Plan to Attend

REMOTE SENSING

THE LEADING EUROPEAN MEETING ON SATELLITE-BASED IMAGING SYSTEMS AND DATA.

Co-located Event

SECURITY + DEFENCE 2017

SENSING, DATA AND SIGNAL ANALYSIS, QUANTUM SCIENCE, AND OPTICAL TECHNOLOGIES FOR ADVANCED SECURITY AND DEFENCE SYSTEMS.

Conferences: 11–14 September 2017
DoubleTree Hilton Hotel
Warsaw, Poland

www.spie.org/RS17programme
REMOTE SENSING
THE LEADING EUROPEAN MEETING ON SATELLITE-BASED IMAGING SYSTEMS AND DATA.

11–14 September 2017
DoubleTree Hilton Hotel • Warsaw, Poland

Four Days
800 participants, 799 opportunities

CUTTING-EDGE RESEARCH
WORLD-CLASS SPEAKERS
TRAINING AND EDUCATION
FOCUSED TECHNICAL TOPICS

REGISTER TODAY
www.spie.org/rs17programme

CONNECTING MINDS. ADVANCING LIGHT.
Everything you need to know about the meeting, DoubleTree Hilton Hotel, and Warsaw is online

- Up-to-date paper listings and session times
- Hotel, travel, and complete registration information
- Information on driving and parking during the meeting
- Schedule your week: MySchedule Tool and phone apps
  - Information about local travel options

Reserve Hotel Rooms by: **25 August 2017**
Registration Rates Increase after: **21 August 2017**

**Programme Current as of: 2 June 2017**

Learn · Connect · Do Business

Register Today: www.spie.org/rs17programme
Plan to attend SPIE Remote Sensing—where the latest information is presented.

Conferences .............................................. p. 14–44
Hear 590 presentations on the latest advances in remote sensing applications, sensors, systems, and satellite platforms.
Conf. 10421: Remote Sensing for Agriculture, Ecosystems, and Hydrology (Neale, Maltese) ................................................ 15
Conf. 10422: Remote Sensing of the Ocean, Sea Ice, Coastal Waters, and Large Water Regions 2017 (Bostater, Neyt, Mertikas) ............... 19
Conf. 10423: Sensors, Systems, and Next-Generation Satellites (Neeck, Kimura, Bézy) .......................................... 22
Conf. 10424: Remote Sensing of Clouds and the Atmosphere (Kassianov, Schafer, Comeron) ................................................ 25
Conf. 10425: Optics in Atmospheric Propagation and Adaptive Systems (Stein, Gladysz) ................................................ 28
Conf. 10426: Active and Passive Microwave Remote Sensing for Environmental Monitoring (Notarnicola, Paloscia, Santi) 30
Conf. 10427: Image and Signal Processing for Remote Sensing (Bruzzone) 32
Conf. 10428: Earth Resources and Environmental Remote Sensing/GIS Applications (Michel, Schulz) ........................................... 36
Conf. 10429: Lidar Technologies, Techniques, and Measurements for Atmospheric Remote Sensing (Singh, Nicolae) 39
Conf. 10430: High-Performance Computing in Remote Sensing (Huang, López, Wu) ................................................ 41
Conf. 10431: Remote Sensing Technologies and Applications in Urban Environments (Erbertseder, Esch, Chrysoulakis) ........................................... 43

Plenary Sessions .......................................... p. 10–11
Don’t miss these world-class speakers talking on the latest advancements and most promising breakthroughs.

Special Events .............................................. p. 12
These important events and sessions will provide valuable information and networking opportunities.

World-Class Exhibition ...................................... p. 13
Don’t miss your chance to speak face-to-face with top suppliers. Walk the floor and see the latest technology innovations and future applications in detection, imaging, sensing, lasers, and their supporting components and devices.

DAILY SCHEDULE ........................................ pages 6–9
PROCEEDINGS ............................................ page 45
GENERAL INFORMATION ................................ pages 46–48
Registration · Author/Presenter Information · Policies · Food and Beverage · Onsite Services · Parking and Car Rental
SPIE POLICIES ............................................ pages 50–51
Plan to Attend

It is our pleasure to welcome your attendance at SPIE’s 2017 International Symposium on Remote Sensing. An excellent technical programme has been prepared, focusing on recent advances in sensor technology, next generation satellites, remote sensing of the Earth and its environment, atmospheric propagation, and signal and image processing.

This year’s event will be held in Warsaw, Poland, and is SPIE’s 24th Remote Sensing Europe meeting. Previous symposia were held at various locations throughout Europe, including Stockholm, Florence, Cardiff, Prague, Berlin, Dresden, Amsterdam, Toulouse and Edinburgh. Over 590 presentations prove again that this event is recognized as an important forum for science, government, and industry to access and share information on remote sensing. The event’s focus is especially on the research aspects of remote sensing, with a concentration on European and international science and technology.

The symposium features eleven conferences that include oral and poster presentations, as well as a plenary session. A Welcome Reception will provide an opportunity to exchange ideas and network in a more personal way. The 24th SPIE Symposium on Remote Sensing will be co-located with the 14th SPIE European Defense & Security Symposium, and will provide an excellent opportunity to explore new opportunities to collaborate with new partners from other fields of activity.

The program promises an exciting week, with excellent science and technology in a setting conducive to international interchange, and we would be pleased to have your participation.

Finally, don’t miss this opportunity of visiting Warsaw, the capital of Poland, with its cornucopia of museums, neighbourhoods and landmarks, the permanent witnesses of its fascinating history.

SYMPOSIUM CHAIR

Klaus Schäfer  
Karlsruhe Institute of Technology, Institute of Meteorology and Climate Research (Germany)

SYMPOSIUM CO-CHAIRS

Christopher M. U. Neale  
University of Nebraska, Daugherty Water for Food Global Institute (USA)

Stanislaw Lewinski  
Space Research Centre, Polish Academy of Sciences (CBK PAN) (Poland)
<table>
<thead>
<tr>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONF. 10421: Remote Sensing for Agriculture, Ecosystems, and Hydrology (Neale, Maltese)</td>
</tr>
<tr>
<td>CONF. 10422: Remote Sensing of the Ocean, Sea Ice, Coastal Waters, and Large Water Regions 2017 (Bostater, Neyt, Mertikas)</td>
</tr>
<tr>
<td>CONF. 10423: Sensors, Systems, and Next-Generation Satellites (Neeck, Kimura, Bézy)</td>
</tr>
<tr>
<td>CONF. 10424: Remote Sensing of Clouds and the Atmosphere (Kassianov, Schafer, Comeron)</td>
</tr>
<tr>
<td>CONF. 10425: Optics in Atmospheric Propagation and Adaptive Systems (Stein, Gladysz)</td>
</tr>
</tbody>
</table>

### MONDAY

#### Morning

- SESSION 1: Oil Spill Sensing, Surveillance and Lasers (Babichenko)
- SESSION 2: Shallow Water Sensing of Coastal Waters, Habitats and Targets (Bostater)
- SESSION 1: European Missions I (Bézy)
- SESSION 2: European Missions II (Bézy)

#### Afternoon

- SESSION 3: Water Quality Related Sensing (Huete-Ortega)
- SESSION 4: European Missions III (Bojkov)
- SESSION 4: European Missions IV (Bojkov)

#### Evening

- JOINT PLENARY SESSION: Security + Defence and Remote Sensing
- WELCOME RECEPTION

### TUESDAY

#### Morning

- SESSION 1: Surface and Groundwater Hydrology I (Neale)
- SESSION 2: Surface and Groundwater Hydrology I (Neale)
- SESSION 4: Aerosol and Polarization Studies (Gilerson)
- SESSION 5: Aerosol and Polarization Studies (Ceamanos)
- SESSION 5: US Missions (Neeck)
- SESSION 6: Japanese Missions I (Kimura)

#### Afternoon

- SESSION 3: Hydrology and Precipitation (Maltese)
- SESSION 4: Evapotranspiration and LST (Neale)
- SESSION 6: Remote Sensing of Vessels, Water Circulation and Tides (Neyt)
- SESSION 7: Japanese Missions II (Kimura)
- SESSION 7: Altimetry, SAR, Microwave and Polarization Sensing (Quartly)
- SESSION 8: Calibration I (Xiong)

#### TUESDAY POSTER SESSION

### WEDNESDAY

#### Morning

- SESSION 5: Vegetation Monitoring I (Neale)
- SESSION 6: Vegetation Monitoring II (Neale)
- SESSION 9: Calibration II (Xiong)
- SESSION 1: Atmospheric Profiling of Aerosol, Trace Gases, and Meteorological Parameters of Remote Sensing I (Comerón, Kassianov)
- SESSION 1: Characterization of the Environment I (van Eijk)
- SESSION 2: Characterization of the Environment II (Lukin)

#### Lunch/Exhibition Break
## DAILY EVENTS SCHEDULE

### MONDAY

<table>
<thead>
<tr>
<th>TIME</th>
<th>SESSION 1: Image Calibration, Enhancement and Restoration (Masse)</th>
<th>SESSION 1: Greenhouse and Trace Gas Measurements (Singh)</th>
<th>SESSION 1: Urban Air Quality and Climate I (Erbertseder)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM</td>
<td>SESSION 2: Image Pan-sharpening and Super-resolution (Garzelli)</td>
<td>SESSION 2: Aerosols, Clouds and Winds Measurements I (Mamouri)</td>
<td>SESSION 2: Urban Air Quality and Climate II (Chrysoulakis)</td>
</tr>
<tr>
<td></td>
<td>Lunch/Exhibition Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PM</td>
<td>SESSION 3: Image Analysis and Change Detection (Bovolo)</td>
<td>SESSION 3: Aerosols, Clouds, and Winds Measurements II (Strawbridge, Romanovski)</td>
<td>SESSION 3: Urban Air Quality and Climate III (Erbertseder)</td>
</tr>
<tr>
<td></td>
<td>Lunch/Exhibition Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>JOINT PLENARY SESSION: Security + Defence and Remote Sensing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>WELCOME RECEPTION</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TUESDAY

<table>
<thead>
<tr>
<th>TIME</th>
<th>SESSION 4: Hyperspectral Image Analysis I (Nielsen)</th>
<th>SESSION 1: Infrastructures and Urban Areas (Boldt)</th>
<th>SESSION 4: Urban Monitoring and Planning I (Chrysoulakis)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM</td>
<td>SESSION 5: Hyperspectral Image and Analysis II (Vozel)</td>
<td>SESSION 2: Processing Methodologies I (Boldt)</td>
<td>SESSION 5: Urban Monitoring and Planning II (Zhang)</td>
</tr>
<tr>
<td></td>
<td>Lunch/Exhibition Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PM</td>
<td>SESSION 6: Estimation and Modelling Techniques (Bruzzone)</td>
<td>SESSION 3: Environmental Monitoring I (Michel, Schulz)</td>
<td>SESSION 6: Urban Monitoring and Planning III (Chrysoulakis)</td>
</tr>
<tr>
<td></td>
<td>SESSION 7: Object-based Image Analysis and Classification (Bruzzone)</td>
<td>SESSION 4: Environmental Monitoring II (Wessollek)</td>
<td>SESSION 7: Smart Cities (Zhang)</td>
</tr>
<tr>
<td></td>
<td>Lunch/Exhibition Break</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### WEDNESDAY

<table>
<thead>
<tr>
<th>TIME</th>
<th>SESSION 8: Image Compression, Detection and Retrieval (Demir)</th>
<th>SESSION 5: Hazard Mitigation Geologic Applications I (Nikolakopoulos)</th>
<th>SESSION 6: Environmental Monitoring III (Michel)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM</td>
<td>SESSION 9: SAR Image Analysis (Garzelli)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lunch/Exhibition Break</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## DAILY EVENTS SCHEDULE

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Afternoon</td>
<td>SESSION 7: Soil Monitoring (Maltese)</td>
<td>SESSION 11: Calibration III (Xiong)</td>
<td>SESSION 2: Atmospheric Profiling of Aerosol, Trace Gases, and Meteorological Parameters of Remote Sensing II (Comerón, Kassianov)</td>
<td>SESSION 3: From here to the Stars (Gladysz)</td>
<td>SESSION 4: Environmental Parameters (Stein)</td>
</tr>
<tr>
<td></td>
<td>SESSION 8: Forestry (Maltese)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SESSION 12: Missions and Sensing I (Bézy)</td>
<td>SESSION 3: Lidar, Radar and Passive Atmospheric Measurements I (Schäfer)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SESSION 13: Missions and Sensing II (Kimura)</td>
<td>SESSION 4: Lidar, Radar and Passive Atmospheric Measurements I (Schäfer)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SESSION 14: Missions and Sensing III (Bézy)</td>
<td>SESSION 5: Adaptive Optics Systems (von der Lühe)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SESSION 15: Missions and Sensing III (Bézy)</td>
<td>SESSION 6: Beam Propagation through Turbulence (Eisele)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>JOINT SESSION with Conf. 10426: Radar (Neale)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### THURSDAY

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning</td>
<td>SESSION 10: Vegetation Monitoring in Agriculture I (Neale)</td>
<td>SESSION 14: Missions and Sensing II (Kimura)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lunch/Exhibition Break</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Afternoon</td>
<td>SESSION 11: Vegetation Monitoring in Agriculture II (Neale)</td>
<td>SESSION 15: Missions and Sensing III (Bézy)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 2017 TECHNICAL COMMITTEE MEMBERS

- **Charles R. Bostater**, Florida Institute of Technology (USA)
- **Lorenzo Bruzzone**, Univ. degli Studi di Trento (Italy)
- **Nektarios Chrysoulakis**, Foundation for Research and Technology-Hellas (Greece)
- **Adolfo Comerón**, Univ. Politécnica de Catalunya (Spain)
- **Thilo Erbertseder**, Deutsches Zentrum für Luft und Raumfahrt e.V. (Germany)
- **Thomas Esch**, Deutsches Zentrum für Luft und Raumfahrt e.V. (Germany)
- **John D. Gonglewski**, European Office of Aerospace Research and Development (United Kingdom)
- **Bormin Huang**, Univ. of Wisconsin-Madison (USA)
- **Evgenii I. Kassianov**, Pacific Northwest National Lab. (USA)
- **Toshiyoshi Kimura**, Japan Aerospace Exploration Agency (Japan)
- **Sebastian López**, Univ. de las Palmas de Gran Canaria (Spain)
- **Antonino Maltese**, Univ. degli Studi di Palermo (Italy)
- **Stelios P. Mertikas**, Technical Univ. of Crete (Greece)
- **Roland Meynart**, European Space Research and Technology Ctr. (Netherlands)
- **Ulrich Michel**, Jade Univ. of Applied Sciences (Germany)
- **Christopher M. U. Neale**, Univ. of Nebraska Lincoln (USA)
- **Steven P. Neeck**, NASA Headquarters (USA)
- **Xavier Neyt**, Royal Belgian Military Academy (Belgium)
- **Doina N. Nicolae**, National Institute of Research and Development for Optoelectronics (Romania)
- **Claudia Notarnicola**, EURAC-Institute for Applied Remote Sensing (Italy)
- **Nazzareno Pierdicca**, Univ. degli Studi di Roma La Sapienza (Italy)
- **Emanuele Santi**, Istituto di Fisica Applicata Nello Carrara (Italy)
- **Klaus Schäfer**, Karlsruhe Institute of Technology (Germany)
- **Karsten Schulz**, Fraunhofer institute of Optronics, System Technologies and Image Exploitation IOSB (Germany)
- **Haruhisa Shimoda**, Tokai Univ. (Japan)
- **Upendra N. Singh**, NASA Langley Research Ctr. (USA)
- **Karín Stein**, Fraunhofer Institute of Optronics, System Technologies and Image Exploitation IOSB (Germany)
- **Zhensen Wu**, Xidian Univ. (China)
DAILY EVENTS SCHEDULE

---|---|---|---|---|---|---
PM | JOINT SESSION with Conf. 10427: SAR Data Processing I (Bruzzone) | JOINT SESSION with Conf. 10426: SAR Data Processing I (Bruzzone) | SESSION 7: Processing Methodologies II (Schulz) | JOINT SESSION with Conf. 10427: SAR Data Processing II (Notarnicola) | SESSION 8: Processing Methodologies III (Hammer) | |
THURSDAY
AM | SESSION 1: SAR Interferometry (Bovenga) | SESSION 9: Hazard Mitigation Geologic Applications II (Nikolakopoulos) | SESSION 2: Environmental Applications (Santi) | SESSION 10: Environmental Monitoring IV (Häufel, Wessollek) | Lunch/Exhibition Break | |
PM | SESSION 3: Tutorial (Santi) | JOINT SESSION with Conf. 10421: Radar (Neale) | |

**Best Student Paper Award 2017 Nomination Process**

As a committed supporter of excellence in student research, SPIE supports Best Student Paper Awards at SPIE conferences across the globe. In addition to cash prizes and award certificates, winners receive SPIE Digital Library downloads and complimentary SPIE Student Membership.

The awards are designed to encourage and acknowledge excellence in oral and poster student paper presentations. Best student papers will be recognized within each of the Remote Sensing conferences.

In order to be considered for this award, the student must meet the following requirements:

- Student must be the presenting author at the conference and must make their oral presentation as scheduled.
- Student must be the leading author of the manuscript.
- Papers submitted by graduate and undergraduate students are eligible.
- Student must enter the best student paper award by responding to an award announcement e-mail.
- The best student award announcement will follow the acceptance notification and will include all details necessary to enter and qualify for the competition.

A panel of experts will evaluate the papers, both for quality and content.
Plenary Presentations
Remote Sensing and Security + Defence Joint Plenary Session
Monday 11 September 2017 • 16:00 to 18:30

Don’t miss these world-class speakers talking on the latest advancements and most promising breakthroughs.

16:00 to 16:05
Welcome Address
SPIE

16:05 to 16:15
Welcome and Introduction

Klaus Schäfer
Karlsruhe Institute of Technology, Institute of Meteorology and Climate Research, Germany (retired)
2017 Remote Sensing Symposium Chair

Ric Schleijpen
TNO Defence, Security and Safety (Netherlands)
2017 Security + Defence Symposium Chair

16:15 to 17:00
Optoelectronics developments in Poland for defense and security

Col. Krzysztof Kopczynski
Military Univ. of Technology, Poland

The achievements and the state-of-art of the selected Polish optoelectronic projects with applications in defense and security fields are described and reviewed. The main attention is paid to projects managed by Institute of Optoelectronics (IOE), Industrial Center of Optoelectronics (PCO S.A) and Telesystem MESKO. Institute of Optoelectronics (IOE) of Military University of Technology is carrying out a number of national, European Defence Agency and NATO projects. PCO S.A. is the biggest Polish producer of optoelectronic devices and all the products are a result of research and development activities of the company. PCO SA produces a wide range of optoelectronic observation, surveillance and sight equipment using night and thermal vision and laser technologies. These include night vision goggles and monoculars as well as day-night thermal imagers and night vision aiming sights, collimator sights, optoelectronic heads with various sensors (NV, IR, TV cameras) and laser rangefinders, fire control systems, or laser warning systems. IR seekers designed by Telesystem MESKO and the IOE for portable air-defence missiles Grom and Piorun produced by MESKO SA are also presented. Two new strategic projects Polish Future Soldier and Direct Energy Weapon with contribution of numerous scientific and industrial establishments are described as well.

Biography: Krzysztof Kopczyński is a graduate of the Military University of Technology, where he obtained his PhD in technical sciences in optoelectronics. After receiving his degree in 2000, he worked as Deputy Director of the MUT Institute of Optoelectronics. From 2005 to 2008 he was a deputy commander of the MUT Military Technology Department, and since 2010 he has been the director of the Institute of Optoelectronics. Dr. Kopczyński has participated in and managed a number of national and international projects from National Centre for Research and Development, EU and European Defence Agency. At present he is a head of research on optoelectronic security and defense systems; he has also managed Polish sections of EDA projects FABIOLA “Fluorescence Applied for Biological Agents Detection”, AD Helw “Air Defense High Energy Laser Weapon”, and AHEAD “Advanced Helmet and Devices for Individual Protection”.

Dr. Kopczyński has won many gold medals and distinctions at international Innovation Shows in Moscow, Geneva, and the EUREKA Exhibitions in Brussels, as well as awards and diplomas by the Minister of Science. He was also awarded the “Merite de L’Invention” Knight’s Cross by the Belgian Royal Committee. He heads the IOE Center for Excellence “Optoelectronic Systems of Security Monitoring “OptoSec”, and he managed and a research project for lidar systems “Remote detection and identification of biological contaminants using advanced optoelectronic methods”. The lidars were used for protection of UEFA Euro 2012 Championship. Dr. Kopczyński has received national and departmental prizes in recognition for his work for his country. For many years he has represented Poland in NATO panels. He is the author of more than 100 publications in Polish and international scientific journals.
Remote sensing in food security

Molly E. Brown
Univ. of Maryland, United States

Small family farms dominate agricultural production in the developing world, producing 80% of the world’s food. More than 500 million family farms manage between 70 and 80% of farmland, particularly in sub-Saharan Africa, South America, and Asia. Understanding how weather and climate affect growing conditions for these smallholders is a central part of food security assessment. Due to the diversity of farm family’s access to resources and sources of income, there is no direct connection between changes in food production and food security outcomes. However, human health beyond nutrition is likely to be affected by environmental changes occurring across multiple geographic and time scales. Impacts range from increasing transmissibility and the range of vectorborne diseases, such as malaria and yellow fever, to undermining nutrition through deleterious impacts on clean water, changes in access to diverse environmental resources and concomitant increases in food prices.

Using a variety of analytic approaches, this talk will describe how remote sensing data and weather information can be combined with household survey and consumption information to better understand the impact of environmental and climate change on food security outcomes. New approaches from the fields of information and communication technology (ICT) and big data analytics will also be described, as they are enabling new tools that will help localize agricultural information and connect farmers with appropriate expertise. Using mobile technologies to gather specific information on small farmers, including crop grown, area cultivated, yield, access to resources, use of inputs and labour, we can improve our ability to generate much higher quality agricultural statistics, which can further improve assessment of food production outcomes. Remote sensing data can be much more useful to smallholder family farmers if they can be integrated into their decision making. Small farmers make up a large proportion of the food insecure populations, therefore promoting their increased productivity through information from remote sensing is a key way to spur economic growth, environmental resilience and improved food security.

