

# REPORT ON ISPRS WG VI/5 AND STUDENT CONSORTIUM SUMMER SCHOOL »THEORY AND APPLICATION OF LASER SCANNING« LJUBLJANA, SLOVENIA, 1 – 7 JULY 2007

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The WG VI/5: Promotion of the Profession to Students, together with the Student Consortium (SC) organized the 2<sup>nd</sup> Summer School (SS) on laser scanning in Ljubljana, Slovenia, 1 – 7 July 2007. Summer schools present one of the most important activities of the WG VI/5 and SC for the promotion of the science among the young researchers. The main purpose is to provide an educational week with training activities for the students and young researchers in the ISPRS's work fields. The 1<sup>st</sup> ISPRS Summer School took place at Istanbul Technical University's Maslak campus, Turkey, 19 – 26 June 2005 with the topic "Satellite Data Processing and Spatio-Temporal Analysis for Resource and Disaster Mapping, Monitoring and Management". The 3<sup>rd</sup> Summer School will take place in Nanjing, China, 27 June – 1 July 2008, proposed topic is »Acquisition, processing and representation of 3D geospatial information«, organized jointly with the biannual Chinese Doctoral Students' Forum in GIS.

The decision for the topic of the SS in Ljubljana was due to the fact that the technology of laser scanning is inevitably entering the everyday surveying practice. The needs from the practice are big and enterprises employing young professionals expect that they are well acquainted with latest development when finishing their study.

The Summer School was hosted by University of Ljubljana, Faculty of Civil and Geodetic Engineering. The University of Ljubljana is an institution with a very rich tradition, established in 1917, and today with over 40.000 of regular students ranks among the biggest universities in the world scale. The organisation of the Summer School was entrusted to the Faculty of Civil and Geodetic Engineering, Slovenian Geodetic Student Association (more than 20 students of geodesy were involved in the organization) and Association of Slovenian Surveyors – Section of Photogrammetry and Remote Sensing.

The success of the Summer School was already a great number of participants – 52 international participants from 20 countries (China, Malaysia, India, Iran, Egypt, Turkey and many European countries), and around 30 domestic participants (students, faculty teaching staff, representatives from sponsors) attended the Summer School. Most foreign participants arrived in Ljubljana on Sunday, 1<sup>st</sup> July, when local students organized the transfer for them to the student hostel Vič near the SS venue, where they were accommodated. The arrivals registered at the registration desk and received the SS bag (a rucksack) with SS materials inside (program book, proceedings on CD-ROM, promotional material, etc.).

The program kicked off on Monday, 2<sup>nd</sup> July, with the opening ceremony. The working group chair Mojca Fras welcomed the audience and gave the floor to the Faculty dean, Prof. Bojan Majes. He warmly greeted the guests, introduced the University of Ljubljana and the host Faculty, and gave some interesting information about Slovenia and Ljubljana. The next speaker

was the ISPRS Second Vice President Prof. Emmanuel Baltsavias, who was present during the complete program of the SS. He gave summarized information about the ISPRS organization and activities, especially about the next Congress in Beijing, and stressed the importance of different student activities within the ISPRS.



Photo1. Opening ceremony, speech of the ISPRS 2<sup>nd</sup> Vice President E. Baltsavias; in the background from the left: U. Renko, A. Lisec, Prof. B. Majes

Than, Mojca Fras read the letter of support, written especially for this occasion by Dr. Janez Potočnik, the European Commissioner for Science and Research. Dr. Potočnik wrote: ".... Europe must invest in its youth. The young are the future, and timely and effective investment in youth is the key of making that future prosperous, both economically and socially. .... Science will play ever increasing role in the development of our societies. Therefore activities such as the organisation of this summer school on Theory and Application of Laser Scanning are essential for stimulating the personal development of potential future scientists and young researchers. ...". This letter is published in full in the program book and SS proceedings (CD-ROM). The TC VI president, Prof. Kohei Cho, was not able to come to this event, but he kindly prepared a video message that was played to the audience. It was a pleasing message, introducing the activities of the TC VI and its working groups. This message received loud applause in the end. Finally, Mojca Fras gave summarized information on the SS program, organizing team and sponsors.

