

**Workshop and Summer School on the Evaluation and Benchmarking Sensors,
Systems and Geospatial Data in Photogrammetry and Remote Sensing**
16-20.09.2019, Warsaw, Poland

REPORT

Joint events aimed at a presentation of the newest solutions in the spatial data processing in the frame of the

- *Workshop on Evaluation and Benchmarking of Sensors, Systems and Geospatial Data in Photogrammetry and Remote Sensing*, 16-17 September 2019, Warsaw University of Technology, ptfit.sgp.geodezja.org.pl/workshop2019/index.html,
- VOLTA - innoVation in geOspatial and 3D daTA Summer School, 18-20 September 2019, University of Warsaw, Faculty of Geography and Regional Studies, Krakowskie Przedmieście 30, Warsaw, volta.uw.edu.pl .

WORKSHOP

The wide variety of sensors and systems available on the market for collecting spatial data makes the evaluation of provided information, calibration of sensors and benchmarking of systems and 3D data a critical task. It is also an important scientific issue for many professionals. In daily work, the assessment of tools for collecting spatial data resources is a crucial issue for National Mapping and Cadastral Agency officers and all professionals handling geospatial data. Workshop on Evaluation and Benchmarking of Sensors, Systems and Geospatial Data in Photogrammetry and Remote Sensing organized was therefore appropriate for potential attendees who wanted to extend their knowledge in the fields of photogrammetry and remote sensing.

This workshop was held in the Warsaw University of Technology, Faculty of Geodesy and Cartography on 16 - 17 September 2019. It was organized by the International Society for Photogrammetry and Remote Sensing (ISPRS) and European Spatial Data Research (EuroSDR) in support of Polish Society for Photogrammetry and Remote Sensing (PTFIT) and German Society for Photogrammetry, Remote Sensing, and Geoinformation (DGPF). 50 people from 15 countries participated in this two-day conference. The topic of the narrow substantive scope was the evaluation and comparison of photogrammetric and remote sensing sensors and data collected therefrom. The program started with keynotes' lectures: dr Gottfried Mandlbürger (University of Vienna/University of Stuttgart) and dr. Isabella Toschi (Bruno Kessler Foundation). After lectures presentations of attendees were placed in a program. They were related to the review of benchmarking initiatives, assessment of geospatial data processing and algorithms for image matching, orientation of low-altitude images from UAV platforms, issues associated with UAV calibration fields. Another interesting subject of presentations were: experience of national mapping agencies in evaluation of geodata, using Sentinel data in

selected applications, assessing sensors in mobile mapping systems. Important topics were presentation new benchmarking initiatives aimed to scientists willing to participate which can help less experienced scientists or less well-known scientific institutions participate in research planned for a wide audience. Conference papers from this workshop has been published in The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, volume XLII-1/W2:

<https://www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XLII-1-W2/index.html>

Program of the Workshop

September 16, 2019 - Workshop Day 1

Warsaw University of Technology, Koszykowa 75, Warsaw, Poland, room 101, 1st floor

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|---------------|---|
| 9.00 - 10.00 | Registration |
| 10.00 - 10.15 | Workshop Opening |
| 10.15-11.00 | Keynote presentation with discussion
Dr. Gottfried Mandlbauer
<i>"Evaluation of Single Photon and waveform LiDAR"</i> |
| 11.00 - 11.15 | coffee/tea break |
| 11.15-12.00 | Keynote presentation with discussion
Dr. Isabella Toschi
<i>"Airborne oblique imaging: towards the hybrid era"</i> |
| 12.00 | Photo of workshop attendees |
| 12.00 - 13.00 | Lunch – Main Hall of Warsaw University of Technology |
| 13.00 - 15.00 | Session #1 – Evaluation and benchmarking geodata and algorithms

