tested in the past years. It is now generally accepted that their estimations will saturate as biomass increases.

Airborne lidar[1] has been used for local and regional biomass estimation studies with encouraging results. Also, terrestrial laser scanning devices (e.g. ECHIDNA) have been used to calibrate lidar data collected by airborne instruments or to provide an accurate prediction of forest stand variables. However, global scale vegetation coverage calls for spaceborne solutions. The Geoscience Laser Altimeter System (GLAS), carried by NASA's ICESat (Ice, Cloud and land Elevation Satellite), is one of the first laser instruments put in orbit in 2003 for -but not only- terrestrial studies[2]. ICESat suffered from some operational problems but at the end managed to acquire a quite useful dataset of lidar waveforms, completing 18 science campaigns. The mission's primary objective was to determine the mass balance of the polar ice sheets and to obtain essential data for prediction of future changes in ice volume and sea-level. Apart from that, the data obtained from GLAS were used to test biomass estimation potential.

The Vegetation Canopy Lidar (VCL) was elected in 1997 to be the first NASA's Earth System Science Pathfinder (ESSP) spaceflight mission. Experimental results based on the airborne test-bed called LVIS (Laser Vegetation Imaging Sensor), demonstrated the "ability to determine surface topography (including sub-canopy) as well as vegetation height and structure."[3] Unfortunately, VCL mission was cancelled in 2000 due to problems encountered during the development of the spaceborne lidar instrument.

In 2007 a unique 'hybrid' mission was proposed to accommodate in one platform an L-band InSAR instrument and a multi-beam lidar. The mission was called the Deformation, Ecosystem Structure, and Dynamics of Ice (DESDynI) and one of its identified applications was the terrestrial biomass estimation. Some of you might have attended one of the presentations of the mission's concept in various conferences. Unfortunately, in February 2011, the mission was practically dropped since 'NASA was directed to cancel all activities on the lidar satellite [...]'[4].

This short 'historical review' on the lost chances of spaceborne lidar indended to highlight the need to build on the previous heritage and extend our earth observing capabilities. Yes, we need spaceborne lidar and we should concentrate our efforts. After all, if systematic mapping and monitoring of carbon stocks is needed, then investing in spaceborne lidar will pay off. As regards to future satellites, which will be -hopefully- launched: The ICESat-II mission, with forest carbon estimation as a secondary objective, is still on schedule and has passed the critical System Requirements and Mission Definition Reviews. On the other part of the Atlantic, the European Space Agency (ESA) prepares its BIOMASS mission, which will be based on P-band polarimetric SAR instead. There is still hope for something good!

[1]The author believes that 'lidar' is long enough in the bibliography to be considered a word and not an acronym (similarly with radar).
[2]The Shuttle Laser Altimeter (SLA) flew on board the space Shuttle Discovery, during August 1997, so this mission can be considered as the first spaceborne lidar device orbiting the Eart
[3]From Blair, J.B., Rabine, D.L., Hofton, M.A., 1999. The Laser Vegetation Imaging Sensor: a medium-altitude, digitisation-only, airborne laser altimeter for mapping vegetation and topogrphy. ISPRS Journal of Phot. & Rem. Sensing, 54, 115-122.
[4]From Goetz, S., 2011. Editorial - The lost promise of DESDynI. Remote Sensing of Environment (in press).

LiDAR detection of forest canopies

by
Elena Lobo, Smithsonian Tropical Research Institute, Panama
Carlomagno Soto, Organization for Tropical Studies, Costa Rica

