

International Society for Photogrammetry and Remote Sensing  
Commission VI – Education and Outreach  
**Working Group VI/5 – Promotion of the Profession to Students  
and Student Consortium**

**Report of the 2<sup>nd</sup> ISPRS WG VI/5 and SC  
Summer School  
“Theory and Application of Laser Scanning”  
Ljubljana, July 1-7<sup>th</sup>, 2007  
[http://www.fgg.uni-  
lj.si/~alisecc/www/ISPRS\\_SS\\_2007/](http://www.fgg.uni-lj.si/~alisecc/www/ISPRS_SS_2007/)**



- Venue:** Faculty of Civil and Geodetic Engineering, Jamova 2, Ljubljana, Slovenia
- Duration:** July 1-7, 2007
- Participants:** 52 international participants from 20 countries (many European countries, China, Malaysia, India, Iran, Egypt, Turkey), and around 30 domestic participants (students, faculty teaching staff, representatives from sponsors) attended the Summer School.
- Structure:** The structure of program was mostly based 1.5 hour sessions followed by refreshment break or lunch at noon. The first three days of lectures were dedicated to the airborne laser scanning, and the last two days to terrestrial laser scanning. Lectures included theoretical and practical parts with practical exercises. Together 32 lecturing hours were performed in five days. Important parts of the program schedule of the Summer School were practical/tourist excursions and social events as well.

**July 1<sup>st</sup>, 2007**

**Registration**

Most foreign participants arrived in Ljubljana on Sunday, 1<sup>st</sup> July and registered at the registration desk, where they received also the Summer School material and some useful information about the venue and program.

**Monday, July 2<sup>nd</sup>, 2007**

**Opening Ceremony (9:15 – 10:00)**

*Mojca Fras* (ISPRS WG VI/5, Chair; Organising Committee) welcomed the audience and made a short introduction to the 2<sup>nd</sup> ISPRS Summer School with a short presentation of the representatives of the Organising Committee and guests.

*Bojan Majes* (Faculty of Civil and Geodetic Engineering, dean) welcomed the Organising Committee, the participants and guests of the Opening Ceremony and gave some information about the University of Ljubljana and Faculty of Civil and Geodetic Engineering, Ljubljana and Slovenia. He especially pointed out the importance of such events. In the end, he expresses a wish to have an interesting, educational and social event in this small but very diverse country.

*Emmanuel Baltsavias* (ISPRS Second Vice President) warmly greeted the Organising Committee, the participants and guests of the Opening Ceremony and expressed the importance of such events as an example of an activity typical of “mediating” the knowledge to the advanced students, an idea that the ISPRS would like to develop in the near future. Furthermore, he gave summarized information about the ISPRS organisation and pointed out the ISPRS Congress in Beijing in 2008.

*Mojca Fras* informed the audience about the letter of support, written especially for this SS by dr. Janez Potočnik, the European Commissioner for Science and Research. All those present heard the words from Mr. Potočnik, who laid stress on the importance of the education, research and science, and international scientific and professional cooperation for the bright future for the next generations.

In addition, the video message from *Kohei Cho* (ISPRS TC VI president) was introduced to the audience. A pleasing greeting to the participants and organising committee of the Summer School was followed by short presentation of the TC VI activities and its working groups.

The Opening ceremony in the festive room was closed with some useful information about the organisation of the Summer School.

#### **Lectures:**

##### ***Requirements for generating a geometrically correct point cloud (10:00 – 13:30)***

*Peter Frieß, independent consultant for Optech International*

During the first two sessions, given by Peter Frieß, the participants got introduced to the principles of airborne laser mapping, mathematical model for laser point computation and laser point block adjustment.

##### ***Airborne LIDAR sensing (14:30 – 16:00)***

*Arthur Rohrbach, Leica Geosystems*

Arthur Rohrbach presented ALS applications and operation with latest generations of scanners – the session included typical applications, flight planning, execution and evaluation, costing and gave examples of projects.

