NewsLetter

ISPRS Student Consortium

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Melbourne, Australia

Spatial Resolution with Respect to Imaging Geometry

Mapping Aid Information for Transparency

isprs

ISPRS SC NewsLetter

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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

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.

Table of Contents

SC CHAIR MESSAGE

Dear Reader,

The ISPRS Melbourne Congress promises a close look at the exciting and challenging world of ISPRS. The recent technological advancements and applications of new techniques will be showcased during oral/poster presentations and at the technical exhibition; new roles and demands from society will be highlighted during the plenary sessions.

Our Newsletter team prepared this special issue of Student Consortium (SC) Newsletter, dedicated to the ISPRS Melbourne Congress, and it will be distributed in hardcopy as well as in digital format.

Within the period of 2008-2012, SC reached almost 800 members from 87 countries. Accordingly, participation in SC has tripled and expanded to a global geographical coverage compared with the previous term. SC volunteers either attended or organized numerous events in order to promote the society and spread the energy of youth. Furthermore, SC successfully organized four international Summer Schools in America, Asia and Europe in cooperation with WGVI/5, TCVI, local hosts and the support of generous sponsors. SC has also played specific roles during the ISPRS Mid-Term Symposia and at the ISPRS Centenary Celebrations in 2010.

SC is playing a major part in the organization of the Youth Forum during the Melbourne Congress: a full day of technical sessions, a panel session and the SC Assembly. These events will all take place on Monday the 27th August. We are glad that the Youth Forum has become a traditional part of the Congresses, as it was originated in the Istanbul Congress. There will be more informal social meetings for young participants of the congress during the whole week and the SC booth will be available at the exhibition hall.

Another important aspect of the Melbourne Congress is that the SC Board will hand over the flag and I expect some of the members including myself will be replaced during the SC GA. During the eight years of activities SC climbed many peaks that we first dreamed and then aimed for. From now on, with passion and a desire of continuous development there will be higher points. I believe one day you might find a youth organization affiliated with ISPRS SC in every member country. I wish good luck and success to the next generation of the SC Board for the next term.

By the time you read this issue, my contribution of reporting news from SC in the newsletter will be about to end. Within the last four years, I have tried to inform you about our mission and activities, and report to you what has been going on. Although preparing periodic articles was not as easy as I thought in the beginning, I hope you were well informed and also enjoyed it as I did. The Newsletter has been one of the key drives of SC activities. Hence, special thanks go to the newsletter team, to the writers who contributed, and especially to our Editor in Chief, Gregor Stavbar from Slovenia who has patiently organized and followed articles to meet the deadlines.

I would like to express my sincere gratitude to ISPRS Council, TCVI, and WGVI/5 officers, specifically to Dr. Manos Baltsavias who always took care of SC and provided good guidance; to the ISPRS Foundation, industry leaders and local societies for their support; to SC Board members for always being an open and strong team; and to volunteers and supporters who merged their passion, energy and precious time for the benefit of a global youth network. Also, I am thankful to my family members who have supported me along this road.

Personally, when I look back in time, this has been a great pleasure and an adventure in the fields of science and networking. My first initiations in ISPRS were started when I was an undergraduate student almost nine years ago. During the ISPRS Congress in Istanbul in 2004, I had the opportunity to be a student volunteer for the Congress and participate in the youth-related events. With different designated roles and duties, I have always been amazed at the synergy of generations and realization of activities from ideas since the early days of SC.

I have had the honor and the privilege of representing Student Consortium in many platforms as the first elected SC Chair. With so many experiences, good memories and friendships, I feel and express myself as a ***fresh graduate from Student Consortium***. From now on, I hope that my engagement in the Student Consortium will continue as a life time supporter.

As always, I encourage you to join and participate to the Student Consortium right now.

Best Regards,
Cemal Özgür KIVILCIM

ISPRS SC Chair
(2008-2012)

Istanbul, August 2012

The View

by Ian Dowman
ISPRS First Vice President

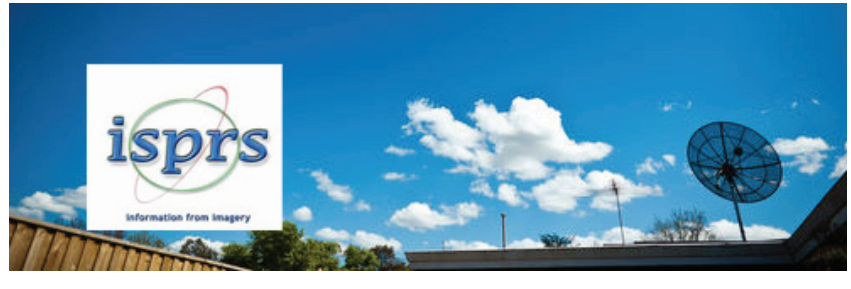
In June 2010 I wrote an article for the Student Consortium Newsletter and my message then was that the most important challenge for the profession, and for ISPRS, is to ensure the future of the profession by familiarizing young people with imagery and how it can be used, and by educating a wide spectrum of professionals and decision makers in the importance of using geospatial data for the benefit of society at large. This still holds but it is interesting to see how ISPRS has developed this policy in the last two years, and to consider future directions.

The most interesting thing about the last two years has been that the Student Consortium has developed in a most encouraging way without a lot of help from ISPRS Council. The Newsletter is a very professional publication and shows that there is plenty going on, including Summer Schools and activities with other societies. This is clearly a good sign for the future.