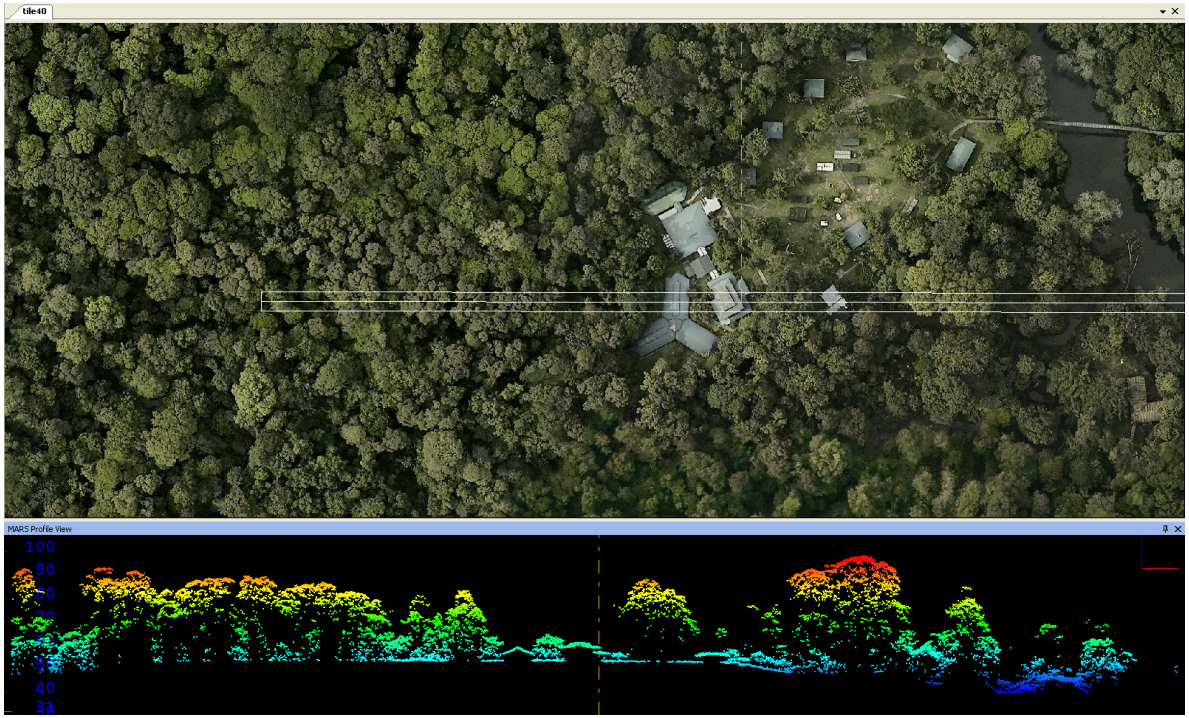
LiDAR is a rapidly growing technology that has found application in many fields including ecology and conservation. Of particular interest under the growing concerns related to greenhouse gases and climate change is LiDAR's ability to penetrate forest canopies, reaching intermediate canopy layers and finally reaching the forest ground. This unique property allows for the creation of Digital Terrain Models (DTM) and Digital Surface Models (DSM) even in areas covered by dense tropical forest canopies. By subtracting these two models (DSM-DTM), a Canopy Height Model (CHM) can be created for any forest landscape. Canopy height models are extremely useful for estimating the forest biomass and consequently the amount of carbon stored in the form of plants.

LiDAR can not only look at the top of tree canopies, it can also provide estimates of vegetation densities at multiple heights under the main canopy. This aspect is of great relevance when trying to assess the biomass or carbon storage of tropical forests, since tropical forests typically have very dense multilayered canopies and also constitute the main pool of carbon stored on terrestrial ecosystems.

As of now, LiDAR application for the study of forest canopies has been mostly at the landscape to regional scale, and the acquisition has been done through airborne LiDAR sensors. The landscape scale allows for enough resolution of the LiDAR-generated products so as to have a reasonable certainty in the biomass and carbon estimates. However, for these LiDAR products to be exploited to their full potential, they need to be linked to estimates of biomass and carbon at finer and global scales. In the last few years, there has been increasing application of terrestrial LiDAR for detailed 3-D mapping of trees, mostly in urban and sparse forests. This way of measuring the trees has been able to provide much more detailed information than the typical field measurements and we cannot wait enough to see their capabilities in tropical forests.