The program started with lecture sessions. Each session was of 1.5 hours duration, followed by half an hour 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. All together 32 lecturing hours were performed in five days (from Monday to Friday). Lectures were

given in different ways, some were theoretical and some were practical in a form of a tutorial (work on computer using special software) and practical exercises (outdoor measurements).

The first lecture was given in two sessions by Dr. Peter Frieß, an independent consultant for Optech International, on requirements for generating a geometrically correct point cloud. He introduced principles of airborne laser mapping, mathematical model for laser point computation and laser point block adjustment. After lunch, the afternoon lecture was given by Dr. Arthur Rohrbach from Leica Geosystems on ALS Applications and operation with latest generation of scanners. He presented typical applications, flight planning, execution and evaluation, costing and gave examples of projects.

The Monday evening was reserved for welcome party in the Faculty entrance hall. It was organized by local students, led by Urška Renko, the president of the Slovenian Geodetic Student Association. She expressed the most cordial welcome and then a short but cheerful cultural program followed with chorus singing Slovenian traditional songs, musical performance duet on synthesiser (Mojca Fras) and singing saw (Tomaz Podobnikar). The guests were served with domestic food ("kraški pršut" – ham dried on the air, and "potica" – rolled walnut cake) and drink. The scene was then really set in motion with trumpets and drums of the "Donald TrumpeT", recently very popular Slovenian music group.



Photo 2. From the left: Cemal Ö. Kivilcim, co-organiser of the 1<sup>st</sup> SS in Istanbul, Anka Lisec co-organizer of the 2<sup>nd</sup> SS in Ljubljana, Yini Jia and Yong Zhang, co-organizers of the 3<sup>rd</sup> SS in Nanjing

On Tuesday morning, 3<sup>rd</sup> July, two sessions were dedicated to ALS data processing tutorial, lectured by Charles Lemaire from INPHO GmbH, in the computer room. The tutorial was about processing lidar data using the INPHO products line: DTM master/DTM master stereo and SCOP++LIDAR package. In the afternoon, a double-decker drove participants to Lesce sport airport where the Slovenian enterprise Flycom has a hangar with helicopters and the newest lidar equipment (full-wave scanner). The company staff cordially accepted the guests and made a thorough presentation of the equipment and some of their recent projects. This was very instructive occasion for many of the participants, having opportunity to see in "real" such an equipment. The way led us further to the Bled glacial lake, very famous and nice tourist resort, surrounded by Julian Alps. There was some free time to discover the

surroundings of this famous place at the edge of the national park (Triglavski narodni park). The day finished with a dinner in a domestic restaurant in Žirovnica, where everyone suffered from the gigantic meal portion.



Photo 3. Visiting Flycom hangar

On Wednesday, 4<sup>th</sup> July, there were two morning and two afternoon sessions in the program. The first session was given by Prof. Norbert Pfeifer from Vienna University of Technology (IPF) on DSM/DTM filtering. He introduced problem definition, approaches to ALS data filtering, exemplified by implemented algorithms. In addition, he explained the physics features of the laser beam and gave some basic information on bathymetric laser scanning.



Photo 4. Prof. N. Pfeifer answering many questions during the break

The second and the third lectures, focused on information extraction from ALS, were given by Prof. George Vosselman from the ITC. This was very interesting and thorough lecture about segmentation of point clouds, detection of buildings, 3D modelling of buildings and 3D modelling of roads. The last session of this day was given by Cristoph Straub from Albert-Ludwigs University Freiburger, Department of RS and Landscape Information Systems, on application of laser scanning in forestry. His presentation was prepared with contribution of Prof. Barbara Koch and her team. He introduced the LS application in forestry, explained some methods for single tree delineation and forest stand mapping, presented

estimation of forest characteristics and made very attractive software demonstration.