Taking a broader view on ISPRS, I believe that the society has made good progress during the past two years. Building on a very successful centenary celebration in Vienna and eight very good Technical Commission symposia in 2010, the scientific side of our work has progressed through many workshops organised by the working groups. The culmination of this work will be seen at the ISPRS Congress in Melbourne where over 1000 papers will be presented. Important developments in the past four years will be discussed, including key topics like the use of the cloud, the collection and use of crowd sourced information, and new techniques for processing data from laser scanning and digital images. The Congress will also look at developments in Earth observation, not just the technical aspects, but topics such as the relationship between government space agencies and space programmes and commercial activities. Legal aspects of privacy and access to data will be discussed. A key interest to young participants will be education and capacity building. Technical Commission VI, under the leadership of Martien Molenaar of ITC (University of Twente), has looked at issues such as cross border qualification and has supported initiatives such as the Geospatial Body of Knowledge; the role and organisation of Commission VI has been reviewed by the Council and in the coming years we hope for co-ordination of capacity building over the whole of ISPRS and better collaboration with other organisations working in this area. ISPRS Council works with other organisations such as UN Office of Outer Space Affairs (UNOOSA) to conduct and support workshops. We have published a book of case studies in disaster management with the Joint Board of Geospatial Information Societies (JBGIS) and UNOOSA and are preparing another, more detailed book at present. Of particular note are workshops in Vietnam, Nairobi, Ethiopia and forthcoming workshops in Morocco and Chile. This aspect of ISPRS work is seen by the Council as being essential if we are to develop photogrammetry, remote sensing and spatial information science for the future. In 2013 the second Latin American remote sensing conference (LARS) will be held. The regional representatives, who were appointed for the first time in 2008, are playing an important part in capacity building outside of Europe and USA and it has been encouraging to see student participation in regional conferences such as the Asian Conference of Remote Sensing. We would like to see more student participation in Africa; UNOOSA and the ISPRS Foundation are helping in this with travel grants.

At the General Assembly in Melbourne, the Council is proposing the introduction of an individual membership level in ISPRS. This will allow individuals to have direct contact with the organisation, even if there is no Ordinary Member in their country, or an inactive Ordinary Member. The subscription rates will be very reasonable for students and I hope that this will enable many more students, in regions like Africa, to become involved in ISPRS. This is also an opportunity for the Student Consortium to extend its membership and build activities in new areas.

ISPRS is not a large organisation, compared with FIG for example, and we are small enough to work together as a family. Council meetings are not too formal and council members are good friends as well as colleagues. The Council is able to keep in touch with all of the activities of ISPRS. I very much hope that those of you currently involved in the Student Consortium will soon become involved in other levels of ISPRS organisation through participation in working groups and commissions. We look forward to a productive and enjoyable Congress in Melbourne and to four more years of progress for ISPRS.



The ISPRS 2012 Technical Program

by Mark Shortis

The technical program will be eight exciting days of workshops, presentations and technical tours.
The main program consists of four plenary sessions, almost 200 oral presentation sessions with up to eleven parallel streams, and short interactive (electronic poster) sessions. Each of the eight Technical Commissions will have an oral presentation stream in almost every session, and the additional parallel streams will be special sessions such as the Earth Observation Forum, the Youth Forum, the Computer Aided Teaching Contest (CATCON) and the 16th Australasian Remote Sensing and Photogrammetry conference.

The plenary session will feature high profile, internationally recognised speakers delivering presentations on topics such as the future of small satellites for Earth observation, the critical role remote sensing plays in monitoring climate change, and the use of Earth observation for early warning and disaster management.

The ISPRS congress in Melbourne is the first to use electronic posters that allow dynamic content. Short interactive sessions will commence with 3 minute 'taster' presentations from every poster author. ePoster presenters will have the opportunity to discuss their presentation with individual delegates at ePoster pods comprising a large screen monitor controlled by an iPad.

All abstracts, presentations and ePosters are available through the ISPRS 2012 Congress app for mobile devices such as smart phones and tablets, as well as on the web site. Delegates are able to search for any presentation by author, session or key words, and create their own personal schedule. Wireless access to the Internet is available throughout the conference and exhibit.

Technical tours will operate on two afternoons during the Congress. The choice of tours includes surveying and mapping production organisations, as well as innovative users of geographic information such as Lonely Planet and the Country Fire Authority. And for something completely different, delegates can visit the Australian Synchrotron to hear about the latest discoveries in advanced physics.

All in all there is something in the ISPRS 2012 Congress programme to excite or delight everyone. Enjoy the experience!

Melbourne, Sporting and Cultural Capital of Australia

Melbourne is a vivid city, nestled in a compact state, providing easy access to an incredible variety of things to see, do and experience year round.

It was founded in 1835, 47 years after the European settlement of Australia, by emigrant Tasmanians. Soon after, during the 1850s, it was swamped by a gold rush and was transformed into one of the world's largest and wealthiest cities. The state capital of Victoria is today to be the 2nd largest city in Australia, in terms of population. The city is situated in the south-east of the country, around Port Phillip Bay, with the city centre positioned at the estuary of the Yarra River at the northernmost point of the bay. Since the city is home to a number of major cultural and sporting events and institutions, it is often called the 'Sporting and Cultural Capital of Australia'. Melbourne is the birthplace of cultural institutions such as Australian film, Australian television, Australian rules football, the Australian impressionist art movement (known as the Heidelberg School) and Australian dance. It is also a major center for contemporary and traditional Australian music. Apart from that, the city is known for its contemporary architecture, extensive tram network and Victorian parks and gardens. When living in Melbourne, you have access to more than 480 hectares of parks and gardens, a greater proportion of open space than any other major city in the world. Melbourne also has many wildlife preserves, including the Melbourne Zoo which has a number of animals that visitors can see safely in their natural habitat, and the high-tech Melbourne aquarium.