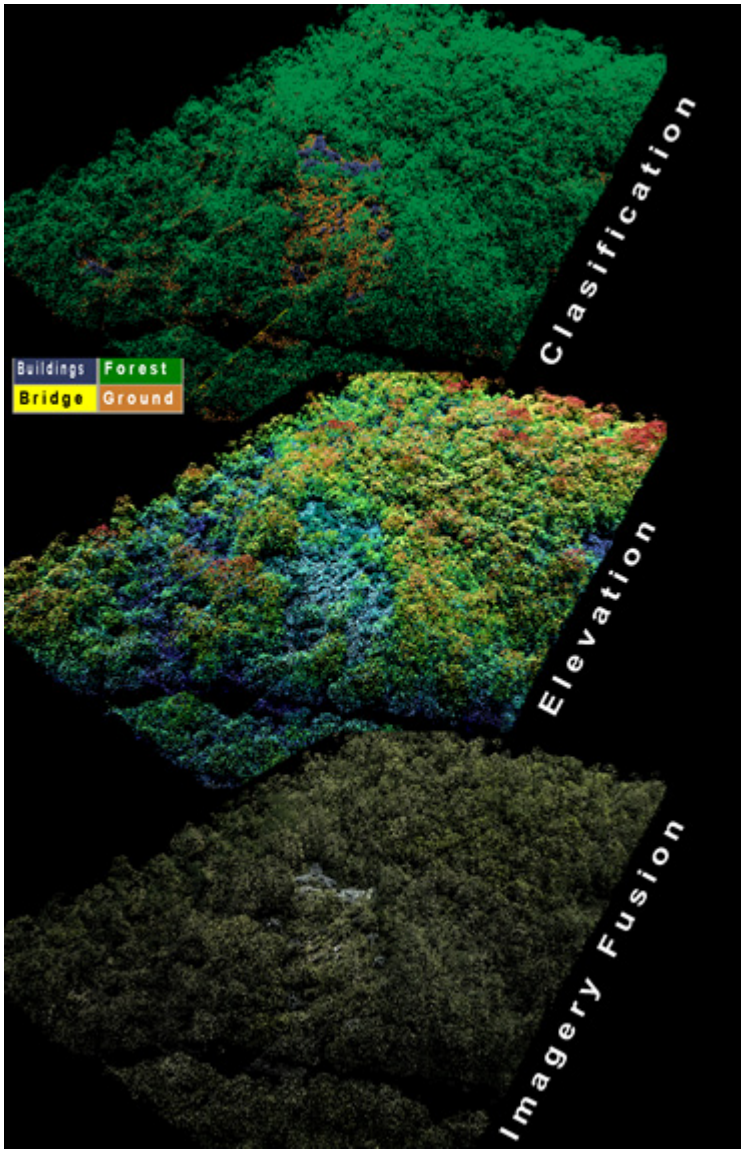
The link of airborne LiDAR measurements to global scales is a work in progress. Though there has been access to some satellite-based Lidar over the last few years with ICESAT, we expect that satellite-based LiDAR will become widely available in the upcoming years. For the time being, continued efforts are needed to fuse airborne LiDAR with satellite based sensors in our attempts to achieve accurate estimates of biomass and carbon stored in forests.

Initiatives to monitor global stocks of biomass and carbon in forested areas are plenty, from GEO's Global Carbon Project to NASA's carbon cycle and ecosystems research and many more national and international efforts. In addition, national initiatives for complete LiDAR coverage are rapidly growing, such as USA's efforts for a national LiDAR dataset, and we expect to see many more in the future.



See more on next page

Finally we would like to emphasize that LiDAR capabilities for the study of forested areas are unique, extremely varied and continuously growing and we are looking forward to see all the innovations that the future will bring.