Biography: Molly E Brown works as an associate research professor of the Department of Geography at the University of Maryland College Park (UMCP), and serves as the Chief Scientist Officer of 6th Grain Global Private Limited, Singapore. Molly has fifteen years of experience in interdisciplinary research using satellite remote sensing data and models with socio-economic and demographic information to better understand food security drivers. She has projects in Africa and south Asia and has lived in Senegal while in the Peace Corps in the early 1990s. She has published over 100 journal articles in a variety of disciplines and has two books. In 2015, she was the lead author of a US Climate Assessment report published by the US Department of Agriculture entitled ‘Climate Change, Global Food Security and the U.S. Food System’. Previously, Dr. Brown worked for thirteen years first as a contractor and then as a civil servant at NASA Goddard Space Flight Center in the Biospheric Sciences Branch. She received the NASA Robert H. Goddard Honor Science Award in 2008, NOAA David Johnson Award National Space Club in 2010, Women in Aerospace (WIA) Outstanding Achievement Award in 2015 and USDA Abraham Lincoln Honor Award for the writing team ‘Climate Change, Global Food Security, and the US Food System’ in 2016. She earned her Ph.D. in Geography from the University of Maryland in College Park, MD. She served as a member of the Coordination Group on Meteorological Satellites Working Group III Tiger team on Socio-Economic Benefits (CGMS), 2013-2015 and the National Science Foundation (NSF) Environmental Research and Education Advisory Committee (ERE-AC), 2010-2012, and is currently serving on the National Research Council-Space Studies Board’s Committee on Earth Science and Applications from Space.

Next Decade in Infrared Detectors

A. Rogalski
Institute of Applied Physics, Military University of Technology, Poland

Fundamental and technological issues associated with the development and exploitation of the most advanced infrared technologies are discussed. In these classes of detectors both photon and thermal detectors are considered. Special attention is directed to HgCdTe ternary alloys, type II superlattices (T2SLs), barrier detectors, quantum wells, extrinsic detectors (including blocked impurity band detectors) and uncooled thermal bolometers. The main challenges facing multicolor devices are concerned with complicated device structures, thicker and multilayer material growth, and more difficult device fabrication, especially for large array sizes and/or small pixel dimensions.

The sophisticated physics associated with the antimonide-based bandgap engineering will give a new impact and interest in development of infrared detector structures. The development of InAs/GaSb T2SLs results from two primary motivations: the perceived challenges of reproducibly fabricating high-operability HgCdTe focal plane arrays (FPAs) at reasonable cost and theoretical predictions of lower Auger recombination for type T2SL detectors compared to HgCdTe.

InAs/GaSb T2SL photodetectors offer similar performance to HgCdTe at an equivalent cutoff wavelength, but with a sizeable penalty in operating temperature, due to the inherent difference in Shockley-Read lifetimes. It is predicted that since the future IR systems will be based on the room temperature operation of depletion-current limited arrays with pixel densities that are fully consistent with background- and diffraction-limited performance due to the system optics, the material system with long Shockley-Read lifetime will be required. Since T2SLs are very resilient in attempts to improve its SR lifetime, current materials that meets this requirement is HgCdTe. Important advantage of T2SLs is the high quality, high uniformity and stable nature of the material. In general, III-V semiconductors are more robust than their II-VI counterparts due to stronger, less ionic chemical bonding. As a result, III-V-based FPAs excel in operability, spatial uniformity, temporal stability, scalability, producibility, and affordability – the so-called “ibility” advantages.

Biography: Antoni Rogalski is a professor at the Institute of Applied Physics, Military University of Technology in Warsaw. During the course of his scientific career, he has made pioneering contributions in the areas of theory, design, and technology of different types of infrared (IR) detectors. In 1997, he received an award from the Foundation for Polish Science (the most prestigious scientific award in Poland) for achievements in the study of ternary alloy systems for IR detectors – mainly an alternative to HgCdTe new material systems such as lead salts, InAsSb, HgZnTe, and HgMnTe. In 2013 he was elected as a Ordinary Member of the Polish Academy of Sciences and a member of the Central Commission for Academic Degrees and Titles. In June 2015 was appointed as a dean of Division IV Polish Academy of Sciences: Engineering Sciences. Professor Rogalski’s scientific achievements include determining the fundamental parameters of narrow-gap semiconducting materials estimating the ultimate performance of IR detectors, elaborating on studies of high-quality PbSnTe, HgZnTe, and HgCdTe photodiodes operated in IR spectral ranges; and conducting comparative studies of the performance limitation of HgCdTe photodiodes versus other types of photon detectors (especially QWIP and QDIP IR detectors, type-II superlattices) for third generation infrared detectors. His activity is focused on research of physical processes and phenomena conditioning the best quality detectors’ formation. His cooperation with Vigo System S.A. lasts about 20 years and is, in the Polish reality, a unique example of a cooperation between the academic research team and the High-Tech optoelectronic devices’ implementation company.

Professor Rogalski is a fellow of the International Society for Optical Engineering (SPIE), vice president of the Polish Optoelectronic Committee, editor-in-chief of the journal Opto-Electronics Review, deputy editor-in-chief of the Bulletin of the Polish Academy of Sciences: Technical Sciences, and a member of the editorial boards of Journal of Infrared and Millimeter Waves, International Review of Physics, International Journal of Electronics and Telecommunications, and Photonics Letters of Poland. He is an active member of the international technical community a chair and co-chair, organizer and member of scientific committees of many national and international conferences on optoelectronic devices and material sciences.
**Special Events**

**Welcome Reception**
Monday 11 September 2017 • 18:30 to 21:30

All attendees are invited to relax, socialise, and enjoy light refreshments. Due to limited space and numbers, guests will be admitted on a first-come, first-served basis. Please contact the onsite registration desk for additional guest tickets.

Please remember to wear your conference registration badges. Dress is casual.

**Posters—Tuesday**
Tuesday 12 September 2017 • 17:45 to 19:30

All symposium attendees are invited to attend Tuesday poster session provided as an opportunity to enjoy networking and refreshments while reviewing poster papers. The interactive poster sessions are designed to promote opportunities for networking with colleagues in your field. Attendees are encouraged to review the high-quality papers that are presented in this alternate format and to interact with the poster authors. Participants are requested to wear their conference registration badges to the poster sessions.

Poster presenters may begin posting their poster papers starting at 10.00 hrs on Monday. Each poster presenter is provided a space 0.95 x 1.20m in which to display a summary of the paper. (The boards are designed to accommodate A0 size in portrait orientation.) Poster authors are requested to attend the official poster session and should be at their papers on Tuesday from 17.45 to 19.30 hrs to answer questions from attendees. Poster presenters who have not set up by 17.45 on Tuesday will be considered a “no show” and their manuscript will not be published. SPIE assumes no responsibility for posters left up after 7:30 pm on Tuesday. Any papers left on the boards at that time will be considered unwanted and will be discarded.

**Industry Session**
Wednesday 13 September 2017 • 09:00 to 17:00

The rapid emergence of innovative “dual use” technologies in the defense, security, and sensing marketplace is increasing the rate of access to many new and exciting end-use applications. Join our speakers and hear expert perspectives on how these applications are delivering in the real-world environment and the underlying technical trends that drive them.

The Industry Sessions offer valuable technical insight, unparalleled networking opportunities, and are open to all attendees.

Programme includes the following speakers and presentations. Please return soon for more details.

- **Welcome to Poland and Warsaw; overview of photonics in Poland and commercial opportunities**
  - Ryszard Kardasz, PPTF Coordinator and CEO of PCO S.A.
  - Adam Piotrowski, President, VIGO System S.A.

- **Markets and opportunities for mid-IR sensing and imaging**
  - Thierry Robin, Partner, Tematys

- **Defense applications of mid-IR detectors**
  - Jozef Piotrowski, VIGO System S.A.

- **Self-calibrated system for testing electro optical imaging and laser systems for surveillance applications**
  - K. Chrzanoski, Military University of Technology

- **The MIRPHAB pilot line: an update**
  - Sergio Nicoletti, Business Development Optical Sensors, Leti – CEA

- **Trends in commercial applications of gallium nitride lasers**
  - Stephen Najda, VP Business Development, TopGaN Lasers
Exhibition

Attend the free co-located Exhibition
12-13 September 2017

Tuesday 12 September 2017 ............ 10:00 to 17:00
Wednesday 13 September 2017 ........ 10:00 to 16:00

Join us at the 2017 Security + Defence Exhibition. Leaders from the defence industries from both Europe and North America will gather to share topics and photonics technology developments related to this critical industry. Walk the floor and see the latest technology innovations and future applications in detection, imaging, sensing, lasers, and their supporting components and devices.

CO-LOCATED WITH SPIE SECURITY + DEFENCE
SPIE Security+Defence and SPIE Remote Sensing attract more than 800 attendees in their combined technology areas. This exhibit represents access to two distinct yet relevant audiences, while exploring new opportunities of collaboration with partners from other fields of activity. As an attendee of this free exhibit, you benefit from this event partnership.

INTERESTED IN EXHIBITING
Extend your company’s presence in the industry and scientific community by showcasing your latest advancements, networking with colleagues, and positioning your new products and services. This is also a great opportunity to see what other suppliers are offering.

For more information regarding these opportunities, contact the SPIE Sales Team:
AL RAGAN
America, Asia and the majority of the World
Tel: +1 360 685 5439 • alr@spie.org

HERMANN DOSTER
Europe (with the exception of UK, France, and Ireland)
Tel: +49 (0) 7025/841 806 • hermann@spieeurope.org

REMOTE SENSING:
Technologies Represented
• Sensors systems and next generation satellites
• GIS & LIDAR technologies
• Adaptive optical systems
• Image and signal processing
• Sensing in urban environments
• Hyperspectral Imaging
• Imaging components, equipment, and systems

Applications Represented
• Oceans, sea ice and coastal waters
• Agriculture and hydrology
• Atmosphere and clouds
• Infrastructure and urban areas
• Hazard prediction and mitigation
• Planetary Exploration

DEFENCE + SECURITY:
Technologies Represented
• Electro-optical and infrared systems
• Infrared sources, detectors and sensors
• THz technology
• High-power lasers
• Quantum information security

Applications Represented
• Unattended and unmanned vehicles
• Target and background signatures detection and recognition
• Counterterrorism and defence
• Infrastructure and urban areas
• Biohazard and chemical sensing
• Change detection
GET LASTING VISIBILITY FOR YOUR RESEARCH

Present and publish with SPIE.
When you share your research at an SPIE conference and publish in the SPIE Digital Library, you are opening up opportunities for networking, collaborating, and promoting your work.

Proceedings of SPIE are covered by major scientific indexes and search services, including Web of Science, Scopus, Inspec, Ei Compendex, Astrophysical Data Service (ADS), CrossRef, and Google Scholar.

SPIE Proceedings
www.spie.org/proceedings

Your paper becomes globally available to the research community.

CONFERENCE 10421

Remote Sensing for Agriculture, Ecosystems, and Hydrology

Conference Chairs: Christopher M. U. Neale, Univ. of Nebraska Lincoln (USA); Antonino Maltese, Univ. degli Studi di Palermo (Italy)

Programme Committee: Wim G. M. Bastiaanssen, UNESCO-IHE Institute for Water Education (France); Antonino Maltese, Univ. degli Studi di Palermo (Italy); Christopher M. U. Neale, Univ. of Nebraska Lincoln (USA)

TUESDAY 12 SEPTEMBER

OPENING REMARKS ....................... TUE 8:50 TO 9:00

SESSION 1 ................................. TUE 9:00 TO 10:00

Surface and Groundwater Hydrology I

Session Chair: Christopher M. U. Neale, Univ. of Nebraska Lincoln (USA)

Automated flood extent identification using WorldView3 imagery for the insurance industry, Christina Geller, AIR Worldwide (USA) ............. [10421-1]

Flood monitoring technique based on RGB composite imagery using MODIS data, Huy Tran, Young-Joo Kwon, Sungwook Hong, Sejong Univ. (Korea, Republic of) ........................................ [10421-2]

Calibration and validation of a semidistributed hydrological model in the Amur River basin using remote sensing data, Shilun Zhou, Institute of Remote Sensing and Digital Earth (China) and Univ. of Chinese Academy of Sciences (China); Wanchang Zhang, Institute of Remote Sensing and Digital Earth (China) ......................... [10421-3]

SESSION 2 ................................... TUE 10:30 TO 11:50

Surface and Groundwater Hydrology II

Session Chair: Christopher M. U. Neale, Univ. of Nebraska Lincoln (USA)

Possibilities of water quality modeling with the use of different remote sensed data sources (ground, airborne and satellite), Malgorzata Slapinska, Warsaw Univ. of Life Sciences SGGW (Poland) .................... [10421-4]

Multisensor satellite data for water quality analysis and water pollution risk assessment: decision making under deep uncertainty with fuzzy algorithm in framework of multimodel approach, Yury V. Kostyuchenko, Ctr. for Aerospace Research of the Earth (Ukraine); Yulia Sztoryka, Institute of Hydrobiology, National Academy of Sciences of Ukraine (Ukraine); Ivan Kopachevsky, Igor Artemenko, Maxim Yuschenko, Ctr. for Aerospace Research of the Earth (Ukraine). ........................ [10421-5]

Modelling spatial and temporal variability of hydrologic impacts under climate changes over the Nenjiang River Basin, China, Hao Chen, Institute of Remote Sensing and Digital Earth (China) and Univ. of Chinese Academy of Sciences (China); Wanchang Zhang, Institute of Remote Sensing and Digital Earth (China) ................................................... [10421-6]

Remote sensing- and GIS technology-based surface and ground water mapping, Kinjai Baru, Sabrina R. Sheonty, S. M. Payyan C. Akash, Bangladesh Univ. of Engineering and Technology (Bangladesh) .................. [10421-7]

Lunch/Exhibition Break ....................... TUE 11:50 TO 13:20

SESSION 3 ................................. TUE 13:20 TO 15:00

Hydrology and Precipitation

Session Chair: Antonino Maltese, Univ. degli Studi di Palermo (Italy)

Validation of global satellite rainfall product for real-time monitoring of meteorological extremals, Fulgencio Cánovas-García, Sandra García-Galiano, Univ. Politécnica de Cartagena (Spain); Negar Karbalaee, Ctr. for Hydrometeorology and Remote Sensing (USA) .......................... [10421-8]

Evaluation of future precipitation changes in the Zagros Karst Regions using CMIP5 data (case study: Kermanshah, Iran), Jafar Masoumipour Samakosh, Razi Univ. (Iran, Islamic Republic of); Morteza Miri, Abdolnabi Abdol Kolahchi, Soil Conservation and Watershed Research Institute (Iran, Islamic Republic of) .......................... [10421-9]

Assessment of GPM precipitation data with rain measurement from rain gauge (case study: Lorestan, Iran), Abdolnabi Abdol Kolahchi, Morteza Miri, Soil Conservation and Watershed Research Institute (Iran, Islamic Republic of) ........ [10421-10]

Assessment of TRMM 3B43 product in drought monitoring over Singapore, Mou Leong Tan, National Univ. of Singapore (Singapore); Kok Chooi Tan, Univ. Sains Malaysia (Malaysia); Wanchang Zhang, Institute of Remote Sensing and Digital Earth (China) .......................... [10421-11]

Evaluation of TRMM products in extreme precipitation events over peninsular Malaysia, Jacquelyne Paska, Alvin M. S. Lau, Univ. Teknologi Malaysia (Malaysia); Mou Leong Tan, National Univ. of Singapore (Singapore); Kok Chooi Tan, Univ. Sains Malaysia (Malaysia) ........ [10421-12]

SESSION 4 ................................... TUE 15:30 TO 17:50

Evapotranspiration and LST

Session Chair: Christopher M. U. Neale, Univ. of Nebraska Lincoln (USA)

Continuous monitoring of evapotranspiration (ET): overview of LSA-SAF evapotranspiration products, Alirio Arboleda, Nicolas Ghilain, Francoise Gellens-Meulenberghs, Royal Meteorological Institute of Belgium (Belgium) .................. [10421-13]

Surface temperature estimated with Landsat 8 images and geostatistical tools in the northwestern São Paulo state, António Herberto C. de Castro Teixeira, Embrapa Monitoramento por Satélite (Brazil); Fernando Braz T. Hernandez, Univ. Estadual Paulista “Júlio de Mesquita Filho” (Brazil); Janice F. Leivas, Embrapa Monitoramento por Satélite (Brazil); Daniel Noe C. Nunez, Renato Alberto Mommesso Franco, Univ. Estadual Paulista “Julio de Mesquita Filho” (Brazil) .......................... [10421-14]

Assessing actual evapotranspiration via surface energy balance aiming to optimize water and energy consumption in large-scale pressurized irrigation systems, Awada Hassan, Giuseppe Cirillo, Antonino Maltese, Giuseppe Properzio, Univ. degli Studi di Palermo (Italy); Juan Ignacio Corcoles, Miguel Angel Moreno, Univ. de Castilla-La Mancha (Spain) .......................... [10421-15]

Sharpening thermal satellite imagery for ET estimation using a super-pixel approach, Mario F. Lillo-Saavedra, Eduardo Holzalpelt Sr., Univ. de Concepción (Chile); Consuelo Gonzalo-Martín, Angel García-Pedrero, Univ. Politécnica de Madrid (Spain); Dionisio Rodríguez-Esparragón, Univ. de Las Palmas de Gran Canaria (Spain) .................. [10421-16]

Low-cost photonic sensors for carbon dioxide exchange rate measurement, Marcin Bieda, Piotr Sobotka M.D., Piotr Lesiak, Tomasz R. Wolnirski, Warsaw Univ. of Technology (Poland) ........ [10421-17]

Determination of the actual evapotranspiration by using remote sensing methods, Eser Bora, General Directorate Water Management (Turkey) .................. [10421-18]

Estimation of the maximum and minimum air temperature of Northern Iran by remote sensing imagery, Abdolnabi Abdol Kolahchi, Soil Conservation and Watershed Research Institute (Iran, Islamic Republic of); Morteza Miri, Islamic Azad Univ. (Iran, Islamic Republic of) .......... [10421-19]

POSTERS—TUESDAY ..................... TUE 17:45 TO 19:30

Conference attendees are invited to attend the Remote Sensing and Security+Defence poster session held on Tuesday 17:45 to 19:30. Posters will be on display after 13:00 hrs on Monday in the Universal Ballroom Foyer. Authors of poster papers will be present to answer questions concerning their papers during the Tuesday Poster Session. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/x32234.xml

An intercomparison of METRIC, TIM and TSEB models for estimating actual evapotranspiration from satellite data in the thermal infrared over the Habra plain in Mascara (West of Algeria), Tefaholle Mohamed, Abderrahmane A. Hamimed, Bekhtiar Djemal, Nahal Laounia, Hamadi Mohamed, Ouadja Abd, Univ. de Mascara (Algeria) .......................... [10421-57]

Water indicators based on SPOT 6 satellite images in irrigated area at the Paracatu River Basin, Brazil, Janice F. Leivas, António Herberto C. de Castro Teixeira, Gustavo B. Silva, Ediene Aparecida M. Garçon, Embrapa Monitoramento por Satélite (Brazil) .......................... [10421-58]
Estimation of flood discharge using satellite-derived rainfall in alluvial watersheds. Joo-Hun Kim, Yun-Seok Choi, Kyeong-Tak Kim, Gil-Ho Kim, Korea Institute of Civil Engineering and Building Technology (Korea, Republic of) .................. [10421-59]

Correction of satellite rainfall estimates by considering the spatial information of gauge-measured rainfall data. Yu-Ri Lee, Dong-Bin Shin, Yonsei Univ. (Korea, Republic of); Joo-Hun Kim, Kyung-Tak Kim, Korea Institute of Civil Engineering and Building Technology (Korea, Republic of) .................. [10421-60]

Detection of the reservoir water level using contour lines from optical images. Claudia Pipitone, Antonino Maltese, Gino G. Dardanelli, Fulvio Capodici, Mauro Lo Brutto, Goffredo La Loggia, Univ. degli Studi di Palermo (Italy); Francesco Mancilla, Stefano Lavecchia, Università degli Studi di Bologna (Italy) .................. [10421-61]

Study the impact of the rainfall on the United Arab Emirates dams using remote sensing and image processing techniques, Fatima Al Marzouqi, Shaikha Al Besher, Saeed H. Al Mansoori, Mohammed Bin Rashid Space Ctr. (United Arab Emirates) .................. [10421-62]

Monitoring total nitrogen content in soil of cultivated land based on hyperspectral technology. Xiaohu Gu, Lizi Wang, Liyan Zhang, Guijun Yang, National Engineering Research Ctr. for Information Technology in Agriculture (China) .................. [10421-63]

Modeling soil organic matter (SOM) from satellite data using VIR-NIR-SWIR spectroscopy and PLS regression with step-down variable selection algorithm: case study of Campos Amazonicos National Park savanna enclaves, Brazil. Olga Alexandra Rosoro-Vassava, Daniel Borini-Alves, Univ. de Zaragoza (Spain); Lidia Vassava, Univ. Tecnica del Estado (Chile); Raquel Monitorno Lovera, Fernando Pérez-Cabello, Univ. de Zaragoza (Spain) .................. [10421-64]

Remote sensing of soil organic matter of farmland with hyperspectral image, Xiaohu Gu, Lei Wang, Guijun Yang, Liyan Zhang, National Engineering Research Ctr. for Information Technology in Agriculture (China) .................. [10421-65]

Burnt area mapping using Sentinel-2 MSI, Alfonso Alonso-Beníto, Manuel Arbelo, Pedro A. Hernandez-Leal, Univ. de La Laguna (Spain); Jose A. Moreno-Ruíz, Jose R. Garcia-Lazaro, Univ. de Almería (Spain) .................. [10421-66]

Multitemporal WorldView satellites imagery for mapping chestnut trees. Francine Marchetti, Adrián Arbelo-Hernández, Manuel Arbelo, Pedro A. Hernandez-Leal, Alfonso Alonso-Beníto, Univ. de La Laguna (Spain); Jose A. Moreno-Ruíz, Univ. de Almería (Spain) .................. [10421-67]

Evaluation of forest fires in Portugal mainland during 2016 summer considering different satellite datasets, Ana C. Teodoro, Ana Ayala, Fernando Santos, Univ. do Porto (Portugal) .................. [10421-68]

Carpathian mountain forest vegetation and its responses to climate stressors. Maria A. Zoran, Roxana S. Savastu, Dan M. Savastu, Marina N. Tautan, Laurentiu V. Baschir, National Institute of Research and Development for Optoelectronics (Romania); Adrian I. Dida, Transilvania Univ. of Brasov (Romania) .................. [10421-69]

Unsupervised detection of burned area from remote sensing images using fuzzy C-means clustering. Taqirg Moughal, Aliama Iqbal Open University (Pakistan); Fusheng Yu, Beijing Normal Univ. (China); Aliyev Mazer, Peking Univ. (China) .................. [10421-82]

Comparison of different discriminant functions for mangrove species analysis in Matang Mangrove Forest Reserve (MMFR), Perak, based on statistical approach, Boon Chun Beh, Kok Chooi Tan, Mohd Zubir Mat Jafri, Ahmad Musa, Dye San Lim, Univ. Sains Malaysia (Malaysia) .................. [10421-70]

