PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 7808

, "Front Matter: Volume 7808," Proc. SPIE 7808, Infrared Remote Sensing and Instrumentation XVIII, 780801 (1 October 2010); doi: 10.1117/12.878610

SPIE.

Event: SPIE Optical Engineering + Applications, 2010, San Diego, California, United States

PROCEEDINGS OF SPIE

Infrared Remote Sensing and Instrumentation XVIII

**Marija Strojnik
Gonzalo Paez**
Editors

**1–3 August 2010
San Diego, California, United States**

Sponsored and Published by
SPIE

Volume 7808

Proceedings of SPIE, 0277-786X, v. 7808

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

Infrared Remote Sensing and Instrumentation XVIII, edited by Marija Strojnik, Gonzalo Paez,
Proc. of SPIE Vol. 7808, 780801 · © 2010 SPIE · CCC code: 0277-786X/10/\$18 · doi: 10.1117/12.878610

Proc. of SPIE Vol. 7808 780801-1

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 *Infrared Remote Sensing and Instrumentation XVIII*, edited by Marija Strojnik, Gonzalo Paez, Proceedings of SPIE Vol. 7808 (SPIE, Bellingham, WA, 2010) Article CID Number.

ISSN 0277-786X

ISBN 9780819483041

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 © 2010, 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/10/\$18.00.

Printed in the United States of America.

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

SPIDigitalLibrary.org

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 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

ix	Conference Committee
xi	Introduction

SESSION 1 IR FOCAL PLANE AND DETECTOR DEVELOPMENT I

- 7808 02 **Demonstration of 1Kx1K long-wave and mid-wave superlattice infrared focal plane arrays (Invited Paper)** [7808-01]
S. D. Gunapala, D. Z. Ting, C. J. Hill, J. Nguyen, A. Soibel, S. B. Rafol, S. A. Keo, J. M. Mumolo, M. C. Lee, J. K. Liu, B. Yang, A. Liao, Jet Propulsion Lab. (United States)
- 7808 04 **Barrier engineering in superlattices and quantum dots for higher operating temperature (Invited Paper)** [7808-03]
S. Krishna, Ctr. for High Technology Materials, The Univ. of New Mexico (United States)
- 7808 05 **Performance of InAsSb-based infrared detectors with nBn design (Invited Paper)** [7808-04]
S. A. Myers, A. Khoshakhlagh, Ctr. for High Technology Materials, Univ. of New Mexico (United States); J. Mailfert, National Institute of Applied Sciences (France); P. Wanninkhof, Univ. of Florida (United States); E. Plis, M. N. Kuttly, H. S. Kim, N. Gautam, B. Klein, Univ. of New Mexico (United States); E. P. G. Smith, Raytheon Vision Systems (United States); S. Krishna, Ctr. for High Technology Materials, Univ. of New Mexico (United States)
- 7808 06 **Study of strain balance in long wavelength infrared InAs/GaSb superlattice materials (Invited Paper)** [7808-05]
H. J. Haugan, G. J. Brown, S. D. Pacley, L. Grazulis, S. T. Fenstermaker, Air Force Research Lab. (United States)
- 7808 07 **Intersubband transitions in GaN-based quantum wells: a new materials platform for infrared device applications (Invited Paper)** [7808-06]
R. Paiella, K. Driscoll, Y. Li, Y. Liao, A. Bhattacharyya, C. Thomidis, Boston Univ. (United States); L. Zhou, D. J. Smith, Arizona State Univ. (United States); T. D. Moustakas, Boston Univ. (United States)
- 7808 09 **Single photon emission and detection at the nanoscale utilizing semiconductor nanowires (Invited Paper)** [7808-62]
M. E. Reimer, M. P. van Kouwen, M. Barkelid, M. Hocevar, M. H. M. van Weert, Technische Univ. Delft (Netherlands); R. E. Algra, E. P. A. M. Bakkers, Philips Research Nederland B.V. (Netherlands); M. T. Björk, H. Schmid, H. Riel, IBM Zürich Research Lab. (Switzerland); L. P. Kouwenhoven, V. Zwiller, Technische Univ. Delft (Netherlands)