Interview
by Hiroyuki Miyazaki

Great contributions to the aid against East Japan Great Earthquake
Interview with Mr. Taichi Furuhashi

Mr. Furuhashi is the most contributing person of open and free geospatial data and software through his positions: the president of MAPconcierge Inc., a consulting and retailing company of geospatial information; the vice president of OpenStreetMap Foundation Japan (OSMFJ), a Japanese community for open and free map data inspired by OpenStreetMap (OSM); a researcher of Center for Spatial Information Science (CSIS), The University of Tokyo; a director of OSGeo.JP, the Japanese foundation for open-source geospatial information software; and an organizer of Geomedia Summit (GMS), a series of developers' open conferences of geospatial information. In addition to activities in his formal role for the organizations, he actively dedicates to outreach of geospatial information techniques. He is an indispensable person for industry-academia collaborations of geospatial information in Japan. As soon as the Great East Japan Earthquake (GEJE) occurred, he created maps of disaster-affected areas through Crisis Mapping of OSM (see detail in the issue vol. 5 no. 1), and called for mappers (data creators of OSM) using his network. As a result, in a month after GEJE, more people than ever have joined OSM for the Crisis Mapping (the number was increased to 1.5 times) and total length of the road data of Japan expanded to 1.6 times longer. Moreover, he had contributed to the start up of sinsai.info (see detail in the issue vol. 5 no. 1). Now, he often visits the disaster-affected areas and has many experiments of surveying there using the newest geographic information gadgets. In this interview, I ask him about the role of the geographical information communities for the aid against the disaster, especially Crisis Mapping of OSM and sinsai.info, and his research activities.

- How did OSM Crisis mapping and sinsai.info start up?

After GEJE occurred at 2:46 PM (Japan standard time for the followings), Mr. Miura, the president of OSMFJ, had declared starting up Crisis Mapping against GEJE on the e-mail list of OSMFJ at 6:19 PM. Following to that, at 6:56 PM, I started to prepare high-resolution satellite images owned by several agencies (JAXA etc.) for the Crisis Mapping.

While the Crisis Mapping was going on, at 6:27 PM, Mr. Higashi, the executive secretary of OSMFJ, reported that he experimentally launched an information platform for Japanese using Ushahidi, which have made practical achievements against 2010 Haiti Earthquake. At 6:58 PM, public release of the platform was announced over Twitter. The first report about victims was disclosed at 7:06 PM of the day. After that, the project had quickly escalated into the stage for practical operations. We transferred the platform from a private server to servers owned by Georepublic Japan Inc. In addition, we called for volunteers for the operation and moderation of the posted reports. Finally, the information platform was named sinsai.info and it has been collecting and disclosing important information with geographical location about the disaster.

- I am really surprised to hear the quick response of the projects against the disaster. I suppose such action was practically contributed to help urgent situations. Are there specific cases in which OSM or sinsai.info was used for urgent rescue?

Yes, the most significant one is that a report posted to sinsai.info was key information to find an isolation of 100 victims. sinsai.info successfully caught a tweet mentioning the isolation and disclosed with the geographical location after checking by moderator. Finally, it was listed as an urgent incident by the authorities. The victims were safely rescued.

- What difficulty was the most challenging during the operation of OSM and sinsai.info?

We had mainly three issues so far: starting up, stabilizing, and maintaining. For the first month, more and more active volunteers were coming, but they were getting over our capacity and we could not direct them efficiently, especially for foreign volunteers. For the second month, spam posts and filtering them were considerable obstacles. Such posts were increasing via Twitter. For the third month and the later, maintaining motivations of the members has been a considerable issue. While many members have left to their usual businesses, remaining members have had more workload required for the operations.

- What are outcomes and issues of the activities of OSM and sinsai.info?

Through the activities, we developed a solid network among IT engineers and skills to operate crowd servers. As the result, we publicly showed the practical achievements of geospatial information contributing to social welfare. But a fundamental issue remained. We could not send information to the areas where information infrastructures were seriously destroyed by tsunami. The open question is how we can support to rescue victims in the medically important 72 hours after the disaster occurred.

- Please tell your impression of the visits at the disaster-affected area and perspectives on it.