K. Bakula, J. P. Mills, F. Remondino
<i>"Review on benchmarking in photogrammetry and remote sensing: preface"</i>
E. Özdemir, I. Toschi, F. Remondino
<i>"A multi-purpose benchmark for photogrammetric urban 3D reconstruction in a controlled environment"</i>
A. Frenzel, N. Deckers, R. Reulke
<i>"Quantitative comparison between neural network- and SGM-based stereo matching"</i>
G. Gabara, P. Sawicki
<i>"Test field Kortowo for testing photogrammetric products accuracy – design and first evaluation"</i> |
| 15.00 - 15.20 | coffee/tea break |
| 15:20 – 15:40 | Sponsor's presentation: P. Strzeliński , K. Kondracki – GISPRO Sp. z o.o.
"Multi-Sensor Aviation Diagnostic Station For Inventory of Forest Areas" |
| 15:40 – 16:00 | Sponsor's presentation: P. Nørgård – Hexagon / Leica Geosystems |

“Choose the best LiDAR technology for the size of your projects”

- 17.30 - 20.00 Social trip in Warsaw Old Town:
Program: Tomb of the Unknown Soldier, Presidential Palace, A. Mickiewicz monument, Chopin's benches and walk through the streets of old city: King Sigismund's Column, Royal Castle, St. John's Cathedral, Old Town Square with monument of Warsaw Mermaid, house of birth Mary Skłodowska Curie, defensive walls with Barbican.
- 20.00 - 24.00 Ice-breaker Dinner in [Podwale 25](#) Restaurant

September 17, 2018 - Workshop Day 2
Warsaw University of Technology, Koszykowa 75, Warsaw, Poland, room 101, 1st floor

- 8.30 – 9.00 News from INTERGEO 2019

9.00 - 10.30 Session #2 – Evaluation of data quality

W. Izdebski, A. Andrzejewski, A. Bober

“Requirements for photogrammetric data collected in national geodetic and cartographic resource”

W. Ma, Y. Zhao, P. Zhang, S. Dong, F. Luo, C. Liu, X. Wu

“Research on quality supervision and spot checks technology for nationwide large-scale topographic maps in China”

P. Wiącek, K. Pyka

“The test field for UAV accuracy assessments”

- 10.30 - 10.45 coffee/tea break

- 10.45 – 11.00 Main Sponsor's presentation: Radomir Bałazy – Gispro Sp. z o.o.

11.00 - 12.30 Session #3 - Evaluation and benchmarking sensors and systems

D. Iwaszczuk, Z. Koppányi, J. Pfrang, C. Toth

“Evaluation of a multi-sensor system for seamless outdoor and indoor mapping”

A. Warchoł

“The concept of LIDAR data quality assessment in the context of BIM modeling”

K. Bakula, T. Kogut, W. Ostrowski

“A concept for LIDAR sensors benchmarking”

- 12.30 - 13.30 Lunch – Main Hall of Warsaw University of Technology

- 13.30 – 13.45 Sponsor's presentation: Jan Konieczny – Vexcel

- 13.45 – 14.00 Sponsor's presentation: Joanna Mleczko – MGGP Aero

- 14.00 – 14.30 coffee/tea break

14.30 - 16.00 Session #4 – Evaluation of sensors and geodata in selected applications

A. Abramowicz, R. Chybiorz

“Fire detection based on a series of thermal images and point measurements: the case study of coal-waste dumps”

M. Cavar, H.S. Duzgun, S. Kemec, D. C. Demirkan

“Land use and land cover classification of Sentinel-2A: St. Petersburg case study”

G. Kuc, J. Chormański

“Sentinel-1 and sentinel-2 data fusion for mapping and monitoring imperviousness in urban areas”

16.00 - 16.30 Closing of Workshop

The main sponsor of the workshop was Polish photogrammetric company [Gispro Sp. z o.o.](#). Other sponsors were [MGGP Aero Sp. z o.o.](#), [Vexcel](#) and [Hexagon](#).



Organizers also prepared social events. In the first day of workshop attendees participated in guided walk trip around Warsaw Old Town visiting: Tomb of the Unknown Soldier, Presidential Palace, Adam Mickiewicz monument, Fryderyk Chopin's benches, King Sigismund's Column, Royal Castle, St. John's Cathedral, Old Town Square with monument of Warsaw Mermaid, house of birth Mary Skłodowska Curie and defensive walls with Barbican. After positively exhausting trip participants took part in Ice-breaker Dinner in restaurant Podwale 25 where they felt Polish hospitality and tasted Polish meals.





