Workshop "Passive and Active Electro-Optical Sensors for Areal and Space Imaging" in the framework of the PSIVT 2019

The Pacific-Rim Symposium on Image and Video Technology (PSIVT) is a series of symposia that aim at providing a forum for researchers and practitioners who are being involved or are contributing to theoretical advances or practical implementations in image and video technology.

Part of the PSIVT are workshops. One of those is the Workshop for "Passive and Active Electro-Optical Sensors for Areal and Space Imaging". The workshop was supported by ISPRS and DGPF. Chair of this Workshop was Ralf Reulke (HU-Berlin), Co-Chair was Petra Helmholz (Curtin University, Perth).

The workshop will focus on new and improved methods, techniques, and applications of (electro-optical) sensors on airborne and space-borne platforms. A previous issue of this workshop has been held at Auckland, New Zealand (2015) and Wuhan, China (2017). This third issue is being held at Sydney, Australia.

The aim of this workshop is to bring together engineers and scientists from academia, industry and government to exchange results and ideas for future applications of electro-optical remote sensing.

Workshop duration was half day at 20.11.2019. The workshop consisted of a presentation by invited speaker (Dr. Anko Börner from DLR, Berlin) and presentations by contributors. Four papers have been submitted. The 12 reviewers have selected 2 contributions for publication in Springer LNCS.

Ralf Reulke (Humboldt-Universität zu Berlin)	Welcome and introduction to the workshop
Anko Börner (German Aerospace Center)	Developing spaceborne imaging sensors – look in the past and in the future (Invited Talk)
(German Aerospace Center)	In-orbit geometric calibration of firebird's infrared line cameras
Henry Meißner (German Aerospace Center)	Evaluation of Structures and Methods for Resolution Determination of Remote Sensing Sensors

In-orbit geometric calibration of firebird's infrared line cameras

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ABSTRACT

The German Aerospace Center (DLR) has developed and launched two small satellites (TET-1 and BIROS) as part of the FireBIRD mission. Both are capable to detect and observe fire related high temperature events (HTE) from space with infrared cameras. To enable a quick localization of the fires direct georeferencing of the images is required. Therefore, the camera geometry measurements with laboratory set-up on ground have to be verified and validated using real data takes. This is achieved using ground control points (GCPs), identifiable in all spectral bands, allowing the investigations of the whole processing chain used for georeferencing. It is shown how the accuracy of direct georeferencing was significantly improved by means of in-orbit calibration using GCPs and how the workflow for processing and reprocessing was developed.

Keywords: Small Satellite, Geometric Calibration, Line Sensor, infra-red (IR), accuracy assessment, FireBIRD

Evaluation of Structures and Methods for Resolution Determination of Remote Sensing Sensors

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Abstract

Effective image resolution is an important image quality factor for remote sensing sensors and significantly affects photogrammetric processing tool chains. Tie points, manda- tory for forming the block geometry, fully rely on feature points (i.e. SIFT, SURF) and qual- ity of these points however is significantly correlated to image resolution. Spatial resolution can be determined in different ways. Utilizing bar test charts (e.g. USAF51), slanted edges (ISO 12233) and Siemens-Stars are widely accepted techniques. The paper describes these approaches and compares all in one joint experiment. Moreover, Slanted-Edge and Siemens-Star method is evaluated using (close to) ideal images convolved with known parameters. It will be shown that both techniques deliver conclusive and expected results.

Keywords: Resolving Power · Image Quality · Siemens-Star · Slanted-Edge · USAF51 Test-Chart.