

PROCEEDINGS OF SPIE

Third International Conference on Remote Sensing Technology and Survey Mapping (RSTSM 2026)

**Akhouri Pramod Krishna
Amin Beiranvand Pour**
Editors

**6–8 March 2026
Wuhan, China**

Organized by
Leshan Normal University (China)

Sponsored by
AEIC—Academic Exchange Information Centre (China)

Published by
SPIE

Volume 14248

Proceedings of SPIE 0277-786X, V. 14248

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 *Third International Conference on Remote Sensing Technology and Survey Mapping (RSTSM 2026)*, edited by Akhouri Pramod Krishna, Amin Beiranvand Pour, Proc. of SPIE 14248, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9798902325628

ISBN: 9798902325635 (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

ix	<i>Conference Committee</i>
xi	<i>Introduction</i>

REMOTE SENSING IMAGE PROCESSING AND ANALYSIS

14248 02	Dual-branch detector with frozen-masked feature distillation for remote sensing incremental object detection [14248-27]
14248 03	Breaking the downlink bottleneck: a dual-stage onboard AI framework for cloud-aware LEO satellites [14248-56]
14248 04	An improved temporal evolution pattern in graph structure on hyperspectral anomaly detection [14248-83]
14248 05	Lightweight on-board encoding and ground-based adaptive decoding: an asymmetric solution for remote sensing image compression [14248-71]
14248 06	Research on pseudorange bias of BeiDou B1C signal using a robust Kalman filter [14248-39]
14248 07	Research on road target extraction from aerial images based on ResNeSt network [14248-26]
14248 08	Spatial scale effects in raster land cover data based on scale-up approaches [14248-19]
14248 09	Investigation of an intelligent classification model for remote sensing images in complex terrain scenarios [14248-32]
14248 0A	High-performance real-time time comparison for BDS-3: a Gaussian adaptive robust Kalman filter method [14248-72]
14248 0B	Land cover classification of MODIS time series data based on feature parameter clustering [14248-70]
14248 0C	MS-DETR: a small target detection network for low-altitude complex scenes [14248-22]
14248 0D	Transformer-based time-series remote sensing analysis of farmland targets: a review of methods and challenges [14248-45]
14248 0E	Research on smoke detection methods in video data based on the normalized difference smoke index and inter-frame difference smoothing method [14248-7]
14248 0F	Lightweight spatial mixing attention for efficient plant feature extraction in edge-based phenotyping [14248-75]

- 14248 OG **Edge-aware semantic segmentation with global state-space refinement for remote sensing image** [14248-47]
- 14248 OH **Underwater stereo image enhancement method based on dual attention depth estimation network** [14248-57]
- 14248 OI **Robust filtering method for multi-frequency satellite navigation positioning with multi-antenna range constraints** [14248-15]
- 14248 OJ **Locality and continuity preserving spatial-spectral Mamba for hyperspectral image classification** [14248-6]
- 14248 OK **CE-YOLO: a lightweight small object detection network for remote sensing images based on context enhancement** [14248-5]
- 14248 OL **Research on partial ambiguity resolution methods based on spoofing constraints in spoofing scenarios** [14248-74]
- 14248 OM **Research on ship wake signal enhancement technology in SAR image under high sea conditions** [14248-34]
- 14248 ON **Automatic flood extraction from SAR imagery fusing waveform-corrected filtering and random forest optimization** [14248-31]
- 14248 OO **Developing a novel hyperspectral index (RPMI) for monitoring severity of rubber tree powdery mildew** [14248-24]
- 14248 OP **Retrieval and forecasting of total precipitable water over the warm pool region using deep neural networks from FY-3D MWHS-II data** [14248-36]
- 14248 OQ **A comparative study of InSAR tropospheric delay correction methods: a case study in Hami, Xinjiang** [14248-61]
- 14248 OR **BDS-3 satellite clock bias prediction method based on GRU-transformer neural network combination model** [14248-77]
- 14248 OS **Adaptive algorithm-based atmospheric remote sensing image denoising technology** [14248-65]
- 14248 OT **A recurrent Kolmogorov–Arnold network-based method for BeiDou satellite orbit prediction** [14248-78]

ENVIRONMENTAL MONITORING AND GEOSPATIAL APPLICATIONS

- 14248 OU **Environment-aware dynamic multimodal fire detection algorithm** [14248-30]
- 14248 OV **A comparative analysis of microphysical characteristics of hail and short-term heavy rainfall in Shenyang based on dual-polarization phased array radar** [14248-25]