SESSION 2 IR FOCAL PLANE AND DETECTOR DEVELOPMENT II

- 7808 0A **Performance improvement of AlN/GaN-based intersubband detectors thanks to quantum dot active regions (Invited Paper)** [7808-08]
D. Hofstetter, J. Di Francesco, Univ. of Neuchâtel (Switzerland); E. Baumann, F. R. Giorgetta, National Institute of Standards and Technology (United States); P. K. Kandaswamy, A. Das, S. Valdueza-Felip, E. Monroy, CEA Grenoble (France)
- 7808 0B **Infrared detectors for spaceborne laser receivers (Invited Paper)** [7808-09]
M. A. Krainak, X. Sun, G. Yang, NASA Goddard Space Flight Ctr. (United States); W. Lu, MEI Technologies (United States)
- 7808 0C **Geiger-mode avalanche photodiode focal plane arrays for three-dimensional imaging LADAR (Invited Paper)** [7808-10]
M. A. Itzler, M. Entwistle, M. Owens, K. Patel, X. Jiang, K. Slomkowski, S. Rangwala, Princeton Lightwave, Inc. (United States); P. F. Zalud, T. Senko, J. Tower, J. Ferraro, Sarnoff Corp. (United States)

SESSION 3 DETECTION TECHNOLOGY AND MATERIALS CHARACTERIZATION

- 7808 0D **Infrared spectroscopy of thin layers under ultra-high vacuum conditions (Invited Paper)** [7808-11]
A. Pucci, Ruprecht-Karls-Univ. Heidelberg (Germany)
- 7808 0E **cQED enhanced light detection and emission in electrically contacted quantum dot micropillars (Invited Paper)** [7808-12]
S. Reitzenstein, C. Kistner, T. Heindel, C. Schneider, M. Lerner, T. Braun, S. Höfling, L. Worschech, A. Forchel, Julius-Maximilians-Univ. Würzburg (Germany)

SESSION 4 THERMAL IR IMAGING OF MERCURY: MERTIS

- 7808 0I **MERTIS—thermal infrared imaging of Mercury: advances in mid-IR remote sensing technology for planetary exploration (Invited Paper)** [7808-16]
G. E. Arnold, Westfälische Wilhelms-Univ. Münster (Germany) and Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); H. Hiesinger, Westfälische Wilhelms-Univ. Münster (Germany); J. Helbert, G. Peter, I. Walter, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)
- 7808 0J **MERTIS: understanding Mercury's surface composition from mid-infrared spectroscopy (Invited Paper)** [7808-17]
J. Helbert, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); H. Hiesinger, Westfälische Wilhelms-Univ. Münster (Germany); I. Walter, T. Säuberlich, A. Maturilli, M. D'Amore, J. Knollenberg, E. Lorenz, G. Peter, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); G. E. Arnold, Westfälische Wilhelms-Univ. Münster (Germany) and Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)
- 7808 0L **MERTIS: shutterless background signal removal** [7808-19]
T. Säuberlich, C. Paproth, J. Helbert, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)

- 7808 OM **MERTIS: system theory and simulation** [7808-20]
C. Paproth, T. Säuberlich, H. Jahn, J. Helbert, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)
- 7808 ON **MERTIS: using diffractive optical elements for geometrical calibration** [7808-21]
M. Bauer, D. Griebbach, T. Säuberlich, M. Scheele, A. Schischmanow, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)
- 7808 OO **MERTIS: reflective baffle design and manufacturing** [7808-22]
T. Zeh, C. Gal, S. Kaiser, Kayser-Threde GmbH (Germany); G. Peter, I. Walter, J. Helbert, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); J. Jachlewski, NiCoForm, Inc. (United States); K. Multhaupt, H. Hiesinger, Westfälische Wilhelms-Univ. Münster (Germany)
- 7808 OQ **MERTIS: optics manufacturing and verification** [7808-24]
A. Gebhardt, R. Steinkopf, S. Scheiding, S. Risse, C. Damm, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); T. Zeh, S. Kaiser, Kayser-Threde GmbH (Germany)

SESSION 5 THE WAY FORWARD: FIRST TO CLARREO

- 7808 OR **Technologies supporting radiative science (Invited Paper)** [7808-25]
R. A. Bauer, G. J. Komar, P. M. Larkin, K. E. Murray, M. P. Pasciuto, A. L. Walton, NASA Earth Science Technology Office (United States)
- 7808 OT **Far-IR measurements at Cerro Toco, Chile: FIRST, REFIR, and AERI** [7808-27]
R. P. Cageao, J. A. Alford, D. G. Johnson, D. P. Kratz, M. G. Mlynchak, NASA Langley Research Ctr. (United States)
- 7808 OV **Infrared detectors overview in the short-wave infrared to far-infrared for CLARREO mission** [7808-29]
M. N. Abedin, M. G. Mlynchak, NASA Langley Research Ctr. (United States); T. F. Refaat, Old Dominion Univ. (United States)
- 7808 OX **A high-accuracy blackbody for CLARREO** [7808-31]
H. Latvakoski, M. Watson, S. Topham, D. Scott, M. Wojcik, G. Bingham, Utah State Univ. (United States)