Here are some interesting and funny facts about Melbourne, to help you know the city better:

- Melbourne was the capital city of Australia for 26 years, from 1901 to 1927.
- A person from Melbourne is called a Melburnian.
- Melbourne's famous tramway system is the largest outside Europe and the fourth largest in the world. It stretches along 244 kilometres with 450 trams.
- About 90 tonnes of dog poo are left on the streets of Melbourne every day.
- Melbourne had the first gay and lesbian radio station in the world.
- Famous beer, Foster's Lager, was actually produced by two Americans.
- Melbourne's first census, conducted in 1836, showed a population of just 145 men and 35 women.
- The expression 'call girl', meaning a prostitute, was invented in Melbourne.
- The largest stained glass ceiling in the world is in Melbourne, at The National Gallery of Victoria. It is 51 metres (167.3 feet) long by 15 metres (49.2 feet) wide.
- Tunnels run almost everywhere in Melbourne.

Interview
by Urša Kanjir

Prof. Clive Fraser

Clive Fraser is a professor at the Department of Infrastructure Engineering at the Melbourne School of Engineering, University of Melbourne (Australia). His main research interests are in digital close-range photogrammetry, industrial measurement systems and the metric exploitation of high-resolution satellite imagery. He also serves as Research Director of the Cooperative Research Centre for Spatial Information and he is a Director of Photometrix Pty Ltd. In recognition of his academic and professional work he has earned numerous international awards, including the Fairchild Photogrammetric Award, the Talbert Abrams, Wild Heerbrugg and Bausch & Lomb Awards, all from ASPRS; and the President's Medal, President's Prize and the E.H.Thompson Award from the Remote Sensing & Photogrammetry Society. Professor Fraser has a number of active international research and industry collaborations, and he serves as a consultant to industry in Australia, Japan, the US and Europe. He is also author of more than 280 publications.

Can you explain to us what are you researching at the moment?

Two areas of primary interest: automation in close-range photogrammetry and metric exploitation of high-resolution satellite imagery.

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

Ever since I was young, I have had a keen interest in maps and I worked in topographic map production during my student years. This introduced me to photogrammetry and as I became more familiar with analytical aspects I realized that there were a lot of under-exploited opportunities in the field of non-topographic, close-range photogrammetry. I've been essentially concentrating in this field now for 35 years, though I'm also interested in the analytics of photogrammetry more broadly.

Can you tell us something about recent developments in remote sensing and GIS in Australia? In which domain is there an emphasis at the moment?

Australia is very much in synch with international developments in remote sensing and GIS and thus it is not unexpected that trends seen in Europe, Asia and North America are also very visible in Australia. Driven perhaps by the needs of the resources sector and non-traditional application domains such as the power industry, there is a growing need for integrated spatial information products generated from multiple sensor types.

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

Very important, for a number of reasons, the most notable of which is meeting with new colleagues. For example, through networking you find out what is really going on in topical research and technological developments (this information cannot always be gleaned from the literature). Also, you may get to develop your presentation skills. Another advantage is that you can meet with peers from all levels, students to senior professors and industry representatives, who can provide information and offer advice across a range of issues. Finally, you can check out the state of the industry and profession in relation to future opportunities, be they in research, or related to career development or job opportunities.

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

Let your interests drive you! Success will generally come more readily when you are keenly interested in your chosen vocation.

"Let your interests drive you!"

The ISPRS Brock Gold Medal Awardee

Dr. Franz Leberl

The Brock Gold Medal is awarded quadrennially by the American Society for Photogrammetry and Remote Sensing for an outstanding contribution to the evolution of photogrammetry, remote sensing and the spatial information sciences. Funds for the provision of medals were given in memory of Arthur and Norman Brock, American photogrammetry pioneers who in 1914 built their first aerial camera. In 2012, this medal will be presented for the fourteenth time.

O. Univ. Prof. Dipl. Ing. Dr. Techn. Franz Leberl has been awarded the Brock Gold Medal for 2012 in recognition of his achievement of landmark developments in the fields of photogrammetry and remote sensing over the past 30 years. The Brock Gold Medal recognizes a lifetime achievement and has been seen by many as the premier award by ISPRS.

Franz Leberl grew up in Austria and received his degrees from Vienna University of Technology (1967 Dipl. - Ing. in Geodetic Engineering; 1972 Doctor of Applied Sciences). He has worked in the Netherlands, California, Minnesota, Colorado and Austria. Today he is chair of the Institute for Computer Graphics and Vision at Graz University of Technology, Austria.

His first role was as an academic. His achievements include a pioneering role in the development of radargrammetry and the applications of imaging radar, with the publication of a definitive textbook on the subject. He has also published over 330 scientific papers and holds 15 patents. He has played a major role in mapping planets using radar images. A second role was as a business man. He developed two successful companies, of which one manufactured and marketed a photogrammetric precision film scanner, the UltraScan (over 600 units sold since 1998), and a large format digital aerial camera, the UltraCam (about 250 sold since 2003). The other company, in Colorado, USA, evolved into a major innovator in the area of radar signal processing. The sale of these two companies led to a role as a director at Microsoft Corporation's Virtual Earth business unit. A third role was as a research manager, as the CEO of Austria's largest public research organization with about 1000 employees, and as founder and director of the research institute for digital image processing at Joanneum Research in Austria. Today, his work is focused on academic computer science and addresses photogrammetric computer vision, 3D object reconstruction, and image - based modeling and rendering. See his website at www.leberl.info for more details.

