

## **WG I/2 - LIDAR, SAR AND OPTICAL SENSORS FOR AIRBORNE AND SPACEBORNE PLATFORMS**

Web page: <http://www.commission1.isprs.org/wg2/>

### ***Working Group Officers***

- Chair: Dr. Boris JUTZI, Institute of Photogrammetry and Remote Sensing, Universität Karlsruhe (Germany)
- Co-Chair: Dr. Charles TOTH, Center for Mapping, The Ohio State University (USA)
- Co-Chair: Dr. Franz MEYER, Geophysical Institute, University of Alaska Fairbanks (USA)
- Secretary: Dr. Naci YASTIKLI, Department of Geodetic and Photogrammetric, Yildiz Technical University (Turkey)

### ***Terms of Reference***

- Evaluation and assessment of systems for processing and integrating SAR, LiDAR and optical data
- Address challenges in low-frequency spaceborne SAR system design and data processing
- Modeling or error sources in active SAR and LiDAR measurements to promote and enhance their value as geodetic observation systems
- Address challenges and applications of high-resolution spaceborne SAR systems (e.g. TerraSAR-X, Cosmo Skymed)
- Evaluation of Systems for generation DEMs (Resolution I.3)
- Evaluation of Multi-frequency SAR, polarimetric InSAR systems
- Evaluation of Multi-pulse and full-waveform LiDAR
- Evaluation of Range imaging with array sensor systems
- Data quality and performance validation of SAR, LiDAR and optical systems
- Liaison with external groups such as CEOS, IGARSS and EuroSDR

### ***Mission***

Active sensor-based SAR and LiDAR technology, introduced in the late 90s, has received wide acceptance in airborne surveying as a leading tool for obtaining high-quality surface data in an unprecedentedly short turnaround time. The adoption of the new technology was fairly smooth and quick, primarily due to the high-level of automation of the data processing. LiDAR systems nowadays do range measurement with an increasing number of points per surface, count multiple returns per single shot, deliver reflectance values of the illuminated surface and capture the full waveform of the backscattered laser light. The role and capabilities of Interferometric SAR (InSAR or IFSAR) continue to expand, particularly with respect to wide area DEM creation. Areas of significant technical interest and application include Polarimetric InSAR and Differential InSAR with respect to quite different but important applications. Fusion of high resolution SAR images with optical is again of interest as new techniques are applied. The mission of this working group is to address data processing and interpretation issues to strengthen the role of active remote sensing systems in mapping and monitoring applications. Additionally, the integration of active remote sensing data with other imaging systems is promoted. The objectives of this working group are detailed in the *Terms of Reference*, listed above.

### ***Working Group Workshops 2010***

- Reviewing and co-organizing of ISPRS Technical Commission I Symposium 2010 in Calgary, Canada. The submitted abstracts underwent a thorough peer review process performed by the officers of WG I/2; each abstract was reviewed by three officers. 25 papers were accepted. The five oral sessions were titled:
  - Data quality and performance validation of active optical systems

- Processing of LIDAR data
- Sensor systems and technologies
- SAR systems and data processing
- Advances in mapping and surface extraction

Altogether 25 papers and one interactive session with six papers were presented.

### ***Other Working Group Activities 2010***

- Regular exchange of information with the WG members through letters.
- A dedicated website has been established and linked to the TC I website to support the work of the WG. See <http://www.commission1.isprs.org/wg2/>.
- Circular call for participation: An active approach to encouraging participation in WG activity was adopted, with a circular invitation to a wide audience. There are currently 22 members of the WG, representing 9 different countries. Note that there are a larger number of professionals who monitor the WG activities, though they are not formal members.
- Planning and progress meetings: The working group Chair and Co-Chair met during the ISPRS symposium in Calgary, Canada to discuss and establish future developments and goals.
- Representation of the Working Group at international meetings and workshops, where the chairmen of the working group assumed active roles in the organization and scientific program, included the following meetings:
  - ASPRS Journal of Photogrammetric Engineering & Remote Sensing (PE&RS) SPECIAL ISSUE 'High-Resolution Earth Imaging for Geospatial Information' (publication, reviewer board)
  - Photogrammetric Computer Vision and Image Analysis (PCV 2010) - Symposium of Commission III the ISPRS, Paris, France (program committee member, reviewer board)
  - International Geoscience and Remote Sensing Symposium IGARSS 2010 - July 25 - 30, 2010, Honolulu, Hawaii, USA (program committee member, organized and chaired invited Session on 'Ionospheric Effects in Polarimetric and Interferometric SAR Data', Review presentation on 'A REVIEW OF IONOSPHERIC EFFECTS IN LOW-FREQUENCY SAR – SIGNALS, CORRECTION METHODS, AND PERFORMANCE REQUIREMENTS')
  - Representing ISPRS and the WG at LARS (Latin American Remote Sensing) in Santiago, Chile, October 4 - 8, 2010 (two invited talks on LiDAR technology and waveform).
  - 3. Fortbildungsseminar Optische Messtechnik für Anwendungen im Maschinenbau 2010 (invited speaker), 14 October 2010 - Karlsruhe, Germany
  - ASPRS Annual and Fall meeting (combined with Commission IV Symposium), liaison to LiDAR committee.
  - Representation at the invitation-only MiniSAR Workshop in Taiwan, aimed at consulting the Taiwanese Government in their efforts to build airborne and spaceborne SAR sensors
  - Representation of the working group as board member of the 2nd critical design review (CDR) of the Argentinean L-band SAR system SAOCOM
  - Representation of working group interests by being named Co-Chair of related International Association of Geodesy (IAG) Study Group IC-SG3: 'Configuration Analysis of Earth Oriented Space Techniques'

