PROCEEDINGS OF SPIE

Sixth Conference on Frontiers in Optical Imaging and Technology: Applications of Imaging Technologies

Zhiping He Zhi Bin Sun Editors

22–24 October 2023 Nanjing, China

Organized by Imaging and Detection Technology Committee, CSOE (China) Nanjing University of Science and Technology (China) Nanjing University (China) Xi'an Technological University (China) Beihang University (China) Science and Technology on Low-Light-Level Night Vision Laboratory (China)

Sponsored by The Chinese Society for Optical Engineering (China)

Published by SPIE

Volume 13157

Proceedings of SPIE 0277-786X, V. 13157

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 SPIEDigitalLibrary.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 Sixth Conference on Frontiers in Optical Imaging and Technology: Applications of Imaging Technologies, edited by Zhiping He, Zhi Bin Sun, Proc. of SPIE 13157, Sevendigit Article CID Number (DD/MM/YYYY); (DOI URL).

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

ISBN: 9781510679740 ISBN: 9781510679757 (electronic)

Published by **SPIE** P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time) SPIE.org Copyright © 2024 Society of Photo-Optical Instrumentation Engineers (SPIE).

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 fees. To obtain permission to use and share articles in this volume, visit Copyright Clearance Center 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.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

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



Paper Numbering: A unique citation identifier (CID) number is assigned to each article in the Proceedings of SPIE 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 Conference Committee

APPLICATIONS OF IMAGING TECHNOLOGIES

13157 02	Study of the effect on system accuracy caused by aerial camera POS lever arm [13157-2]
13157 03	Packaging technology of very long wavefront array infrared detectors working in deep low temperature [13157-3]
13157 04	An intersection measurement method with two optoelectronic pods for drop point measurement in far seas [13157-4]
13157 05	Detecting intracellular onion-like carbon nanostructures based on cell biolens' properties by holographic flow cytometry [13157-6]
13157 06	Analysis of aerosol characteristics in the North Yellow Sea based on the calibration and validation field network of autonomous ocean satellites [13157-7]
13157 07	Research of event cameras in space object detection [13157-9]
13157 08	Road trafficability analysis based on the fusion of high-resolution satellite images and point cloud elevation information [13157-10]
13157 09	Overview of ocean bathymetric LiDAR [13157-11]
13157 0A	Analysis of the influence of typical parameters on scattering characteristics of space target [13157-12]
13157 OB	Autocalibration full-Stokes imaging polarimetry using a polarization array [13157-13]
13157 OC	Research on camouflaged object image enhancement using subblock histogram equalization in HSV space [13157-14]
13157 OD	Design of cluster scheduling system based on high performance hybrid architecture [13157-15]
13157 OE	Spatiotemporal variation of surface energy flux in Hefei City based on multi-spectral data [13157-16]
13157 OF	Crop lodging area detection using polarimetric SAR images [13157-18]
13157 0G	Electronic design of a spatial low-light camera [13157-20]

13157 OH	Structure feature extraction algorithm for multi-modal forearm registration [13157-21]
13157 01	Laser communication systems between high-altitude aircraft and underwater platforms with real-time PPM time slot correction algorithm [13157-22]
13157 OJ	Characteristics of upper atmospheric optical turbulence over China [13157-23]
13157 OK	Hybrid event-enhanced image de-occlusion [13157-24]
13157 OL	Investigation of the optical properties of aerosols over the coastal region at Qingdao [13157-26]
13157 OM	Reshaping the feature distribution to aid in building extraction [13157-27]
13157 ON	The study of multi-wavelength computational ghost imaging based on feature dimensionality reduction [13157-28]
13157 00	Fast identification of hazardous solid based on Raman spectroscopy [13157-29]
13157 OP	The Fried parameter estimating method using limited refractive structure index measurement and its influence factors over horizontal propagation path in the near-surface boundary layer [13157-30]
13157 0Q	Optical design of high-resolution camera with large compression ratio [13157-32]
13157 OR	Comparison of refractive index structure constants in different models within the atmospheric boundary layer [13157-33]
13157 OS	3D imaging sensing and prediction technology of large component surface with multi-source sensing [13157-34]
13157 OT	Transformer model for evaluating Gaussian beam propagation through turbulent atmosphere [13157-35]
13157 00	Enhancement of the resolution for low-quality fluorescence microscopy image by novel computational method [13157-36]
13157 OV	Analysis of infrared radiation characteristics and detection technology of near-space hypersonic vehicles [13157-37]
13157 OW	A visible light and infrared fusion method based on pulse coupled neural network [13157-38]
13157 OX	Research on the production and correction of forecasted FY-4 infrared cloud image and the correction of forecasted short-term precipitation in the far sea areas [13157-39]
13157 OY	Underwater image enhancement based on deep learning water body pre-classification [13157-42]
13157 OZ	Research on motion control system of underwater remotely operated vehicles [13157-43]

- 13157 10 Seasonal variation of chlorophyll concentration in the Yongding New River Estuary from 2017 to 2021 [13157-44]
- 13157 11 Uncertainty analysis of propagation efficiency of high-energy laser horizontal propagation in the atmosphere [13157-45]
- 13157 12 New optics and SAR co-aperture imaging system that integrates flat film optical grating and phased array antenna [13157-46]
- 13157 13 Semantic information guided semi-supervised compact ISAR image super-resolution [13157-47]
- 13157 14Full-field-of-view image quality analysis based on residual distribution of drift angle in agile
satellite [13157-48]
- 13157 15 Exploration of the variation characteristics of greenhouse gas CO₂ and CH₄ concentrations in the Hefei region [13157-49]
- 13157 16 Research on the optical properties and sensitivity of the middle and upper limb atmospheric characteristics [13157-50]
- 13157 17Performance comparison of optimization algorithms for multi-frame blind deconvolution
[13157-51]
- 13157 18 Point cloud power line extraction based on improved DBSCAN algorithm in multiweather scenarios [13157-52]
- 13157 19 Research on interpolation algorithm in infrared distortion image correction [13157-54]
- 13157 1A A machine learning algorithm for planetary boundary layer height estimating by combining remote sensing data [13157-55]
- 13157 1B Wood-leaf separation method based on dual-wavelength active range-gated imaging [13157-56]
- 13157 1C Assessing the impact of cirrus cloud thickness on ICESat-2's maximum bathymetric capabilities in coastal waters [13157-57]
- 13157 1D Design of imaging performance evaluation software based on infrared characteristic database [13157-58]
- 13157 1E Detection of manganese nodule ore based on underwater hyperspectral imaging technology [13157-59]