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SATURDAY 16 JULY 2016

# ISPRS Congress Daily

## HIGHLIGHTS

ISPRS COUNCIL | PHOTON LIDAR | STUDENTS | DUBAI

## 16 Years' Experience on the ISPRS Council

Looking back, I have been able to carry out the priorities set at the beginning of my term. In 2000, when I was elected as Congress Director, my priority was to organise an excellent event that would be memorable in the minds of people for a long time and I can confess that I have achieved this goal, as I still meet many people around the world who thank me for the wonderful congress in 2004. Another interim goal that arose during my time as congress director was the request of young scientists to have their own programme at the congress, which resulted in the establishment of youth sessions and, after the congress, a summer school for more than 80 students. This became a sustained tradition at

many ISPRS events and congresses and led to the establishment of a student consortium. The path from Congress director to secretary general (2004-2008) was a very different one, but past experiences as manager at different governmental and private organisations made my task to fulfill my duties easy. Then came my term as the president of the Society (2008-2012). When I look back at the last days of my term as president, I realize that the priorities are reflected in the preamble of the Strategic Plan of the Society, which was approved in Vienna at the Centenary Celebrations of the ISPRS in 2010: "as the mission of ISPRS... to advance the photogrammetry, remote sensing and spatial

information sciences through international cooperation in research, development and education for the benefit of society and for environmental sustainability... Implementation of the strategy will produce an efficient, professional organisation, ready to meet the challenges of changes to the environment...". In the Strategy Definition we say: "use core disciplines in applications such as disaster management, health, cultural heritage and maintenance of a sustainable environment" and "develop interest in key international issues such as working towards the Millennium Development Goals and climate change". We work closely with members of the Joint Board of Spatial Information Societies



Orhan Altan.

(JBGIS), the ICSU GeoUnions, UNOOSA, COPUOS, GEO and the UN initiative on Global Geospatial Information Management (GGIM).

Read Orhan Altan's full story at [www.gim-international.com/isprs](http://www.gim-international.com/isprs)



## COLUMN

### Making geomatics more attractive

*What is geomatics? What is the geospatial industry? These are questions put to me quite regularly. Friends and family are interested in what I do in my daily life. They know that I work for a publishing company, on occasion they even know that we write about some kind of technology, and even rarer are those friends who remember that I "do something with geomatics". OK, that's nice! But doesn't this say an awful lot about the status of the geospatial sector? Doesn't this necessitate us to bridge the gap between the man on the street and geomatics?*

*Over the past years I've interviewed many people for GIM International and education was often the topic of at least one of the questions. In many countries there is a lack of new geomatics professionals. I was discussing this with the people of Hexagon Geospatial and Leica Geosystems during their media roundtable at this ISPRS Congress. I touched a sensitive subject of the geomatics community. Why don't young talented people at college decide to study geomatics or related subjects? Probably because they have no clue as to what it entails. And if they do, surveying – unless they know how great the job really is – sounds like a dusty word to many youngsters. Not appealing at all to young people. The truth can be hard to swallow, but let's face reality!*

*Creating 3D worlds is already much more exciting. The links between the gaming and the geospatial industry are getting stronger. Students use Google Maps and many other geo-applications are becoming intertwined with everyday life. Actually, Pokémon Go also has a geospatial element in it! I'm sure we can make the geospatial sector much more attractive. This will result in many more students at the geomatics departments. It's time for a transformation, it's time to make use of the great opportunity being offered by the smart phone revolution. Geospatial has become so visible to the citizens of our wonderful planet, but they're not aware of it. They are living a geomatics life without knowing what geomatics is. We're on a mission – will you join us? Let me know! I'm sure GIM International can be perfect platform to help this operation succeed!*

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## Geospatial Week 2017



Yellow Crane Tower, Wuhan.

During the ISPRS Geospatial Week 2015 in La Grande Motte, France, the decision was taken to hold the next Geospatial Week in China, organised by Wuhan University. A strong Chinese delegation submitted a winning application to the panel and was successful in their bid. Wuhan University is the largest university in the field of photogrammetry, remote sen-

sing and spatial science, with approximately 4,000 undergraduate and graduate students.

The 2017 edition of the Geospatial Week will take place from 18 to 22 September with Deren Li, honorary member of ISPRS, as director. He will be joined by a large team headed by Jianya Gong (currently president of Commission VI), Huayi Wu and Bisheng Yang.

The organizing committee looks forward to an interesting and successful Geospatial Week in 2017 and already welcomes all readers to join them in Wuhan!

You will find more on ISPRS Geospatial Week 2017 in one of the upcoming issues of this newsletter.

