PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Session 11017

, "Front Matter: Session 11017," Proc. SPIE 11017, Sensors and Systems for Space Applications XII, 1101701 (31 July 2019); doi: 10.1117/12.2536294

Event: SPIE Defense + Commercial Sensing, 2019, Baltimore, MD, United States

PROCEEDINGS OF SPIE

Sensors and Systems for Space Applications XII

**Genshe Chen
Khanh D. Pham**
Editors

**15–16 April 2019
Baltimore, Maryland, United States**

Sponsored and Published by
SPIE

Volume 11017

Proceedings of SPIE 0277-786X, V. 11017

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

Sensors and Systems for Space Applications XII, edited by Genshe Chen, Khanh D. Pham, Proc. of SPIE
Vol. 11017, 1101701 · © 2019 SPIE · CCC code: 0277-786X/19/\$18 · doi: 10.1117/12.2536294

Proc. of SPIE Vol. 11017 1101701-1

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 XII*, edited by Genshe Chen, Khanh D. Pham, Proceedings of SPIE Vol. 11017 (SPIE, Bellingham, WA, 2019) Seven-digit Article CID Number.

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

ISBN: 9781510626997
ISBN: 9781510627000 (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 © 2019, 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 \$18.00 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/19/\$18.00.

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.

SPIE. DIGITAL LIBRARY
SPIDigitalLibrary.org

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

v	<i>Authors</i>
vii	<i>Conference Committee</i>

SENSOR AND SENSING

11017 02	Modeling and simulating SOSA sensor systems [11017-1]
11017 04	Breaking the diffraction limit with nearest neighbor pixel deconvolution [11017-3]
11017 05	Visual sensor selection for satellite swarm cooperative localization [11017-4]
11017 06	A hidden chamber detector based on a MIMO SAR [11017-6]

AUTONOMY AND SPACE SITUATIONAL AWARENESS

11017 07	Autonomy in use for space situation awareness [11017-7]
11017 08	Adaptive Markov Inference Game Optimization (AMIGO) for rapid discovery of satellite behaviors [11017-8]
11017 09	Reducing space sensing and other mission cost with 3D printing infill optimization [11017-5]
11017 0A	Probabilistic reasoning for real-time UAV decision and control [11017-10]

OPTICAL AND LASER COMMUNICATION

11017 0B	The effect of atmospheric optical turbulence on laser communications systems: Part 1, theory [11017-11]
11017 0C	The effect of atmospheric optical turbulence on laser communication systems: Part 2, practice [11017-12]
11017 0D	Proton and gamma radiation testing of 10 GHz bandwidth, uncooled, linear InGaAs optical receivers [11017-13]

11017 0F **Toolchain based hybrid implementation for GPS satellite communications with optical crosslinks [11017-15]**

COMMUNICATION AND NETWORKING

11017 0G **An effective satellite transponder linearization method using a physics-based predistorter [11017-16]**

11017 0H **SDR based secure communication system with novel noise modulated transmission [11017-17]**

ARTIFICIAL INTELLIGENCE AND BLOCKCHAIN APPLICATION

11017 0J **Face recognition in low-resolution surveillance video streams [11017-19]**

11017 0K **Decentralized smart surveillance through microservices platform [11017-20]**

11017 0L **A study on smart online frame forging attacks against Video Surveillance System [11017-21]**

11017 0M **Deep learning based automatic signal modulation classification [11017-22]**

11017 0O **Electricity consumption forecasting for smart grid using the multi-factor back-propagation neural network [11017-24]**