Assessment and monitoring of land-cover change to reduce the risk of natural disaster with the use of satellite images and GIS technologies, Iuliana I. Polyesvichikova, Volga State Univ. of Technology (Russian Federation) .................. [10421-71]

Green FPAR and its relationship with spectral vegetation indices. Shouzhen Liang, Shandong Institute of Agricultural Sustainable Development (China) .................. [10421-72]

Competition between agricultural, urban and sand-mining areas at the Paraiba do Sul watershed in southeastern Brazil. Carlos C. Ronquim, Guilherme Conrado, Fabiano Amorim, Antonia T. Texeira, Janice F. Leivas, Embrapa Monitoramento por Satélite (Brazil) .................. [10421-73]

Localization of the invasive water hyacinth (Eichhornia crassipes) in Guadiana River using Sentinel-2A MSI imagery. Gabriel Navarro Almendros, Isabel Caballero, Consejo Superior de Investigaciones Científicas (Spain); Edward Morris, Univ. de Cádiz (Spain) .................. [10421-74]

Systematic evaluation of CNN on land cover classification from remotely sensed images. Elman Kattan, The Univ. of Reading (United Kingdom) .................. [10421-75]

The fusion of satellite and UAV data: simulation of high spatial resolution band from the UAV data, Agnieszka Jenrowicz, Katarzyna Siok, Małgorzata Woszczyk, Agata Orych, Wojskowa Akademia Techniczna im. Janusza Dabrowskiego (Poland) .................. [10421-76]

Use of satellite data for land use land cover (LULC) classification and wheat yield prediction in irrigated areas of Punjab, Pakistan, Afzaal Naezer, Bahauddin Zakaria Univ. (Pakistan) .................. [10421-77]

Unmanned aerial vehicle (UAV) data analysis for industrial tomato fertilization dose assessment, Antonis Kavadias, En Agris (Greece); Emmanuel Psomiadis, Agricultural Univ. of Athens (Greece); Manouli Chanioti, Inforest Research O.C. (Greece); Alexandros Tsaloupas, Leonidas Toulou, Hellenic Agricultural Organization-Soil Mapping and Classification Institute (Greece) .................. [10421-78]

Evaluation and cross-comparison of vegetation indices for precision farming from Sentinel-2 and WorldView-2 images, Emmanuil Psomiadis, Univ. of Thessaly (Greece); Nicholas Dercas, Agricultural Univ. of Athens (Greece); Nicolas R. Dalezios, Univ. of Thessaly (Greece); Nicos V. Spiroou, SIGMA Geotechnologie (Germany) .................. [10421-79]

Land products validation of Sentinel-2, Proba-V, and Sentinel-3 missions for agriculture and grazings areas: comparison to Copernicus biophysical parameters, Katarzyna Dabrowska-Zielinska, Institute of Geodesy and Cartography (Poland); Fabrizio Niro, European Space Agency (Italy); Zbigniew Bochencz, Radoslaw Gurdak, Maciej Bartold, Institute of Geodesy and Cartography (Poland) .................. [10421-80]

Changes in ecosystem service values in Zhoushan Island using remote sensing time series data, Xiaoping Zhang, Yanpei Qin, Ying Lv, Luoyang Normal Univ. (China); Guangzhao Zhan, Sinomine Resource Exploration Co., Ltd. (China); Chaoqui Li, Huanr Univ. (China) .................. [10421-81]

Temporal analysis of vegetation indices related to biophysical parameters using Sentinel 2A images to estimate maize production, Lucas Macedo, Fernando S. Kawakubo, Univ. de São Paulo (Brazil) .................. [10421-83]

Combining optical remote sensing data with in-situ measurements in order to estimate vegetation parameters on agricultural fields and corresponding uncertainties, Katharina Heupel, Helmholtz-Zentrum Potsdam Deutsches GeoForschungsZentrum GFZ (Germany) .................. [10421-84]

Spatial-temporal evaluation of ground based LAI measurements for sugarcane, Diego Delia Justina, Janine Vieira Rocha, Paulo Sergio Graziano Montanari, Rubens Augusto Camargo Llampere, Univ. Estadual de Campinas (Brazil); Yu Zhao, Yoriko Kazama, Hitachi, Ltd. (Japan) .................. [10421-85]

Fusion of radar and optical data for mapping and monitoring of water bodies, Agnieszka Jenerowicz, Katarzyna Siok, Military University of Technology (Poland) .................. [10421-86]

Evaluation of crop development stages with TerraSAR-X backscatter signatures (2010-12) by using growing degree days (GDD), Aftab Nazeer, IUSS, TU Dresden (Germany); Rene Pasternak, Univ. Stuttgart (Germany); Christine Woesille, TU Dresden (Germany) .................. [10421-87]

A temporal downscaling method for TRMM monthly products based microwave soil moisture data, Hailao Jin, Huazhu Xue, Dong Fan, Heran Polytechnic Univ. (China) .................. [10421-88]

Contribution of the new satellite (Sentinel-1, Sentinel-2 and SPOT-6) to the coastal vegetation monitoring in the Pays de Brest (France), Halima Talab Oui Ali, Simona Niculescu, LETG (France); Christophe Bouguillé, Vanessa Selin, Conservatoire Botanique National de Brest (France) .................. [10421-89]
SESSION 7 .......................... WED 12:00 TO 13:20

Soil Monitoring
Session Chair: Antonino Maltese, Univ. degli Studi di Palermo (Italy)
Combining Landsat-8 and WorldView-3 data to assess crop residue cover in fields and watersheds. Craig S. T. Daughtry, U.S. Dept. of Agriculture (USA); W. Dean Hively, U.S. Geological Survey (USA); Alan J. Stern, U.S. Dept. of Agriculture (USA); Miguel Quemada, Univ. Politécnica de Madrid (Spain).

Directional optical transmission through a sand layer: a preliminary laboratory experiment. Jia Tian, William Philpot, Cornell Univ. (USA).

ASEAN Workshop on Remote Sensing and Space Technology Development Agency (Thailand); Phalakorn Kooha, Siam Forest Tree Co., Ltd. (Thailand).

Light transmission through a sand layer: modeling changes due to illumination direction. William Philpot, Jia Tian, Cornell Univ. (USA).

Seasonal dynamics of tilled soil surface reflectance. Igor Savin, V.V. Dokuchayev Soil Science Institute (Russian Federation) and Agrarian-Technological Institute (Russian Federation); Elena Pudrinkova, V.V. Dokuchayev Soil Science Institute (Russian Federation); Petr Dzulka, Agrarian-Technological Institute (Russian Federation).

SESSION 8 .......................... WED 13:20 TO 15:40

Forestry
Session Chair: Antonino Maltese, Univ. degli Studi di Palermo (Italy)
Aboveground forest biomass modeling using remote sensing and FIA data in Tennessee, USA. Mann Kumari Giri, Bharat Pokharel, Tennessee State Univ. (USA).

Mapping forest disturbance and recovery for biomass dynamics over large areas using Landsat time-series remote sensing. Huy Trung Nguyen, Mariela Soto-Berelov, Simon D. Jones, RMIT Univ. (Australia) and CRCRS (Australia); Andrew Haywood, European Forest Institute (Spain) and Dept. of Environment, Land, Water and Planning, Victoria (Australia); Samuel Hilsop, RMIT. (Australia) and CRCRS (Australia).


The potential of Sentinel satellites for large area aboveground forest biomass mapping. Andrew Haywood, European Forest Institute (Spain); Christine Stone, New South Wales Primary Industry (Australia).

Early warning techniques for deforestation and degradation monitoring of Dry Chaco Forest, Argentina using time series analysis of optical and microwave data. Veronica Barraza, Francisco Grings, Esteban Roitberg, Mercedes Salvia, Haydee Karszenbaum, Instituto de Astronomía y Física del Espacio (Argentina).

Detection of the ecological connectivity between landscape patches obtained using the knowledge engineer (expert) classification technique. Sardar Selim, Namik K. Sonmez, Isin Onur, Mesut Cosku, Akdeniz Univ. (Turkey).

SPIE Remote Sensing 2017 • www.spie.org/RS17programme • Program current as of 6/2/2017

CONFERENCE 10421

JOINT SESSION THU 15:30 TO 17:30

Radar
Session Chairs: Nazzareno Pierdicca, Sapienza Univ. di Roma (Italy); Antonino Maltese, Univ. degli Studi di Palermo (Italy)


SPI-defined extremes in Southern South America (SSA) analyzed by satellite soil moisture (SM) products and Orchidee Land Surface Model (LSM), Mercedes Salvia, Instituto de Astronomía y Física del Espacio (Argentina); Romina Ruscica, Univ. de Buenos Aires (Argentina); Jan Polcher, Ctr. National de la Recherche Scientifique (France); Anna Sörensson, Univ. de Buenos Aires (Argentina); Haydee Karszenbaum, Instituto de Astronomía y Física del Espacio (Argentina). ............................... [10426-12]

Application of Sentinel 1 VH and VV and Sentinel-2 for soil moisture studies, Katarzyna Dabrowska-Zielinska, Maria Budzynska, Radoslaw Gurdak, Jan Musial, Alicja Malinska, Martyna Gatkowska, Maciej Bartold, Institute of Geodesy and Cartography (Poland) ......................... [10426-13]

Application of multifrequency SAR data and neural networks for Mediterranean forests characterization, Emanuele Santi, Simone Pettinato, Simonetta Paloscia, Istituto di Fisica Applicata “Nello Carrara” (Italy); Fabio Maselli, Marta Chiesi, Istituto di Biometeorologia (Italy); Gherardo Chirici, Univ. degli Studi di Firenze (Italy); Andrea Garzelli, Univ. degli Studi di Siena (Italy) .................................................. [10426-14]

Biomass estimation using sentinel 1 SAR data in Kudremukh forest range, Vinayak A. Huggannavar, Amba Shetty, Punith Raj, National Institute of Technology Karnataka, Surathkal (India). ............................ [10426-15]

Applying a particle filtering technique for canola crop growth stage estimation in Canada, Abhijit Sinha, Yifeng Li, A.U.G. Signals Ltd. (Canada); Anna M. Pacheco, Heather McNairn, Agriculture and Agri-Food Canada (Canada) ............................................... [10421-55]

Object-based data fusion for land cover classification using COSMO-SKYMED SAR and THAICHTOE optical images, Chanka Sukawattanavijit, Kridsakron Ayumiroundronkool, Geo-Informatics and Space Technology Development Agency (Thailand) ......................... [10421-56]

Expand Your Network with SPIE Social Media.

#SPIEremotesensing
Remote Sensing of the Ocean, Sea Ice, Coastal Waters, and Large Water Regions 2017

Conference Chairs: Charles R. Bostater Jr., Florida Institute of Technology (USA); Stelios P. Mertikas, Technical Univ. of Crete (Greece); Xavier Neyt, Royal Military Academy (Belgium); Sergey Babichenko, Ocean Visuals AS (Norway)

Programme Committee: Richard J. Breitlow, Agfa Corp. (USA); Jean-Paul Bruyant, ONERA (France); Stephen Sun Chiao, San José State Univ. (USA); Alexander Gilerson, The City College of New York (USA); Carlton R. Hall, NASA Kennedy Space Ctr. (USA); Frederic Lamy, ONERA (France); Ana M. Martins, Univ. dos Açores (Portugal); Petri Pellikka, Univ. of Helsinki (Finland)

MONDAY 11 SEPTEMBER

OPENING REMARKS .......................... 8:25 TO 8:30

SESSION 1 ............................. MON 8:30 TO 10:20

Oil Spill Sensing, Surveillance and Lasers
Session Chair: Sergey Babichenko, Ocean Visuals AS (Norway)

Real-time surveillance system for marine environment based on HLIF lidar (Invited Paper), Sergey Babichenko, Ocean Visuals AS (Norway) ................. \[10422-1\]
Vessel and oil spill early detection using COSMO satellite imagery, Claudio A. Delrieux, Univ. Nacional del Sur (Argentina) ......................... \[10422-2\]

Radar and optical remote sensing in offshore domain, characterize and quantify ocean surface oil slicks, Sebastien Angeliaume, Françoise Viallefont, ONERA (France); Veronique Megebelle, Total E&P (France); Elise Koeniguer, Fabrice Janez, Xavier Ceanamos, ONERA (France); Cedric Taillandier, Total S.A. (France); Dominique Dubrucq, Total E&P (France); Alexandre Bouch, Philippe Deliot, ONERA (France) ........... \[10422-3\]

Oil spill detection from TerraSAR-X dual-polarized images using artificial neural network. Daesung Kim, Hyung-Sup Jung, The Univ. of Seoul (Korea), Republic of .................. \[10422-4\]

Investigation of excitation efficiency of emission lines of chemical elements in plasma focusing of femtosecond laser pulses on water solutions, Yuliya S. Biryukova, Sergey S. Golik, Anton Borovsky, Far Eastern Federal Univ. (Russian Federation); Dmytro Y. Proshchenko, Maritime State Univ. named after G.I. Nevelskoi (Russian Federation) .................. \[10422-5\]

SESSION 2 .......................... MON 10:50 TO 12:30

Shallow Water Sensing of Coastal Waters, Habitats and Targets
Session Chair: Charles R. Bostater Jr., Florida Institute of Technology (USA)

Recognition of bathymetry on the basis of color aerial photographs: Baltic shallow coastal zone studies, Lukasz Cieszyński, West Pomeranian Univ. of Technology (Poland) and Univ. of Szczecin (Poland); Kazimierz Furanarcy, Univ. of Szczecin (Poland) .................. \[10422-6\]

Landsat-8/Sentinel-2 constellation for water quality monitoring in coastal/inland areas, Nima Paltevan, Sudipta Sarkar, Sandeep Chittimalli, Sundarabalan Balasubramanian, NASA Goddard Space Flight Ctr. (USA) .................. \[10422-7\]

Shallow water bathymetry correction using sea bottom classification with multispectral satellite imagery, Yoriko Kazama, Tonomori Yaminoto, Hitachi, Ltd. (Japan) .................. \[10422-8\]

Collection and corrections of oblique multiband hyperspectral bidirectional reflectance imagery of the water surface, Charles R. Bostater Jr., Florida Institute of Technology (USA) .................. \[10422-9\]

Using remote sensing methods to identify valuable underwater habitats, Meri Koskelainen, SYKE Finnish Environment Institute (Finland); Eline Virtanen, Samuli Korpinen, Markku Villasalo, Finnish Environment Institute (Finland) .................. \[10422-10\]

Lunch Break .................................. Mon 12:30 to 13:40

SESSION 3 ............................. MON 13:40 TO 15:30

Water Quality Related Sensing
Session Chair: Maria Huete-Ortega, The Univ. of Sheffield (United Kingdom)

Grain size mapping in shallow rivers using spectral information: a lab spectroradiometry perspective (Invited Paper), Milad Nourmand-Jadidi, Alfonso Vitti, Univ. degli Studi di Trento (Italy) .................. \[10422-11\]

Performance of primary production algorithms in the northern and southern subtropical ocean, Aurore Regaudie de Gioux, Instituto Mediterrâneo de Estudios Avanzados, Consejo Superior de Investigaciones Científicas (Spain); Maria Huete-Ortega, The Univ. of Sheffield (United Kingdom); Pedro Cermeno, Instituto de Ciencias del Mar (Spain); Cristina Solarino, Univ. de Vigo (Spain); Dafne Lopez-Sandoval, King Abdullah Univ. of Science and Technology (Saudi Arabia); Natalia Gonzalez, Univ. Rey Juan Carlos (Spain); Ana Fernandez, Emilio Marañon, Univ. de Vigo (Spain); Susana Agusti, Carlos Duarte, King Abdullah Univ. of Science and Technology (Saudi Arabia); Iker Zabala (Spain) .................................................. \[10422-12\]

Impact on satellite retrievals of temporal changes in Karenia brevis harmful algal blooms in the West Florida Shelf, Samir Ahmed, Ahmed El-Habashi, The City College of New York (USA); Vincent Lovko, Mote Marine Lab. (USA) .................. \[10422-13\]

Trends in phytoplankton phenology in the Mediterranean Sea, Paula Maria Salgado Hernanz, Institut Mediterrani d’Estudis Avançats (Spain); Marie-Fanny Racault, Plymouth Marine Lab. (United Kingdom); Gotzon Basterrecheya Oyarzabal, Institut Mediterrani d’Estudis Avançats (Spain) .................................................. \[10422-14\]

Features of electromagnetic properties of the water area of the Kara Sea and their influence on the excitation, propagation and reception of radio waves in different seasons of the year, Mikhail Dembelov, Institute of Physical Material Sciences SB RAS (Russian Federation); Yuri B. Bashkuev, Institute of Physical Material Sciences SB RAS (Russian Federation) .................................................. \[10422-15\]

JOINT PLENARY SESSION  ......... MON 16:00 TO 18:30

Security + Defence and Remote Sensing Joint Plenary Session

Welcome Address and Introductory Remarks
6:15 to 6:15
Optoelectronics developments in Poland for defense and security
6:15 to 7:00
Col. Krzysztof Kopczynski, Military Univ. of Technology, Poland

17:00 to 17:45
Remote sensing in food security
17:45 to 18:30
TBA
Vietnam
Study on variation in turbidity in Cam Ranh Bay and Thuy Trieu Lagoon, simulated data, Surya P. Tiwari, King Abdullah Univ of Science and Freshwater lakes in Västerbotten and Jämtland in northern Sweden (China) ................................................. [10422-26]

Dynamic sea clutter at low grazing angle, Alexander Gilerson, Eder Herrera, Satellite sensors and AERONET-OC data, Alexander Gilerson, Eder Herrera, The City College of New York (USA) ................................. [10422-18]

Synergy of satellite-derived datasets, Svetlana Karimova, Univ. de Liège (Invited Paper) .............................................. [10422-20]

Characterization of aerosol parameters over ocean from the Ocean Color satellite sensors and AERONET-OC data, Alexander Gilerson, Eder Herrera, Yaron Klein, Robert Foster, The City College of New York (USA). [10422-19]

Oil spill characterization thanks to optical airborne imagery during the NOFO campaign 2015 (Invited Paper), Xavier Ceamanos, Françoise Viévillefont, ONERA (France); Veronique Miegebielle, Total E&P (France); Sebastien Angelliaume, ONERA (France). [10422-20]

Identifying pancake ice and computing pancake size distribution in aerial photography, Angèle de Cirmé (Italy); Miguel Moctezuma-Flores, Univ. Nacional Autónoma de Mexico (Mexico). [10422-22]

Long-term monitoring of sea ice condition in the Kerch Strait by remote sensing data, Olga Y. Lavrova, Marina I. Mityagina, Space Research Institute (Russian Federation); Andrey G. Kostianoy, P.P. Shirshov Institute of Oceanology (Russian Federation) and S.Yu. Witte Moscow University (Russian Federation). [10422-23]

Surface electromagnetic wave over sea covered by ice, Valery Khaptanov, Institute of physical material sciences (Russian Federation); Yuri B. Bashkuev, Institute of Physical Material Sciences SB RAS (Russian Federation); Mikhail Dembolov, Institute of physical material sciences (Russian Federation). [10422-24]

Lunch/Exhibition Break ............................. Tue 12:20 to 13:30

Remote Sensing of Vessels, Water Circulation and Tides
Session Chair: Xavier Neyt, Royal Military Academy (Belgium)
Surface circulation in the Western Mediterranean shown by a synergy of satellite-derived datasets, Svetlana Karimova, Univ. de Liège (Belgium) [10422-25]

A parallel efficient partitioning algorithm for the statistical model of dynamic sea clutter at low grazing angle, Tao Wu, Zhenhui Wu, Xidian Univ. (China). [10422-26]


Apparent optical properties of the Red Sea from measurements and simulated data, Surya P. Tiwari, King Abdullah Univ of Science and Technology (Saudi Arabia). [10422-28]

Study on variation in turbidity in Cam Ranh Bay and Thuy Trieu Lagoon, Vietnam, Guang Nguyen Hao, Nha Trang Univ. (Viet Nam). [10422-29]

Remote Sensing
SESSION 4 ............................... TUE 8:30 TO 10:00
Aerosol and Polarization Studies
Session Chair: Alexander Glierson, The City College of New York (USA)
Simultaneous retrieval of atmosphere and ocean properties from collocated polarimeters and lidar measurements: results for the SABOR campaign (Invited Paper), Jacek Chowdhary, Columbia Univ. (USA) and NASA Goddard Institute for Space Studies (USA); Pierre A. St. Amant, NASA Langley Research Ctr. (USA); Brian Cairns, NASA Goddard Institute for Space Studies (USA); Chris A. Hostetler, NASA Langley Research Ctr. (USA). [10422-16]


Imaging of polarized target in underwater environment, Carlos Carrizo, Robert Foster, Ahmed El-Habashi, The City College of New York (USA); Den J. Gray, U.S. Naval Research Lab. (USA) and Xavier Gilerson, The City College of New York (USA). [10422-18]

Assessing the quality of HY-2A satellite sea surface height data, Qintao Song, Qimao Wang, Xiamin Ye, Zhenghai Wu, National Satellite Ocean Application Service (China). [10422-32]

Assessing altimetry close to the coast, Graham Quarterly, Francesco Nencioli, Plymouth Marine Lab. (United Kingdom); Daniel Cooke, Plymouth Univ. (United Kingdom). [10422-33]

Coastline detection with time series of SAR images, Dongyang Ao, Beijing Institute of Technology (China); Octavian Dumitru, Gottfried Schwarz, Mihai P. Datcu, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany). [10422-34]

Nonlinear retrieval algorithm for HY-2A spaceborne microwave radiometer, Qintao Song, Qintao Wang, Xinyu Liu, Xinyu Liu, Zhaohui Wang, National Satellite Ocean Application Service (China). [10422-35]

Poster Submission:
Attendees are required to wear their conference registration badges to the poster sessions. Posters will be on display after 13:00 hrs on Monday in the Universal Ballroom Foyer. Authors of poster papers will be present to answer questions concerning their papers during the Tuesday Poster Session. Conference Attendees enjoy light refreshments, ask questions, and network with colleagues in your field. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/x022324.xml
Evaluation of HY-2A microwave scatterometer geolocation errors, Robby Chan, Qingshan Song, National Satellite Ocean Application Service (China) ............................................. [10422-43]

The re-analysis for satellite retrieved chlorophyll-a in East China Sea, Hao Zhengzhou, Delu Pan, Fang Gong, Xianqiang He, The Second Institute of Oceanography, SOA (China); Difeng Wang, Second Institute of Oceanography SOA (China) ............................................. [10422-44]

Unusual phytoplankton blooms in the southwestern Bay of Bengal: a comparative study, Xiaoyan Chen, Yan Bai, Xianqiang He, The Second Institute of Oceanography, SOA (China) ............................................. [10422-45]

