PREFACE

Welcome to the ISPRS Technical Commission I Midterm Symposium on “Innovative Sensing – From Sensors to Methods and Applications” held in Karlsruhe, Germany, on 10-12 October 2018. The symposium is organized by the ISPRS Technical Commission I “Sensor Systems” which is concerned with the design, construction, characterization, calibration and use of imaging and non-imaging sensors, sensor systems and sensor networks for photogrammetry, remote sensing and spatial information sciences. This includes the development of new and innovative technological concepts, yet likewise models and methods to optimally exploit, calibrate and thoroughly evaluate new sensors, networks and single sensor components.

The recent years were characterized by rapid developments in various fields of sensor technology, design of smart sensor networks, small unmanned platforms (UAS) and new satellite imaging concepts or satellite constellations, respectively. This includes the sector of – often low-cost – industrial imaging sensors and likewise the development of highly sophisticated and specialized sensors for Earth observation, thereby covering multiple modes of active or passive sensor technology and various scales of imaging.

In summary, the main topics of the symposium are:

- Innovative and integrated UAS-oriented sensor and (small) platform concepts
- Systems and methods for terrestrial and mobile mapping in complex indoor and outdoor environments
- Small and low-cost active sensing (micro-LIDAR and -RADAR sensors)
- Design and realization of sensors and constellations for digital aerial and spaceborne missions for Earth observation
- Geometric and radiometric properties, quality standards, and factors affecting data quality
- Benchmark definition, calibration and evaluation of imaging and non-optical imaging sensors
- Integrated platform guidance, navigation, direct georeferencing (positioning and orientation) and integrated sensor orientation
- On-board (pre-)processing and concepts for embedded systems

Regarding these topics, a diversity of contributions are provided by the ten ISPRS Commission I Working Groups and the two related ISPRS Intercommission Working Groups:

- WG I/1 – Multi- and Hyperspectral Sensing
- WG I/2 – LiDAR, Air- and Spaceborne Optical Sensing
- WG I/3 – SAR and Microwave Sensing
- WG I/4 – Calibration and Validation of Satellite Sensors
- WG I/5 – New 3D Sensors for Metrology and Industrial Vision
- WG I/6 – Multi-sensor Integration and Fusion
- WG I/7 – Mobile Mapping Technology
- WG I/8 – Satellite Constellations for Remote Sensing
- WG I/9 – Integrated Sensor Orientation, Calibration, Navigation and Mapping
- WG I/10 – Sensor Systems Verification, Benchmarks, Evaluation
- ICWG I/II – UAS and Small Multi-sensor Platforms: Concepts and Applications
- ICWG I/IV – Robotics for Mapping and Modelling

In total, we received 36 full paper submissions and 85 abstract submissions. The full paper submissions entered a strict double-blind peer-review process. Each paper was checked by at least three reviewers and, in case of strongly varying opinions, an additional external reviewer was involved for the acceptance decision. Finally, 22 full paper submissions were accepted for publication in the *ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences* (Volume IV-I). Among the remaining full paper submissions and the abstract submissions, a total number of 70 submissions were accepted for publication in the *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences* (Volume XLII-I).

All provided reviews have been thoroughly checked regarding their level of detail and their quality. We are pleased to recognize the following researchers for their “Outstanding Contribution in Reviewing”:

- Michael Cramer
- Marcus Hebel
- Petra Helmholz
- Ludwig Hoegner

This contribution has been peer-reviewed. The double-blind peer-review was conducted on the basis of the full paper.
https://doi.org/10.5194/isprs-annals-IV-1-1-2018 | © Authors 2018. CC BY 4.0 License.

- Franz Rottensteiner
- Michael Schmitt
- Michael Weinmann

The program of the symposium is organized in seven technical sessions and two poster sessions. These sessions are complemented by three keynotes:

- K1 – 3D Reconstruction in Realtime (Marc Stamminger)
- K2 – Tandem-L or NewSpace SAR: Which Spaceborne Sensor Technology will Shape the Future? (Alberto Moreira)
- K3 – Visual Localization with Deep Convolutional Networks (Torsten Sattler)

In addition, three full- or half-day tutorials are offered (9 October 2018) with special focus on young scientists and practitioners from industry and (non-)governmental agencies:

- T1 – UAV and Deep Learning Technologies for Remote Sensing (Raul Queiroz Feitosa, Petra Helmholz)
- T2 – Topography and Bathymetry via Laser Scanning and Multi-Spectral Imaging – From Sensors to Applications (Gottfried Mandlburger)
- T3 – Photogrammetric Methods in the Machine Vision Industry (Markus Ulrich)

We wish to thank all authors, the keynote speakers and the tutorial organizers for their contributions. Furthermore, we thank the members of the scientific committee for their excellent job in reviewing the received submissions and the members of the local organizing committee for their great support.

October 2018

Boris Jutzi, Martin Weinmann, Stefan Hinz

SCIENTIFIC COMMITTEE