

PROCEEDINGS OF SPIE

Infrared Remote Sensing and Instrumentation XXV

**Marija Strojnik
Maureen S. Kirk**
Editors

**7–8 August 2017
San Diego, California, United States**

Sponsored and Published by
SPIE

Volume 10403

Proceedings of SPIE 0277-786X, V. 10403

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

The papers in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIDigitalLibrary.org.

The papers reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from these proceedings:

Author(s), "Title of Paper," in *Infrared Remote Sensing and Instrumentation XXV*, edited by Marija Strojnik, Maureen S. Kirk, Proceedings of SPIE Vol. 10403 (SPIE, Bellingham, WA, 2017) Seven-digit Article CID Number.

ISSN: 0277-786X
ISSN: 1996-756X (electronic)

ISBN: 9781510612631
ISBN: 9781510612648 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time)- Fax +1 360 647 1445
SPIE.org

Copyright © 2017, Society of Photo-Optical Instrumentation Engineers.

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/17/\$18.00.

Printed in the United States of America

Publication of record for individual papers is online in the SPIE Digital Library.

SPIE. DIGITAL LIBRARY

SPIDigitalLibrary.org

Paper Numbering: *Proceedings of SPIE* follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a seven-digit CID article numbering system structured as follows:

- The first five digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc. The CID Number appears on each page of the manuscript.

Contents

- vii *Authors*
- ix *Conference Committee*
- xi *Introduction*

SESSION 1 EMERGING INFRARED TECHNOLOGIES

- 10403 03 **Research on active imaging information transmission technology of satellite borne quantum remote sensing [10403-2]**

SESSION 2 MID IR SOURCES AND DETECTORS

- 10403 05 **Long wavelength interband cascade lasers on GaSb substrates (Invited Paper) [10403-4]**
- 10403 06 **Antimonide-based resonant tunneling photodetectors for mid-infrared wavelength light detection (Invited Paper) [10403-5]**
- 10403 07 **Trace gas spectroscopy using state-of-the-art mid-infrared semiconductor laser sources: progress, status, and applications (Invited Paper) [10403-6]**
- 10403 08 **Mid infrared DFB interband cascade lasers (Invited Paper) [10403-7]**
- 10403 09 **A GaAs-based up-converter for mid-infrared detection utilizing quantum cascade transport [10403-8]**

SESSION 3 FOCAL PLANE TECHNOLOGY AND IMAGE PROCESSING

- 10403 0A **High bit depth infrared image compression via low bit depth codecs (Invited Paper) [10403-9]**
- 10403 0B **Observation and analysis of modulation and noise in visible and near infrared diffuse ambient daylight [10403-10]**
- 10403 0C **Flexible thermistors: MCNO films with low resistivity and high TCR deposited on flexible organic sheets by RF magnetron sputtering [10403-11]**
- 10403 0D **Nanoantenna integrated thermomechanical infrared pixels [10403-12]**

SESSION 4 INFRARED SYSTEM CALIBRATION AND PERFORMANCE ASSESSMENT

- 10403 0E **Assessing the GOES-16 ABI solar channels calibration using deep convective clouds (Invited Paper)** [10403-13]
- 10403 0F **Preliminary study of the on-orbit radiometric traceability and artifacts for the VIIRS longwave infrared channels during blackbody temperature changes** [10403-14]
- 10403 0G **Millikelvin thermal dynamics of infrared scenes: sensitivity limits on optical detection of gas leaks** [10403-15]
- 10403 0H **Utilizing the precessing orbit of TRMM to produce hourly corrections of geostationary infrared imager data with the VIRS sensor** [10403-45]

SESSION 5 PLANETARY AND COMET MISSIONS

- 10403 0I **Rosetta's studies of comet 67P's surface: a review after the end of the mission (Invited Paper)** [10403-16]
- 10403 0J **The Venus Emissivity Mapper concept (Invited Paper)** [10403-17]

SESSION 6 MODELING INFRARED SYSTEMS AND PROCESSES

- 10403 0L **Directional ringlet intensity feature transform (DRIFT) based object tracking in IR imagery (Invited Paper)** [10403-19]
- 10403 0O **Object parameters optimization on pure and mixed pixels in thermal hyperspectral imagery** [10403-22]

SESSION 7 INSTRUMENTS, MISSIONS AND THEIR RETURNS

- 10403 0P **Sentinel-5: the new generation European operational atmospheric chemistry mission in polar orbit (Invited Paper)** [10403-23]
- 10403 0Q **Tissue characterization by trans-illumination interferometry** [10403-30]
- 10403 0R **Design and characterization of a low cost CubeSat multi-band optical receiver to map water ice on the lunar surface for the Lunar Flashlight mission** [10403-25]

SESSION 8 RECENT DEVELOPMENTS IN TERAHERTZ TECHNOLOGY

- 10403 0S **Millimeter-wave/terahertz detection and photonic double-mixing by transistors (Invited Paper)** [10403-27]
- 10403 0T **Generation of ultra-stable signal twins and idler twins by coupled optical parametric oscillators: applications in remote sensing (Invited Paper)** [10403-28]

POSTER SESSION

- 10403 0U **Thermal pulse propagation in the search of subcutaneous masses** [10403-32]
- 10403 0V **Noncoding sequence classification based on wavelet transform analysis: part I** [10403-33]
- 10403 0W **Optical spectral characterization of leaves for endemic species from La Primavera forest** [10403-34]
- 10403 0Y **High precision phase-shifter modulator in a shearing interferometric system** [10403-36]
- 10403 0Z **Differential shearing interferometer** [10403-37]
- 10403 11 **Forward and inverse solutions for Risley prism based on the Denavit-Hartenberg methodology** [10403-39]
- 10403 12 **Three-dimensional shape profiling by projection of binary patterns: generated by a deterministic optimization approach** [10403-40]
- 10403 13 **Online 3D measurement by an efficient iterative algorithm** [10403-41]
- 10403 14 **Piezoresistive method for a laser induced shock wave detection on solids** [10403-42]
- 10403 17 **Noncoding sequence classification based on wavelet transform analysis: part II** [10403-46]