##### ***Welcome party***

Welcome Party in the Faculty entrance hall in the evening was organised by local student organisation of geodesy. *Urška Renko*, the president of the Slovenian Geodetic Student Association expressed welcome, followed by cheerful cultural program and social evening with traditional Slovenian music and food.

#### **Tuesday, July 3<sup>rd</sup>, 2007**

#### **Lectures:**

##### ***Airborne laser scanning data processing tutorial (8:30 – 12:00)***

*Charles Lemaire, INPHO GmbH*

The tutorial, led by Charles Lemaire, was about processing lidar data using the INPHO products line: DTM master/DTM master stereo and SCOP++LIDAR package.

##### **Practical excursion**

In the afternoon, the participants had an opportunity to visit the Slovenian enterprise Flycome, more precisely its hanger at the Lesce sport airport, where the company maintain the

helicopter with the newest lidar equipment. The practical visit in Lesce was followed by the tourist visit of famous tourist resort Bled that lies at the edge of the national park and is famous for its glacial lake with a small island with 17<sup>th</sup> century church, and great alpine scenery. The day finished with dinner in a domestic restaurant in Žirovnica.

### **Wednesday, July 4<sup>th</sup>, 2007**

#### **Lectures:**

##### ***DSM/DTM filtering (8:30 – 10:00)***

*Norbert Pfeifer, Vienna University of Technology*

Norbert Pfeifer introduced problem definition, approaches to ALS data filtering, exemplified by implemented algorithms. In addition, the physics features of the laser beam were explained and some basic information on bathymetric laser scanning was given.

##### ***Information extraction from airborne laser scanning data (10:30 – 12:00; 13:00 - 14:30)***

*George Vosselman, ITC*

The lectures, given by George Vosselman, were focused on information extraction from ALS. The contents of the lectures related to segmentation of point clouds, detection of buildings, 3D modelling of buildings and 3D modelling of roads.

##### ***Applications of laser scanning in forestry (15:00 – 16:30)***

*Cristoph Straub, Albert Ludwigs University Freiburg*

Cristoph Straub made an introduction to the LS application in forestry. The presentation, prepared together with prof. Barbara Koch as counsellor, consists of short explanation of some methods for single tree delineation and forest stand mapping, followed by attractive software demonstration.

### **Thursday, July 5<sup>th</sup>, 2007**

#### **Lectures:**

##### ***Overview of terrestrial laser scanning systems (8:30 – 10:00; 10:30 - 12:00)***

*Norbert Pfeifer, Vienna University of Technology*

Norbert Pfeifer gave an introduction to the terrestrial laser scanning systems. The lectures comprised the range measurement and beam deflection and basic principles of relative and absolute orientation of laser scanning point clouds. Furthermore, some modelling approaches and selected examples of the terrestrial laser scanning were presented.

##### ***Point cloud co-registration and 3D modelling in cultural heritage (15:00 – 16:30)***

*Devrim Akca, Swiss Federal Institute of Tehnology (ETH) Zürich*

Devrim Akca put emphasis on the point cloud co-registration, where an algorithmic extension of the 2D image matching to the 3D case was explained. The second part of his lectures was reserved for the presentation of 3D modelling, texturing and applications for the purpose of the cultural heritage.

#### **Short meeting on Student Consortium activities**

During the Summer School, a short meeting on Student Consortium activities and related ISPRS Congress youth events was organised. In the meeting were present Prof. Emmanuel Baltsavias (ISPRS Second Vice President), Mojca Fras and Anka Lisec (WG VI/5 chair and

the secretary), Krzysztof Sterenczak, Cemal Ö. Kivilcim, Gregor Stavbar (the representatives of students) and Yong Zhang, Yini Jia, Gang Han, Yixiang Tian (organisers of the 3<sup>rd</sup> Summer School in China). The discussion was about the next Summer School in Nanjing, about the Youth forum during the ISPRS Congress 2008 in Beijing and about the organisation and activities of the Student Consortium. The details are reported in the minutes of the meeting.