SESSION 6 IR INSTRUMENTS AND MISSIONS

- 7808 OY **Ordered/disordered broadband antireflective structures for near-infrared detector applications (Invited Paper)** [7808-54]
Y. M. Song, E. S. Choi, G. C. Park, S. J. Jang, Gwangju Institute of Science and Technology (Korea, Republic of); J. S. Yu, Kyung Hee Univ. (Korea, Republic of); Y. T. Lee, Gwangju Institute of Science and Technology (Korea, Republic of)
- 7808 OZ **Measurement of trace gases in East Asia from satellite infrared radiometer** [7808-32]
F. Kataoka, Y. Mitomi, Remote Sensing Technology Ctr. of Japan (Japan)

- 7808 10 **Imaging stand-off detection of explosives by quantum cascade laser based backscattering spectroscopy (Invited Paper)** [7808-33]
F. Fuchs, S. Hugger, M. Kinzer, B. Hinkov, R. Aidam, W. Bronner, R. Lösch, Q. Yang, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); K. Degreif, Fraunhofer-Institut für Physikalische Messtechnik (Germany); F. Schnürer, W. Schweikert, Fraunhofer-Institut für Chemische Technologie (Germany)
- 7808 11 **The evolution of the performance of the AVHRR, HIRS, and AMSU-A instruments on board MetOp-A after over three years in orbit** [7808-34]
D. Battles, Raytheon Technical Services Co. (Germany); R. Lambeck, Perot Systems Government Services (United States); A. Pérez Albiñana, European Space Agency (ESTEC) (Netherlands); M. K. Rama Varma Raja, I.M. Systems Group, Inc. (United States); X. Wu, C. Cao, NOAA-NESDIS (United States); H. Bauch, VEGA Deutschland GmbH (Germany); F. Montagner, EUMETSAT (Germany)
- 7808 12 **1.5 to 5 μ radiometer for spectral contrast of objects in changing backgrounds in real time (Background Discrimination Radiometer or BDR)** [7808-35]
D. Cabib, A. Gil, CI Systems (Israel) Ltd. (Israel)
- 7808 13 **Advances in modeling the obstruction in the HIRDLS optical train and resulting data (Invited Paper)** [7808-36]
J. Gille, Univ. of Colorado (United States) and National Ctr. for Atmospheric Research (United States); C. Cavanaugh, C. Halvorson, C. Hartsough, B. Nardi, National Ctr. for Atmospheric Research (United States)
- 7808 14 **In-orbit health and performance of operational AVHRR instruments** [7808-37]
M. K. Rama Varma Raja, National Oceanic and Atmospheric Administration (United States); D. Battles, Raytheon Technical Services Co. (Germany); X. Wu, National Oceanic and Atmospheric Administration (United States); H. Bauch, VEGA Deutschland GmbH (Germany); F. Yu, ERT Systems, Inc. (United States); R. W. Lambeck, Perot Systems Government Services (United States); N. Sun, National Oceanic and Atmospheric Administration (United States); A. Perez Albinana, European Space Agency (Netherlands); F. Montagner, EUMETSAT (Germany)
- 7808 15 **The multi-spectral imager onboard the EarthCARE spacecraft** [7808-39]
A. Pérez Albiñana, R. Gelsthorpe, A. Lefebvre, European Agency (Netherlands); M. Sauer, E. Weih, K.-W. Kruse, R. Münzenmayer, EADS Astrium GmbH (Germany); G. Baister, M. Chang, Surrey Satellite Technology Ltd. (United Kingdom)
- 7808 16 **A highly integrated micropayload for broadband infrared spectrometry (HIBRIS)** [7808-40]
M. Esposito, S. Hannemann, S. Moon, D. Lampridis, M. Collon, M. Beijersbergen, cosine Research B.V. (Netherlands)

SESSION 7 NOVEL IR DEVICE AND INSTRUMENT CONCEPTS

- 7808 17 **Spaceborne laser transmitters for remote sensing applications (Invited Paper)** [7808-41]
A. W. Yu, S. X. Li, M. A. Stephen, A. J. Martino, J. R. Chen, M. A. Krainak, S. Wu, H. Riris, J. B. Abshire, D. J. Harding, NASA Goddard Space Flight Ctr. (United States); G. R. Allan, Sigma Space Corp. (United States); K. Numata, Univ. of Maryland, College Park (United States)