On Thursday, 5<sup>th</sup> July, program started with the ALS technology. Prof. Norbert Pfeifer gave a lecture in two sessions on overview of TLS systems, overall processing and applications. He explained in details the range measurement and beam deflection, gave basic principles of relative and absolute orientation of laser scanning point clouds, some modelling approaches and selected examples. In the afternoon, two sessions were given by Dr. Devrim Akca from the Swiss Federal Institute of Technology (ETH) Zürich. First lecture was on point cloud co-registration, which is the first step of the whole processing chain (methods from the literature, algorithmic extension of the 2D image matching to the 3D case, different examples). His second lecture was on 3D modelling, texturing and applications in cultural heritage. This lecture was application oriented, about 3D surface meshing and texture capabilities of the available commercial software packages (e.g. PolyWorks, Geomagic), with some examples. In the late afternoon, there was a meeting on Student Consortium activities and related ISPRS Congress youth events. In the meeting were present the ISPRS Second Vice President (Prof. Emmanuel Baltsavias), the WG VI/5 chair and the secretary (Mojca Fras and Anka Lisec), the representatives of students (Krzysztof Stereńczak, Cemal Ö. Kivilcim, Gregor Stavbar) and the Chinese student group (Yong Zhang, Yini Jia, Dr. Gang Han, Yixiang Tian). The discussion was about the next SS in Nanjing, youth forum during the Congress in Beijing (awards, preparation of themes for YF panel session), publishing of the SC digital Newsletter (first issue planned in October 2007), checking and improving SC members database, proposals for improvement of SC functioning and organisation etc. The details are reported in the minutes of the meeting. The evening was reserved for a guided tour of Ljubljana old centre, which finished with a boat trip along the Ljubljanica river to a nice restaurant where another pleasant social gathering took place.



Photo 5. Guided tour to Ljubljana centre, in front of the city hall

On Friday morning, 6<sup>th</sup> July, program started with outdoor practical measurements. Mr. Nikolaus Studnicka from RIEGL LMS GmbH 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. The second session followed in the lecture room, where Mr. Studnicka presented the results

of scanning. In addition, he showed examples of different applications (mobile laser scanning, forensic, archaeology, etc.). The next session was a little bit special, namely, it was dedicated to students – young authors, who wrote a paper or prepared a poster about their research work in laser scanning, and presented it to the audience. All together, there were five oral presentations and one poster presentation. The presentations were very well prepared and there was a lively discussion from the audience.

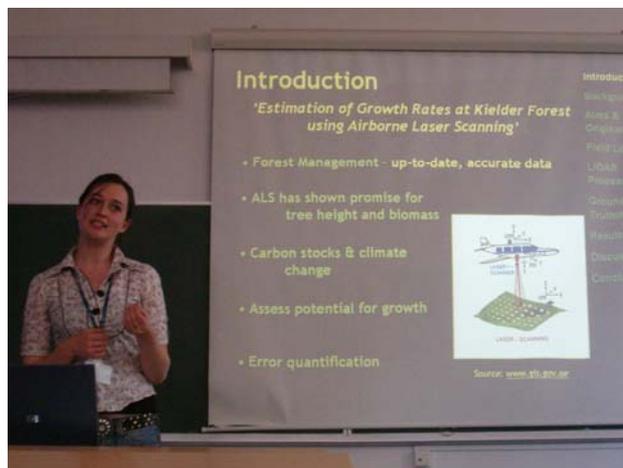


Photo 6. Young author paper presentation given by Amy S. Woodget

The last program session was given by Mr. Gregor Bilban from the Slovenian company Geoservis, a Leica Geosystems authorized distributor. He demonstrated work with the Leica Geosystems terrestrial laser scanner and data processing, and gave some examples of projects. The final program of the summer school finished with the closing session. The 2nd Vice President 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 Krzysztof Stereńczak, the newly appointed editor for the SC Newsletter, gave information on the goals and contents of the SC Newsletter. Furthermore, there was a discussion about the topics and structure of the program for the next summer school, led by the WG VI/5 chair who kindly asked the audience about their opinion. Urška Renko presented some statistics on this SS in Ljubljana (number of participants, countries) and played a photo show of the past days, during which Mojca 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> Summer School was a hen piloting a plane performing scanning; the hen represents Slovenia which shape is looks like a hen. The Slovenian students prepared for the organizers-in-chief (Mojca Fras, Anka Lisec and Urška Renko) a pleasant surprise, they gave a sincere thanks and flowers. 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 2<sup>nd</sup> Summer School.