We asked the awardee, Dr. Leberl, to share with us few thoughts about the medal and the science.

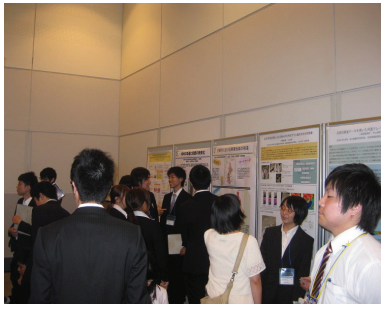
Dr. Leberl: This honor completes an amazing year for me, since in March 2012 I was recognized by the American Society for Photogrammetry and Remote Sensing as the inaugural awardee of the Outstanding Technical Achievement Award; the ASPRS specifically mentioned the UltraCam digital aerial camera development as the reason for that award. The Brock Gold Medal has more the flavor of a lifetime achievement award and recognizes an entire career with its many facets. Subjectively, I felt often like an outsider in the field, with difficulties to find sympathizers for innovations I had proposed. For example, in my late thirties, I had difficulties finding a professorial position in photogrammetry and for that reason went into business, and later on accepted an academic position in computer science to work on computer vision, in lieu of photogrammetry. It is thus very gratifying to now receive my peers' recognition at the end of my career – in fact, this means more to me than most may expect.

Photogrammetry, spatial information and remote sensing have been, and continue to be, very exciting endeavours. The technologies are amazing, the rates of innovation are staggering, the opportunities to succeed with good ideas and hard work are excellent. But the crux is in the »rates of innovation«. The mental flexibility, the visionary abilities that are in demand today have never before been challenged as they are now. Smart phones, the Internet-of-Things, ambient intelligence, the location-aware Internet, vehicle and pedestrian navigation all call for location and spatial information, not as this existed a while ago, but as it exists right now. "Geo" is everywhere, at a density and urgency as never before. And all of humanity is becoming an expert of location. What an amazing time we live in, what a privilege to be young and able to contribute to the dynamics of photogrammetry, remote sensing and spatial information!

Geoinformation Student Forum 2012

by Hiroyuki Miyazaki

On 23th of June 2012, the Geoinformation Student Forum 2012 was successfully held as an event at the G-Spatial EXPO in Yokohama, Japan. With the support of Japan Association of Surveyors, it has been held every year since 1999 to promote students' communication and networking over geoinformation-related studies.



This year, 40 undergraduate master's and PhD students came from 14 schools across Japan to present their research work in posters, videos and demonstrations. The topics ranged from basic technique (remote sensing, photogrammetry, unmanned airborne vehicles, GNSS, wearable sensors, and sensor network) to applied research (environmental management, disaster management, urban studies, archaeology, psychology, location-based services, and regional information services). The forum provided a great opportunity to learn about technological benefits and applications. The students broadened their vision of their own work and stimulated each other's motivation. The program also included a lecture by Mr. Durk Haarsma, the publishing director of GIM International (www.gim-international.com). His lecture provided informative insights on globals trends in geospatial information technologies from the perspective of his experience in the geospatial industry. 137 people joined active discussions at the presentation session and lecture session.

For more detail, please visit http://gi-studentjp.co.cc/s_forum/.

The student group in Kansai (west part of Japan) is planning to hold the 4th Geospatial Information Forum for Students and Young Engineers in Kansai this November. I hope that the growing community of Japanese students will expand to active cooperation with the international student activities of ISPRS Student Consortium.

Overview of Remote Sensing and Spatial Information Researches and Applications in Taiwan

Fuan Tsai [a] and Chaoyuan Lo [b]

[a]Associate Professor, Center for Space and Remote Sensing Research, NCU, Taiwan
[b]Ph.D. Candidate, Department of Civil Engineering, National Central University, Taiwan

After the successful conclusion of the 32nd Asian Conference on Remote Sensing (ACRS2012) and the 7th ISPRS Student Consortium and WG VI/5 Summer School last year, remote sensing and spatial information sciences continue to prosper in Taiwan. The National Space Organization (NSPO) operates and manages Taiwan's earth observing satellite, FORMOSAT-2, which has a 2m spatial resolution and a unique daily revisit capability. The Center for Space and Remote Sensing Research (CSRSR) of National Central University is another key component of Taiwan's remote sensing and spatial information infrastructure. The ground station of CSRSR receives several satellite data in real time and is an essential data and service provider for geo-spatial applications. In addition, there are 7 airborne LiDAR systems and 6 large-frame digital cameras operated by governmental and private entities in Taiwan. Recently, an airborne hyperspectral image spectrometer has also been put into service. In conjunction with other high-end ground-based instruments, such as terrestrial laser scanners and mobile mapping systems, these systems provide a comprehensive data acquisition capability to support various studies and applications.

In general, a wide variety of remote sensing and geo-spatial research and applications is actively being pursued in different governmental, academic and industrial sectors in Taiwan. Several topics have been of particular interest recently. First of all, because of its geographic location and geologic conditions, Taiwan is vulnerable to natural hazards such as flooding and landslides induced by earthquake, typhoon and other extreme weathers. Therefore, environmental and hazard monitoring is an important task for remote sensing research and application, including long term land-cover monitoring and event-driven hazard investigation. For example, after the devastating flooding and landslides caused by Typhoon Morakot in 2009, a nation-wide high-resolution digital elevation model (DEM) was produced using airborne LiDAR instruments, to better understand the geological and geotechnical

See more on next page

properties of the entire country. Various studies have also been carried out using remote sensing and spatial technologies to look into different aspects of these disasters and to provide decision- and policy-making support for disaster mitigation, recovery and prevention. This kind of task is not restricted to Taiwan only; similar monitoring and analysis are also conducted at regional and larger scales. A recent example is support for the disaster investigation and mitigation effort of the 2011 Tohoku earthquake and tsunami in Japan.

