PROCEEDINGS OF SPIE

Spectral Imaging Sensor Technologies: Innovation Driving Advanced Application Capabilities

David P. Bannon Editor

8 May 2014 Baltimore, Maryland, United States

Sponsored and Published by SPIE

Volume 9104

Proceedings of SPIE 0277-786X, V. 9104

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

Spectral Imaging Sensor Technologies: Innovation Driving Advanced Application Capabilities, edited by David P. Bannon, Proc. of SPIE Vol. 9104, 910401 · © 2014 SPIE · CCC code: 0277-786X/14/\$18 · doi: 10.1117/12.2069556

Proc. of SPIE Vol. 9104 910401-1

The papers included 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. The papers published in these proceedings 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 this book:

Author(s), "Title of Paper," in Spectral Imaging Sensor Technologies: Innovation Driving Advanced Application Capabilities, edited by David P. Bannon, Proceedings of SPIE Vol. 9104 (SPIE, Bellingham, WA, 2014) Article CID Number.

ISSN: 0277-786X ISBN: 9781628410419

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 © 2014, 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/14/\$18.00.

Printed in the United States of America.

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



Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent 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. Numbers in the index correspond to the last two digits of the six-digit CID Number.

Contents

v Conference Committee

SATELLITE AND AIRBORNE HYPERSPECTRAL SENSORS

- 9104 02 Hyperspectral forest monitoring and imaging implications (Invited Paper) [9104-1] D. G. Goodenough, Univ. of Victoria (Canada); D. Bannon, Headwall Photonics, Inc. (United States)
- 9104 03 SYSIPHE: focus on SIELETERS, the medium and longwave infrared spectral imaging instrument [9104-2]
 Y. Ferrec, L. Rousset-Rouvière, C. Coudrain, J. Primot, S. Thétas, A. Kattnig, ONERA (France)
- 9104 04 Optical design of wide swath hyperspectral imager [9104-3]
 Y. Wang, L. Yuan, J. Wang, Shanghai Institute of Technical Physics (China) and Key Lab. of Space Active Opto-Electronics (China)
- 9104 05 **Development of co-boresighted Vis-NIR-SWIR hyperspectral imaging systems** [9104-4] K.-K. Wong, Headwall Photonics, Inc. (United States)
- 9104 06 Light weight airborne imaging spectrometer remote sensing system for mineral exploration in China [9104-5]
 T. Wu, L. Zhang, Y. Cen, J. Wang, Q. Tong, Institute of Remote Sensing and Digital Earth (China)
- 9104 07 Demosaicking for full motion video 9-band SWIR sensor [9104-6]
 A. V. Kanaev, U.S. Naval Research Lab. (United States); M. Rawhouser, Tekla Research (United States); M. R. Kutteruf, M. K. Yetzbacher, U.S. Naval Research Lab. (United States); M. J. DePrenger, K. M. Novak, C. A. Miller, Tekla Research (United States); C. W. Miller, Tekla Research (United States) and U.S. Naval Research Lab. (United States)

SENSOR INTEGRATION WITH UAVS AND GROUND-TRUTH ANALYSIS

9104 0A Miniaturization of sub-meter resolution hyperspectral imagers on unmanned aerial systems [9104-9] S. L. Hill, P. Clemens, Headwall Photonics, Inc. (United States)

LABORATORY AND PROCESS LINE HYPERSPECTRAL APPLICATIONS I

9104 OE Utility of hyperspectral imagers in the mining industry: Italy's gypsum reserves [9104-13] J. H. Wilson, Headwall Photonics, Inc. (United States); R. N. Greenberger, Brown Univ. (United States)

Author Index

Conference Committee

Symposium Chair

David A. Whelan, Boeing Defense, Space, and Security (United States)

Symposium Co-chair

Wolfgang Schade, Technische Universität Clausthal (Germany) and Fraunhofer Heinrich-Hertz-Institut (Germany)

Conference Chair

David P. Bannon, Headwall Photonics, Inc. (United States)