### ***Planned Working Group Activities***

#### **2011**

- WG I/2 will be Co-Organizing 7th International Symposium on Mobile Mapping Technology, 13-16 June 2011, Cracow, Poland.
- WG I/2 will be Co-Organizing Working Group of the ISPRS Workshop High-Resolution Earth Imaging for Geospatial Information 2011 at the 14-17 June 2011 in Hanover, Germany.

- WG I/2 will be Co-Organizing Working Group of the ISPRS Workshop ISPRS Workshop Laserscanning 2011 in conjunction with the other ISPRS working groups, which will take place at the 29-31 August 2011 in Calgary, Canada.
- WG I/2 will be Co-Organizing Working Group of the ISPRS Workshop Photogrammetric Image Analysis PIA11 in conjunction with the other ISPRS working groups of Commission III, which will take place at the 5-7 October 2011 in Munich, Germany.
- WGI/2 will be actively contributing to IGARSS'11 by organizing a invited session on 'Ionospheric Effects in Polarimetric and Interferometric SAR Data'
- WG I/2 chairmen will serve on Scientific Committee of the 1st International Workshop on the Quality of Geodetic Observation and Monitoring Systems (QuGOMS) of the Intercommission Committee on Theory (ICCT) of the International Association of Geodesy (IAG), Munich, GERMANY, 4/13 – 4/15/2011.
- WG I/2 chairmen will be member of Program Committee of 'Earth Observation of Global Changes', Munich, Germany, 4/13 – 4/15/2011

## 2012

- Organize sessions at the ISPRS Congress 2012 in Melbourne, Australia.

### *Working Group Officers Contact Information:*

Chair:

Dr. Boris JUTZI

Institute of Photogrammetry and Remote Sensing

Karlsruhe Institute of Technology (KIT)

Kaiserstr. 12

76128 Karlsruhe

Germany

Tel: +49 721 608-6993

Fax: +49 721 608-8450

http: [www.ipf.uni-karlsruhe.de](http://www.ipf.uni-karlsruhe.de)

[boris.jutzi@ipf.uni-karlsruhe.de](mailto:boris.jutzi@ipf.uni-karlsruhe.de)

Co-Chair:

Dr. Charles TOTH

Center for Mapping

The Ohio State University

470 Hitchcock Hall

2070 Neil Avenue

Columbus, OH 43210-1275

USA

Tel: +1 614 292 7681

Fax: +1 614 292 2957

http: [www.cfm.ohio-state.edu](http://www.cfm.ohio-state.edu)

[toth@cfm.ohio-state.edu](mailto:toth@cfm.ohio-state.edu)

Co-Chair:

Dr. Franz MEYER

Geophysical Institute

University of Alaska Fairbanks

903 Koyukuk Dr., P.O. Box 757320

Fairbanks, Alaska 99775-7320

USA

Tel: +1 907 474 7767

Fax: +1 907 474 6441  
http: [www.insar.alaska.edu](http://www.insar.alaska.edu)  
[fmeyer@gi.alaska.edu](mailto:fmeyer@gi.alaska.edu)

Secretary:

Dr. Naci YASTIKLI  
Department of Geodetic and Photogrammetric  
Yildiz Technical University  
Engineering Davutpasa Cad., 34210 Esenler  
Istanbul  
Turkey  
Tel: +90 212 383 5328  
Fax: +90 212 261 6762  
[nyastikli@mail.com](mailto:nyastikli@mail.com)