SUMMER SCHOOL

The idea of the Summer School was oriented on a presentation of theoretical backgrounds of the hyperspectral data acquisition, processing and analysis. In the morning session there were tutorials, and afternoon practical sessions presented by leading organisations on the field of hyperspectral technology (alphabetical order): Malvern Panalytical, MGGP Aero, Norsk Elektro Optikk AS., ReSe Applications, University of Warsaw and supported by the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 734687 of the VOLTA project and co-supported by the Polish Ministry of Science and Higher Education in the frame of H2020 co-financed projects No. 3934/H2020/2018/2 and 379067/PnH/2017.

Registration was limited due to an access to equipment and possibilities of interactive discussions between participants and tutors. 20 participants from: Austria, China, Czech Republic, Japan, Jordan, Poland, Portugal, Romania, Slovenia, Spain, Sweden, Turkey attended the Summer School.

The program of the School covered 27 hours:

- 18.09.2019, *hyperspectral field data acquisition and processing*: **Brian Curtiss**, **Szymon Stolarek** ([Malvern Panalytical](#)), **Marlena Kycko** (UW). The course was oriented on the ASD FieldSpec processing chain from the setup up to final products generation, including calibration, spectra acquisition, file export, spectral curves and indices calculation,
- 19.09.2019, *hyperspectral airborne data acquisition and preprocessing*: **Niels Christian Moen** ([NEO](#)), **Jan Niedzielko** ([MGGP Aero](#)). The course was focused on

the HySpex concept, flight planning, image data pre-, processing (atmospheric and geometric correction), final product generation,

- 20.09.2019, *hyperspectral airborne image classification*: **Edwin Raczko** (UW). The course was oriented on hyperspectral image classification methods basing on the R software.

All course participants received the Summer School confirmations.

An important part of the School was the dinner, which was organised at the Dawne Smaki restaurant, which offers old style Polish meals. It was a proper place for discussions and an experience exchange.

Suponsors



Ministry of Science
and Higher Education
Republic of Poland



VOLTA
innoVation in geOspatial and 3D daTA

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[Marie Skłodowska-Curie Actions, Research and Innovation Staff Exchange \(RISE\) H2020-MSCA-RISE-2016 - REA G.A. 734687](#)

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Supporters of Summer School

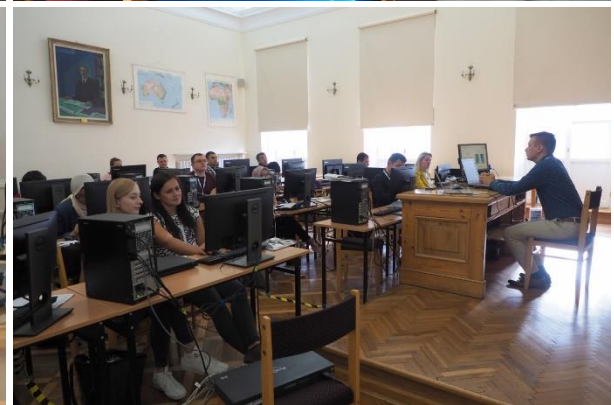
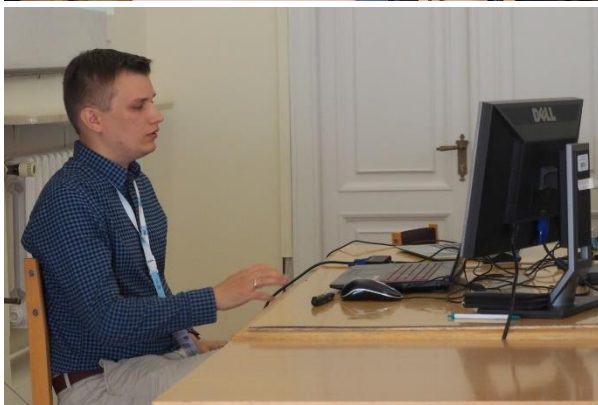
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APPLICATIONS



**Malvern
Panalytical**
a spectris company

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All materials (including [Gallery](#)) are presented on the web page: <http://volta.uw.edu.pl>





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German Society of Photogrammetry, Remote
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Supporters of both events



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