PROCEEDINGS OF SPIE

Earth Observing Systems XXI

James J. Butler
Xiaoxiong (Jack) Xiong
Xingfa Gu
Editors

30 August–1 September 2016
San Diego, California, United States

Sponsored and Published by
SPIE

Volume 9972

Proceedings of SPIE 0277-786X, V. 9972

Earth Observing Systems XXI, edited by James J. Butler, Xiaoxiong (Jack) Xiong, Xingfa Gu, Proc. of SPIE
Vol. 9972, 997201 · © 2016 SPIE · CCC code: 0277-786X/16/$18 · doi: 10.1117/12.2260570

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 *Earth Observing Systems XXI*, edited by James J. Butler, Xiaoxiong (Jack) Xiong, Xingfa Gu, Proceedings of SPIE Vol. 9972 (SPIE, Bellingham, WA, 2016) Six-Digit Article CID Number.

ISSN: 0277-786X
ISSN: 1996-756X (electronic)
ISBN: 9781510603356
ISBN: 9781510603363 (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

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

SPIE. DIGITAL LIBRARY
SPIEDigitalLibrary.org

Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print. Papers are published as they are submitted and meet publication criteria. A unique citation identifier (CID) number is assigned to each article at the time of the first 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, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four 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. The complete citation is used on the first page, and an abbreviated version on subsequent pages.

Contents

Authors

Numbers in the index correspond to the last two digits of the six-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first four 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.

Conference Committee

Program Track Chair

Allen H.-L. Huang, University of Wisconsin-Madison (United States)

Conference Chairs

James J. Butler, NASA Goddard Space Flight Center (United States)
Xiaoxiong (Jack) Xiong, NASA Goddard Space Flight Center (United States)
Xingfa Gu, Institute of Remote Sensing Applications (China)

Conference Program Committee

Philip E. Ardanuy, Raytheon Intelligence & Information Systems (United States)
Hal J. Bloom, Science & Technology Corporation (United States)
Jeffrey S. Czapla-Myers, College of Optical Sciences, The University of Arizona (United States)
Armin Doerry, Sandia National Laboratories (United States)
Christopher N. Durell, Labsphere, Inc. (United States)
Bertrand Fougnie, Centre National d'Études Spatiales (France)
Mitchell D. Goldberg, National Environmental Satellite, Data, and Information Service (United States)
Joel McCorkel, NASA Goddard Space Flight Center (United States)
Thomas S. Pagano, Jet Propulsion Laboratory (United States)
Jeffery J. Puschell, Raytheon Space & Airborne Systems (United States)
Carl F. Schueler, Schueler Consulting-Santa Barbara (United States)
Mark A. Schwarz, Stellar Solutions Inc. (United States)

Session Chairs

1 System and Subsystem Instrument Prelaunch Calibration
Christopher N. Durell, Labsphere, Inc. (United States)

2 Infrared Instruments
Armin W. Doerry, Sandia National Laboratories (United States)

3 Landsat
Bertrand Fougnie, Centre National d'Études Spatiales (France)

4 Algodones Field Campaign
Joel McCorkel, NASA Goddard Space Flight Center (United States)