Photo 7. WG VI/5 chair M. Fras granting certificate of attendance to the participants

In addition, it has to be mentioned, that on Friday there was another event organized in parallel, a workshop entitled "Laser Scanning – where and how to use it". It was organized by the Association of Slovenian Surveyors – Section of Photogrammetry and Remote Sensing, Slovenian Geodetic Student Association and Slovenian Academy of Science and Arts. It was focused on Slovenian audience (over 40 people participated), giving the potential user of LS information about the state-of-the-art, domestic companies and institutions providing data acquisition and data processing and examples of interesting projects. In the opening, Prof. Emmanuel Baltsavias gave information on ISPRS role and activities, Prof. Norbert Pfeifer had the invited introduction lecture, and then nine presentations from companies and institutions followed. This event showed that in Slovenia the laser scanning technology is already present, and that the interest from the consumers for this technology is increasing.

On Saturday, 7<sup>th</sup> July, a double-decker drove the participants on the excursion to the Slovenian Karst, where our guests visited the magnificent cave of Postojna, and then proceeded to the Slovenian coast, with long stop in Piran, a picturesque littoral city, where 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 an old tradition and high quality wine production. During journey back to Ljubljana almost everyone has recollected the past days impressions and it was difficult to realize that the summer school was over.

It took the organizers a lot of effort to organize this event, but we accepted this with pleasure and awareness that it is for good and very positive purpose – to promote the profession among the students and to transfer the knowledge from the experts to the youth. As a reward for our efforts, we have received already during the event and also after it many thanks and congratulations for the successful accomplishment, from both, the participants and the lecturers. Here, just a few selected comments from the students:

*"This Summer School will be a memorable time for me in my life. I can enjoy different cultures, also delicious food in Slovenia. People there are very friendly, which makes me feel at home. Thank you very much! As one of the local coordinators in China, I feel very happy I can learn a lot from you, and I hope next year you can come to Nanjing to take part in next year's SS. Best Wishes!" (Yong Zhang, China)*

*"I can comment it in a few words: advantages: well-organized, high quality of education, interesting excursions, participants, organizers and lecturers very friendly and fun-loving; disadvantages: high sleep deprivation :)" (Tomasz Drobny, Poland)*

*"The camp was very, very great - I just missed the last 2 days but Katherina wrote me that these days especially on the beach-trip were amazing. You organized very well, the beginning party was great, with the music and dance, could have been every day! The lectures were very professional and deep, also we got a wide view about laser scanning, practical experience on the PC and a visit by the company with the helicopter. The accommodation and the food was more than good and your support again the best. Thanks for all." (Stefan Peters, Germany)*

In the first place, the quality of the lectures was crucial for a success of the SS, but not less important was a very friendly atmosphere developed during the whole week. Participants worked as a group of old friends and many new friendships were established. A lot of discussion was running between the participants and the lecturers, some questions have been set during the lectures or students asked particular details during the breaks.

The web page of the SS is still active ([http://www.fgg.uni-lj.si/~alisec/www/ISPRS\\_SS\\_2007/](http://www.fgg.uni-lj.si/~alisec/www/ISPRS_SS_2007/)), where there is a photo gallery published and the complete materials could be download (please, contact the WG VI/5 secretary to receive the password).



Photo 8. Happy participants in the front of the UL-Faculty after the summer school closing

#### **Acknowledgement:**

The organizers deeply thank the ISPRS Council, who supported and sponsored this event, as well as numerous international and Slovenian sponsors for their financial and material support. The sponsors are published in the program book of the summer school. We cordially thank all the lecturers in this summer school for their generosity to contribute and share their valuable knowledge with young people interested in the profession.

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