Multisensor satellite survey of natural oil slicks in the Southeastern Black Sea, Marina I. Mityagina, Olga Y. Lavrova, Space Research Institute (Russian Federation) ............................................. [10422-46]

Study on the long time variation of chlorophyll-a concentration, phytoplankton particle size and marine primary production in the northern South China Sea by satellite remote sensing, Teng Li, State Key Lab. of Satellite Ocean Environment Dynamics (China) and State Key Laboratory of Satellite Ocean Environment Dynamics, Second Institute of Oceanography, SOA (China); Yan Bai, Xiaoyan Chen, State Key Laboratory of Satellite Ocean Environment Dynamics, Second Institute of Oceanography, SOA (China); Qiankun Zhu, Fang Gong, Difeng Wang, The Second Institute of Oceanography, SOA (China) ............................................. [10422-47]

Inter-satellite comparisons and evaluations of three ocean color products along the Zhejiang coast, eastern China, Cui Qiuyuan, Second Institute of Oceanography (China); Wang Difeng, Geng Fang, Delu Pan, Hao Zengzhou, Tianyu Wang, Qiankun Zhu, The Second Institute of Oceanography, SOA (China) ............................................. [10422-48]

Retrieval of total suspended particulate matter in highly turbid the Hangzhou Bay waters based on geostationary ocean color imager, Jia Liu, Jiahong Lu, Xin’An Institute of Optics and Precision Mechanics, CAS (China); Xianqiang He, The Second Institute of Oceanography, SOA (China); Tieqiao Chen, Xin’An Institute of Optics and Precision Mechanics, CAS (China); Feng Zhu, Yihao Wang, Xin’An Institute of Optics and Precision Mechanics, CAS (China) ............................................. [10422-49]

Satellite remote sensing of the aquatic pCO2 in the basin of the South China Sea, Hangyu Lu, Nanjing Univ. (China); Yan Bai, Xiaoyan Chen, Fang Gong, Qiankun Zhu, Difeng Wang, The Second Institute of Oceanography, SOA (China) ............................................. [10422-50]

Measurement errors associated with backscattering measurement in turbid and productive waters, Sayooob Vadakke Chanat, Indian Institute of Technology Madras (India); Palanisamy Shanmugam, Indian Institute of Technology Madras (India) ............................................. [10422-51]

On the relationship between sea level anomalies and upper ocean parameters in the Indian Ocean, Venugopal Thandiam, Indian National Ctr. for Ocean Information Services (India) ............................................. [10422-52]

Tidal strain of landfast sea ice around Campbell Glacier Tongue in East Antarctica analyzed by DDInSAR images, Hyangsun Han, Korea Polar Research Institute (Korea, Republic of); Hoon-yol Lee, Kangwon National Univ. (Korea, Republic of) ............................................. [10422-53]

Optical multispectral monitoring of ocean surface, Victor I. Titov, Institute of Applied Physics of the Russian Academy of Sciences (Russian Federation) ............................................. [10422-54]

Vortex structures in the southeastern part of the Baltic Sea: results of oceanographic experiments and satellite observations, Evgeny V. Krayushkin, Space Research Institute of RAS (Russian Federation); Olga Y. Lavrova, Ksenia R. Nazirova, Space Research Institute (Russian Federation) ............................................. [10422-55]

The study of long-term sea level variability in the South China Sea based on satellite data, Ying Xu, National Satellite Ocean Application Service (China) ............................................. [10422-56]

The influence of tide on sea surface temperature in the marginal sea of northwest Pacific Ocean, Shih-Jen Huang, Yun-Chan Tsai, Yao-Tsi Lo, Nan-Jung Kuo, National Taiwan Ocean Univ. (Taiwan) ............................................. [10422-57]


Satellite observation of the recent changes of marine ecological environment in the South China Sea and Bay of Bengal, Shujie Yu, Xiaoyan Chen, Yan Bai, Teng Li, Tianyu Wang, Fang Gong, Qiankun Zhu, The Second Institute of Oceanography, SOA (China) ............................................. [10422-59]


Utilization of multichannel ocean lidar data to classify type of waveform, Tiancheng Huang, Bangyi Tao, The Second Institute of Oceanography, SOA (China); Yan He, Shanghai Institute of Optics and Fine Mechanics (China); Shanjiang Hu, Shanghai Institute of Optics and Fine Mechanics (China) and Second Institute of Oceanography (China); Gongbo Xu, The Second Surveying and Mapping Institute of Zhejiang University (China); Jiangong Xu, Shandong Univ. of Science and Technology (China); Congcong Wang, Zhejiang Univ. (China) ............................................. [10422-61]

Estimation of chlorophyll-a concentration in inland and marine waters using HICO, MODIS, Landsat OLI-8 and OCM-2 sensors, Varunan Theenathayan, Indian Institute of Technology Madras (India) ............................................. [10422-62]
CONFERENCE 10423

Monday–Thursday 11–14 September 2017 • Proceedings of SPIE Vol. 10423

Sensors, Systems, and Next-Generation Satellites

Conference Chairs: Steven P. Neeck, NASA Headquarters (USA); Jean-Loup Bézy, European Space Research and Technology Ctr. (Netherlands); Toshiyoshi Kimura, Japan Aerospace Exploration Agency (Japan)

Conference Co-Chairs: Haruhisa Shimoda, Tokai Univ. (Japan); Roland Meynart, European Space Research and Technology Ctr. (Netherlands)

Programme Committee: Olivier Saint-Pe, Airbus Defence and Space (France); Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA)

MONDAY 11 SEPTEMBER

WELCOME AND INTRODUCTION .......... MON 8:25 TO 8:30

SESSION 1 ......................... MON 8:30 TO 10:00

European Missions I

Session Chair: Jean-Loup Bézy, European Space Research and Technology Ctr. (Netherlands)

ESA Observation Missions (Invited Paper), Jean-Loup Bézy, European Space Research and Technology Ctr. (Netherlands) ........ [10423-1]

AEOLUS mission: the latest preparations before launch, Anders Elfving, FOI-Swedish Defence Research Agency (Sweden); Roland Meynart, A. Straume, European Space Research and Technology Ctr. (Netherlands) ................ [10423-2]

Earth Cloud, Aerosol and Radiation Explorer optical payload development status, Arnaud Hélière, Kotska Wallace, Joao Pereira do Carmo, Alain Lefebvre, European Space Research and Technology Ctr. (Netherlands); Enrico Fossati, Lucia Pettinato, Annalisa Capanni, Leonardo (Italy) ........................................ [10423-4]

SESSION 2 ......................... MON 10:20 TO 12:00

European Missions II

Session Chair: Jean-Loup Bézy, European Space Research and Technology Ctr. (Netherlands)

Image quality validation of Sentinel 2 Level-1 products: performance status and methods at the beginning of constellation’s routine phase, Benjamin Francesconi, Marion Neveu-VanMalle, Thales Alenia Space (France); Bahijat Ahmammad, ARGANS Ltd. (United Kingdom); Françoise Viallefont, ONERA (France); Catherine Bourgoin, CS Systemes d’information (France); Sébastien Clerc, ARGANS Ltd. (United Kingdom); Ferran Gascon, ESRIN (Italy) ........................................ [10423-5]

The Copernicus Sentinel-4 mission: a geostationary imaging UVN spectrometer for air quality monitoring, Gregory Bazalgette Courrèges-Lacoste, Giorgio Bagnasco, M. Sallusti, G. Bulsa, Ben Velthman, European Space Research and Technology Ctr. (Netherlands) ...................... [10423-6]

Sentinel-5 Precursor: characterization of out-of-band straylight effects, Herbert Nett, S. Ekhoin, European Space Research and Technology Ctr. (Netherlands); Quintus Kleipool, Antje Ludewig, Koninklijk Nederlands Meteorologisch Instituut (Netherlands); Daniel Ten Bloemendal, Airbus Defence and Space (United Kingdom) ........ [10423-7]

Sentinel-5 instrument: status of design, performance and development, Tobias Gühne, Corneil Keim, Peter Bartsch, Stefan Weiss, Markus Melf, Wolfgang Seefelder, Airbus Defence and Space (Germany) ........................... [10423-8]

A multistatic SAR mission concept enhancing Sentinel-1 capability in surface current dynamics retrieval, Valentina Boccia, European Space Agency (Netherlands); Erik De Witte, Josep Roselló, Michel Tossaint, Craig Dorton, Klaus Scipal, European Space Agency (Netherlands); Geoff Burbridge, Airbus Defence and Space (United Kingdom); Harald Johnsen, Norut Tromsø (Norway) .......................... [10423-9]

Lunch Break .................................. Mon 12:00 to 13:00

SESSION 3 .......................... MON 13:00 TO 14:30

European Missions III

Session Chair: Bojan R. Bojkov, EUMETSAT (Germany)

Overview of EUMETSAT remote sensing products and science activities (Invited Paper), Bojan R. Bojkov, NASA Goddard Space Flight Ctr. (USA); Paul Cournet, L. Schueller, EUMETSAT (Germany) ...................... [10423-10]

EUMETSAT, K. Dieter Klaes, Manfred Lugert, EUMETSAT (Germany) ........................ [10423-11]

The current Meteosat Second Generation (MSG) products and services, Jochen Grandell, Joachim Saalmüller, EUMETSAT (Germany) .......................... [10423-12]

The Copernicus Sentinel-3 Mission, marine products and services, Francois Montagner, European Organisation for the Exploitation of Meteorological Satellites (Germany); Hillary Wilson, EUMETSAT (Germany) ........................ [10423-13]

SESSION 4 .......................... MON 15:00 TO 16:00

European Missions IV

Session Chair: Bojan R. Bojkov, EUMETSAT (Germany)

An overview of the EUMETSAT surface topography missions, Remko Scharroo, Francois Parisot, EUMETSAT (Germany) ........................ [10423-14]

Introduction to the next generation EUMETSAT Polar System (EPS-SG) observation missions, Peter Schlüssel, European Organisation for the Exploitation of Meteorological Satellites (Germany); Gökahn Kayal, EUMETSAT (Germany) ........................ [10423-15]

JOINT PLENARY SESSION ........... MON 16:00 TO 18:30

Security + Defence and Remote Sensing Joint Plenary Session

16:00 to 16:15 Welcome Address and Introductory Remarks

16:15 to 17:00 Optoelectronics developments in Poland for defense and security

17:00 to 17:45 Remote sensing in food security

17:45 to 18:30 TBA

Programme current as of 6/2/2017
**SESSION 5 ............................... TUE 8:40 TO 10:10**

**US Missions**

Session Chair: Steven P. Neece, NASA Headquarters (USA)

The NASA Earth Science Flight Program: an update (Invited Paper), Steven P. Neece, NASA Headquarters (USA) ................................................... [10423-16]

Implementing Earth science flight projects at NASA-JPL, Amit Sen, Steven Baird, Tooraj Kia, Jet Propulsion Lab. (USA) ........................................... [10423-17]


HydroCube Mission concept: P-Band signals of opportunity for remote sensing of snow and root zone soil moisture, Simon Yueh, Jet Propulsion Lab. (USA); Rashmi Shah, Jet Propulsion Lab (USA): Xiaolan Xu, Jet Propulsion Lab. (USA); Kelly Elder, Rocky Mountain Research Station, U.S. Forest Service (USA); Chun Suk Chae, Jet Propulsion Lab. (USA); Steven Margulis, Univ. of California, Los Angeles (USA); Glen E. Liston, Colorado State Univ. (USA); Michael Durand, The Ohio State Univ. (USA); Chris Denkens, Environment and Climate Change Canada (Canada); Konstantinos Andreadis, Jet Propulsion Lab. (USA) ................................................ [10423-19]

**SESSION 6 ............................... TUE 10:40 TO 12:10**

**Japanese Missions I**

Session Chair: Toshiyoshi Kimura, Japan Aerospace Exploration Agency (Japan)

Overview of Japanese Earth observation programs (Invited Paper), Haruhsia Shimoda, Tokai Univ. (Japan) ......................................................... [10423-20]

Precise mission results of the dual-frequency precipitation radar on the global precipitation measurement core spacecraft and the version 5 GPM standard products, Kenji Furukawa, Tomonori Nio, Riko Oki, Takuki Kubota, Japan Aerospace Exploration Agency (Japan): Toshiro Iuchi, National Institute of Information and Communications Technology (Japan) ........................................... [10423-21]

Pre-launch instrument characterisation results and in-orbit verification plan of GCOM-C/SLI, Tomoyuki Urabe, Shigesato Ando, Yukihiro Okamura, Kazuhiro Tanaka, Masaaki Mekono, Japan Aerospace Exploration Agency (Japan); Takahiro Arano, Koichi Shiratama, NEC Corp. (Japan): Jun Yoshida, NEC Space Technologies Ltd. (Japan) ........................................... [10423-22]

Overview of the Japanese Advanced Optical Satellite: mission objectives, an onboard camera and a satellite system, Hidenori Watarai, Haruyoshi Katayama, Takeo Tadono, En Kato, Masakazu Sagisaka, Japan Aerospace Exploration Agency (Japan) ................................................ [10423-23]

Lunch/Exhibition Break ............................................... TUE 12:10 to 13:20

**SESSION 7 ............................... TUE 13:20 TO 15:00**

**Japanese Missions II**

Session Chair: Toshiyoshi Kimura, Japan Aerospace Exploration Agency (Japan)

Flight model of H-ISS hyper-spectral sensor onboard ISS (International Space Station), Jun Tanii, Japan Space Systems (Japan); Yoshishiki Ito, NEC Space Technologies Ltd. (Japan): Akira Iwasaki, The Univ. of Tokyo (Japan); Osamu Kashihara, Japan Space Systems (Japan) ........................................... [10423-24]

Observation planning algorithm of a Japanese space-borne sensor: Hyperspectral Imaging Suite (HISU) onboard International Space Station (ISS) as platform, Kenta Ogawa, Yukiko Kornor, Rakuono Gakuen Univ. (Japan): Satoru Yamamoto, Tsuneo Matsunaga, National Institute for Environmental Studies (Japan); Tetsuichi Tachikawa, Koma Komoda, Japan Space Systems (Japan) ........................................... [10423-25]

The development status of the mission instruments of GOSAT-2, Masakatsu Nakajima, Hiroshi Suto, Hiroko Imai, Yuuki Yajima, Makiko Hashimoto, Kei Shiomi, Japan Aerospace Exploration Agency (Japan) ................................................ [10423-26]

Aircraft experiment to demonstrate intelligent pointing system onboard GOSAT-2, Yuuki Yajima, Hiroshi Suto, Masakatsu Nakajima, Japan Aerospace Exploration Agency (Japan) ................................................ [10423-27]

Development status of multi-footprint observation lidar and imager (MOL) on ISS, Toshiyoshi Kimura, Tadashi Imai, Daisuke Sakaiwa, Junjiro Murukou, Rei Matsuhashi, Japan Aerospace Exploration Agency (Japan) ................................................ [10423-28]
**SESSION 11 ........................ WED 13:40 TO 15:20**

**Calibration IV**
Session Chair: **Xiaoxiong J. Xiong**, NASA Goddard Space Flight Ctr. (USA)

Assessment of MODIS reflective solar bands calibration stability.
Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA); Amit Angal, Dan Link, Aisheng Wu, Science Systems and Applications, Inc. (USA) ................. [10423-42]

The use of deep convective clouds to uniformly intercalibrate the next generation of geostationary solar imagers.
David R. Doelling, NASA Langley Research Ctr. (USA); Rajendra Bhatti, Benjamin R. Scarino, Arun Gopalan, Science Systems and Applications, Inc. (USA) ......... [10423-43]

A comparison of vicarious calibration for high- and medium resolution satellite-borne sensors using RadCaNet, Andrew C. Banks, Samuel E. Hunt, Javier Gorroño, Tracy Scanlon, National Physical Lab. (United Kingdom) .. [10423-44]

Ground comparisons at RadCaNet sites to determine the equivalence of sites within the network. Tracy Scanlon, Claire L. Greenwell, National Physical Lab. (United Kingdom); Jeffrey S. Czapla-Myers, Nikolaus J. Anderson, College of Optical Sciences, The Univ. of Arizona (United States); Kurtis J. Thorne, NASA Goddard Space Flight Ctr. (United States); Emma Walliams, National Physical Lab. (United Kingdom); Geiland Porrovecchio, Petr Linduška, Marek Šmíd, Czech Metrology Institute (Czech Republic); Nigel Fox, National Physical Lab. (United Kingdom) ....... [10423-45]

Assessment of polarization correction impact on the calibration of Terra MODIS reflective solar bands, Aisheng Wu, Xu Geng, Science Systems and Applications, Inc. (USA); Javad Haghshenas, Amir Hossein Bahrami, Thierry L. Trémas, Ctr. National d’Études Spatiales (France); Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA) ............. [10423-46]

---

**WEDNESDAY 13 SEPTEMBER**

**SESSION 9 .......................... WED 8:50 TO 10:20**

**Calibration II**
Session Chair: **Xiaoxiong J. Xiong**, NASA Goddard Space Flight Ctr. (USA)

Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA); Ning Lei, Zhipeng Wang, Vincent Chiang, Science Systems and Applications, Inc. (USA); James J. Butler, NASA Goddard Space Flight Ctr. (USA) .......... [10423-33]

**SNPP VIIRS reflective solar bands on-orbit calibration using the Moon.**
Junchang Sun, Global Science & Technology, Inc. (USA); Menghua Wang, National Oceanic and Atmospheric Administration (USA) ............ [10423-34]

**Sentinel-2B Image Quality commissioning phase results and Sentinel2 constellation performances.**
Florence Languélie, Angélique Gaudel-Vacaresse, Bruno Vidal, Renaud Binet, Ctr. National d’Etudes Spatiales (France); Vincent Pouliant, Thales Services (France); Thierry L. Trémas, Ctr. National d’Etudes Spatiales (France) ......... [10423-35]

**Near-nadir scan overlap in Earth observations from VIIRS and MODIS.**
Slawomir Błonksi, ERT, Inc. (USA); Changyong Cao, National Environmental Satellite, Data, and Information Service (USA) and National Oceanic and Atmospheric Administration (USA) ............... [10423-36]

**SESSION 10 .......................... WED 10:50 TO 12:30**

**Calibration III**
Session Chair: **Xiaoxiong J. Xiong**, NASA Goddard Space Flight Ctr. (USA)

Lunar calibration improvements for the shortwave infrared bands in Aqua and Terra MODIS.

**Aqua MODIS electronic crosstalk survey from Moon observations.**
Graziela R. Keller, Zhipeng Wang, Aisheng Wu, Science Systems and Applications, Inc. (USA); Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA) ............ [10423-38]

**Crosstalk error and its mitigation in MODIS and VIIRS thermal emission bands.**
Junchang Sun, National Oceanic and Atmospheric Administration (USA) and Global Science & Technology, Inc. (USA); Menghua Wang, National Oceanic and Atmospheric Administration (USA) ......... [10423-39]

**Suomi NPP VIIRS solar diffuser screen transmittance model and its applications.**
Ning Lei, Science Systems and Applications, Inc. (USA); Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA) .......... [10423-40]

**The positional dependence of the SNPP VIIRS SD BRDF degradation factor.**
Ning Lei, Science Systems and Applications, Inc. (USA); Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA) ............... [10423-41]

Lunch/Exhibition Break. .......... [10423-41]

---

**SESSION 12 .......................... WED 15:50 TO 17:30**

**Missions and Sensing I**
Session Chair: **Jean-Loup Bézy**, European Space Research and Technology Ctr. (Netherlands)

**Microsat camera with high resolution and wide FoV.**
Roland Geyl, Safran Reosc (France) ......... [10423-47]

**Sentinel 5 instrument: the principle ability of a Silt Homogenizer to reduce scene contrast for earth observation spectrometer.**
Christian Meister, Marcel Voigts, Geoland, Reosc (France) .......... [10423-48]

**An innovation approach to construct an additional VIIRS moderate resolution spectral band centered at 630 nm, and a discussion of the potential application of that band to detect certain coastal processes.**
Bruce Guenther, Stellar Solutions Inc. (USA) ........ [10423-49]

Local or global? How to choose the training set for principal component compression of hyperspectral satellite measurements. Tim H. Hultberg, Thomas August, Flavia Lentí, EMETTSAT (Germany) .... [10423-50]

**Mechanical monolithic compact sensors for real-time linear and angular broadband low-frequency monitoring and control of spacecrafts and satellites.**
Fabrizio Barone, Univ. degli Studi di Salerno (Italy) .......... [10423-51]

---

**THURSDAY 14 SEPTEMBER**

**SESSION 13 .......................... THU 8:30 TO 10:10**

**FPA**
Session Chair: **Steven P. Neeck**, NASA Headquarters (USA)

**Multiangle spectropolarimetric images for aerosol.**
Giacomo Mariani, John C. Pearson, Kevin Burke, David J. Diner, Jet Propulsion Lab. (USA) .......... [10423-53]

**Characterisation results of the CMOS visnir detector for metimage instrument.**
Jérôme Pralong, e2v technologies plc (United Kingdom); Michel Becht De Boissanger, Airbus (France); Michael Skegg, Airbus Defence and Space (Germany); Robert Simpson, Steve Bowring, e2v technologies plc (United Kingdom); Victor Berenzon, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) .... [10423-54]

**Dark current at low operating temperatures in InAs/GaSb type-II superlattice infrared detectors.**
Volker Daumer, Johannes Schmidt, Frank Rutz, Andreas Wöhl, Tim O. Stadelmann, Raphael Müller, Vera Gramlich, Robert Rethm, Fraunhofer-Institut für Festkörperforschung (Germany) .......... [10423-55]

**Environmental evaluation of the ULIS Pico1024 microbolometer.**
Ilías G. Manolis, Jean-Loup Bézy, Roland Meynart, European Space Research and Technology Ctr. (Netherlands); Thierry Dartois, Thales Avenir Space (France); Christofö-Luc Tiee, ULIS (France) ........ [10423-56]

**Improving uniformity over larger areas and overall performance of CdTe/CZT imaging and spectrometry sensors.**
Joseph G. Bolke, Kathryn O’Brien, Mike Spicer, Peter Wall, Brock Alexander, 5N Plus Semiconductors, LLC (USA) ....... [10423-57]
SESSION 14 .......................... THU 10:40 TO 12:00

Missions and Sensing II
Session Chair: Toshiyoshi Kimura,
Japan Aerospace Exploration Agency (Japan)

Multispectral imaging photometer-polarimeter for Aerosol-UA space mission, Ivan I. Syniavskyi, Yury S. Ivanov, Georgii Koshman, The National Academy of Sciences of Ukraine (Ukraine); Gennadi P. Milinevsky, The National Academy of Sciences of Ukraine (Ukraine) and Taras Shevchenko National Univ. of Kyiv (Ukraine); Mikhail Sosonkin, The National Academy of Sciences of Ukraine (Ukraine) ........................................... [10423-58]

