PROCEEDINGS OF SPIE

Algorithms for Synthetic Aperture Radar Imagery XXVII

Edmund Zelnio Frederick D. Garber Editors

27 April – 8 May 2020 Online Only, United States

Sponsored and Published by SPIE

Volume 11393

Proceedings of SPIE 0277-786X, V. 11393

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 Algorithms for Synthetic Aperture Radar Imagery XXVII, edited by Edmund Zelnio, Frederick D. Garber, Proceedings of SPIE Vol. 11393 (SPIE, Bellingham, WA, 2020) Seven-digit Article CID Number.

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

ISBN: 9781510635630 ISBN: 9781510635647 (electronic)

Published by **SPIE** P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time)· Fax +1 360 647 1445 SPIE.org Copyright © 2020, Society of Photo-Optical Instrumentation Engineers.

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 copying fees. The Transactional Reporting Service base fee for this volume is \$21.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online 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. The CCC fee code is 0277-786X/20/\$21.00.

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: Proceedings of SPIE follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article 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

SESSION 1 ADVANCED IMAGING AND 3D RECONSTRUCTION

11393 04	Perturbation amplitude effects of power law errors on refraction autofocus [11393-4]
11393 06	Deep learning methods for image reconstruction from angularly sparse data for CT and SAR imaging [11393-6]
11393 07	A novel approach to sparse synthesis for imaging [11393-7]
11393 09	2D and 3D convolutional and correlation SAR imaging [11393-9]
11393 OB	3D scene reconstruction from multi-sensor EO-SAR data [11393-11]
SESSION 2	MACHINE-LEARNING-BASED SAR ATR
11393 OC	Review of recent advances in AI/ML using the MSTAR data [11393-12]
11393 OD	Using deep learning to estimate linear structure orientation in polarimetric radar data [11393-14]

- 11393 0J Automatic target recognition of aerial vehicles based on synthetic SAR imagery using hybrid stacked denoising auto-encoders [11393-20]
- 11393 OK Investigating the saliency of SAR image chips [11393-21]

SESSION 3 PERFORMANCE MODELING

11393 ON	Aerial and ground vehicles synthetic SAR dataset generation for automatic target recognition [11393-25]
11393 OO	Hardware-accelerated SAR simulation with NVIDIA-RTX technology [11393-26]
11393 OP	Statistical analysis of SAR signature domains [11393-27]
11393 OT	Self-proficiency assessment for ATR systems [11393-31]