Another topic of interest is three-dimensional (3D) city modeling and its applications. This field of research integrates multiple remote sensing and spatial information techniques to acquire and process heterogeneous spatial and non-spatial data to reconstruct multi-temporal 3D city models in multiple levels of detail. To fully utilize the constructed city models, 3D spatial analysis and visualization systems are also important topics of development. Coupled with state-of-the-art communication, computing, and network technologies, 3D Geographic Information Systems are the platform for urban planning, management, intelligent navigation, location-based services and other innovative applications using digital city modeling.

There are also growing activities in education and international collaboration in geo-spatial sciences and related fields. The universities continue to attract local and international students enrolling in undergraduate and graduate programs. In addition to international conferences, there are also short-term training courses and workshops designed for international students and young scientists. For example, following the 7th ISPRS SC & WG VI/5 Summer School last year, the 1st International Summer School on Mobile Mapping Technology was successfully held this year and there will be a workshop in remote sensing for Southeast Asian young scientists in September. Several similar events have also been planned for the next two years. There are also international collaboration programs in Southeast Asia and Central America to develop geo-spatial infrastructure and build skills of local professionals in these regions. Meanwhile, the leading organization of remote sensing and spatial information sciences in Taiwan, the Chinese Taipei Society for Photogrammetry and Remote Sensing (CSPRS) has been and will be actively participating in events and activities of ISPRS, AARS (Asian Association on Remote Sensing) and other international societies.

In summary, Taiwan has invested heavily in remote sensing and spatial information technology. Education, research, development, and application of geo-spatial sciences are in high demand. We will continue to devote ourselves to these fields and cooperate with the international community through ISPRS.

by Ahmet Şengül

The ISPRS SC website was published just before the 2008 ISPRS Congress in Beijing, China. The next big congress is going to happen at the end of August in Melbourne, Australia. In the last four years, the website has been upgraded several times and new sections such as a photo gallery, materials, message boards, and message box have been added. Needless to say, the latest version of our website is still accessible on the Internet. You can start to benefit from this website after a short membership registration process.
One of the remarkable advantages of the SC website is the easy exchange of information by means of the message boards which lets the membership get to know members from different countries. Moreover, we will always keep you updated with the latest news and upcoming events, for which you will be eligible to register at discounted rate. Four years after the publication of our website, we are proud to say that the number of members has reached 760 members originating from 85 countries worldwide.

Visit our Student Consortium website at www.isprs-sc.org and also join in on SC's Facebook group where members posts their questions, opinions, study opportunities, etc.

Spatial Resolution with Respect to Imaging Geometry of Aerial and Satellite Sensor Configurations

by Thanasis Moysiadis
Department of Planning and Regional Development, University of Thessaly

In a remote sensing context, resolution is expressed as the ability of an optical instrument to identify two points and make one object distinguishable from another by the eye. An analogue image is a continuous representation of the surface being recorded, while a digital image is a discrete 2D array recording of target radiometric response, a collection of picture elements (pixels). Spatial resolution is a measure of the smallest object that can be resolved by the sensor, or the linear dimension on the ground represented by each pixel in the image. Pixel size is not equal to resolution. Images with the same pixel size may have different resolution. Satellite imagery gives an overview of a very large area in small scales with high spatial resolution. On the other hand, aerial photography, at much lower flying heights, usually gives sufficient resolution when objects appear bigger than the grain size of the photographic film. The image pixels from a spaceborne scanner are often idealized as an identical rectangular array with no overlap, arranged in a simple geometrical 2D structure, while the grains in a photographic film are of unequal size and irregular shape in an irregularly arrangement.

The frame geometry of a film camera images a large area all at once; therefore all points are imaged at the same time from one perspective center. The pinhole camera model describes the basic geometry of the frame photograph. Each point in the object space reflects a light that passes through the pinhole and forms a unique image point on the film. This illustrates the collinearity of the point in object space, the pinhole aperture and the point in the image plane. However, this ideal case is not the norm; deviations from the theoretically perfect imaging geometry of the camera lens system exist, due to diffraction. Therefore, a spot of light is generated rather than a unique image point. Camera calibration is able to compen¬sate for the distortions of the lenses and must be known in order to evaluate the stability and the performance of a camera. Other factors such as atmospheric haze, camera vibration, and lighting conditions also affect its performance.

The majority of satellite imagery is gathered with the use of electro-optical sensors, where other geometries are used. In the point imaging geometry (whiskbroom scanners), the pixels within each line of the image are generated by scanning in the cross track direction with mechanical motion. Each new image is generated by the motion of the platform, therefore synchronization is needed between the scanning speed and the platform velocity, to complete each scan in the time required to move from one pixel to the other. The image geometry is therefore affected by the motion of the platform. In the line imaging geometry (pushbroom scanners), the image is formed line by line and the sensor is oriented perpendicular to the motion of the platform. Perspective geometry is achieved only in the direction along the sensor; therefore an orthographic view of the image is formed in the direction of flight only. The geometric strength of pushbroom images is poor, since each line is an independent image and has it own position and orientation due to the motion of the platform. In panoramic configuration the imaging line is oriented parallel to the direction of flight and scanned perpendicular to the flight path giving a very wide field of view. This has an adverse effect on uniform pixel size and therefore causes serious geometric distortions, due to the motion of the camera during the scanning, the variability in image scale across an image, and the distortions of the Image Motion Compensation (IMC) mechanism which is used to prevent image blur.