Optical concept of imaging space-borne spectrometer for ozone monitoring, Yury Dobroletsinsk, Space Research Institute (Russian Federation); Yuriy Ivanov, Main Astronomical Observatory of the National Academy of Sciences of Ukraine (Ukraine); Ilya Dzubiyan, Space Research Institute (Russian Federation); Dmitry Ionov, Saint Petersburg State Univ. (Russia Federation); Oleg Korablev, Space Research Institute (Russian Federation); Ivan I. Syniavskyi, Main Astronomical Observatory of the National Academy of Sciences of Ukraine (Ukraine); Nikita Vyazovetskiy, Space Research Institute (Russian Federation) .............................. [10423-59]

Modeling and design of a tunable spatial heterodyne spectrometer for broadband spectral line studies, Nirmal K., Sridharan Rengaswamy, Jayant Murthy, Indian Institute of Astrophysics (India). . . . [10423-60]

Influence of high-resolution satellites attitude parameters on image quality, Walid A. Wahballah, Taher M. Bazan, Fawzy El-Tohamy, Egyptian Armed Forces (Egypt); Mahmoud Fathy, Benha Univ. (Egypt) . . . . . . . [10423-61]

Lunch Break ..................................... Thu 12:00 to 13:10

SESSION 15 .......................... THU 13:10 TO 14:50

Missions and Sensing III
Session Chair: Jean-Loup Bézy,
European Space Research and Technology Ctr. (Netherlands)

Smear effect on high-resolution satellites image quality, Walid A. Wahballah, Taher M. Bazan, Fawzy El-Tohamy, Egyptian Armed Forces (Egypt); Mahmoud Fathy, Benha Univ. (Egypt) . . . . . . . [10423-62]

High efficient optical remote sensing images acquisition for nanosatellite framework, Feng Li, Lei Xin, Yang Liu, China Academy of Space Technology (China); Jie Fu, Yuhong Liu, Lanzhou Jiaotong Univ. (China); Yi Guo, Western Sydney Univ. (Australia) ............................ [10423-63]

The design of visualization telemetry system based on camera module of the commercial smartphone, Chao Wang, Zhao Ye, Bin Wu, Huan Yin, Qipeng Cao, Jun Zhu, Aerospace Dong Fang Hong Satellite Co., Ltd. (China) . . . . . . . . . . . . [10423-64]

SRS-lidar for 13C/12C isotops measurements environmental and food, Alexandr S. Grishkanich, ITMO Univ. (Russian Federation); Yan Chubchenko, D.I. Mendeleev Institute for Metrology (Russian Federation); Valentin V. Elizarov, Aleksandr P. Zhevlakov, ITMO Univ. (Russian Federation); Leonid Konopelko, D.I. Mendeleev Institute for Metrology (Russian Federation) ............................................. [10423-65]

Optical system design of the coded aperture superresolution imager, Linlin Pei, Academy of Opto-Electronics, CAS (China) . . . . . . . . . . . . [10423-66]
Remote Sensing of Clouds and the Atmosphere

Conference Chairs: Adolfo Comerón, Univ. Politécnica de Catalunya (Spain); Evgeni I. Kassianov, Pacific Northwest National Lab. (USA); Klaus Schäfer, Karlsruher Institut für Technologie (Germany)

Conference Co-Chairs: Richard H. Picard, ARCON Corp. (USA); Konradin Weber, Fachhochschule Düsseldorf (Germany)

Programme Committee: Aldo Amodeo, Istituto di Metodologie per l’Analisi Ambientale (Italy); Christoph C. Borel-Donohue, U.S. Army Research Lab. (USA); Young Joon Kim, Gwangju Institute of Science and Technology (Korea, Republic of)

TUESDAY 12 SEPTEMBER

POSTERS—TUESDAY ................. TUE 17:45 TO 19:30

Conference attendees are invited to attend the Remote Sensing and Security+Defence poster session held on Tuesday 17:45 to 19:30. Posters will be on display after 13:00 hrs on Monday in the Universal Ballroom Foyer. Authors of poster papers will be present to answer questions concerning their papers during the Tuesday Poster Session. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/322234.nml

Wednesday - Thursday 13-14 September 2017 • Proceedings of SPIE Vol. 10424
SESSION 2 .............................. WED 14:00 TO 16:50
Atmospheric Profiling of Aerosol, Trace Gases, and Meteorological Parameters of Remote Sensing II
Session Chairs: Adolfo Comerón, Univ. Politécnica de Catalunya (Spain); Evgenii I. Kassianov, Pacific Northwest National Lab. (USA)

Detection and retrieval of single and multilayer clouds in an artificial neural network approach. Sunny Sun-Mack, Science Systems and Applications, Inc. (USA) and NASA Goddard Space Flight Ctr. (USA); Patrick Minnis, NASA Langley Research Ctr. (USA); Gang Hong, Science Systems and Applications, Inc. (USA) and NASA Langley Research Ctr. (USA); William L. Smith Jr., NASA Langley Research Ctr. (USA); Yan Chen, Science Systems and Applications, Inc. (USA) and NASA Langley Research Ctr. (USA).

A Meteosat Bayesian Cloud Fractional Cover Climate Data Record: evaluation, homogeneously assessment and intercomparison with existing climate data records. Jedrzej S. Bojanowski, Institute of Geodesy and Cartography (Poland); Reto Stöckli, Anke Duguay-Tetzlaff, MeteoSwiss (Switzerland); Stephan Finkensieper, Deutscher Wetterdienst (Germany).

Macrophysical properties of continental cumulus clouds from active and passive remote sensing. Evgenii I. Kassianov, Pacific Northwest National Lab. (USA); Erin A. Riley, Jessica M. Kleiss, Lewis & Clark (USA); Charles N. Long, Univ. of Colorado Boulder (USA); Laura Rihimäki, Donna Flynn, Connor Flynn, Larry K. Berg, Pacific Northwest National Lab. (USA).

Cloud cover forecast from a ground-based all sky infrared thermal camera, Sylvain Cros, Olivier Liandrat, Antonin Braun, Nicolas Schmutz, Reuninwart (France).

High-altitude aircraft demonstration of the Spatial Heterodyne Observations of Water (SHOW) instrument, Ryan R. Cooney, Canadian Space Agency (Canada).

Smart air quality net, Klaus Schäfer, Stefan Erneis, Karlsruhe Institute of Technology (Germany).

Generalization of optical, energy and excess-noise parameters to compare capabilities of lidar with PMT/APD/SiPM, Ravi R. Agishev, Kazan State Power Engineering Univ. (Russian Federation); Adolfo Comerón, Univ. Politécnica de Catalunya (Spain).

SESSION 3 .............................. WED 16:50 TO 17:50
Lidar, Radar and Passive Atmospheric Measurements I
Session Chair: Klaus Schäfer, Karlsruher Institut für Technologie (Germany)

Determination of aerosol optical properties for retrieval of water-leaving radiance at Roodeplaat Dam relating to calibration and validation of Sentinel 2 and 3, Zimbita Faniso, CSIR National Laser Ctr. (South Africa) and Univ. of Fort Hare (South Africa); Derek J. Griffith, Council for Scientific and Industrial Research (South Africa); Mark Metthews, Cyanolakes (Pty) Ltd. (South Africa); Jeremy Kravitz, Cyanolakes (Pty) Ltd. (South Africa) and Univ. of Cape Town (South Africa).

Use of the fragmentary spectrum registration method for Raman spectroscopy, Alexander V. Fadeyev, Vitol E. Pozhar, Scientific and Technological Ctr. for Unique Instrumentation (Russian Federation).

Freezing level and bright band height over the Indian Ocean, Rajasri Sen Jaiswal, Sonia R. Frederick, Rasheed Mohammed, Sona College of Technology (India).

SESSION 4 .............................. THU 9:00 TO 12:30
Lidar, Radar and Passive Atmospheric Measurements II
Session Chair: Klaus Schäfer, Karlsruher Institut für Technologie (Germany)

Improving consistency of CERES ERB record measured by scanneres on Terra/Aqua/NPP-S satellites, Z. Peter Szewczyk, Science Systems and Applications, Inc. (USA).

Joint use of weather radars, satellites and rain gauge for precipitation monitoring, Andrea Antonini, Lab. per la Meteorologia e la Modellistica Ambientale (Italy); Samantha Melani, Alessandro Mazza, Alberto Ortolani, Lab. per la Meteorologia e la Modellistica Ambientale (Italy) and Istituto di Biometeorologia (Italy).

Development of multisensor global cloud and radiance composites for earth radiation budget monitoring from DISCOVR. Konstantin V. Khlopenkov, David P. Duda, Patrick Minnis, Science Systems and Applications, Inc. (USA); Christopher M. Bedka, NASA Langley Research Ctr. (USA).

Detecting of convective overshooting cloud tops using Himawari-8 images and machine learning approaches. Miae Kim, Jungho Lee, Juhyun Lee, Jungho Im, Ulsan National Institute of Science and Technology (Korea, Republic of).

Estimating PM2.5 spatial and temporal variation in Hong Kong with GTWR model and MODIS AOD retrieval. Xin Li, Shandong Agricultural Univ. (China) and The Hong Kong Polytechnic Univ. (Hong Kong, China); Yongjun Feng, Shandong Agricultural Univ. (China); Hongyu Liang, The Hong Kong Polytechnic Univ. (Hong Kong, China).


First experiments on high-detailed mapping of tropospheric NO2 using GSA hyperspectral imager on board Resurs-P satellite aimed to natural resource investigation. Oleg V. Postylyakov, Alexander N. Borovski, A.M. Obukhov Institute of Atmospheric Physics (Russian Federation); Aleksandr A. Makarenkov, Ryazan State Radio Engineering Univ. (Russian Federation).

Mesoscale atmospheric eddies over the Black Sea and the Caspian Sea on synthetic aperture radar and optical images, Andrei Y. Ivanov, Nadezda Terleeva, P.P. Shirshov Institute of Oceanology (Russian Federation).

**WEDNESDAY 13 SEPTEMBER**

**WELCOME AND INTRODUCTION ............. WED 8:50 TO 9:00**

**SESSION 1 ............................... WED 9:00 TO 10:20**

**Characterization of the Environment I**

Session Chair: Alexander M. J. van Eijk,
TNO Defence, Security and Safety (Netherlands)

Comparison of integrated optical turbulence over the sea in different coastal regions in the world, Detlev Sprung, Erik Sucher, Christian Eisele, Dirk P. Seiffer, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany), Alexander M. J. van Eijk, TNO Defence, Security and Safety (Netherlands). ........................................... [10425-1]

Temporally resolved refractive index structure parameter measurement, Markus Henriksson, Robin Forsling, FOI-Swedish Defence Research Agency (Sweden). ................................. [10425-2]

Meteorological measurements to characterize atmospheric turbulence variation, Robert Gignilliat, U.S. Naval Research Lab. (USA); Rebekah F. Wilson, Thomas M. Taczak, Applied Technology, Inc. (USA) .................... [10425-3]

Inhomogeneity of optical turbulence over False Bay (South Africa), Carmen Ullwer, Detlev Sprung, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Willie Gunter, Institute for Maritime Technology (South Africa); Alexander M. J. van Eijk, TNO Defence, Security and Safety (Netherlands); Karin U. Stein, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany). ........................................... [10425-4]

**SESSION 2 ............................... WED 10:50 TO 12:30**

**Characterization of the Environment II**

Session Chair: Vladimir P. Lukin,
V.E. Zuev Institute of Atmospheric Optics (Russian Federation)

Electro-optical propagation measurements during the MINOTAUROS experiment in the Cretan Sea, Christian Eisele, Erik Sucher, Norbert Wendelstein, Karin U. Stein, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Andrey V. Kanaev, Weilin W. Hou, U.S. Naval Research Lab. (USA) . . . . . . . . . . . . . . . [10425-5]

Characterization of underwater optical turbulence on the example of the Rayleigh-Benard water tank, Szymon Gladysz, Rui Barros, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Karin U. Stein, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany). ........................................... [10425-6]

Long-term experiment VERTURM (vertical turbulence measurements): comparison of measurements and modeling of the vertical distribution of optical turbulence in the surface layer, Detlev Sprung, Peter Grossmann, Erik Sucher, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Alexander M. J. van Eijk, TNO Defence, Security and Safety (Netherlands); Karin U. Stein, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany). ........................................... [10425-7]

Characterizing the discoloration of EBT3 films in solar UV measurement using light emitting diode, Ahmad Fairuz Omar, Ummi Shuhada Osman, Kok Chooi Tan, Univ. Sains Malaysia (Malaysia). ........................................... [10425-8]

Seasonal ionospheric scintillation analysis during increasing Solar activity at mid-latitude, Wasiu Akande Ahmed, Falin Wu, Beihang Univ. (China); Ganiyu I. Agbaje, African Regional Ctr. for Space Science and Technology Education (Nigeria); Edoefi Edoefi, Desi Marlia, Yan Zhao, Beihang Univ. (China) ........................................... [10425-9]

Lunch/Exhibition Break ......................... Wed 12:30 to 14:00

**SESSION 3 ............................... WED 14:00 TO 15:10**

From here to the Stars

Session Chair: Szymon Gladysz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)

Preliminary results from the Stereo-SCIDAR at the VLT Observatory: extraction of reference atmospheric turbulence profiles for E-ELT adaptive optics instrument performance simulations (Invited Paper), Marc S. Sarazin, European Southern Observatory (Germany); James Osborn, Durham Univ. (United Kingdom); Julio Navarrete, Julien Milli, European Southern Observatory (Chile); Miska Le Louarn, Frederic J. Derie, European Southern Observatory (Germany); Richard R. W. Wilson, Durham Univ. (United Kingdom) ........................................... [10425-10]

Local optical turbulence at and in the vicinity of the GREGOR solar telescope at the Teide Observatory, Tenerife, Oskar F. von der Lühe, Thomas Berkefeld, Kiepenheuer-Institut für Sonnenphysik (Germany); Detlev Sprung, Erik Sucher, Karin U. Stein, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) ........................................... [10425-11]

The turbulence study in the astronomical observatory in the North Caucasus, Vladimir P. Lukin, Viktor V. Nosov, Eugeni V. Nosov, Andrey V. Torgashev, V.E. Zuev Institute of Atmospheric Optics (Russian Federation) ........................................... [10425-12]

**SESSION 4 ............................... WED 15:40 TO 17:30**

Environmental Parameters

Session Chair: Karin U. Stein, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)

Nightglow studies at Onera for nightvision applications (Invited Paper), Pierre Simonette, Sophie Dereite, Joel R. Deschamps, Stephane Laglais, Didier Henry, ONERA (France) ........................................... [10425-13]

Shortwave infrared for night vision applications at Fraunhofer IOSB, Uwe Adomeit, Jürgen Krieg, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) ........................................... [10425-14]

Experimental study on spectral absorbance of fog as a function of temperature, liquid water content and particle size, Aki P. Mäyrä, Eero Hietala, Matti H. Kullia, Pasi Pyynkönen, Mikko Tihonen, Tuomas Jokela, VTT Technical Research Ctr. of Finland Ltd. (Finland) ........................................... [10425-15]

Aerosol optical properties inferred from in-situ and path-averaged measurements, Sven A. van Binsbergen, TNO Defence, Security and Safety (Netherlands); Peter Grossmann, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Faith J. February, Institute for Maritime Technology (South Africa); Leo H. Cohen, Alexander M. J. van Eijk, TNO Defence, Security and Safety (Netherlands); Karin U. Stein, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany). ........................................... [10425-16]

The upper atmosphere layer height changes as a precursor of the Padang earthquake on 30 September 2009, Edoefi Edoefi, Falin Wu, Wasiu Akande Ahmed, Yan Zhao, Beihang Univ. (China) ........................................... [10425-17]
THURSDAY 14 SEPTEMBER

SESSION 5 ........................... THU 9:00 TO 10:00

Adaptive Optics Systems

Session Chair: Oskar F. von der Lühe,
Kiepenheuer-Institut für Sonnenphysik (Germany)


Experimental demonstration of holographic wavefront sensor, based on diffuse Fourier holography, Vyacheslav V. Orlov, ITMO Univ. (Russian Federation); Vladimir Y. Venediktov, Saint Petersburg Electrotechnical Univ. “LETI” (Russian Federation) ............. [10425-19]

The design method of Fresnel CGH for real-time control of phase wavefront aberrations, Polina Malinina, Sergey B. Odinokov, Michael Kovalev, Vladimir I. Bobrinen, Bauman Moscow State Technical Univ. (Russian Federation) . ...................... [10425-20]

SESSION 6 ........................... THU 10:30 TO 12:10

Beam Propagation through Turbulence

Session Chair: Christian Eisele, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)

Measurement of the spatial distribution of atmospheric turbulence characteristics: evaluation of SCINDAR on a mosaic of urban surfaces, Khanh-Lin, Célia Robert, Jean-Marc Cohard, Jean-Pierre Lagouarde, ONERA (France); Michael P. Irvine, AngioDynamics (United Kingdom); Jean-Marc Conan, Laurent M. Mugnier, ONERA (France) ................. [10425-21]

Experimental studies of the correlation of wave-front aberrations of coherent radiation source and an extended luminous object, Vladimir P. Lukin, Nina N. Botygina, Oleg N. Emaleev, V.E. Zuev Institute of Atmospheric Optics (Russian Federation). ...................... [10425-22]

Modelling of propagation and scintillation of a laser beam through atmospheric turbulence, Fedor V. Shugaev, Ludmila S. Shtemenko, Olya I. Dokukina, Oxana A. Nikolaeva, Dmitri Y. Cherkasov, Natalia A. Suhareva, M.V. Lomonosov Moscow State Univ. (Russian Federation) ................ ...... [10425-23]

Wave-optic analysis with phase screen method using Non-Kolmogorov atmospheric turbulence, Fehmiye Yildiz, TOBB Univ. of Economics and Technology (Turkey) and Roketsan A.S. (Turkey); Hamza Kurt, TOBB Univ. of Economics and Technology (Turkey) ........................ [10425-24]

Beam wander of focused electromagnetic multi-Gaussian Schell-model beams propagation in anisotropic turbulence, Lin Guo, Mingjian Cheng, Jiangting Li, Xidian Univ. (China) ...................... [10425-25]
Conference Chairs: Claudia Notarnicolai, EURAC (Italy); Nazzareno Pierdicca, Univ. degli Studi di Roma La Sapienza (Italy); Emanuele Santì, Istituto di Fisica Applicata Nello Carrara (Italy)

Programme Committee: Richard Bamler, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Fabio Bovenga, CNR ISSIA (Italy); Maria-Paola Clarizia, Univ. of Michigan (USA); Fabio Covello, Agenzia Spaziale Italiana (Italy); Katarzyna Dabrowska-Zielinska, Institute of Geodesy and Cartography (Poland); Mihail P. Datcu, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Fabio Del Frate, Univ. degli Studi di Roma "Tor Vergata" (Italy); Dara Entekhabi, Massachusetts Institute of Technology (USA); Marek Graniczny, Polish Geological Service (Poland); Carlos Lopez-Martinez, Univ. Politecnica de Catalunya (Spain); Luca Pulvirenti, CIMA Research Foundation (Italy); Stefan Schneiderbauer, EURAC research (Italy); David Small, Univ. of Zürich (Switzerland)

Tuesday 12 September

POSTERS—TUESDAY ................. TUE 17:45 TO 19:30
Conference attendees are invited to attend the Remote Sensing and Security+Defence poster session held on Tuesday 17:45 to 19:30. Posters will be on display after 13:00 hrs on Monday in the Universal Ballroom foyer. Authors of poster papers will be present to answer questions concerning their papers during the Tuesday Poster Session. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Attendees are required to wear their conference registration badges to the poster sessions.
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/x32234.xml

Building damage mapping of 2016 Kumamoto, Japan, earthquake using ALOS-2/PAL SAR-2 interferometric coherence, Tomohisa Konishi, Yuzo Suga, Hiroshima Institute of Technology (Japan) .......................................................... [10426-19]

Persistent scatterer interferometry synthetic aperture radar technique for monitoring of land subsidence of Gangotri (Himalayan) Region, India. Harikesh Singh, Central Univ. of Jharkhand (India) ........................................ [10426-20]

Study on urban land surface subsidence monitoring based on SBAS technology, Jianping Yue, Leping Guo, Shun Yue, Hohai Univ. (China) .................................................. [10426-21]

Advanced subsidence monitoring using persistent scatterer interferometry for Jharia Coal Field, Dhanbad, India, Shailaja Thapa, Indian Institute of Remote Sensing (India) ........................................ [10426-22]

The effect of precipitation on measuring sea surface salinity from space, Xuchun Jin, Delu Pan, Xiaojing He, Difeng Wang, Qiankun Zhu, Fang Gong, Advanced subsidence monitoring using persistent scatterer interferometry for Jharia Coal Field, Dhanbad, India, Shailaja Thapa, Indian Institute of Remote Sensing (India) ........................................ [10426-22]

The effect of precipitation on measuring sea surface salinity from space, Xuchun Jin, Delu Pan, Xiaojing He, Difeng Wang, Qiankun Zhu, Fang Gong, Advanced subsidence monitoring using persistent scatterer interferometry for Jharia Coal Field, Dhanbad, India, Shailaja Thapa, Indian Institute of Remote Sensing (India) ........................................ [10426-22]

Creation of maps of soil moisture with the use of radar imaging data from Sentinel-1, Volodymyr Hnatushenko, EOS Data Analytics (Ukraine) and Dnipropetrovsk National Univ. (Ukraine); Igor Garkusha, EOS Data Analytics (Ukraine); Volodymyr Vasylenko, EOS Data Analytics (Ukraine) and Dnipropetrovsk National Univ. (Ukraine) .......................................................... [10426-24]


Sea surface wind retrievals from SAR using theoretical backscattering model, Xiaomin Ye, National Satellite Ocean Application Service (China) .......................................................... [10426-26]

WEDNESDAY 13 SEPTEMBER

JOINT SESSION ................. WED 13:40 TO 15:20
SAR Data Processing I
Session Chair: Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy)


Time domain SAR raw data simulation using CST and image focusing of 3D objects, Adrian Saeed, Olaf Hellwich, Technische Univ. Berlin (Germany) .......................................................... [10427-46]

L1 regularization recovered SAR images based interferometric SAR imaging via complex approximated message passing, Hui Bi, Chenyang Wu, Institute of Electronics, Chinese Academy of Sciences (China) and Univ. of Chinese Academy of Sciences (China); Bingchen Zhang, Yun Lin, Wen Hong, Institute of Electronics, Chinese Academy of Sciences (China) .................................................. [10427-47]

An automatic technique for the probabilistic detection of subglacial lakes in radar sounder data acquired in Antarctica, Ana-Maria Ilisei, Mahdi Khodadadzadeh, Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy) .................................................. [10427-48]

