

PROCEEDINGS OF SPIE

Electro-optical and Infrared Systems: Technology and Applications XIX

Duncan L. Hickman
Helge Bürsing
Editors

5–7 September 2022
Berlin, Germany

Sponsored by
SPIE

Cooperating Organisations
Cranfield University (United Kingdom)
OpTecBB (Germany)
International Society for Photogrammetry and Remote Sensing
European Association of Remote Sensing Companies

Published by
SPIE

Volume 12271

Proceedings of SPIE 0277-786X, V. 12271

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 *Electro-optical and Infrared Systems: Technology and Applications XIX*, edited by Duncan L. Hickman, Helge Bürsing, Proc. of SPIE 12271, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510655454

ISBN: 9781510655461 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2022 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.

**SPIE. DIGITAL
LIBRARY**

SPIDigitalLibrary.org

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

v *Conference Committee*

SENSORS AND SYSTEMS

- 12271 02 **Narrow bandgap HgCdTe technology for IR sensing and imaging focal plane arrays (Invited Paper)** [12271-1]
- 12271 03 **Single-photon infrared waveguide-based upconversion imaging** [12271-4]
- 12271 05 **Mid-infrared (longwave infrared) passive spectroscopic imaging with an uncooled microbolometer array sensor** [12271-2]

MODELLING AND SIMULATION

- 12271 08 **Modelling and simulation framework for ATR design evaluation** [12271-6]
- 12271 09 **A scenario-based approach for the evaluation of video object tracking algorithms' performance** [12271-7]
- 12271 0A **Methodology for the empirical representation of image processing functions in EO/IR sensor system models and simulations** [12271-25]
- 12271 0B **Modeling EO/IR systems with ASSET: applied machine learning for synthetic WFOV background signature generation** [12271-9]

TECHNOLOGY IN GERMANY

- 12271 0D **Field validation of a mobile detection system for laser scattering measurements in the NIR range** [12271-10]
- 12271 0E **SIMTAD: a simulation tool for evaluating target detection performance of imaging systems (Invited Paper)** [12271-11]
- 12271 0F **Prototype measurement setup to assess near-eye display imaging quality: an update** [12271-13]
- 12271 0G **Microbolometer compatible metamaterial absorber for multispectral imaging** [12271-14]

IMAGE AND DATA PROCESSING

- 12271 OH **Comparison of algorithms for contrast enhancement based on TOD assessments by convolutional neural networks** [12271-15]
- 12271 OJ **Deep learning-based infrared image deblurring** [12271-17]
- 12271 OK **Maximum eigenvalue-based detection in fiber-optic distributed acoustic sensors applications** [12271-18]
- 12271 OL **Pre-launch geometric calibration methodology of a high-resolution push-broom payload** [12271-19]

POSTER SESSION

- 12271 OM **Development and characterisation of a portable, active short-wave infrared camera system for vision enhancement through smoke and fog** [12271-12]
- 12271 ON **Segmentation of electrical discharge processes based on the image analysis of plasma-electrolyte oxidation** [12271-21]
- 12271 OO **Development of a fusion technique and an algorithm for merging images recorded in the IR and visible spectrum in dust and fog** [12271-22]
- 12271 OP **Deep visible and thermal image fusion for enhancement visibility for surveillance application** [12271-23]
- 12271 OQ **Mid-infrared (long-wave infrared) passive spectroscopic imaging with an uncooled micro-bolometer array sensor: background correction using Planck's law as a basis function for general purposes such as noninvasive blood glucose sensing and remote sensing** [12271-20]