## KOMPSAT-3A Imagery

SI Imaging Services (SIS) has started commercial services of KOMPSAT-3A imagery with the world's second highest resolution satellite on 5 July. KOMPSAT-3A is part of the Korean Multipurpose Satellite Programme developed and operated by the Korea Aerospace Research Institute (KARI) for Earth observation purpose.

The Earth observation satellite offers clear imagery with a resolution less than 0.5metre. KOMPSAT-3A, also known as Anirang-3A, was launched into orbit in March 2015. After more than a year of successful test operation, SIS began commercial services on 5 July. It would make South Korea the world's second country to enter the less-than-0.5-metre-resolution satellite imagery market after the United States.

KOMPSAT-3A is the sister of KOMPSAT-3, using the same

satellite bus and payload. Its local access time is unique in the afternoon, 13:30, which is the same as KOMPSAT-3. However, since KOMPSAT-3A was put into lower orbit than KOMPSAT-3, it delivers clearer and sharper view.

You are welcome to visit the SI Imaging Services booth (nr. 89) to learn more about the possibilities KOMPSAT-3A imagery offers.



## Editorial and Advertising Opportunities

From 12-19 July 2016, the 23rd ISPRS Congress is being held in Prague, the beautiful capital of the Czech Republic. As the GIM International team, we are proud that we are publishing a daily round-up of all the latest congress news and developments during this gathering of photogrammetry and remote sensing experts from all over the world. The 'ISPRS Congress Daily' will be available as both a digital and a print publication. We welcome your press releases and other content ideas, so please feel free to contact Wim van Wegen ([wim.van.wegen@geomares.nl](mailto:wim.van.wegen@geomares.nl)), editorial manager, with your suggestions for editorial contributions. For attractive promotional opportunities in the 'ISPRS Congress Daily', please get in touch with Sybout Wijma ([sybout.wijma@geomares.nl](mailto:sybout.wijma@geomares.nl)), key account manager.

## Youth Forum

The new Student Consortium Board will be elected in the Small Hall on Sunday 17 July starting at 4:30 pm.

Contributions by young scientist cover all the main domains of photogrammetry, remote sensing and spatial scientists.

There will be two Youth Forum Best Paper Awards and two Youth Forum Best Poster Awards for the best papers presented at

the ISPRS Youth Forum Sessions.

The main purpose of the Student Consortium is to link students, young researchers and professionals in different countries and provide a platform for exchange of information, to organize student specific events and other actions that integrate youth effectively into ISPRS.

More info at [www.isprs2016-prague.com](http://www.isprs2016-prague.com)

## Photon Lidar

Airborne Lidar has matured over the last two decades into a mapping technology routinely used for 3D modelling of urban areas, capturing boreal forests, seabed mapping and many other applications all over the world. The speed with which the laser pulses are fired continues to soar and for a number of commercial systems it has reached the impressive number of one million pulses per second. Multiple pulses in air and (full) waveform digitisation are other developments which found their way to the users in recent years. Last year Optech introduced Titan, the world's first multi-spectral airborne Lidar. Without doubt the enhancements and advances will continue to emerge. One seemingly promising recent advance for mapping applications is photon Lidar (also known as Geiger-mode Lidar). But what is photon Lidar?

In conventional Lidar systems one pulse provides data on the reflectivity, the range and, when using (full) waveform digitisation,

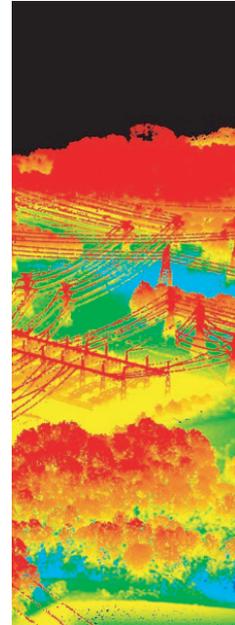
the surface structure of the footprint of the single pulse on the object - one pulse results in an information nucleus for one object point. The return signal contains thousands of photons. In contrast, the photon Lidar approach creates an array of points from a single pulse fired by the system - one pulse is divided into dozens or hundreds of sub-pulses. The partition of one pulse into many is enabled through the use of diffractive optics which split the outgoing pulse into an array of sub-pulses. The optics can be tailored to the needs of the user; the size of the array may be, for example, such that a quadrangle of 10 by 10 sub-pulses is generated from one pulse emitted by the sensor. The partition of the pulse in a 10 by 10 array enables one pulse to capture a point cloud of up to 100 points. The returns from the individual sub-pulses are captured by a receiver also consisting of a 10 by 10 array. So, one pulse does not cover one footprint, as conventional airborne Lidar does, but rather captures multiple individual

adjacent points resulting in a high point density. The sensitivity of the sensor is so high that the range to the surface of an object can already be determined even if just one photon is present in the return signal. Therefore, it is of no great concern if many photons in the fired pulses or return signals get lost in the atmosphere. As a result, the distance from sensor to the object may be much larger than for conventional Lidar. Similarly the swath width may be larger which reduces the number of flight lines, and hence data acquisition time, without affecting point density. A typical conventional airborne Lidar survey may be flown at 1,000m to 1,500m while a photon Lidar survey may achieve equivalent point densities at a flying height of 4,000m to 5,000m and the number of flight lines may be reduced by a factor three.

