

PROCEEDINGS OF SPIE

Signal Processing, Sensor/Information Fusion, and Target Recognition XXXV

Ivan Kadar
Erik P. Blasch
Lynne L. Grewe
Editors

27–29 April 2026
National Harbor, Maryland, United States

Sponsored and Published by
SPIE

Volume 14049

Proceedings of SPIE 0277-786X, V. 14049

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 *Signal Processing, Sensor/Information Fusion, and Target Recognition XXXV*, edited by Ivan Kadar, Erik P. Blasch, Lynne L. Grewe, Proc. of SPIE 14049, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9798902320548

ISBN: 9798902320555 (electronic)

Published by

SPIE

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

Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2026 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

vii *Conference Committee*

MULTISENSOR FUSION, MULTITARGET TRACKING, AND RESOURCE MANAGEMENT I

- 14049 02 **A baseline for emerging/existing autonomy in data-driven multimodal target tracking**
[14049-1]
- 14049 03 **On the incomplete observability of the white noise angular acceleration model for target tracking** [14049-2]
- 14049 04 **PMBM multitarget tracking: practical improvements in space-based tracking** [14049-4]
- 14049 05 **Fusion of satellite LOS and OTHR azimuth measurements** [14049-5]

MULTISENSOR FUSION, MULTITARGET TRACKING, AND RESOURCE MANAGEMENT II

- 14049 06 **Simulation and linear importance analysis of uncertain information fusion networks**
[14049-7]
- 14049 07 **On a linearized, L1-informed Pareto optimization of uncertain networks** [14049-8]

INFORMATION FUSION METHODOLOGIES AND APPLICATIONS I

- 14049 09 **Math of deep learning** [14049-11]
- 14049 0B **The importance of cognitive defense and cognitive resilience in an age of gen AI information warfare** [14049-13]
- 14049 0C **Bayesian network guided vulnerability analysis of detection, fusion continuity, and sensor handoffs for aircraft custody in terminal airspace** [14049-14]

INFORMATION FUSION METHODOLOGIES AND APPLICATIONS II

- 14049 0E **Advances in dynamic data driven applications systems (DDAS) digital twins** [14049-16]

- 14049 OF **Opportunities and challenges for fusion of information using large language models (FILLMs)** [14049-17]
- 14049 OG **Earthling logic: toward humanlike reasoning in information processing** [14049-18]

INFORMATION FUSION METHODOLOGIES AND APPLICATIONS III

- 14049 OH **Human event camera teaming** [14049-20]
- 14049 OI **On improvement of the DBSCAN algorithm for radar-scan deinterleaving** [14049-69]
- 14049 OJ **Multimodal automatic target classification with confusion matrix fusion** [14049-22]
- 14049 OK **Modeling the performance of a context-based object classifier** [14049-67]
- 14049 OM **Hybrid part-aware recognition of military vehicles via set-structured fusion** [14049-21]
- 14049 ON **Failure characterization and boundary prediction for spiking neural networks** [14049-25]

SIGNAL AND IMAGE PROCESSING, AND INFORMATION FUSION APPLICATIONS I

- 14049 OO **Situational awareness through generative instructional narration from environmental cues** [14049-38]
- 14049 OP **Radar-based midair writing recognition via multirange-bin post-spectrogram interferometry** [14049-41]
- 14049 OQ **Accelerating time-to-rescue: a C8-ISR framework for fusing disparate data streams in emergency response** [14049-42]

SIGNAL AND IMAGE PROCESSING, AND INFORMATION FUSION APPLICATIONS II

- 14049 OR **A spatial-spectral convolutional neural network for dim, unresolved target detection in multispectral imagery** [14049-44]
- 14049 OS **Extraction of measurements from out-of-focus targets in a focal plane array** [14049-23]
- 14049 OT **Synthetic aperture radar image of drones behind soft vegetation in urban environments** [14049-26]

SIGNAL AND IMAGE PROCESSING, AND INFORMATION FUSION APPLICATIONS III

- 14049 0U **Multimodal visual fusion via frequency-aware gating and text-audio semantic modulation**
[14049-58]
- 14049 0V **TSUNOMI radar thrust quarterly progress report. OTFS: marriage of PAM and OFDM for joint sensing and comms** [14049-74]
- 14049 0Y **Family-guided multi-expert attachment framework for enhanced class-wise modulation recognition** [14049-56]

SIGNAL AND IMAGE PROCESSING, AND INFORMATION FUSION APPLICATIONS IV

- 14049 0Z **Hardware design for real-time radiation detection and analysis** [14049-31]
- 14049 10 **Information elasticity-based analysis of radar-camera fusion for semantic segmentation**
[14049-70]
- 14049 11 **Integration of CsPbBr₃ single-crystal perovskites and machine learning for automated multisource radiation detection** [14049-50]
- 14049 12 **Tracking multiple targets with gimballed imager flight data using random finite sets**
[14049-53]

POSTER SESSION

- 14049 13 **Simulation of transmission spectra for energetic materials using micro-to-macro scaling of DFT-calculated IR spectra** [14049-28]
- 14049 14 **Improved SIC signal detection for OFDM power domain NOMA** [14049-29]
- 14049 15 **Developing and evaluating algorithms and system parameters of OFDM-based ISAC system using 5G waveform** [14049-30]
- 14049 17 **Enhancing infiltration event detection using Keras slim residual network (ResNet) with training schedule and pruning techniques** [14049-33]
- 14049 19 **Integrated machine vision and ranging for unmanned aerial systems** [14049-35]
- 14049 1A **Towards online change point algorithms on-the-edge for real-time fault detection in power converters** [14049-36]
- 14049 1B **Design and evaluation of a Kalman filtering algorithm for optimal firing time prediction**
[14049-37]
- 14049 1D **Multitime scale state estimation of vehicle dynamics using physics-informed neural process**
[14049-72]

- 14049 1E **An information elasticity framework for sensor fusion** [14049-64]
- 14049 1F **A biologically inspired target screener for lunar surface anomaly detection** [14049-66]
- 14049 1G **A modular/hybrid processing architecture for space-based reconnaissance applications**
[14049-68]