Improved signal processing algorithm for a practical WAS-GMTI system, Yong Li, He Yan, Nanjing Univ. of Aeronautics and Astronautics (China) .................................................. [10427-49]

Design, deployment and localization of bidirectional corner reflectors for TerraSAR-X, Adrian Saeed, Olaf Hellwich, Technische Univ. Berlin (Germany) .................................................. [10427-50]

JOINT SESSION ................. WED 15:50 TO 17:10
SAR Data Processing II
Session Chair: Claudia Notarnicolai, EURAC (Italy)


Automatic identification of nonreflective subsurface targets in radar sounder data based on morphological profile, Mahdi Khodadadzadeh, Ana-Maria Ilisei, Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy) .................................................. [10427-51]

Investigating ground instabilities in Indonesia through SAR interferometry, Fabio Bovenga, Alberto Refice, Antonella Belmonte, CNR ISSIA (Italy); Raffaele Nutricato, Davide O. Nitti, Maria T. Chiaradia, Univ. degli Studi di Bari Aldo Moro (Italy); Athanasias Ganas, National Observatory of Athens (Greece); Paolo Manunta, Collaborative Space Ltd. (Ireland); Elizir., . Darusman, Syah Kuala Univ. (Indonesia); Philippe Bally, ESRIN (Italy) .................................................. [10426-16]

HydroSAT: a Ku/Ka band synthetic aperture radar space mission concept for high-resolution mapping of hydrometeorological parameters, Saverio Mori, Frank S. Marzano, Sapienza Univ. di Roma (Italy) and Univ. degli Studi dell’Aquila (Italy); Nazzareno Pierdicca, Sapienza Univ. di Roma (Italy); Onelia Bombaci, Domenico Giancristoforo, Thales Alenia Space (Italy); Giovanni Maceloni, Consiglio Nazionale delle Ricerche (Italy); Juha Lemmettyinen, Finnish Meteorological Institute (Finland); Davide Gaudici, ARESYS s.r.l. (Italy); Armen Poghosyan, Skolkovo Institute of Science and Technology (Russian Federation) .................................................. [10426-17]

Extraction of damaged area caused by debris flows in Hiroshima using COSMO-SkyMed images, Tomohisa Konishi, Yuzo Suga, Hiroshima Institute of Technology (Japan) .................................................. [10426-18]
THURSDAY 14 SEPTEMBER

OPENING REMARKS ................................. 8:35 TO 8:40

SESSION 1 ................................. THU 8:40 TO 10:00

SAR Interferometry
Session Chair: Fabio Bovenga, CNR ISSIA (Italy)

Deformation vector measurement by means of ground based
Interferometric radar system, Alberto Michelini, Francesco Coppi, IDS
GeoRadar (Italy). ........................................... [10426-1]

Using multitemporal interferometry and Sentinel-1 data to monitor
ground instability hazards related to open-cast mining operations
Janusz Wasowski, Istituto di Ricerca per Protezione Idrogeologica (Italy); Fabio Bovenga, CNR ISSIA (Italy); Davide O. Nitti, Raffaele Nutricato, Khalid Tijani, GAP S.R.L. (Italy); Alberto Morea, Univ. degli Studi di Bari Aldo Moro (Italy); Maria T. Chiaradia, Politecnico di Bari (Italy) ........................ [10426-2]

Sentinel-1 interferometric coherence assessment for land cover and
texture analysis of urban and sub-urban environments in
Geosources area and in the countryside of Rome (Italy)
Sara Crapolicchio, Serco SpA (Italy) ............................... [10426-6]

ERA and ISMN: an error characterization through extended quadruple
Soil moisture products comparison between SMAP, SMOS, ASCAT,
Snow and Avalanche Study Establishment (India) ................ 
Priya Jothi, Rajesh Jeyakrishnan, Avik Bhattacharya, Gulab Singh, Gopalan Arun Bharathi Pugazhenthi, Arnab Muhuri, Shaunak De, Abhishek Maity, Surendar Manickam, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Fabio Bovenga, CNR ISSIA (Italy); Davide O. Nitti, Raffaele Nutricato, Khalid Tijani, GAP S.R.L. (Italy); Alberto Morea, Univ. degli Studi di Bari Aldo Moro (Italy); Maria T. Chiaradia, Politecnico di Bari (Italy) ........................ [10426-2]

An improved compensation method of azimuth phase undulations
in airborne interferometric SAR, Zhen Wang, Sheng Lin, Zegang Ding, Tiandong Liu, Tao Zeng. Beijing Institute of Technology (China) ........................ [10426-4]

SESSION 2 ................................. THU 10:30 TO 12:10

Environmental Applications
Session Chair: Emanuele Santi,
Istituto di Fisica Applicata “Nello Carrara” (Italy)

HiM SAR: a scientific toolbox for snowpack parameters estimation,
Surendar Manickam, Friedrich-Alexander-Universität Erlangen-Nürnberg (Germany); Arun Bharathi Pugazhenth, Arnab Muhuri, Shaunak De, Abhishek Maity, Priya Jothi, Rajesh Jeyakrishnan, Avik Bhattacharya, Gulab Singh, Gopalan Venkataraman, Indian Institute of Technology Bombay (India); Shehnamini, Snow and Avalanche Study Establishment (India) ........................ [10426-5]

Soil moisture products comparison between SMAP, SMOS, ASCAT,
ERA and ISMN: an error characterization through extended quadruple
Collocation technique, Fabio Fascetti, Nazzareno Pierdicca, Sapienza Univ. di Roma (Italy); Luca Pulvirenti, CIMA Research Foundation (Italy); Raffaele Crapolicchio, Serco SpA (Italy) ........................ [10426-6]

Monitoring by forward scatter radar techniques: an improved second-
order analytical model, Marta Tecla Falconi, Davide Comite, Alessandro Galli, Frank S. Marzano, Debora Pastina, Pierfrancesco Lombardo, Sapienza Univ. di Roma, Marta Tecla Falconi, Davide Comite, Alessandro Galli, Frank S. Marzano, Debora Pastina, Pierfrancesco Lombardo, Sapienza Univ. di Roma (Italy); Davide O. Nitti, Raffaele Nutricato, Khalid Tijani, GAP S.R.L. (Italy); Alberto Morea, Univ. degli Studi di Bari Aldo Moro (Italy); Maria T. Chiaradia, Politecnico di Bari (Italy) ........................ [10426-2]

Spatiotemporal mapping of a flood event “migration” in a transboundary
Flood event, Theodora Perrou, Asterios Papastergiou, Issaak Parcharidis, Harokopio Univ. of Athens (Greece); Marco Chini, Luxembourg Institute of Science and Technology (Luxembourg) ........................ [10426-8]

Correlation between land cover and ground vulnerability in Alexandria
City (Egypt) using time series SAR interferometry and optical Earth
Observation data, Tarek A. Seleem, Suez Canal Univ. (Egypt); Vyron Stergiopoulos, Harokopio Univ. of Athens (Greece); Penelope Kourouli, GAMMA Remote Sensing Research and Consulting AG (Switzerland); Theodora Perrou, Issaak Parcharidis, Harokopio Univ. of Athens (Greece). ........................ [10426-9]

Lunch Break ........................................... Thu 12:10 to 13:30
CONFERENCE 10427

Monday–Wednesday 11–13 September 2017 • Proceedings of SPIE Vol. 10427

Image and Signal Processing for Remote Sensing

Conference Chair: Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy)
Conference Co-Chairs: Francesca Bovolo, Fondazione Bruno Kessler (Italy); Jon Atlí Benediktsson, Univ. of Iceland (Iceland)

Programme Committee: Selim Aksoy, Bilikent Univ. (Turkey); Luciano Alparone, Univ. degli Studi di Firenze (Italy); José M. Bioucas-Dias, Univ. Técnica de Lisboa (Portugal); Gustavo Camps-Valls, Univ. de Valencia (Spain); Jocelyn Chanussot, Lab. des Images et des Signaux (France); Chi-Hau Chen, Univ. of Massachusetts Dartmouth (USA); Fabio Dell’Acqua, Univ. degli Studi di Pavia (Italy); Begüm Demir, Univ. degli Studi di Trento (Italy); Peijun Du, Nanjing Univ. (China); Giles M. Foody, The Univ. of Nottingham (United Kingdom); Andrea Garzelli, Univ. degli Studi di Siena (Italy); Jordi Inglada, Ctr. d’Estudis Espatials de la Biosisfera (France); Gabriele Moser, Univ. degli Studi di Genova (Italy); Allan A. Nielsen, Technical Univ. of Denmark (Denmark); Ryuei Nishi, Kyushu Univ. (Japan); Antonio J. Plaza Miguel, Univ. de Extremadura (Spain); John A. Richards, The Australian National Univ. (Australia); Josiane B. Zerubia, INRIA Sophia Antipolis - Méditerranée (France)

MONDAY 11 SEPTEMBER

OPENING REMARKS ....................... MON 8:25 TO 8:30

SESSION 1 .......................... MON 8:30 TO 10:10
Image Calibration, Enhancement and Restoration
Session Chair: Antoine Massé, Institut Géographique National (France)

- Bulk processing of the Landsat MSS/TM/ETM+ archive of the European Space Agency: an insight into the level 1 MSS processing. Sebastien Saunier, Telespazio France SAS (France) . [10427-1]
- Fast and accurate denoising method applied to very high resolution remote sensing images. Antoine Massé, Ctr. National d’Etudes Spatiales (France); Sebastien Lefevre, Univ. de Bretagne-Sud (France); Renaud Binet, Stéphanie Artigues, Gwendoline Blanchet, Simon J. Ballarin, Ctr. National d’Etudes Spatiales (France). [10427-2]
- Sen2Cor for Sentinel-2. Magdalena Main-Krom, Bringfried Pflug, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Jerome Louis, Vincent Debaecker, Telespazio France SAS (France); Uwe Müller-Wilm, Telespazio VEGA Deutschland GmbH (Germany); Ferran Gascon, European Space Agency (Italy). [10427-3]
- Performance analysis and correction of thermally-induced IR image defocus. Woo-Yong Jang, Univ. of Dayton Research Institute (USA); James Park, Zahn Hyun Ku, Augustin M. Urbas, Air Force Research Lab. (USA). [10427-4]
- Stray light simulation tool for GOCI ISRD (inter-slot radiometric discrepancy). Ki-Beom Ahn, Seong-Ick Cho, Eunsong Oh, Korea Institute of Ocean Science & Technology (Korea, Republic of) and Yonsei Univ. (Korea, Republic of); Young-Je Park, Korea Institute of Ocean Science & Technology (Korea, Republic of); Sug-Wan Kim, Yonsei Univ. (Korea, Republic of). [10427-5]

SESSION 2 .......................... MON 10:40 TO 12:20
Image PanSharpening and Superresolution
Session Chair: Andrea Garzelli, Univ. degli Studi di Siena (Italy)

- Resolution enhancement of DEM using photometric stereo method in time-varying shadowed region. Sunghyun Moon, Han-Lim Choi, KAIST (Korea, Republic of). [10427-6]
- Benefits of haze removal for modulation-based pansharpening. Simone Loll, Instituto di Metodologie per l’Analisi Ambientale (Italy); Luciano Alparone, Univ. degli Studi di Firenze (Italy); Andrea Garzelli, Univ. degli Studi di Siena (Italy); Gemine Vivone, Univ. degli Studi di Salerno (Italy). [10427-7]
- The effect of denoising on superresolution of hyperspectral images. Armin Eskandari Nasab, Shahid Bahonar Univ. of Kerman (Iran, Islamic Republic of); Azam Karami, Shahid Bahonar Univ. of Kerman (Iran, Islamic Republic of) and Univ. Antwerpen (Belgium). [10427-8]
- New developments in super resolution for GaoFen-4. Feng Li, Lei Xin, Qian Xuesen Lab. of Space Technology (China); Jie Fu, Yuhong Liu, Lanzhou Jiaotong Univ. (China); Xiaohong Kao, China Academy of Space Technology (China). [10427-9]
- Superresolution mapping of satellite images to estimate the water spread area of reservoirs using multi-objective genetic algorithm. Heltin Genitha C., Indhumathi Multhia, St. Joseph’s College of Engineering (India). [10427-10]
- Lunch Break ............................ Mon 12:20 to 13:40

SESSION 3 .......................... MON 13:50 TO 15:30
Image Analysis and Change Detection
Session Chair: Francesca Bovolo, Fondazione Bruno Kessler (Italy)

- Semi-autonomous remote sensing time series generation tool. Dinesh Kumar Babu, Christof Kaufmann, Marco Schmidt, Hochschule Bochum (Germany); Thorsten Dams, Christopher Conrad, Julius-Maximilians-Univ. Würzburg (Germany). [10427-12]
- A theoretical Gaussian framework for anomalous change detection in hyperspectral images. Nicola Acito, Accademia Navale (Italy); Marco Diani, Accademia Navale (Italy); Giovanni Corsini, Univ. di Pisa (Italy). [10427-13]
- Change detection analysis using information theoretic measures on SAR images. Debashri Ratha, Avik Bhattacharya, Indian Institute of Technology Bhubaneswar (India); Alejandro G. Fryer, Univ. Federal de Alagoas (Brazil). [10427-14]
- Change detection approach using co-occurrence matrix on multitemporal SAR imagery. Na Li, Tianhui Satellite Ctr. of China (China); Fang Liu, National Univ. of Defense Technology (China); Lei Qiu, Beijing Institute of Tracking and Telecommunication Technology (China). [10427-15]

TUESDAY 12 SEPTEMBER

SESSION 4 .......................... TUE 8:30 TO 10:10
Hyperspectral Image Analysis I
Session Chair: Allan A. Nielsen, Technical Univ. of Denmark (Denmark)

- Evaluation of dimensionality reduction techniques in hyperspectral imagery and their application for the classification of terrestrial ecosystems. Edurne Ibarrola-Ulzurrun, Francisco Javier Marcello-Ruiz, Univ. de Las Palmas de Gran Canaria (Spain); Consuelo Gonzalo-Martín, Univ. Politécnica de Madrid (Spain). [10427-17]
- Classification of hyperspectral images using unsupervised support vector machine. Sayyed Ashkan Adibi, Mohammad Hassani, Shahid Bahonar Univ. of Kerman (Iran, Islamic Republic of); Azam Karami, Shahid Bahonar Univ. of Kerman (Iran, Islamic Republic of) and Univ. Antwerpen (Belgium). [10427-18]
Nearest neighbor-density-based clustering methods for large hyperspectral images, Claude Cariou, Kacem Chehdi, Univ. de Rennes 1 (France) .................................................. [10427-19]

Maximum auto- and cross- mutual-information factor analysis, Allan A. Nielsen, Technical Univ. of Denmark (Denmark) .............................................. [10427-20]

SESSION 5 ................................................................ TUE 10:40 TO 12:20

Hyperspectral Image Analysis and II
Session Chair: Benoît Vozel, Univ. de Rennes 1 (France)

Hyperspectral image classification using nonsubsampled shearlet transform, Mohamad Reza Soleimanzadeh, Azam Karimi, Shahid Bahonar Univ. of Kerman (Iran, Islamic Republic of) ............................................. [10427-21]

Blind estimation of blur in hyperspectral images, Mo Zhang, Benoit Vozel, Kacem Chehdi, Univ. de Rennes 1 (France); Mykhaili Leontievich Uss, Sergey K. Abramov, Vladimir V. Lukin, National Aerospace Univ. (Ukraine) ............................................................. [10427-22]

Hyperspectral image denoising and anomaly detection based on low-rank and sparse representations, Lina Zhuang, Instituto Superior Tecnico, Univ. de Lisboa (Portugal); Lianru Gao, Bing Zhang, Institute of Remote Sensing and Digital Earth (China); José M. Bioucas-Dias, Instituto Superior Tecnico (Portugal) and Instituto de Telecomunicacões (Portugal) and Univ. de Lisboa (Portugal) .................................................. [10427-23]

Blind hyperspectral sparse unmixing based on online dictionary learning, Xiaorui Song, Equipment Academy (China); Lingda Wu, Hongxing Hao, Academy of Equipment (China) .......... [10427-24]

A method to correct the small effect based on the combination correlation of radiometric and spectrum, Chuncheng Zhou, Chuangrong Li, Lingli Tang, Yongguang Zhao, Academy of Opto-Electronics, CAS (China) ........ [10427-25]

Lunch/Exhibition Break ........... Tue 12:50 to 13:50

SESSION 6 ................................................................ TUE 13:40 TO 15:20

Estimation and Modelling Techniques
Session Chair: Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy)

Deep learning for estimating spatially-distributed evapotranspiration, Angel M. García-Pedrozo, Consuelo Gonzalo-Martín, Univ. Politécnica de Madrid (Spain); Mario F. Lillo-Saavedra, Univ. de Concepción (Chile); Dioniós Rodríguez-Esparragón, Univ. de las Palmas de Gran Canaria (Spain); Alejandro Rodríguez-González, Emestina Menasalvas, Univ. Politécnica de Madrid (Spain) .......................................................... [10427-26]

An approach to conifer stem location and modeling in high density airborne lidar data, Aravind Harikumar, Francesca Bovolo, Fondazione Bruno Kessler (Italy); Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy) ........ [10427-27]

Comparative study of building footprint estimation methods from lidar point clouds, Esteban Rozas, Univ. of Santiago de Compostela (Spain); Francisco Fernández Rivera, José Carlos Cabaleiro Domínguez, David L. Vilariño, Óscar Fernández Pesa, Univ. de Santiago de Compostela (Spain) .......................................................... [10427-28]

Fitting image-based depth estimation onto digital elevation and city models, Boitelmuf Rob, Fraunhofer-Institut für Ortrockn, Systemtechnik und Bildauswertung (Germany) .......................................................... [10427-29]

Semi-automatic tree detection from images of unmanned aerial vehicle using object-based image analysis method, Sendar Selim, Namik Kemal Selim, Univ. of Electronics, Chinese Academy of Sciences (China) ........ [10427-30]

SESSION 7 ................................................................ TUE 15:50 TO 17:30

Object-based Image Analysis and Classification
Session Chair: Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy)

Land cover classification using deep learning convolutional neural networks with spectral curves, Junghee Lee, Jungho Im, Daeyeon Han, Ulsan National Institute of Science and Technology (Korea, Republic of) .................................................. [10427-31]

Multispectral data fusion based on OBIA approach, Consuelo Gonzalo-Martín, Univ. Politécnica de Madrid (Spain); Mario F. Lillo-Saavedra, Univ. de Concepción (Chile); Ángel M. García-Pedrozo, Univ. Politécnica de Madrid (Spain); Dioniós Rodríguez-Esparragón, Univ. de las Palmas de Gran Canaria (Spain) .................................................. [10427-32]

Object-based image analysis for cadastral mapping using satellite images, Diviyani Kohli, Faculty of Geo-Information Science and Earth Observation, UTC (Netherlands); Sophie Crommelinck, Rohan Bennett, Mills Kate, Univ. of Pretoria (South Africa); Christiana Lemmen, Kadaster International (Netherlands) .......................................................... [10427-33]

Supervised classification of remotely sensed images using Bayesian network models and Kruskal algorithm, Radja Kheddam, Univ. des Sciences et de la Technologie Houari Boumediene (Algeria) .......................................................... [10427-62]

Differences between broadleaf and coniferous forests from satellite data by different observation angles, Noriko Soyama, Tenri Univ. (Japan); Kanako Muramatsu, Nara Women's Univ. (Japan); Motomasa Daigo, Doshisha Univ. (Japan) .......................................................... [10427-63]

Progressive sample processing of band selection for hyperspectral imagery, Keng-Hao Liu, Hung-Chang Chen, National Sun Yat-Sen Univ. (Taiwan); Shih-Yu Chen, National Yunlin Univ. of Science and Technology (Taiwan) .......................................................... [10427-64]