- 7808 18 **Next generation infrared sensor instrumentation: remote sensing and sensor networks using the openPHOTONS repository (Invited Paper)** [7808-42]
S. So, E. Jeng, C. Smith, D. Krueger, G. Wysocki, Princeton Univ. (United States)
- 7808 19 **Applications of quantum cascade lasers in chemical sensing (Invited Paper)** [7808-43]
S. Wu, A. Deev, Y. Tang, California Institute of Technology (United States)
- 7808 1A **Advanced optoacoustic sensor designs for environmental applications (Invited Paper)** [7808-44]
C. Di Franco, A. Elia, V. Spagnolo, P. M. Lugarà, G. Scamarcio, CNR-IFN, Univ. degli Studi di Bari (Italy)

SESSION 8 RADIOMETRIC CALIBRATION AND STANDARDS

- 7808 1E **Calibration of far-IR and sub-mm detectors traceable to the international system of units** [7808-48]
R. Müller, B. Gutschwager, C. Monte, A. Steiger, J. Hollandt, Physikalisch-Technische Bundesanstalt (Germany)
- 7808 1F **NPP Visible/Infrared Imager Radiometer Suite (VIIRS) radiance uncertainty emissive bands: tested performance** [7808-49]
E. Johnson, K. Galang, C. Ranshaw, B. Robinson, Raytheon Space and Airborne Systems (United States)
- 7808 1G **Pre-launch characterization of the WISE payload** [7808-50]
H. Latvakoski, J. Cardon, M. Larsen, J. Elwell, Utah State Univ. (United States)

POSTER SESSION

- 7808 1H **Aberrations of a transparent sphere** [7808-51]
G. Paez, M. Strojnik, C. Ramirez, Ctr. de Investigaciones en Óptica (Mexico)
- 7808 1I **Image splitter for mid-infrared bi-spectral analysis of flames** [7808-52]
A. Ortega-Martinez, G. Paez, M. Strojnik, Ctr. de Investigaciones en Óptica (Mexico)
- 7808 1J **Oxygen saturation with simulated breathing** [7808-53]
C. Vazquez-Jacaud, G. Paez, M. Strojnik, Ctr. de Investigaciones en Óptica (Mexico)
- 7808 1K **Tunable filter imager for JWST: etalon opto-mechanical design and test results** [7808-55]
D. Touahri, P. Cameron, C. Evans, C. Haley, Z. Osman, A. Scott, N. Rowlands, COM DEV International Ltd. (Canada)
- 7808 1O **Micro-controller based fall detector to assist recovering patients or senior citizens** [7808-59]
F. Páez, L. Asplund, Univ. of Mälardalen (Sweden)

- 7808 1Q **The Astro-Comb project** [7808-61]
G. Schettino, Univ. degli Studi di Firenze (Italy) and Osservatorio Astrofisico di Arcetri (Italy);
C. Baffa, E. Giani, Osservatorio Astrofisico di Arcetri (Italy); M. Inguscio, Univ. degli Studi di
Firenze (Italy) and Istituto Nazionale di Ottica, CNR (Italy); E. Oliva, A. Tozzi, Osservatorio
Astrofisico di Arcetri (Italy); P. Cancio Pastor, Univ. degli Studi di Firenze (Italy),
LENS-European Lab. for Non-Linear Spectroscopy (Italy), and Istituto Nazionale di Ottica,
CNR (Italy)
- 7808 1R **Simultaneous measurement of multiple parameters using a single fiber Bragg grating**
[7808-63]
M. Kondiparthi, Indian Institute of Science (India)

Author Index

Conference Committee

Program Track Chair

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

Conference Chairs

Marija Strojnik, Centro de Investigaciones en Óptica (Mexico)

Gonzalo Paez, Centro de Investigaciones en Óptica (Mexico)

Program Committee

John Antoniadis, BAE Systems (United States)

Gail E. Bingham, Utah State University (United States)

David A. Cardimona, Air Force Research Laboratory (United States)

Catherine J. Cesarsky, European Southern Observatory (Germany)

Jam Farhoomand, TechnoScience Corporation (United States)

Gerald T. Fraser, National Institute of Standards and Technology
(United States)

John C. Gille, National Center for Atmospheric Research
(United States)

Sarath D. Gunapala, Jet Propulsion Laboratory (United States)

Dietrich Lemke, Max-Planck-Institut für Astronomie (Germany)

Stanley Wellard, Space Dynamics Laboratory (United States)

Jan L. Williams, e-Systems Management Consultants (United States)

Juergen Wolf, NASA Ames Research Center (United States)