People in foreign countries say “Japan seems to be in a serious situation”. People in west Japan say “East Japan seems to be in a serious situation”. People in south-east Japan say “North-east Japan seems to be in a serious situation”. People in inland of north-east Japan say “Coastal area seems to be in a serious situation”. From my experience of the visits to the disaster-affected area, I feel such inconsistencies are attributed from incompleteness of current ITs. There are still many issues needed to be informed to people. I believe geospatial information is the most useful tool to exactly inform the situation to the people in Japan as well as to the people of the world. To fully utilize the effectiveness of geospatial information technologies, we need to develop much more human resources with literacy of geospatial information.

- Three month later after the disaster, the affected areas are getting from stages of rescue to those of recovery and rebuilding. How will OSM, sinsai.info, and your research activities contribute to those?

I have an idea of three steps for contributing there. First, we will make map data about status of recovery and rebuilding by Crisis Mapping and continuously archive the information into OSM and sinsai.info. Second, we will regularly represent the outcomes to the people living in the disaster-affected area with friendly ways, such as posters, audios, and videos. Third, we will develop people’s understandings, especially children’s, on technologies of open-license geospatial information and the worthiness. Such efforts would build people’s skills and literacy of geospatial information technologies which are freely available and useful for their societies as well as their businesses.

- Please give messages for student readers of ISPRS SC Newsletter.

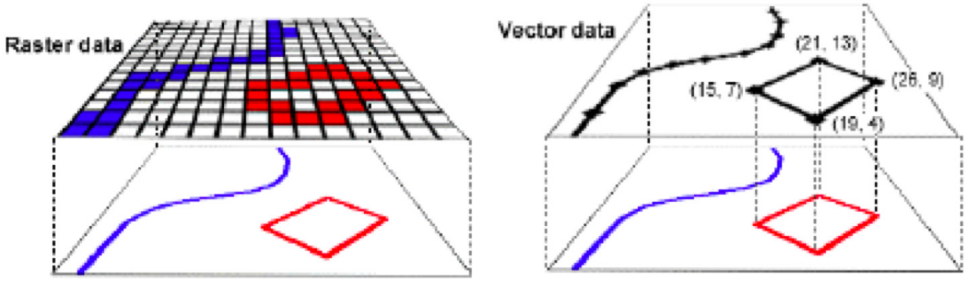
We joined Crisis Mapping against the 2010 Haiti Earthquake and learned the significant effects for supporting there. Place and time of disasters and conflicts are always unpredictable (e.g. 2010 Chili Earthquake, June 2011 Christchurch earthquake, Egypt’s class conflict in 2011, and Libya’s conflict in 2011). However, owing to real-time communication over the Internet and freely-available technologies based on open-source software and open data, people can support to aid victims from their home wherever the crisis is. Actually, in the activities against the GEJE, foreign communities of OSM and those of Crisis Mapping made more efforts than Japanese communities did. Also, I should mention that such activities have been established based on well-developed technologies of remote sensing and GIS. Now, people can easily make connections with the other even if she or he lives in the other side of the world. We will dedicate to develop more solid networks over the countries to support people who need help. I hope your kind help. With active feedback of experiences of Japan to the world, we will make your efforts into worthy contribution for the people.

Digital Representation of Geospatial Data: Vector or Raster?

by Thanasis Moysiadis (University of Thessaly)

Real world objects or discrete entities (roads, towns, rivers) are represented as points, lines or polygons or a combination between them. These are called features. Unlike features, surfaces have a numeric value instead of shape. Phenomena which change continuously in space such as temperature, slope, and elevation do not have a discrete shape. Such geographical phenomena are more easily represented as surfaces, called fields. In digital form, features are represented in vector format whereas fields in raster format. Vector data, points, lines or polygons, have sharp boundaries and shape. Points are characterized by its x, y coordinates referred to a local reference system. Two pairs of coordinates form a line and if the start and the end point coincide, a polygon is formed. Vector data representation is related to the scale of the feature to be depicted. For example, a city is represented as a point in a 1:200.000 scale and as a polygon in a 1:20.000 scale. Raster data are those referred to sum of pixels, with a numerical value in each of them, which represent a part, a whole or many features. For example, a numerical value of a pixel may show a temperature of 20 degrees or an elevation of 200 meters.