Are there no snags? Yes, there are. Photon Lidar detects only photons and registers the time of flight but not the strength of the return signal and thus no wave-

form digitisation is possible. By using RGB and NIR cameras the first shortcoming can be compensated for while the reconstruction of the surface structure, which is the main asset of waveform digitisation, can be derived from the dense point cloud. The ability to operate at low power levels is an advantage but requires on the other hand highly sensitive sensors which may wrongly detect solar photons as return signals. The effects of this type of noise may be diminished by careful design of beam divergence, spectral width, filters and other system parameters. Up until now, photon Lidar is not in use for the commercial collection of geodata. Before it can become a proven technology, further research is required to obtain thorough insight in the accuracy and reliability characteristics and into the ways to improve these major surveying parameters.

*Mathias Lemmens, senior editor  
GIM International  
(this column originally was published in GIM International)*



## Dense Image Matching

Point clouds are increasingly a prime data source for 3D information. For many years, Lidar systems have been the primary way to create point clouds. More recently, advances in the field of computer vision have allowed for the generation of detailed and reliable point clouds from images - not only from traditional aerial photographs but also from uncalibrated photos from consumer-grade cameras. Dense image matching is the powerful technology underpinning this development.

Understanding photogrammetry  
A good understanding of dense image matching requires insight into the way photogrammetry works. Photogrammetry in itself is

not a new technology; it has been applied in practice for decades without many changes to its fundamental concepts. In photogrammetry, 3D geometry is obtained by creating images of the same object from different positions. This makes a single point on the object visible as a pixel in multiple images. For each image, a straight line can be drawn from the camera centre through the pixel in the image. These lines will intersect at one point, which is the 3D location of the object point.

However, this requires the position and orientation of each image to be known. To this end, so-called tie points are used to link all

the images together. Each tie point is a well-recognisable point that is identified in all images where it occurs. Sufficient tie points allow for the reconstruction of the relative position of all images. Additionally, known points or ground control points (GCPs) with 3D world coordinates should be added to obtain scale and absolute coordinates. Tie points and GCPs are combined in a bundle block adjustment, resulting in the 3D coordinates of all tie points and, more importantly, the position and orientation of each image.

Read more at [www.gim-international.com](http://www.gim-international.com)

## Pioneering Dubai

Dubai has always been a pioneer and lead from the start when it comes to innovation and the application of new-age technologies to modernise the functioning of various organisations. Furthermore, the city has spearheaded several initiatives intended to make the world a better place to live in for its inhabitants. However, the activities are not just limited to Dubai. Some of the Emirates' initiatives extend to diverse parts of the globe. The Mohammed Bin Rashid Al Maktoum Global Initiative is one such step that aims to improve the world through humanitarian, developmental and community work in the areas of combating poverty and disease, spreading knowledge, empowering communities, and entrepreneurship and innovation for the future.

Several projects launched by the Initiative, in the above mentioned areas, have benefitted 130 million people from over 100 countries across the developing world and the future looks even brighter. Geospatial data and imagery assume great significance in giving impetus to these initiatives by providing crucial intelligence to people on the ground and thus making sure that the efforts are directed in the right direction and produce the best possible results.

In order to give further impetus to the use of these technologies, the need of the hour is to showcase the immense benefits of these technologies on a global plat-



form. The hosting of the 2020 ISPRS Congress in Dubai will not only be a boost for the further promotion and propagation of these technologies in the region but will also give the participants a chance to experience the traditional Middle Eastern culture with a delectable mix of some of the most advanced and ultra-modern architectural creations on the planet. To find out more about these initiatives and support Dubai's bid for hosting ISPRS 2020, please visit Dubai Municipality pavilion at booth no. 69.

## Black Light Theatre

Price: 25 Euro  
Address: Rytiřská 539/31

The intense darkness of the black theatre is full of fantasy. Poetic pictures approach you from the mysterious and almost indefinite depth of a black cabinet. Music will bring inanimate to life, tragic will change into comic, unbelievable will become real. Moreover, your imagination will awake fully. If you are willing to join the adventure you may find inside something you never knew existed.



Black Light Theatre, Prague