- 14248 0W **Synergistic hyperspectral and UAV remote sensing for monitoring crop growth and nitrogen status in salinized farmland: a review** [14248-9]
- 14248 0X **Landslide displacement prediction of typhoon and rainstorm type in low mountain and hilly areas based on DeepAR model** [14248-84]
- 14248 0Y **Research on data governance technology for waterway resource planning and management** [14248-60]
- 14248 0Z **Accuracy optimization of high-resolution remote sensing images in agricultural land surveying** [14248-44]
- 14248 10 **Application and accuracy assessment of crowdsourced bathymetry in the Bohai Bay** [14248-85]
- 14248 11 **Assessing six-spotted mite damage severity in rubber leaves using hyperspectral reflectance data** [14248-11]
- 14248 12 **Airport clear zone environmental inspection and monitoring system based on high-resolution remote sensing satellites and its application** [14248-82]
- 14248 13 **Spatiotemporal variation of vegetation indices and their hydrothermal response in the Kerulen River Basin based on different NDVI datasets** [14248-21]
- 14248 14 **Comparative assessment of landslide susceptibility using ensemble and hybrid deep learning models** [14248-43]
- 14248 15 **Response mechanism of mesopause temperature derived from wavelet analysis of SABER** [14248-42]
- 14248 16 **A study on vegetation change trends and driving mechanisms in the upper reaches of southwestern rivers from 2000 to 2023** [14248-53]
- 14248 17 **A deep-learning-based framework for assessing micro-space governance quality using street-view imagery: a case study of the main urban area of Sanyuan County** [14248-63]
- 14248 18 **Study on the impact of different landslide sampling strategies on landslide susceptibility assessment** [14248-38]
- 14248 19 **Grid-scale green development evaluation via multi-source remote sensing: a case study of Ningxia** [14248-59]
- 14248 1A **Research on water pollution source tracing based on hyperspectral remote sensing and UMAP manifold learning** [14248-62]
- 14248 1B **Changes in extreme temperature indices and their geographic controls in Northern Xinjiang** [14248-41]
- 14248 1C **Analysis of land use change in Nan'an District of Chongqing City based on remote sensing images** [14248-52]

- 14248 1D **An optimized ensemble learning algorithm based on the InSAR-HSA sampling strategy for landslide susceptibility mapping** [14248-86]
- 14248 1E **Analysis of changes in coastal shelterbelts along the Northern South China Sea over the past 30 years based on NDVI** [14248-17]
- 14248 1F **Research on spatiotemporal evolution and driving mechanisms of ecological vulnerability in the Yunnan-Guangxi-Guizhou karst desertification region** [14248-4]
- 14248 1G **Spatial-temporal variations and trend prediction of NDVI vegetation in Yushu Region from 2001 to 2023** [14248-67]

MULTIMODAL FUSION AND GEOSPATIAL MAPPING

- 14248 1H **Automatic track centerline extraction from railway point clouds using GNSS PPP trajectory** [14248-10]
- 14248 1I **HSDHA: hybrid sparse-dense hierarchical attention for lightweight transformer-based UAV plant phenotyping** [14248-54]
- 14248 1J **Research on magnetic anomaly extraction and multi-layer recognition methods for small targets in complex shallow sea environments** [14248-23]
- 14248 1K **Low-cost GNSS navigation for a tracked agricultural robot in hilly terrain: slip error modeling and trajectory tracking control** [14248-18]
- 14248 1L **From geographic information to intelligent decision-making: the evolution of power line planning** [14248-33]
- 14248 1M **SINS/USBL/DVL integrated navigation based on transformer-decoder deep learning error constraint** [14248-35]
- 14248 1N **Cost-effective dense 3D RGB mapping using superpixel-driven LiDAR-camera fusion for indoor environments** [14248-79]
- 14248 1O **Research on multimodal remote sensing image semantic segmentation based on dual-branch feature fusion** [14248-3]
- 14248 1P **Technology for assembly accuracy inspection of prefabricated buildings based on integration of 3D laser scanning and BIM** [14248-14]
- 14248 1Q **Inversion of saltmarsh soil organic carbon using multi-source UAV data fusion** [14248-13]
- 14248 1R **TianDiTu Shaanxi multi-source data updates and prospects for One Map geospatial base map data updates** [14248-29]
- 14248 1S **Research on multi-source data-driven indoor-outdoor integrated three-dimensional modelling technology** [14248-68]

- 14248 1T **Remote sensing time-series-based vegetation functional zonation for power transmission corridors in Northern Shaanxi, China** [14248-40]
- 14248 1U **Estimating blue carbon storage in Daya Bay mangrove forests using an integrated DeepSeek-Python-ArcGIS (DPA) framework** [14248-28]
- 14248 1V **Wetland vegetation height retrieval based on UAV LiDAR data and PMF: the impact of vegetation coverage** [14248-12]
- 14248 1W **KGDNet: a dual-branch fusion network for inland aquaculture pond semantic segmentation** [14248-8]
- 14248 1X **Automatic UAV point cloud segmentation of ore stockpiles and ground in open-pit mining scenarios** [14248-69]
- 14248 1Y **Research on dynamic decomposition and collaborative planning methods for multi-satellite and multi-payload tasks in large regional cartographic missions** [14248-66]
- 14248 1Z **Integrated DEM interpolation with differential evolution** [14248-55]
- 14248 20 **A two-stage reconstruction method for metasurface-based phaseless microwave computational imaging** [14248-76]
- 14248 21 **Reliability evaluation of seismic moment re-location results in Yangyuan Basin based on Bayesian network fusion** [14248-73]