Subaperture analysis to measure directivity and isotropy in pot-CSAR, Fei-Teng Xue, Univ. of Chinese Academy of Sciences (China); Yun Lin, Institute of Electronics, Chinese Academy of Sciences (China); Bingcheng Chen, Institute of Electronics, Chinese Academy of Sciences (China); Wenyi Shen, Yue Zhao, Univ. of Chinese Academy of Sciences (China); Wen Hong, Institute of Electronics, Chinese Academy of Sciences (China) .......................................................... [10427-66]
Small real time detection satellites for MDA using hyperspectral images, Daiki Nakaya, Hiroki Yanagida, Happy Science (Japan); Shin Satori, Happy Science (Japan); Tomonori Ito, Yusuke Takeuchi, Hokkaido Satellite Co., Ltd. (Japan) ............................................. [10427-67] Remote sensing applied to terrestrial laser scanner surveys, case study walls paintings of the Sant Miquel chapel, Juan Manuel Corso Sarmiento, Josep Roca Cladera, Felipe Buil Pozuelo, Univ. Politècnica de Catalunya (Spain) .................................[10427-68] Unsupervised hyperspectral image classification using spectral unmixing and spatial filtering, Mohammad Hoshyar Moghadam, Shahin Bahonar Univ. of Kerman (Iran, Islamic Republic of); Azam Karami, Shahin Bahonar Univ. of Kerman (Iran, Islamic Republic of) and Univ. Antwerpen (Belgium) ............................................. [10427-69] A modified four components decomposition method using C band PolSAR DATA, Houda Lalatche, Mounia Ouarzedine, Univ. des Sciences et de la Technologie Houari Boumediene (Algeria) . . .................................. [10427-70] A research on multifeature automatic registration algorithm based on VNR/MWIR image of GaoFen-4, Jing Guo, Jian Yang, Institute of Remote Sensing and Digital Earth (China); Changdong Ji, Liaoning Technical Univ. (China); Qingyan Meng, Zhenhui Sun, Institute of Remote Sensing and Digital Earth (China) ................................................. [10427-71] Analysis of the SNR and sensing ability of different sensor types in lidar system, Gyudong Choi, Bongki Mheen, Hong Seok Seo, Munhyun Han, Electronics and Telecommunications Research Institute (Korea, Republic of) ............................................. [10427] Estimating the number of endmembers in hyperspectral imagery using accumulated convex hull vertex and similarity measure, Jee-Cheng Wu, National Ilan Univ. (Taiwan); Kang-Pei Wu, Hong-Chao Teng, Tunghai Univ. (Taiwan) .................................................. [10427-73] Research of generalized wavelet transformations of Haar correctness in remote sensing of the Earth, Maretta Kazaryan, Financial Univ. under the Government of the Russian Federation (Russian Federation); Mihail Shakhramanyan, Researching Institute “AEROCOSMOS” (Russian Federation); Roumen Nedkov, Space Research and Technology Institute (Bulgaria); Andrey Richter, Researching Institute “AEROCOSMOS” (Russian Federation); Denitsa Borisova, Nataliya Stankova, Iva Ivanova, Mariana Zahirinova, Space Research and Technology Institute (Bulgaria) .......................................................... [10427-74] Image baseline estimation using lines matching and geometrical transformation, Mohamed Tadj-Eddine Mahmoudi, Takieddine Skanderi, Aichouche Belhadj Aissa, Univ. des Sciences et de la Technologie Houari Boumediene (Algeria) . . .................................................. [10427-75] Multisource data fusion for documenting archeological sites, Vladimir A. Knyaz, GosNIAS (Russian Federation); Alexander G. Chibunchev, Moscow State Univ. of Geodesy and Cartography (Russian Federation); Denis V. Zhuravlev, State Historical Museum (Russian Federation) ................ [10427-] Ensemble learning for spatio-temporal raw area mapping using Landsat 8 satellite data, Jayantara D. Mohite, Tata Consultancy Services Ltd. (India); Suryakant Sun, Indigenous Institute of Technology Bombay (India); Gajanan Kothawade, Savitribai Phule Pune Univ. (India); Srinivasu Pappula, Tata Consultancy Services Ltd. (India) .................................................. [10427-77] Multispectral image enhancement processing for microsat-borne image, Jianying Sun, Zheng Tan, Quobo Lv, Linlin Pei, Academy of Opto-Electronics, CAS (China) .......................................................... [10427-78] Evaluation of different image processing methods in the context of an image registration framework, Stefan Brützel, Fraunhofer-Institut für Ortronik, Systemtechnik und Bildauswertung (Germany) .................................................. [10427-80] A new inversion algorithm for volume height estimation based on the fusion between CAPON and LS in a multi-baseline SAR application, Hichem Mahgoun, Mounia Ouarzedine, Univ. des Sciences et de la Technologie Houari Boumediene (Algeria) .............................................. [10427] High efficient optical remote sensing images acquisition for nanosatellite reconstruction algorithms, Yang Liu, CAST-X’ian Institute of Space Radio Technology (China); Feng Li, Lei Xin, Qian Xuesen Lab. of Space Technology (China); Jie Fu, Lanzhou Jiaotong Univ. (China); Puming Huang, CAST-X’ian Institute of Space Radio Technology (China) .................................................. [10427-81] Content based multilabel image retrieval with deep features, Xavier Giro, Michele Comprini, Univ. Politècnica de Catalunya (Spain); Begüm Demir, Univ. degli Studi di Trento (Italy) .................................................. [10427-82] Effects of the modulation transfer function of high spatial resolution remote sensing imaging system on localization errors in land use patches, Jiahui Cheng, Zhanliang Yuan, Henan Polytechnic Univ. (China) .................................................. [10427-83] Output MSE and PSNR prediction in DCT-based lossy compression of remote sensing images, Ruslan A. Kozhemiakin, Sergey K. Abramov, Vladimir V. Lukin, National Aerospace Univ. (Ukraine); Benoît Vozel, Kacem Chebhi, Univ. de Rennes 1 (France) .................................................. [10427-] Vehicle detection in UAV remotely sensed images, Mohamed Salah Ismail, German Univ. (Egypt); Mohammed Abdel-Megeed Salen, Ain Shams Univ. (Egypt) .................................................. [10427-85]
JOINT SESSION ........................ WED 13:40 TO 15:20

SAR Data Processing I
Session Chair: Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy)

Joint Session between Conference 10427,
Image and Signal Processing for Remote Sensing, and
Conference 10426, Active and Passive Microwave Remote
Sensing for Environmental Monitoring

Time domain SAR raw data simulation using CST and image focusing of
3D objects, Adnan Saeed, Olaf Hellwich, Technische Univ. Berlin
(Germany) .............................................. [10427-46]

L1 regularization recovered SAR images based interferometric SAR
imaging via complex approximated message passing, Hui Bi, Chenyang
Wu, Institute of Electronics, Chinese Academy of Sciences (China) and Univ. of
Chinese Academy of Sciences (China); Bingchen Zhang, Yun Lin, Wen Hong,
Institute of Electronics, Chinese Academy of Sciences (China) . . . . . [10427-47]

An automatic technique for the probabilistic detection of subglacial lakes
in radar sounder data acquired in Antarctica, Ana-Maria Ilisei,
Mahdi Khodadadzadeh, Lorenzo Bruzzone, Univ. degli Studi di Trento
(Italy) .............................................. [10427-48]

Improved signal processing algorithm for a practical WAS-GMTI
system, Yong Li, He Yan, Nanjing Univ. of Aeronautics and Astronautics
(China) ................................................ [10427-49]

Improved signal processing algorithm for a practical WAS-GMTI
system, Yong Li, He Yan, Nanjing Univ. of Aeronautics and Astronautics
(China) ................................................ [10427-49]

An automatic technique for the probabilistic detection of subglacial lakes
in radar sounder data acquired in Antarctica, Ana-Maria Ilisei,
Mahdi Khodadadzadeh, Lorenzo Bruzzone, Univ. degli Studi di Trento
(Italy) .............................................. [10427-48]

SESSION JS2 ........................ WED 15:50 TO 17:10

Joint Session: SAR Data Processing II
Session Chair: Claudia Notarnicola, EURAC (Italy)

Joint Session between Conference 10427,
Image and Signal Processing for Remote Sensing, and
Conference 10426, Active and Passive Microwave Remote
Sensing for Environmental Monitoring

Automatic identification of nonreflective subsurface targets in radar
sounder data based on morphological profile, Mahdi Khodadadzadeh,
Ana-Maria Ilisei, Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy) [10427-51]

Investigating ground instabilities in Indonesia through SAR Interferometry,
Fabio Bovenga, Alberto Refice, Antonella Belmonte, CNR ISSIA (Italy);
Raffaele Nutricato, Davide O. Nitti, Maria T. Chiaradia, Univ. degli Studi di Bari
Aldo Moro (Italy); Athanasios Galis, National Observatory of Athens (Greece);
Paolo Manunta, Collaborative Space Ltd. (Ireland); . Elizar, . Darusman,
Syiah Kuala Univ. (Indonesia); Philippe Bally, ESRIN (Italy) . . . . . . . . . . . . . [10426-16]

KydroSAT: a Ku/Ka band synthetic aperture radar space mission concept
for high-resolution mapping of hydrometeorological parameters,
Saverio Mori, Frank S. Marzano, Sapienza Univ. di Roma (Italy) and Univ.
delg.: Studi dell’Aquila (Italy); Nazzareno Pierdicca, Sapienza Univ. di Roma
(Italy); Omelia Bombaci, Domenico Gancristoforo, Thales Alenia Space (Italy);
Giovanni Macelotti, Consiglio Nazionale delle Ricerche (Italy);
Juha Lemmetynen, Finnish Meteorological Institute (Finland); Davide Giudici,
ARESYS s.r.l (Italy); Armen Poghosyan, Skolkovo Institute of Science and
Technology (Russian Federation) . . . . . . . . . . . . . . . . . [10426-17]

Extraction of damaged area caused by debris flows in Hiroshima using
COSMO-SkyMed images, Tomohisa Konishi, Yuzo Suga, Hiroshima Institute
of Technology (Japan) . . . . . . . . . . . . . . . . . . . . . . . . . . . . [10426-18]
Earth Resources and Environmental Remote Sensing/GIS Applications

Conference Chairs: Ulrich Michel, Jade Univ. of Applied Sciences Oldenburg (Germany); Karsten Schulz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)

Conference Co-Chairs: Konstantinos G. Nikolakopoulos, Univ. of Patras (Greece); Daniel Civco, Univ. of Connecticut (USA)

Programme Committee: Thomas Blaschke, Univ. Salzburg (Austria); Markus Boldt, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Tilman U. Bucher, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Dimitri Bulatov, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Garik Gutman, NASA Headquarters (USA); Marguerite M. Madden, The Univ. of Georgia (USA); Derya Maktav, Istanbul Technical Univ. (Turkey); Matthias S. Moeller, Univ. of Applied Sciences Berlin (Germany); Pablo H. Rosso, RapidEye AG (Germany); Florian Savopol, Natural Resources Canada (Canada); Jochen Schiewe, HafenCity Univ. Hamburg (Germany); Wenzhong Shi, The Hong Kong Polytechnic Univ. (Hong Kong, China); Karl Staenz, Univ. of Lethbridge (Canada)

TUESDAY 12 SEPTEMBER

WELCOME AND INTRODUCTION .......... TUE 8:25 TO 8:30

SESSION 1 ........................... TUE 8:30 TO 10:30

Infrastructures and Urban Areas

Session Chair: Markus Boldt, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)

Change classification in SAR time series: a functional approach, Markus Boldt, Antje Thiele, Karlsruher Institut für Technologie (Germany). [10428-1]

Generating high-accuracy urban distribution map for short-term change monitoring based on convolutional neural network by utilizing SAR imagery, Shigeki Tino, Rikou Dojo, Kenji Okada, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany). [10428-2]

Building change detection in time series of TanDEM-X interferograms, Amelie Welte, Horst Hammer, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Antje Thiele, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) and Karlsruher Institut für Technologie (Germany). [10428-3]

Sensor data fusion for textured reconstruction and virtual representation of alpine scenes, Gisela Häufel, Dimitri Bulatov, Peter Selmayr, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany). . [10428-4]

Building rooftop classification using random forests for large-scale PV deployment, Dan Assouline, Nahid Mohajeri, Jean-Louis Scartezzini, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . [10428-5]

3D building reconstruction in a remote sensing application workflow, Merlin Becker, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Imgard Runkel, GEOSYSTEMS GmbH (Germany); Wolfgang Middelmann, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany). [10428-6]

SESSION 2 ........................... TUE 10:50 TO 12:10

Processing Methodologies I

Session Chair: Markus Boldt, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)

Amaro-autonomous real-time detection of moving maritime objects: introducing a flight experiment for an on-board ship detection system, Kurt Schwenk, Katharina A. M. Willburger, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany). [10428-7]

Evaluation of automatic cloud removal method for high elevation areas in Landsat 8 OLI images to improve environmental indexes computation, César Álvarez, Univ. do Porto (Portugal) and Univ. Politécnica Salesiana (Ecuador); Ana C. Teodoro, Univ. do Porto (Portugal); Alfonso Tierra, Univ. de las Fuerzas Armadas-ESPE (Ecuador). [10428-8]

A combined use of multispectral and SAR images for ship detection and characterization through object based image analysis, Martina Aielo, Marco Gianinetto, Politecnico di Milano (Italy) . [10428-9]

Normalization of time-series satellite reflectance data to a standard sun-target-sensor geometry using a semi-empirical model, Yongguang Zhao, Chuaraarrong Li, Lingbing Ma, Ning Wang, Yonggang Qian, Chuncheng sun-target-sensor geometry using a semi-empirical model, Georgios Komodromos, Ministry of Transport, Communications and Works (Cyprus). [10428-10]

SESSION 3 ........................... TUE 13:40 TO 15:20

Environmental Monitoring I

Session Chairs: Ulrich Michel, Jade Hochschule (Germany); Karsten Schulz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)

Analysis of economic values of land use and land cover changes in crisis territories by satellite data: models of socio-economy and population dynamics in war, Yuriy V. Kucherlenko, Moscow State University (Russia); Movchan, Ivan Kopachevsky, Ctr. for Aerospace Research of the Earth (Ukraine). . [10428-11]

UAV remote sensing hazard damage assessment in Funing tornado disaster, Qi H. Wen, Wei Wang, Shuang Li, Donghua Pan, Ping Wang, Tong Tang, National Disaster Reduction Ctr. of China (China) . [10428-12]

The use of UAVs for monitoring land degradation, Kyriacos Themistocleous, Cyprus Univ. of Technology (Cyprus) . [10428-13]

ERATOSTHENES: excellence research Centre for Earth surveillance and space-based monitoring of the environment, the EXCELSIOR Horizon 2020 learning project, Dofattoz, G. Hadjimitsis, Cyprus Univ. of Technology (Cyprus); Charalambos C. Kontos, National Observatory of Athens (Greece); Gunter Schreier, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Albert Ansman, Leibniz Institut für Troposphärenforschung (Germany); Georgios Komodromos, Ministry of Transport, Communications and Works (Cyprus); Kyriacos Themistocleous, Rodanthis-Elisavet Mamouri, Silas C. Michaelides, Argyro Nisantzi, Christiana Papoutsos, Cyprus Univ. of Technology (Cyprus). [10428-14]

Characterization of satellite-derived surface solar irradiance products: SASSCAL stations, Vaneen R. Shahi, Univ. of the Witwatersrand (South Africa) . [10428-15]

SESSION 4 ........................... TUE 15:50 TO 17:50

Environmental Monitoring II

Session Chair: Christine Wessollek, TU Dresden (Germany)

Spectral discrimination of macrophyte species among different seasons in a tropical wetland using in-situ hyperspectral remote sensing, Richi Saluja, J. K. Garg, Guru Gobind Singh Indraprastha Univ. (India). . [10428-16]

Explicit area-based accuracy assessment for mangrove tree crown delineation using geographic object-based image analysis (GEOBIA), Muhammad Kamal, Univ. Gadjah Mada (Indonesia); Kasper Johansen, The Univ. of Queensland (Australia). [10428-17]


Impacts of post-disaster recovery on land surface temperature after the 2004 Indian tsunami: a case study of Banda Aceh, Indonesia, Zaum Syahrina, Muhamad Syukri Surbakti, Syiah Kuala Univ. (Indonesia); Kok Chooi Tan, Hayee Saf Lim, M Pong Jui Zuli, Mat Jafi, Univ. Sains Malaysia (Malaysia) . [10428-20]

POSTERS—TUESDAY ............................... TUE 17:45 TO 19:30
Conference attendees are invited to attend the Remote Sensing and Security+Defence poster session held on Tuesday 17:45 to 19:30. Posters will be on display after 13:00 hrs on Monday in the Universal Ballroom Foyer. Authors of poster papers will be present to answer questions concerning their papers during the Tuesday Poster Session. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Attendees are required to wear their conference registration badges to the poster sessions.
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/x32234.xml.

The multiscale classification system and grid encoding mode of ecological land in China, Jing Wang, Wuhan Univ. (China); Aixia Liu, China Land Surveying and Planning Institute (China); Yifan Lin, Peking Univ. (China) .......................................................... [10428-49]
Demarcation of mineral rich zones in adjoining areas of a copper prospect in Rajasthan, India using ASTER, DEM (ALOS) and spaceborne gravity data, Vivek K. Sengar, Indian Institute of Remote Sensing (India) .................................................. [10428-50]
Image object-based water body types identification in coastal area, Jianyu Chen, The Second Institute of Oceanography, SOA (China) .......................................................... [10428-51]
SAR and optical data in land degradation processes estimation: a case study from southeast Bulgaria, Daniela Avetisyan, Roumen Nedkov, Denitsa Borisova, Space Research and Technology Institute (Bulgaria); Demirstra Salazar Villegas, TU Dresden (Germany) ....................... [10428-27]
Peculiarities of use of ECOC and AdaBoost based classifiers for thematic processing of hyperspectral data, Alexander Dementev, Yegor V. Dmitriev, Institute of Numerical Mathematics (Russian Federation); Vladimir V. Kozodoev, M.V. Lomonosov Moscow State Univ. (Russian Federation); Vitaly G. Voloshin, Institute of Numerical Mathematics (Russian Federation) .......................................................... [10428-57]
Analysis of analysis of remote sensing in the Dudh Koshi basin, Suman Thapa, Tribhuvan University (Nepal) .......................................................... [10428-67]
Characterisation of macrophyte phenology in the Doñana marshland, David Aragones, Estación Biológica Doñana, Consejo Superior de Investigaciones Científicas (Spain); Jose A. Caparros-Santiago, Univ. de Sevilla (Spain); Ibrahim Salahi-Nejad, Osama Abdes-Rafou, National Water Research Ctr. (Egypt) .......................................................... [10428-66]
A GIS-based approach to habitat suitability of wild water buffo (Bubalus arnee) on the Rapit floodplain of Chitwan National Park, Shankar Tripathi, Agriculture and Forestry Univ. (Nepal) .......................................................... [10428-67]
Remote sensing data and hydrogeophysical parameters as a guide for sustainable development in the northwestern coast of Egypt, Ibrahim Salahi-Nejad, Osama Abdes-Rafou, National Water Research Ctr. (Egypt) .......................................................... [10428-66]
Analysis of health centres distribution in Gwarinpa District: remote sensing and GIS perspective, Oboh Satur Okosun, Federal Univ. Kashere (Nigeria) .......................................................... [10428-69]

WEDNESDAY 13 SEPTEMBER
SESSION 5 ............................................ WED 08:30 TO 10:10
Hazard Mitigation Geologic Applications I
Session Chair: Konstantinos G. Nikolakopoulos, Univ. of Patras (Greece)

Remote sensing data and hydrogeophysical parameters as a guide for sustainable development in the northwestern coast of Egypt, Ibrahim Salahi-Nejad, Osama Abdes-Rafou, National Water Research Ctr. (Egypt) .......................................................... [10428-66]
A GIS-based approach to habitat suitability of wild water buffo (Bubalus arnee) on the Rapit floodplain of Chitwan National Park, Shankar Tripathi, Agriculture and Forestry Univ. (Nepal) .......................................................... [10428-67]
Radar remote sensing for environmental monitoring, Tomonori Deguchi, Nittetsu Mining Consultants Co., Ltd. (Japan) .......................................................... [10428-68]
Analysis of health centers distribution in Gwarinpa District: remote sensing and GIS perspective, Oboh Satur Okosun, Federal Univ. Kashere (Nigeria) .......................................................... [10428-69]

SESSION 6 ............................................ WED 11:00 TO 12:40
Environmental Monitoring III
Session Chair: Ulrich Michel, Jade Hochschule (Germany)

Can porosity affect the hyperspectral signature of sandy landscapes?, Gladimir V. G. Baranasko, Bradley W. Kimmel, Univ. of Waterloo (Canada) .......................................................... [10428-26]
Mapping above ground biomass in lowland Amazon forest gradient using canopy texture index derived from the whole MODIS NDVI time series and machine learning algorithms, Victor F. Rodriguez-Galiano, Univ. de Sevilla (Spain); David Aragones, Estación Biológica Doñana, Consejo Superior de Investigaciones Científicas (Spain); Jose A. Caparros-Santiago, Univ. de Sevilla (Spain) .......................................................... [10428-28]

Vulnerable land ecosystems classification using spatial context and spectral indices, Edurne Ibarrola-Ulzurrun, Univ. de Las Palmas de Gran Canaria (Spain); Consuelo Gonzalez-Martin, Univ. Politecnica de Madrid (Spain); Francisco Javier Marcelo-Ruiz, Univ. de Las Palmas de Gran Canaria (Spain) .......................................................... [10428-29]
Analysis of phenological changes of high vegetation in amplitude images of SAR time series, Ramona Ihrig, Karlsruher Institut für Technologie (Germany) and Fraunhofer-Institut für Optronik, Systemtechnik und Bildverarbeitung (Germany); Silvia Kuny, Antje Thiele, Fraunhofer-Institut für Optronik, Systemtechnik und Bildverarbeitung (Germany) and Karlsruher Institut für Technologie (Germany); Stefan Hinz, Karlsruher Institut für Technologie (Germany); Stefan Hinz, Karlsruher Institut für Technologie (Germany); Stefan Hinz, Karlsruher Institut für Technologie (Germany) .......................................................... [10428-30]
Lunch/Exhibition Break .................................................. Wed 12:40 to 13:50

Remote sensing data and hydrogeophysical parameters as a guide for sustainable development in the northwestern coast of Egypt, Ibrahim Salahi-Nejad, Osama Abdes-Rafou, National Water Research Ctr. (Egypt) .......................................................... [10428-66]
A GIS-based approach to habitat suitability of wild water buffo (Bubalus arnee) on the Rapit floodplain of Chitwan National Park, Shankar Tripathi, Agriculture and Forestry Univ. (Nepal) .......................................................... [10428-67]
Radar remote sensing for environmental monitoring, Tomonori Deguchi, Nittetsu Mining Consultants Co., Ltd. (Japan) .......................................................... [10428-68]
Analysis of health centers distribution in Gwarinpa District: remote sensing and GIS perspective, Oboh Satur Okosun, Federal Univ. Kashere (Nigeria) .......................................................... [10428-69]

CONFERENCE 10428
CONFERENCES 10428

SESSION 7 .......................... WED 13:50 TO 15:10
Processing Methodologies II
Session Chair: Karsten Schulz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)

Quick multitemporal approach to get cloudless improved multispectral imagery for large geographical areas, Nicola Colaninno, Univ. Politecnica de Catalunya (Spain); Alejandro Marmbio, Univ. Nacional Autónoma de México (Mexico); Josep Roca Cladera, Univ. Politécnica de Catalunya (Spain) ................................................ [10428-31]

Simulation of vegetation and relief induced shadows on rivers with remote sensing data, Pierre Karrasch, Sebastian Hunger, TU Dresden (Germany) ................................................ [10428-32]

Hyperspectral signature analysis of three plant species to long-term hydrocarbon and heavy metal exposure, Guillaume Lassalle, ONERA (France); Anthony Credoz, Total S.A. (France); Sophie Fabre, ONERA (France); Arnaud Elger, Ecolab (France); Rémy Hédacq, Dominique Dubucq, Total S.A. (France) ................................................ [10428-33]

Automated flood extent identification using WorldView3 imagery for the insurance industry, Christina Geller, AER Worldwide (USA) ................. [10428-34]

SESSION 8 .......................... WED 15:40 TO 17:00
Processing Methodologies III
Session Chair: Horst Hammer, Fraunhofer-Gesellschaft (Germany)

Identification and classification of tree species of riparian zones using object-based image analysis, Sebastian Hunger, Pierre Karrasch, TU Dresden (Germany) ................................................ [10428-35]

SYeNERGY: the satellite data-based platform for energy sector in Poland, the pilot study with PGE S.A. company, Martyna Gatkowska, Wojciech Kiryla, Katarzyna Dabrowska-Zielińska, Institute of Geodesy and Cartography (Poland) ................................................ [10428-36]

Modeling and testing of geometric processing model based on double baselines stereo photogrammetric system, Yingbo Li, Bin Hu, Haibo Zhao, Jinping He, Xuemin Zhao, Beijing Institute of Space Mechanics and Electricity (China) ................................................ [10428-37]

Modeling chlorophyll-a and turbidity concentrations in river Ganga (India) using Landsat 8 OLI imagery, Satish Prasad, Ridhi Saluja, J. K. Garg, Guru Gobind Singh Indraprastha Univ. (India) ................................................ [10428-38]

SESSION 9 .......................... THU 09:00 TO 10:20
Hazard Mitigation Geologic Applications II
Session Chair: Konstantinos G. Nikolakopoulos, Univ. of Patras (Greece)