Authors

Numbers in the index correspond to the last two digits of the seven-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first five digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Aved, Alex, 0K	Wang, Yu, 04
Barnhart, David A., 05	Wang, Zhonghai, 06, 07, 0H
Berthold, Brian, 0A	Wei, Sixiao, 0F
Bezouska, William A., 05	Xiang, Xingyu, 06
Bihl, Trevor J., 0A	Xiong, Wenhao, 0H
Blasch, Erik, 06, 07, 08, 0J, 0K, 0L	Xu, Ronghua, 0K
Cameron, Thomas, 09	Zhang, Liwen, 0J
Chen, Genshe, 06, 07, 08, 0F, 0G, 0H, 0J, 0M, 0O	Zhang, Zhe, 06
Chen, Yu, 07, 0J, 0K, 0L, 0O	Zhao, Xuan, 0J
Chen, Zhijiang, 0F	Zhou, Ning, 0O
Collier, Charles, 02	Zhu, Sencun, 0L
Cox, Chadwick, 0A	
D'Angiolillo, Matthew, 0D	
Datta, Shubhashish, 0D	
Eichers, Martin, 09	
Eichholz, Benjamin, 09	
Farrell, Thomas C., 0B, 0C	
Foo, Ken, 0F	
Jardine, James, 0D	
Jenkins, Todd A., 0A	
Jia, Bin, 07	
Jones, Andrew, 09	
Joshi, Abhay M., 0D	
Kray, Taylor, 09	
Leland, Logan, 0A	
Li, Lun, 0G	
Li, Yi, 0F, 0M	
Lin, Xingping, 06	
Lu, Jingyang, 08, 0G, 0M	
Lu, Yujing, 04	
Lyke, James, 0F	
Mertz, Jeffrey, 0D	
Miller, Ryan, 0D	
Nagothu, Deeraj, 0L	
Nguyen, John, 0G	
Nikouei, Seyed Yahya, 0K	
Pham, Khanh, 06, 07, 08, 0F, 0G, 0H, 0M	
Rusek, Adam, 0D	
Sargent, Garrett C., 02	
Schwell, Jacob, 0L	
Sheaff, Carolyn, 08	
Shen, Dan, 07, 08, 0G, 0H, 0M	
Sivertz, Michael, 0D	
Song, Hao, 0O	
Soni, Niles, 0D	
Straub, Jeremy, 09	
Sullivan, Nichole, 0F, 0H	
Tian, Xin, 0F, 0G, 0H, 0M	
Tian, Zhi, 06	

Conference Committee

Symposium Chairs

Jay Kumler, JENOPTIK Optical Systems, LLC (United States)
Ruth Moser, Air Force Research Laboratory (United States)

Symposium Co-chair

John Pellegrino, Electro-Optical Systems Laboratory, Georgia Institute of Technology (United States)

Conference Chairs

Genshe Chen, Intelligent Fusion Technology, Inc. (United States)
Khanh D. Pham, Air Force Research Laboratory (United States)

Conference Program Committee

Xiaoli Bai, Rutgers, The State University of New Jersey (United States)
Trevor J. Bihl, Air Force Institute of Technology (United States)
Erik P. Blasch, Air Force Research Laboratory (United States)
Yu Chen, Binghamton University (United States)
Joseph L. Cox, LinQuest (United States)
Sarah T. Crites, Institute of Space and Astronautical Science (Japan)
Thomas George, SaraniaSat Inc. (United States)
Ping Hagler, Missile Defense Agency (United States)
Uttam Kumar Majumder, Air Force Research Laboratory (United States)
Brian K. McComas, Raytheon Missile Systems (United States)
Tien M. Nguyen, The Aerospace Corporation (United States)
Andre Samberg, Sec-Control Finland Ltd. (Finland)
Dan Shen, Intelligent Fusion Technology, Inc. (United States)
Ryan M. Weisman, Air Force Research Laboratory (United States)

Session Chairs

- 1 Sensor and Sensing
Jeremy Straub, North Dakota State University (United States)
Nichole Sullivan, Intelligent Fusion Technology, Inc. (United States)
- 2 Autonomy and Space Situational Awareness
Dan Shen, Intelligent Fusion Technology, Inc. (United States)
Zhonghai Wang, Intelligent Fusion Technology, Inc. (United States)

- 3 Optical and Laser Communication
 Thomas C. Farrell, Air Force Research Laboratory (United States)
 Sixiao Wei, Intelligent Fusion Technology, Inc. (United States)
- 4 Communication and Networking
 Wenhao Xiong, Intelligent Fusion Technology, Inc. (United States)
 Lun Li, Intelligent Fusion Technology, Inc. (United States)
- 5 Artificial Intelligence and Blockchain Application
 Yu Chen, Binghamton University (United States)
 Jingyang Lu, Intelligent Fusion Technology, Inc. (United States)