The Instantaneous Field of View (IFOV), an angular cone of visibility of the sensor at a specific time and at a certain altitude, which largely determines the spatial resolution of the aforementioned sensor configurations, is therefore not rectangular, but depends on the swath width, the detector design and the scanning mechanism. Even though at small scales with an ideal case of a uniform response from all points in the geometrical IFOV, it is often the case that subpixel size objects (**figure 1**) may contribute sufficiently to the received signal to cause the pixel intensity to differ from those of surrounding pixels.

But even with a uniform intensity throughout the IFOV, the response of the sensor to a source of radiation will vary according to the location of the source within the field of view and outside the IFOV as well. The Point Spread Function (PSF) describes the response of an imaging system to nominal point source or point object; the ideal case would be for the pixel response to be uniform for all points within the IFOV. However, each pixel responds imperfectly to the signal as shown in **figure 2**.

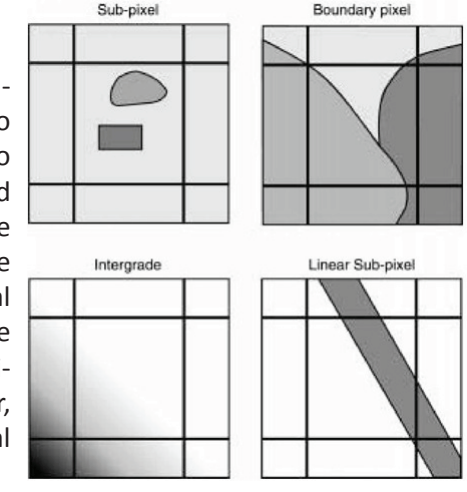


Figure 1: Cases of mixed pixels (Fisher, 1997).

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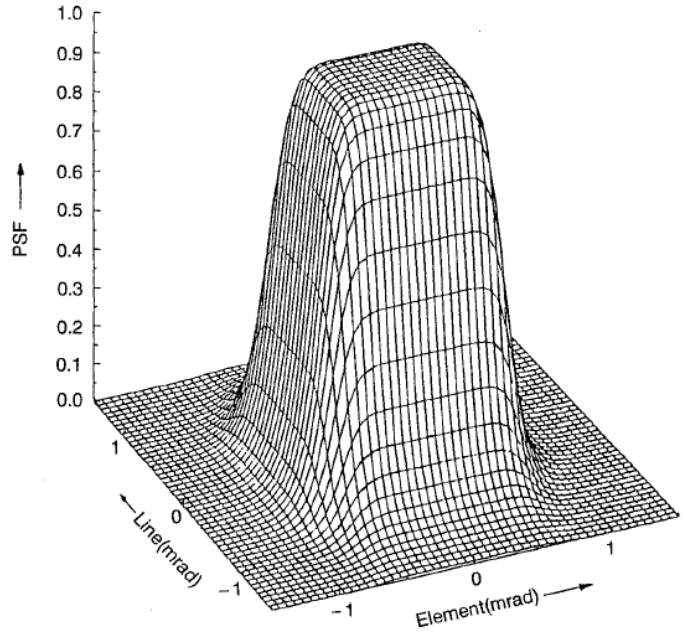

Figure 2: Point spread function for AVHRR (Mannstein and Gesell, 1991).

The spatial resolution of an image is affected by the optical aspects, the detectors used and the imaging geometry configuration of either aerial or satellite sensors, which cause geometric distortions. Among others, the above considerations are quite complicated and must always be taken into account in relation to the aim of any research work.

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Mapping Aid Information for Transparency: Current Status and Expectations

by Hiroyuki Miyazaki,
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Since January 2012, I have been seconded to the Asian Development Bank in the Philippines by the Center for Spatial Information Science, The University of Tokyo. I have found a lot of potential forgeospatial technology to be a critical solution for development issues. In this article, I would like to presentthepossibility thatgeospatialtechnology can improve transparency by a simple way: mapping.

While globalization accelerates the economy of the world, the benefits are not evenly shared and many people worldwide are living in a state of poverty caused by the process of globalization. For further global economic growth, proper management of globalization is inevitably required. Multilateral development banks (MDBs) aiming at poverty reduction all over the world have been established to promote sustainable development. Financial aid donated by developed countries has been invested in projects in developing countries by MDBs but further financial aid will be required for achieving the goal of poverty reduction. Transparency and accountability to donors is a key factor for financial aid to be continued. Moreover, transparency enhances information exchanges among aid agencies and leads to better decision-making and strategy through coordination and collaboration, such as reducing redundant businesses and promoting joint businesses.

Open Aid Partnership (OAP) is a partnership aiming to improve transparency of aid information. It focuses on the effect of visualization through maps as a way of promoting comprehensive understanding of development projects. OAP has been developing maps of aid information with geographical location information. The most representative one is the World Bank's Mapping for Results (http://maps.worldbank.org/), which includes information on 30,000 activities in all 143 of its client countries. The World Bank's achievement in 2010 showed a good practice of enhancing transparency of aid information. As a result, other MDBs have started planning to publish their aid informationon maps as well. In 2011, the African Development Bank published their geocoded aid information (http://184.73.156.57/afdbprojects/). Apart from the partnership, the Greater Mekong Subregion Envi-

ronment Operation Center, operated by the Asian Development Bank, has provided an interactive map of past, ongoing, and planned projects in theGreater Mekong Subregion (http://www.gms-eoc.org/gms-development-maptool). Such interest in mapping aid information is still increasing.