In terms of data acquisition, geospatial data are categorized in primary and secondary sources for both vector and raster data. Primary sources of geospatial data are derived from direct measurements. Typical examples of raster data are: satellite images, digital aerial photographs, whereas for vector data are conventional survey, GPS and Lidar measurements. Secondary sources of geospatial data are those related to the use of data already acquired. Typical examples of raster data are: scanning of analog maps or aerial photographs and for vector data, maps digitization and raster to vector conversion (data automation, data translation).



Raster and vector representation of digital geospatial data, (Ordnance Survey, 2003 - Crown copyright)

However, which form of data, vector or raster, best represents the real world objects? This is mainly dependent on the accuracy and the scale of the object being represented. More specifically, the advantages and disadvantages of each are outlined below:

Vector Data

Advantages

- Fine presentation of the entities being modelled
- Uniform and consistent data structure
- Accurate mapping output according to the scale
- Graphics and qualitative characteristics are updated and generalized
- Topology accurately displayed, therefore spatial analysis and queries are sufficient processed
- Data are displayed in their original detailed form without generalization

Disadvantages

- Each point position is to be stored
- Continuous data are not accurately modelled
- Complex data structures
- Analysis and processing algorithms are quite complex
- Difficulties in simulation, each section has a different topological form
- High processing requirements, in terms of layers' overlay (identification of sections/nodes/lines, reconstruction/rearrangement of polygons)
- Spatial analysis and use of filters within the polygons is impossible

Raster Data

Advantages

- Simple data structure
- Continuous identities are better represented
- Simple overlay operation with remotely sensed data
- Spatial analysis is easier
- Simple mathematical modelling is simpler because of the same type and size of spatial unit
- Data acquisition (satellite imagery, aerial photographs) in raster format, quick and easy database creation
- Cheap and fast growing technology

Disadvantages

- Accuracy representation is dependent on the pixel size
- Linear elements and network structures are more difficult to model
- Spatial data transformations give rise to distortions
- Accuracy of spatial analysis is small
- Topological relationships of spatial data are difficult to identify
- Projective transformation is time consuming, unless special algorithms are used
- It is difficult to create network links
- Non-processed thematic maps are much less presentable than the linear ones

*References

WG V/2 Conference "Cultural heritage data acquisition & processing"
York, UK, 17-19 August 2011
For more info visit: http://areeweb.polito.it/ricerca/TCV_WG2/events.html

WG V/3 Laser Scanning 2011
Calgary, Canada, 29-31 August 2011
For more info visit: : http://www.ucalgary.ca/laserscanning2011/

Workshop on Innovative Technologies for efficient Geospatial Management of Earth resources
Ulaanbaatar, Mongolia, 4-8 September 2011
For more info visit: http://hevra.haifa.ac.il/~isprs/events.html

WG VIII/2 Symposium on "Advances in Geospatial Technologies for Health"
Santa Fe, USA, 11-14 September 2011
For more info visit: http://isprs-wg8-2.unm.edu/symposium

ICWG I/V International Conference on Unmanned Aerial Vehicle in Geomatics (UAV-g)
Zurich - Hoenggerberg, Switzerland, 14-16 September 2011
For more info visit: http://www.geometh.ethz.ch/uav_g/

WG IV/8 28th Symposium of Urban Data Management Society (UDMS 2011)
Delft, The Netherlands, 28-30 September 2011
For more info visit: http://www.udms.net/

INIT Autumn School on 3D Imaging Technologies
Benicàssim, Spain October 3-7, 2011
For more info visit: http://www.init.uji.es/school2011

WG III/5 Photogrammetric Image Analysis 2011 (PIA11)
Munich, Germany, 5-7 October 2011
For more info visit: http://www.pf.bv.tum.de/isprs/pia11/

7th ISPRS SC and WG VI/5 Summer School
Jhongli, Taiwan, 8-12 October 2011
For more info visit: http://www.acrs2011.org.tw/ISPRS_SummerSchool/

This column serves as a guide for the students who are thinking or are willing to go studying or doing practical work abroad. We have searched for new opportunities in different faculties, schools and other learning programs all over the world in order to encourage as many students as possible to take new steps towards new horizons.