### **Friday, July 6<sup>th</sup>, 2007**

#### **Lectures:**

##### ***Practical aspects of terrestrial laser scanning (8:30 – 10:00: 10:30 - 12:00)***

*Nikolas Studnicka, RIEGL LMS GmbH*

Nikolas Studnicka demonstrated the work with the Riegl terrestrial laser scanner. A part of the ancient Roman wall of Emona (today Ljubljana), which is situated near the SS venue, was scanned from different positions. In the lecture room, the results of scanning were presented. In addition, some examples of application (mobile laser scanning, forensic, archaeology, etc.) were given.

##### ***Student Session – young authors' papers (13:00 – 14:30)***

This session was dedicated to students and young researchers who presented the results of their work to the audience. There had been a call for young authors' papers and five papers were selected for the presentation in this session:

- *M. Alshawa*: ICL: Iterative closest line, a novel point cloud registration algorithm based on linear features
- *S. Woodget*: Estimation of growth rates at Kielder forest using airborne laser scanning
- *G. Jóźków*: Moving polynomial in filtering of airborne scanning laser data
- *C.Ö. Kivilcim*: An undergraduate project with terrestrial laser scanner for purpose of architectural survey
- *M. Bitenc*: Analysis of airborne laser scanning data and products in the Neusiedler see project

In addition, one poster was presented (*Martin Somers*) during this session.

##### ***TLS practical exercise***

*Gregor Bilban, Geoservis d.o.o.*

Gregor Bilban from the Slovenian company Geoservis, a Leica Geosystems authorized distributor demonstrated work with the Leica Geosystems terrestrial laser scanner and data processing.

##### **Student Consortium Assembly and final discussion**

The final program of the 2nd Summer School finished with the closing session.

*Emmanuel Baltsavias* gave concentrated information on the next ISPRS Congress in Beijing and reported about the recent 32<sup>nd</sup> International Symposium on RS of Environment in Costa Rica, where a special program for the students was organised as well.

*Cemal Ö. Kivilcim* reported on SC past activities and made a short presentation about the Student Consortium.

*Krzysztof Sterenczak*, the newly appointed editor for the SC Newsletter, gave information on the goals and contents of the ISPRS SC Newsletter. Together with *Gregor Stavbar* they will be responsible for editing the newsletter.

*Mojca K. Fras* asked the audience for their opinion about the topics and structures of the program for the next summer school in Nanjing, and the discussion followed. Most of those who were present agreed that there has to be a main topic defined to encourage students and researchers for the participation.

*Urška Renko* presented some statistics on this SS in Ljubljana. 52 international participants and around 30 domestic participants from 20 countries attended the summer school. The participants came from Austria, Bosnia and Herzegovina, Bulgaria, China, Croatia, Egypt, France, Germany, Greece, Hungary, Iran, India, Ireland, Malaysia, Poland, Romania, Slovenia, the Netherlands, Turkey and the United Kingdom.

During a photo show of the past days, *Mojca K. Fras* granted certificates of the attendance to the SS participants and a T-shirt with the SS logo. The logo of the 2<sup>nd</sup> SS was a hen piloting a plane performing scanning – the hen represents Slovenia which shape looks like a hen.

The students gave to the organizers-in-chief, *Mojca K. Fras*, *Anka Lisec* and *Urška Renko* a pleasant surprise, sincere thanks and to each a beautiful sunflower as a symbol of thanks.

In the evening there was a relaxed social gathering in the hostel *Vič*, where the Slovenian students prepared some funny program, finishing with the festive cake dedicated to the successful closure of the summer school.

### **Saturday, July 7<sup>th</sup>, 2007**

#### ***Trip to Primorska***

The tourist visit on Saturday led the participants to the Slovenian Karst and marvellous Postojna cave. The next stop was Adriatic coastline where we participants enjoyed walking, or sitting along the coast. In Piran, a picturesque littoral city, we could enjoy in swimming in the Adriatic Sea, visiting nice tourist spots, etc. The evening finished with the dinner in a farm guest house with on old tradition and high quality wine production.



*2<sup>nd</sup> Summer School in Ljubljana, Slovenia,  
1-7<sup>th</sup> July, 2007 – participants*