For interoperability among information published by MDBs and other relevant agencies, the International Aid Transparency Initiative (IATI; http://www.aidtransparency.net/) is developing standardization of aid information. IATI's efforts provide consolidated aid information with machine-readable XML format on their repository (http://iatiregistry.org/); however, standards for locational information are still

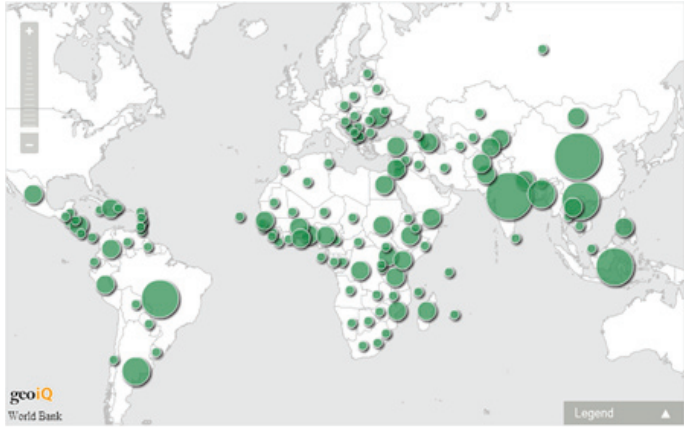


Figure 1: Map showing number of projects conducted by the World Bank.
Source: http://maps.worldbank.org/

not well defined. Existing maps are representing project location by points although there is likely much room for discussion of ways to represent geographical information. For example, economic corridor projects should be represented by lines to indicate accurate geographical relationships with other projects. Taxonomy of aid also needs standardization. For example, the Asian Development Bank has a sector for 'Transport and ICT', while the World Bank separates this sector into 'Transportation' and 'Information and Communications'. This kind of difference poses a considerable obstacle to coordination and collaboration of a specific sector among agencies.

Even though the need for standardization is well defined as mentioned above, applicable technology is required for organizing a huge amount of existing project

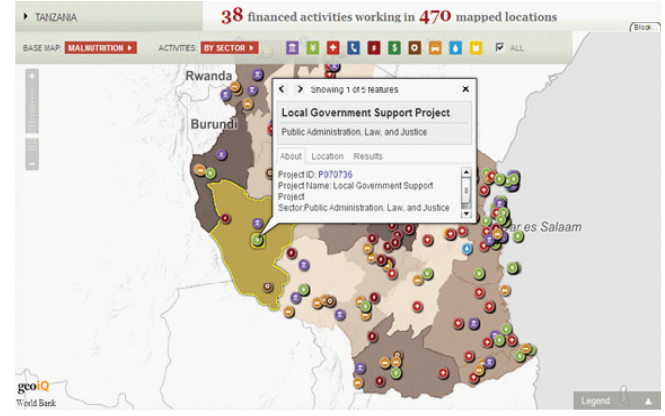


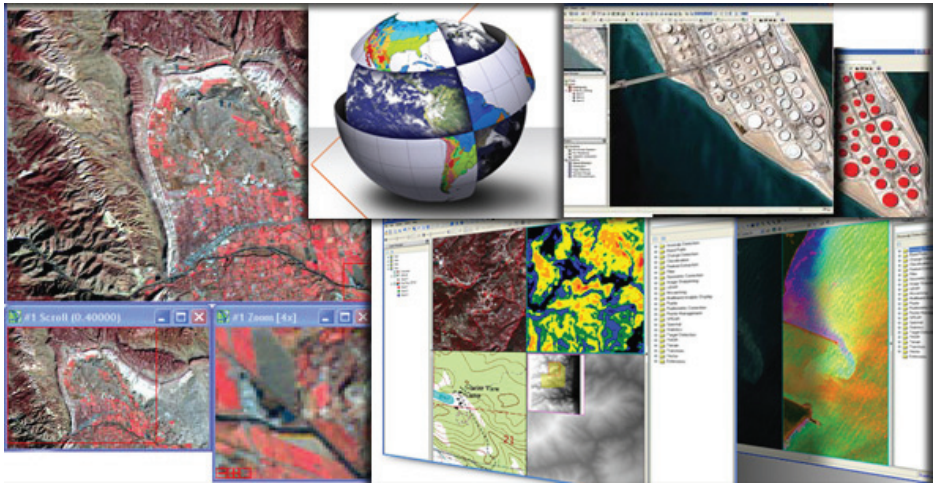
Figure 2: Map showing distribution of projects by sector. Description is shown with balloon by clicking marker on the map.
Source: http://maps.worldbank.org/

data. For example, text data mining of data about project location and sector would be greatly helpful to organizing existing project information if done according to one standard. This suggests that standardization will need advanced information technology in order to lead to effective solutions.

In conclusion, mapping aid information is essential for improving transparency. In addition, to ensure interoperability of the information, geospatial technology and relevant technologies need to be developed in order to apply a common standard to a huge amount of past information. As a seconded expert in the Asian Development Bank, I hope to contribute myself to deployment of geospatial technologies in development issues.

ENVI 5

Exelis Visual Information Solutions announces the release of ENVI 5, the next generation of ENVI, the company's image analysis software which is used across industries by professionals who want to uncover hidden information in geospatial imagery in order to make better, more informed decisions. ENVI 5 introduces imagery consumers to an innovative and streamlined user process for their image analysis workflow, making complex analysis tasks easier.