1) Cranfield University's Geographical Information Management programme provides a balanced coverage of the key GIS technologies, which can be applied at local, national and global levels to issues such as climate change, improving farming yields, tropical deforestation, transportation, smart navigation systems, disaster response management, recreation, property management and telecommunications. Geoplan has made a bursary available for United Kingdom and European Union students enrolling on the MSc Geographical Information Management for October 2011 entry. This bursary will cover tuition fees and provide a contribution towards living expenses. Application deadline: 31 August 2011. To apply please visit the course website: www.cranfield.ac.uk/sas/gim

2) The "Centre de Recherche Public - Gabriel Lippmann", a public establishment for applied scientific research and technology transfer in Luxembourg, has an opening on a permanent contract basis for its department 'Environment and agro-biotechnologies' (EVA) for an engineer-technician in Geomatics (Ref: EVA-23511-INGGEO). The selected candidate will serve as the team expert on GIS and remote sensing applications. The essential functions of the new position include the design and implementation of geodatabases (including metadata), acquisition and processing of remote sensing data, conversion of processes and models into a GIS environment, data visualization, and technical assistance in the spectroscopy lab. Applications should be received by August 31st, 2011. Read full announcement at: http://www.nature.com/naturejobs/science/jobs/200123-an-engineer-technician-in-geomatics-m-f

3) Position as PhD Research fellow (Stipendiat SKO 1017) is available at Department of Geosciences, University of Oslo, Norway. The fellowship is for a period of 3 years. The candidate will develop, evaluate and apply so-called offset-tracking methods for quantifying glacier flow based on satellite radar imagery. The candidate will be part of a lively research environment in cold regions sciences, in particular in remote sensing, geoinformatics, glaciology and geomorphology. Applications should be received by August 20th, 2011. Read full announcement at: http://ec.europa.eu/euraxess/index.cfm/jobs/jobDetails/33720731

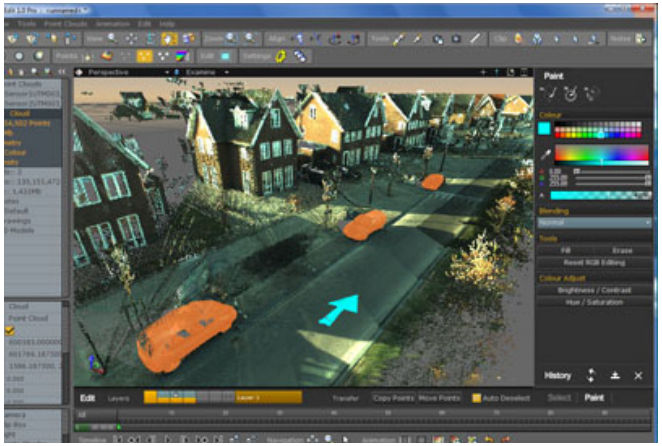
See more on next page

4) The Maxwell Ralph Jacobs Fund is used to support worthy projects in forestry science research. The following broad categories of activity may be supported: a) work to be carried out in or related to Australasia in any field of forestry science; b) field orientated research in Australia and New Zealand in fields reflecting Max Jacobs's particular interests; c) overseas travel for either administrators or scientists. The principles applying to the application of grants are: funds available each year are capped at $5000 (GST exempt); two grants will be allocated at approximately $2500 each. Applications should be received by September 30th, 2011. Read full announcement at: www.forestry.org.au/ifa/a/a2-ifa.asp

