

PROCEEDINGS OF SPIE

Sensors and Systems for Space Applications XVII

**Genshe Chen
Khanh D. Pham**
Editors

**23–25 April 2024
National Harbor, Maryland, United States**

Sponsored and Published by
SPIE

Volume 13062

Proceedings of SPIE 0277-786X, V. 13062

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 *Sensors and Systems for Space Applications XVII*, edited by Genshe Chen, Khanh D. Pham, Proc. of SPIE 13062, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510674424

ISBN: 9781510674431 (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.

**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*

SESSION 1 **SPECTRAL SENSING FOR SPACE SITUATIONAL AWARENESS: JOINT SESSION WITH CONFERENCES
13031 AND 13062**

13062 02 **Spectral characteristics of generation after next satellite navigational sensors [13062-1]**

SESSION 2 **SENSOR AND DEVICE FOR SPACE APPLICATION**

13062 03 **Advances in spaceborne hyperspectral imagery, a comparative study between nano satellites
and large satellites (Invited Paper) [13062-2]**

13062 04 **Corning's standard low earth orbit (LEO) hyperspectral imaging platform [13062-3]**

13062 05 **Countering environmental effects in optical systems using Kapton tape [13062-4]**

13062 06 **Enabling space-qualified opto-electronic systems through photonic wirebonding [13062-5]**

SESSION 3 **OPTICAL COMMUNICATION AND SYSTEM**

13062 07 **Radiation testing of 25 Gbaud balanced photoreceivers with bismuth ions for linear energy
transfer up to 70 MeV cm²/mg [13062-8]**

SESSION 4 **SPACE DOMAIN AWARENESS AND NAVIGATION**

13062 09 **Advanced motion estimations and predictions of a tumbling, non-cooperative space object
during long-term occlusion (Invited Paper) [13062-10]**

13062 0A **Shadow imagery resolution advantages from multispectral image stacking [13062-11]**

13062 0B **Demonstration of the frequency and correlation behavior of a forward scatter baseline crossing
event [13062-12]**

13062 0C **Improvements to global ionospheric forecasting with a recurrent convolutional neural network
[13062-13]**

13062 0E **Requirements modeling of resilience-aware human-on-the-loop PNT of multiple UASs
[13062-15]**

SESSION 5 AI/ML FOR SPACE APPLICATION

- 13062 0F **A homogeneous low-resolution face recognition method using correlation features at the edge (Invited Paper)** [13062-16]
- 13062 0H **Convolutional variational autoencoders for secure lossy image compression in remote sensing** [13062-18]
- 13062 0I **Machine learning-based real-time task scheduling for Apache Storm** [13062-19]
- 13062 0J **Enhanced robot state estimation using physics-informed neural networks and multimodal proprioceptive data** [13062-20]

SESSION 6 REMOTE SENSING AND SPACE CONTROL

- 13062 0K **Networked control systems and their applications to smart satellites: a survey (Invited Paper)** [13062-21]
- 13062 0L **Adaptive SIF-EKF estimation for fault detection in attitude control experiments** [13062-22]
- 13062 0M **Parameter estimation and control of an automatic balancing system for CubeSat research and applications** [13062-23]

SESSION 7 COMMUNICATION AND NETWORKING

- 13062 0N **Low-cost collision avoidance in microverse for unmanned aerial vehicle delivery networks** [13062-25]
- 13062 0O **Distributed edge computing for cooperative augmented reality: enhancing mobile sensing capabilities** [13062-26]
- 13062 0Q **Integrating power beaming and communication through laser modulation** [13062-28]