Designed to make image analysis accessible to users of virtually any experience level, ENVI 5 provides:

- An intuitive, easy-to-navigate interface.
- A highly-efficient display for large datasets.
- New automated processes for several popular analysis tasks.
- A flexible application programming interface for customizing the software to unique user needs.

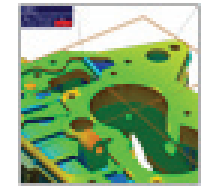
ENVI 5 was developed to introduce efficiency and speed into the previously complex workflow of converting raw imagery into actionable information. The new, streamlined user process benefits today's changing imagery consumer, from the GIS professional who needs to enhance a mapping application for better geographic awareness, to the research scientist using imagery to aid in critical discoveries.

More:
http://www.exelisvis.com/ProductsServices/ENVI/ENVILatestRelease.aspx

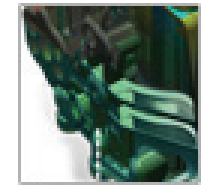
RAPIDFORM

Rapidform provides a full range of software for point cloud processing (XOS), reverse engineering (XOR) and dimensional inspection (XOV). Rapidform software opens a world of possibilities with 3D scanners. Create parametric solid models directly from 3D scans in Rapidform XOR. Use the intelligence of your CAD designs to automatically inspect parts with Rapidform XOV. Process raw scans into meshes and surfaces with Rapidform XOS.

Rapidform XOR is the only reverse engineering software that combines CAD with 3D scan data processing and it is purpose-built to create usable 3D models directly from scan data.It allows you to create parametric, editable solid models of virtually anything you scan.

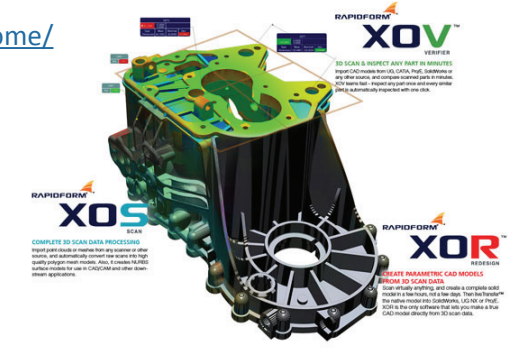


XOV is safer, easier inspection software. Combine the power of 3D scanning and CAD to verify parts quickly and thoroughly.It's the only point cloud software that recognizes features, so you do nothave to extract reference geometry before you define dimensions and tolerances.Reproducibility is ensured by its automatic feature extraction algorithms, which reliably extract reference geometry from measurement data without user intervention.



Rapidform XOS is 3D scan data processing software that converts data from any 3D scanner into high quality meshes and NURBS surface models. It is compatible with any 3D scanner and it is best-in-class point cloud and mesh editing, XOS advanced hole-filling, smoothing, and mesh optimization tools.

More: http://www.rapidform.com/home/



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ForestSAT 2012 Remote Sensing Conference
Oregon, USA, 11-14 September 2012
For more info visit: http://www.forestsat2012.com/

Auto-Carto 2012
Columbus, USA, 16-18 September 2012
For more info visit: www.cartogis.org/autocarto.php

2012 SilviLaser Conference
Vancouver, Canada, 16-19 September 2012
For more info visit: http://www.inpe.br/geobia2012

SPIE Remote Sensing 2012
Edinburgh, Scotland, 24-27 September 2012
For more info visit:
http://spie.org/remote-sensing-europe.xml?WT.mc_id=RCal-ERSW

2nd International Summer School for Cultural Heritage Documentation
Sevilla, Spain, 24-28 September 2012
For more info visit:
http://www.earsel.org/symposia/2012-symposium-Mykonos/index.php

International Symposium on Remote Sensing 2012
Songdo Covensia, Incheon, South Korea
10-12 October, 2012
For more info visit: http://www.isrs.or.kr/

First Latin America Conference of Free and Open Source GIS
Guayaquil, Ecuador. 22-23 October 2012
For more info visit: www.fiec.espol.edu.ec/LatinOSGIS/index.php

XXII International Symposium on Modern Technologies
Education and Professional Practice
Sofia, Bulgaria, 8-9 November 2012
For more info visit: http://geodesy-union.org

ACRS 2012 , The 33rd Asian Conference On Remote Sensing
Pattaya, Thailand, 26-30 November 2012
For more info visit: http://acrs2012.gistda.or.th/

INTERESTING LINKS

GIM International
http://www.gim-international.com/

USGS Center for LIDAR Information Coordination and Knowledge
http://lidar.cr.usgs.gov/

RESOURCES
GIS Data
http://gislounge.com/data-and-gis-resources/

Web Links Database - Geoinformatics
http://www.weblinks.spakka.net/db/0?var=812

EDUCATION
GIS Graduate Programs Online at USC
http://gis.usc.edu/gismsdegree/

FREE SOFTWARE
FUSION
http://forsys.cfr.washington.edu/fusion/fusionlatest.html

TdhGIS is free software for vector based analysis
http://www.tdhgis.com/

JOBS, CAREER OPPORTUNITIES
Geospatial Jobs and Career Center
http://www.directionsmag.com/careers/geospatial-jobs/

JOURNALS
GeoInformatics
http://fluidbook.geoinformatics.com/GEO-Informatics_5_2012/

South-Eastern European Journal of Earth Observation and Geomatics
http://ejournals.lib.auth.gr/seejeog/index

RELATED ORGANIZATIONS, ASSOCIATIONS
ILMF - The International LiDAR Mapping Forum
www.lidarmap.org

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