5) The "Centre de Recherche Public - Gabriel Lippmann" (Luxembourg) has an opening on a fixed-term contract basis for its department 'Environment and Agro-biotechnologies' (EVA) for a researcher in remote sensing (m/f). The researcher will develop new methodologies and applications for a novel hyperspectral imaging spectrometer (VIS/NIR/SWIR) based on FT-technology. A special focus will be the assessment of biochemical and structural characteristics from environmental targets (vegetation, soil, water) at laboratory and field conditions using both statistical approaches and radiative transfer modelling. At the end the developed techniques will be integrated into a toolbox specialized for the new spectrometer. Applications should be received by August 31st, 2011. Read full announcement at: http://ec.europa.eu/euraxess/index.cfm/jobs/jobDetails/33662856

6) The CIMO Fellowships programme is open to young Doctoral level students and researchers from all countries and from all academic fields. Neither studies at Master's level nor post-doctoral studies are supported in the programme. The scholarship period may vary from 3 to 12 months. The monthly allowance is 900-1200 euros (in 2011). The scholarship is intended to cover living expenses in Finland for a single person. No additional allowance for housing is paid. Expenses due to international travel to and from Finland are not covered by CIMO. Applications may be submitted at any stage at: www.studyinfinland.fi/tuition_and_scholarships/cimo_scholarships/cimo_fellowships

Pointools

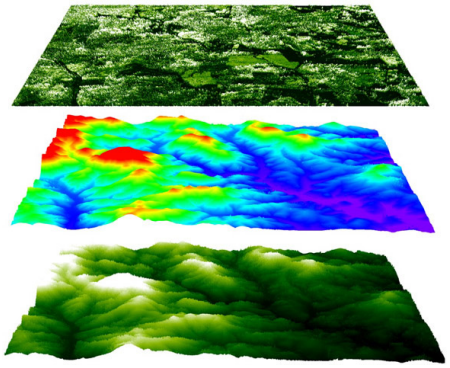


The Pointools suite of software leverages the high-performance Pointools POD format for working with the largest point cloud models inside the broadest range of applications. Used by architects, engineers, contractors, and surveyors to work with 3D laser scan data. Pointools products enabling efficiently work with multi-billion point datasets with unmatched speed and supports multiple workflows including Art & Entertainment, Forensics, GIS & Mapping, Heritage, Infrastructure, Manufacturing, and Security & Defence.

Pointools offerings include stand-alone applications, CAD software plug-ins, and a third-party development platform for point cloud processing and visualisation; uniquely enabling point cloud model reuse across Bentley, Autodesk, and Rhino applications without time-consuming translation.

Source: http://www.pointools.com/

Tiffs 7.0



Tiffs (Toolbox for Lidar Data Filtering and Forest Studies) is software of lidar data processing and information extraction. It is highly automatic, very fast, and accurate in generating bare earth models, digital surface models, and extracting forest information from individual trees to regional scales.

Tiffs 7.0 now can generate individual tree polygons, which makes it possible to integrate with other remote sensing data to perform classification at the object-level. Many additional statistics (such as standard deviation, skewness, percentiles, etc) can be generated based on the point cloud vertical distribution within each individual tree crowns. This will greatly enhance the capability of using lidar to extract object-level information (such as biomass, basal area, land cover and land use classification).

Source: http://globalidar.com/

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Asia-Pacific Regional Space Agency Forum
http://www.aprsaf.org/

Spill International - News on Marine Spills and Pollution
http://www.spill-international.com/

RESOURCES

National Academies Press - free GIS related e-books
http://search.nap.edu/nap-cgi/de.cgi?term=GIS&x=0&y=0

EDUCATION

Google's Python Class
http://code.google.com/intl/sl/edu/languages/google-python-class/

FREE SOFTWARE

Opticks (Free and Open Source Remote Sensing software)
http://opticks.org/

JOBS, CAREER OPPORTUNITIES

GIS Connection
http://www.gisconnection.com/

JOURNALS

LIDAR Magazine
http://lidarnews.com/emag/2011/vol1no1/

RELATED ORGANIZATIONS, ASSOCIATIONS

United Nations Platform for Space-based Information for Disaster Management and Emergency Response
http://www.un-spider.org/

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