Session Chairs

- 1 IR Focal Plane and Detector Development I
David A. Cardimona, Air Force Research Laboratory (United States)
Marija Strojnik, Centro de Investigaciones en Óptica (Mexico)
- 2 IR Focal Plane and Detector Development II
Marija Strojnik, Centro de Investigaciones en Óptica (Mexico)
David A. Cardimona, Air Force Research Laboratory (United States)
- 3 Detection Technology and Materials Characterization
Sarath D. Gunapala, Jet Propulsion Laboratory (United States)
Gonzalo Paez, Centro de Investigaciones en Óptica (Mexico)

- 4 Thermal IR Imaging of Mercury: MERTIS
Gabriele E. Arnold, Deutsches Zentrum für Luft- und Raumfahrt e.V.
(Germany)
Joern Helbert, Deutsches Zentrum für Luft- und Raumfahrt e.V.
(Germany)
- 5 The Way Forward: FIRST to CLARREO
Stanley Wellard, Space Dynamics Laboratory (United States)
John D. Elwell, Space Dynamics Laboratory (United States)
- 6 IR Instruments and Missions
John C. Gille, National Center for Atmospheric Research
(United States)
Marija Strojnik, Centro de Investigaciones en Óptica (Mexico)
- 7 Novel IR Device and Instrument Concepts
Gonzalo Paez, Centro de Investigaciones en Óptica (Mexico)
Marija Strojnik, Centro de Investigaciones en Óptica (Mexico)
- 8 Radiometric Calibration and Standards
Gerald T. Fraser, National Institute of Standards and Technology
(United States)
Sergey N. Mekhontsev, National Institute of Standards and Technology
(United States)

Introduction

The 18th conference on Infrared Remote Sensing and Instrumentation was held in San Diego, California, 1 to 3 August 2010, as a part of SPIE Optics + Photonics 2010. San Diego looks prettier every year because of continued reconstruction of the downtown historical area next to the convention center. This year, though, the tourist crowds appeared somewhat less densely populated than in previous years, possibly due to the difficult economic times. Next year, we are meeting again in San Diego, 21 through 25 August 2011, for the 19th in the series of infrared remote sensing conferences, hopefully under brighter circumstances. At that time, the annual meeting will report on the progress of basic science, development of new technologies, and works of engineering achievements in the IR remote sensing.

Our conference this year focused on the description of experiments and missions to explore our environment, comprised of Earth and its atmosphere, space, and celestial bodies in the IR region of the electromagnetic spectrum. Also, we paid special attention to the development of new materials for the detector and the source fabrication. In the past year, it appears that the technology has received more funding than the missions and space experiments. The author participation at our conference did not appear to experience a significant change from that in the previous years. In the early nineties, Earth observation started to be important once again, as all the other planets in our solar system were surveyed at least once. The cycle of surveying other planets appears to be returning with the mission to the planet Mercury to determine its natural resources. We also had a strong participation from the Space Dynamic Laboratory with their excellent engineering successes.

About 60 papers were presented at the conference, with scientific participation from Europe, Asia, and North America. Most of the manuscripts are included in these proceedings. We wish to express our appreciation to the participants, the authors, and the active audience who contributed to the discussions, for making the extra effort of attending under these difficult economic conditions of restricted travel and carefully watched budgets.

While we are remembering the important contributions of so many people who have promoted a successful outcome for this conference, we have to include the significant collaborations of the committee members who are working year after year to organize sessions on the subject of their particular specialty and/or scientific projects. This year was no exception. The conference was effectively started with a one-day session on the technology development of novel IR detectors, organized by Dr. Gonzalo Paez, who is now also a chair of our conference.

German scientists under leadership of Prof. Dr. Gabriele Arnold presented a session on the instruments and mission to survey with higher resolution the surface

of the planet Mercury, named MERTIS. This group has been actively participating in the conference for the past 15 years. Now, Dr. Arnolds is joining the conference committee to assure strong participation of the German scientific community in future events.

Similarly, the engineering staff of Utah State University's Space Dynamic Laboratory have been active participants and session organizers, starting with Dr. Jack Kemp early on, followed by Dr. Gail Bingham more recently. As Gail and his wife are contemplating a new career of charitable and missionary work, we are pleased to welcome the active participation of Dr. Stanley Wellard as a member of the technical committee and a session organizer. CLARREO and FIRST are among the successful missions described in detail this year.

We are fortunate that the members of the technical committee agreed to chair the specialized sessions. They are knowledgeable and skillful, knowing how to start an interesting discussion over a breakthrough theme and, on occasion, how to tactfully close it to keep the conference on schedule. Their capable guidance of sessions is admired and appreciated.

Special thanks are due to the SPIE staff for providing friendly guidance and organizational support to meet all the deadlines. Organizing a technical conference and publishing a book of conference proceedings involves hard work by a team of dedicated people.

**Marija Strojnik
Gonzalo Paez**