Remote sensing-based identification of NWW strike large-deep fault and its relation to uranium ore-field in Southeast China, We Pan, Zhangfu Yu, Hanbo Li, Qinglin Tian, Beijing Research Institute of Uranium Geology (China) ................................................ [10428-39]

Emergency response to landslide using GNSS measurements and UAV, Konstantinos G. Nikolakopoulos, Ioannis Koukouvelas, Univ. of Patras (Greece) ................................................ [10428-40]

Surface deformation analysis over Vrancea seismogenic area through radar and GPS geospatial data, Maria A. Zoran, Roxana S. Savastru, Dan M. Savastru, National Institute of Research and Development for Optoelectronics (Romania); Florin Serban, Delia Telea, TERRASIGNA (Romania); Doru Mateiuciu, National Institute for Earth Physics (Romania) ................................................ [10428-41]

Passive thermal infrared hyperspectral imaging for quantitative imaging of shale gas leaks, Marc-Andre Gagnon, Pierre Tremblay, Simon Savary, Vincent Farley, Philippe Lagueux, Eric Guyot, Martin Chamberland, Jean Giroux, Marc-Antoine Langevin, Telops Inc. (Canada) ................. [10428-43]

SESSION 10 .......................... THU 10:50 TO 12:30
Environmental Monitoring IV
Session Chairs: Gisela Häufel, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Christine Wessollek, TU Dresden (Germany)

Monitoring structural breaks in vegetation dynamics of the nature reserve Königsbrücker Heide, Christine Wessollek, Pierre Karrasch, TU Dresden (Germany) ................................................ [10428-44]

Analyses of GIMMS NDVI Time Series in Kogi State, Nigeria, Jessica Palka, Christine Wessollek, Pierre Karrasch, TU Dresden (Germany) ................................................ [10428-45]

Distinguishing sliding area by decision analyzing with remote sensing image and lidar data combined, Chia-Hao Chang, Jee-Cheng Wu, National Ilan Univ. (Taiwan) ................................................ [10428-46]

Research on intelligent extraction method of coastal aquaculture areas on high resolution remote sensing image based on multi-features fusion, Bo Cheng, Yueming Liu, Guizhou Wang, Xiaoshao Ma, Institute of Remote Sensing and Digital Earth (China) ................................................ [10428-47]

Fusion of remote sensing, DGPS, total station and GPR data for the3-D mapping of Himalayan cryosphere: application and future potential, Pawan Kumar, Milap C. Sharma, Jawaharlal Nehru Univ. (India) ................................................ [10428-48]
Monday 11 September 2017 • Proceedings of SPIE Vol. 10429

Lidar Technologies, Techniques, and Measurements for Atmospheric Remote Sensing

Conference Chairs: Upendra N. Singh, NASA Langley Research Ctr. (USA); Doina Nicoleta Nicolae, National Institute of Research and Development for Optoelectronics (Romania)

Programme Committee: Arnoud Apituley, Rijksinstituut voor Volksgezondheid en Milieu (Netherlands); Lucas Alados-Arboledas, Univ. de Granada (Spain); Andreas Behrendt, Univ. Hohenheim (Germany); Gerhard Ehret, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Barry M. Gross, NOAA-CREST (USA); Philippe L. Keckhut, LATMOS (France); George J. Komar, NASA Headquarters (USA); Eduardo Landulfo, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Koheif Mizutani, National Institute of Information and Communications Technology (Japan); Lucia Mona, Istituto di Metodologia per l’Analisi Ambientale (Italy); Alexandros D. Papayannis, National Technical Univ. of Athens (Greece); Gelsomina Paparlardo, Istituto di Metodologia per l’Analisi Ambientale (Italy); Vincenzo Rizi, Univ. degli Studi dell’Aquila (Italy); Laurent Sauvage, Leosphere France (France); Georgios D. Tzeremes, European Space Agency (Netherlands); Ulla Windinger, Leibniz Institut für Troposphärforschung (Germany); Jirong Yu, NASA Langley Research Ctr. (USA)

MONDAY 11 SEPTEMBER

WELCOME REMARKS .......................... MON8:30 TO 8:50
Upendra N. Singh, NASA Langley Research Ctr. (USA)

SESSION 1 ............................ MON 8:50 TO 10:20
Greenhouse and Trace Gas Measurements
Session Chair: Upendra N. Singh, NASA Langley Research Ctr. (USA)
Airborne IPDA lidar development for column measurement of trace gases (Invited Paper), Upendra N. Singh, Mulugeta Petros, Tamer F. Refaat, NASA Langley Research Ctr. (USA); Syed Imail, Analytical Services and Materials, Inc. (USA) .................................................. [10429-1]
New lidar challenges for gas hazard management in industrial environments, Nicolas Cézard, Anastashe Limény, Philippe Benoit, Simon Le Méhauté, Didier Fleury, Didier Goular, Christophe Planchat, Matthieu Valla, Béatrice Auger-Caron, ONE (France) .................................................. [10429-2]
GHG measurement and concentration profiling through differential absorption lidar, Quamrul Huda, Zheng Yang, Long Fu, AEMERA (Canada) .................................................. [10429-3]
Optical parametric oscillator lidar for the gas constituents sensing in the spectral range of 3-4 µm, Olga V. Kharchenko, Oleg A. Romanovski, Sergey A. Sadvonovik, Semen V. Yakovlev, V.E. Zuev Institute of Atmospheric Optics (Russian Federation) .................................................. [10429-4]

SESSION 2 ........................... MON 10:50 TO 12:00
Aerosols, Clouds and Winds Measurements I
Session Chair: Rodanthis-Elisavet Mamouri, Cyprus Univ. of Technology (Cyprus)
Arctic aerosol and water vapor profiling of the atmosphere using CAAAL (Canadian Autonomous Arctic Aerosol Lidar): first results (Invited Paper), Kevin B. Strawbridge, Environment and Climate Change Canada (Canada) .................................................. [10429-5]
Strategic positioning of the ‘ERATOSTHENES Research Centre’ for atmospheric remote sensing research in the Eastern Mediterranean and Middle East region, Rodanthis-Elisavet Mamouri, Cyprus Univ. of Technology (Cyprus); Albert Ansman, Leibniz Institut für Troposphärforschung (Germany); Difonstanto G. Hadjimitsis, Cyprus Univ. of Technology (Cyprus); Johannes Bühli, Leibniz Institut für Troposphärforschung (Germany); Argyo Nantasinti, Cyprus Univ. of Technology (Cyprus); Cristofero Jimenez, Leibniz Institut für Troposphärforschung (Germany); Silas C. Michaelides, Cyprus Univ. of Technology (Cyprus); Patric Seifert, Ronny Engelmann, Ulla Windinger, Leibniz Institut für Troposphärforschung (Germany); Charalampous C. Kontos, National Observatory of Athens (Greece); Gunter Schreier, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Georgios Komodromos, Ministry of Transport, Communications and Works (Cyprus); Kyriacos Themistocles, Cyprus Univ. of Technology (Cyprus) .................................................. [10429-6]
Retrieval of microphysical properties of liquid water clouds from atmospheric lidar measurements: comparison of the Raman dual field of view and the depolarization techniques, Cristofero Andres Jimenez Jimenez, Albert Ansman, Leibniz Institut für Troposphärforschung (Germany); David Donovan, Koninklijk Nederlands Meteorologisch Instituut (Netherlands); Ronny Engelmann, Jörg Schmidt, Ulla Windinger, Leibniz Institut für Troposphärforschung (Germany) .................................................. [10429-7]

Lidar and in situ observations of aerosols, radiation fluxes, and meteorological parameters during the 20 March 2015 solar eclipse over southern Italy, Maria-Rita Perrone, Pasquale Burlizzi, Salvatore Romano, Univ. del Salento (Italy) .................................................. [10429-8]
Lunch Break ........................................................................... Mon 12:20 to 13:20

SESSION 3 .................................. MON 13:20 TO 15:30
Aerosols, Clouds, and Winds Measurements II
Session Chairs: Kevin B. Strawbridge, Environment and Climate Change Canada (Canada); Oleg A. Romanovski, V.E. Zuev Institute of Atmospheric Optics (Russian Federation)
Advancement of coherent Doppler wind lidar at NASA Langley Research Center (Invited Paper), Upendra N. Singh, Michael J. Kavaya, NASA Langley Research Ctr. (USA); George D. Emmitt, Simpson Weather Associates, Inc. (USA) .................................................. [10429-9]
Siberian lidar station: the basic complex of remote laser sounding of the atmosphere, Oleg A. Romanovski, Gennadii G. Matveenko, Yuri S. Balin, Sergey M. Bobrovnikov, Alexey V. Nefzovorov, V.E. Zuev Institute of Atmospheric Optics (Russian Federation) .................................................. [10429-10]
Two wavelengths Mie-Raman lidar for full-time measurements of aerosol characterization, Longhong Wang, Samo Stancic, Univ. of Nova Gorica (Slovenia); William E. Eichinger, The Univ. of Iowa (Armenia); Asta Gregoric, Maruška Mole, Univ. of Nova Gorica (Slovenia); Klemen Bergant, Univ. of Nova Gorica (Slovenia); and Slovenian Environment Agency (Slovenia) .................................................. [10429-11]
A graph signal filtering-based approach for detection of different edge types on airborne lidar data, Eida Bayram, Elif Vural, A. Aydin Alatan, Middle East Technical Univ. (Turkey) .................................................. [10429-12]
The vertical correction of point cloud strips performed over the coastal zone of changing sea level, Ewa Gasinska-Kolyszko, Kazimierz Furmanczyk, Ewa Gasinska-Kolyszko, Kazimierz Furmanczyk, Univ. of Szczecin (Poland) .................................................. [10429-13]
Polarization lidar observations of elevated aerosol layer over a tropical rural site in India, Vishnu R., Bhavani Kumar Yellapragada, National Atmospheric Research Lab (India); James Jebaseelan Samuel, VIT University (India) .................................................. [10429-14]

JOINT PLENARY SESSION ....... MON 16:00 TO 18:30
Security + Defence and Remote Sensing Joint Plenary Session
16:00 to 16:15 Welcome Address and Introductory Remarks
16:15 to 17:00 Optoelectronics developments in Poland for defense and security
Col. Krzysztof Kopczynski, Military Univ. of Technology, Poland
17:00 to 17:45 Remote sensing in food security
Molly E. Brown, Univ. of Maryland, United States
17:45 to 18:30 TBA
TUESDAY 12 SEPTEMBER

POSTERS—TUESDAY .................. TUE 17:45 TO 19:30

Conference attendees are invited to attend the Remote Sensing and Security+Defence poster session held on Tuesday 17:45 to 19:30. Posters will be on display after 13:00 hrs on Monday in the Universal Ballroom Foyer. Authors of poster papers will be present to answer questions concerning their papers during the Tuesday Poster Session. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/x32234.xml


Space-based lidar for monitoring the Martian canyons, Alexandr S. Grishkanich, Leonid Smirnov, ITMO Univ. (Russian Federation); Dmitry N. Redka, Saint Petersburg Electrotechnical Univ. “LETI” (Russian Federation) .................... [10429-16]

Research on the temporal and spatial distribution characteristics of ozone based on differential absorption lidar and WRF-Chem model over the Yangtze River Delta, China, Yan Xiang, Anhui Institute of Optics and Fine Mechanics (China) and Univ. of Science and Technology of China (China); Jianguo Liu, Anhui Institute of Optics and Fine Mechanics (China); Yafang Cheng, Max-Planck-Institut für Chemie (Germany) and Institute for Environmental and Climate Research (China); Tianshu Zhang, Guangqiang Fan, Yunsheng Dong, Zhenyi Chen, Anhui Institute of Optics and Fine Mechanics (China); LiHui Lv, Anhui Institute of Optics and Fine Mechanics (China) and Univ. of Science and Technology of China (China); Fan Guangqiang, Tianshu Zhang, Anhui Institute of Optics and Fine Mechanics (China); Dongfang Wang, Shanghai Environmental Monitoring Ctr. (China); Wenqiang Liu, Jianguo Liu, Yibin Fu, Yunsheng Dong, Anhui Institute of Optics and Fine Mechanics (China) .................... [10429-17]

Data processing technique for the all-fiber wind profiler, Gleb Petrov, International Aeronavigation Systems Concern (Russian Federation); Nikolay A. Baranov, Dorodnicyn Computing Ctr. (Russian Federation) .................... [10429-18]

Observations of aerosol characteristics by mobile vehicle lidar in summer 2016 in Central Plains, China, Lihui Lv, Wenqing Liu, Tianshu Zhang, Zhenyi Chen, Yunsheng Dong, Guangqiang Fan, Yan Xiang, Fengcheng Wu, Anhui Institute of Optics and Fine Mechanics (China) .................... [10429-19]

Enhanced air pollution associated with wind in northern China, Zhenyi Chen, Hefei Institutes of Physical Science (China); Tianshu Zhang, Yunsheng Dong, Guangqiang Fan, Lihui Lv, Yang Liu, Yan Xiang, Xiaowen Shu, Anhui Institute of Optics and Fine Mechanics (China) .................... [10429-20]

Wind field profiling technique for lidar data processing, Gleb Petrov, JSC “International Aeronavigation Systems Concern” (IANS) (Russian Federation); Nikolay A. Baranov, Dorodnicyn Computing Ctr. (Russian Federation); Ilia Shiraev, JSC “International Aeronavigation Systems Concern” (IANS) (Russian Federation) .................... [10429-21]

The vertical profiles and comparison of ozone observed by differential absorption lidar and captive balloon in Shanghai, 2016, Fan Guangqiang, Tianshu Zhang, Anhui Institute of Optics and Fine Mechanics (China); Dongfang Wang, Shanghai Environmental Monitoring Ctr. (China); Wenqiang Liu, Jianguo Liu, Yibin Fu, Yunsheng Dong, Anhui Institute of Optics and Fine Mechanics (China) .................... [10429-22]
High-Performance Computing in Geoscience and Remote Sensing

Session 1: High Performance Computing I

Opening Remarks: TUE10:25 TO 10:30

Session Chair: Bormin Huang, Univ. of Wisconsin-Madison (USA)

On the use of Jetson TX1 board for parallel hyperspectral compressive sensing, José M. P. Nascimento, Gabriel Martín, Instituto de Telecomunicaciones (Portugal)

Low-complexity multiple collaborative representations for hyperspectral image classification, Yan Xu, Qian Du, Mississippi State Univ. (USA)

Real-time implementation of digital stabilization for high-resolution Earth observation imaging, Carole Thiebaut, Sophie Petit, Jean-Marc Delvit, Christophe Latry, Univ. national d’Études Spatiales (France)

Deducing scheme for atmospheric condition with optical observations of Aurora spectral images, Wanjun Kong, Jiaji Wu, Xidian Univ. (China)

The implementation of aerial object recognition algorithm based on contour descriptor in FPGA-board on-board vision system, Valery V. Strotov, Pavel V. Babayan, Sergey A. Smirnov, Ryazan State Radio Engineering University (Russia)

GPU-accelerated pedestrian detection and distance computation based on binocular stereo vision, JiaoJiao Li, Jiaji Wu, Xidian Univ. (China)

Lunch/Exhibition Break: TUE12:30 TO 13:40

Session 2: High Performance Computing II

Session Chair: Sebastián López, Univ. de Las Palmas de Gran Canaria (Spain)

Optimizing an algorithm for automatically detecting targets in remotely sensed hyperspectral imagery on Intel’s knights landing processor, Sergio Bernabé, Carlos E. Garcia, Guillermo Botella, Manuel Prieto-Martínez, Univ. Complutense de Madrid (Spain)

Location of high-speed railway passengers using deep learning, Liwen Ma, Jaiji Wu, Chunyuan Li, Xidian Univ. (China)

Spectral matching-based mineral mapping in Hyperion images to estimate the grades of iron ore, limestone and magneisite deposits of India, Sanjeevi Shanmugam, Padma SriNivasa Perumal, Anna Univ., Chennai (India)

Convolutional generative adversarial networks for hyperspectral image analysis, Mercedes Eugenia Paletto Avila, Juan Maria Haut Hurtado, Javier Plaza, Antonio J. Plaza Miguel, Univ. de Extremadura (Spain)

GPU implementation of discrete particle swarm optimization algorithm for endmember extraction from hyperspectral image, Chaoyin Yu, Zheng-Wu Yuan, Chongqing Univ. of Posts and Telecommunications (China)

High Performance Computing III

Session Chair: José M. P. Nascimento, Instituto de Telecomunicações (Portugal)

Spaceborne synthetic aperture radar signal processing using FPGAs, Yohei Sugimoto, Satoru Ozawa, Noriyasu Inaba, Japan Aerospace Exploration Agency (Japan)

Parallel exploitation of a spatial-spectral classification approach for hyperspectral images on RVC-CAL, Raquel Lazcano Lópezd, Daniel Madroñal Quintin, Univ. Politécnica de Madrid (Spain)

Technology for organization of the onboard system for processing and storage of ERS data for ultrasmall spacecraft, Valery V. Strotov, Alejandro I. Toganov, Aleksandr N. Koljesnikov, Yuvali V. Kankin, Ryazan State Radio Engineering University (Russia)

Wavelet-based multicomponent denoising on GPU to improve the classification of hyperspectral images, Pablo Quezada-Barriluso, Dora B. Heras, Francisco Argüello, Univ. de Santiago de Compostela (Spain)

A FPGA implementation for linearly unmixing a hyperspectral image using OpenCL, Raul Guerra, Institute of Applied Microelectronics (Spain)

Location of high-speed railway passengers using deep learning, Liwen Ma, Jaiji Wu, Chunyuan Li, Xidian Univ. (China)

Spectral matching-based mineral mapping in Hyperion images to estimate the grades of iron ore, limestone and magneisite deposits of India, Sanjeevi Shanmugam, Padma SriNivasa Perumal, Anna Univ., Chennai (India)

Conference Chairs: Bormin Huang, Univ. of Wisconsin-Madison (USA) Sebastián López, Univ. de Las Palmas de Gran Canaria (Spain) Zhensen Wu, Xidian Univ. (China) Valeriy V. Strotov, Ryazan State Radio Engineering Univ. (Russian Federation)

Programme Committee: Saeed H. Al-Mansoori, Emirates Institution for Advanced Science and Technology (United Arab Emirates) Boris A. Alpatov, Ryazan State Radio Engineering Univ. (Russian Federation) Dora Blanco Heras, Univ. de Santiago de Compostela (Spain)

Chein-I Chang, Univ. of Maryland, Baltimore County (USA) Yang-Lang Chang, National Taipei Univ. of Technology (Taiwan)

Mingmin Chi, Fudan Univ. (China) Qian Du, Mississippi State Univ. (USA) Dustin Feld, Univ. zu Köln (Germany)

Carlos E. Garcia Gonzalez, Univ. Complutense de Madrid (Spain) Lixin Guo, Xidian Univ. (China)

Eduardo Juarez, Univ. Politécnica de Madrid (Spain) Francesco Leporati, Univ. degli Studi di Pavia (Italy)

Qiguang Miao, Xidian Univ. (China) Caner Ozcan, Karabük Univ. (Turkey) Sheng-En Qian, Canadian Space Agency (Canada)

Enrique S. Quintana-Orti, Univ. de Extremadura (Spain) Antonio J. Plaza, Univ. de Extremadura (Spain) Sergio Sanchez Martinez, Masdar Institute of Science & Technology (United Arab Emirates)

Roberto Sarmiento, Univ. de Las Palmas de Gran Canaria (Spain) Yuliya Tarabalka, INRIA Sophia Antipolis - Méditerranée (France)

Carole Thiebaut, Ctr. National d’Études Spatiales (France) Tanya Vladimirova, Univ. of Surrey (United Kingdom) Shih-Chieh Wei, Tamkang Univ. (Taiwan)

Yuanfeng Wu, Institute of Remote Sensing and Digital Earth (China)

Conference Co-Chairs: Jose M. Nascimento, Instituto de Telecomunicacoes (Portugal) Jun Li, Sun Yat-Sen Univ. (China) Valeriy V. Strotov, Ryazan State Radio Engineering Univ. (Russian Federation)

Opening Remarks: TUE10:25 TO 10:30

Session 1: High Performance Computing I

Session Chair: Bormin Huang, Univ. of Wisconsin-Madison (USA)

On the use of Jetson TX1 board for parallel hyperspectral compressive sensing, José M. P. Nascimento, Gabriel Martín, Instituto de Telecomunicaciones (Portugal)

Low-complexity multiple collaborative representations for hyperspectral image classification, Yan Xu, Qian Du, Mississippi State Univ. (USA)

Real-time implementation of digital stabilization for high-resolution Earth observation imaging, Carole Thiebaut, Sophie Petit, Jean-Marc Delvit, Christophe Latry, Ctr. National d’Études Spatiales (France) Emma Bousquet, Magellium (France) Guillaume Laurent, Ctr. National d’Études Spatiales (France)

Deducing scheme for atmospheric condition with optical observations of Aurora spectral images, Wanjun Kong, Jiaji Wu, Xidian Univ. (China) Gwanggil Jeon, Incheon National Univ. (Korea)

The implementation of aerial object recognition algorithm based on contour descriptor in FPGA-board on-board vision system, Valery V. Strotov, Pavel V. Babayan, Sergey A. Smirnov, Ryazan State Radio Engineering University (Russia)

GPU-accelerated pedestrian detection and distance computation based on binocular stereo vision, JiaoJiao Li, Jiaji Wu, Xidian Univ. (China)

Lunch/Exhibition Break: TUE12:30 TO 13:40

Session 2: High Performance Computing II

Session Chair: Sebastián López, Univ. de Las Palmas de Gran Canaria (Spain)

Optimizing an algorithm for automatically detecting targets in remotely sensed hyperspectral imagery on Intel’s knights landing processor, Sergio Bernabé, Carlos E. Garcia, Guillermo Botella, Manuel Prieto-Martínez, Univ. Complutense de Madrid (Spain) Antonio J. Plaza Miguel, Univ. de Extremadura (Spain)

Location of high-speed railway passengers using deep learning, Liwen Ma, Jaiji Wu, Chunyuan Li, Xidian Univ. (China)

Spectral matching-based mineral mapping in Hyperion images to estimate the grades of iron ore, limestone and magneisite deposits of India, Sanjeevi Shanmugam, Padma SriNivasa Perumal, Anna Univ., Chennai (India)
POSTERS—TUESDAY  .................. TUE 17:45 TO 19:30
Conference attendees are invited to attend the Remote Sensing and Security+Defence poster session held on Tuesday 17:45 to 19:30. Posters will be on display after 13:00 hrs on Monday in the Universal Ballroom Foyer. Authors of poster papers will be present to answer questions concerning their papers during the Tuesday Poster Session. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Attendees are required to wear their conference registration badges to the poster sessions.

Performance tuning Fu-Liou-Gu radiative transfer scheme on Intel Xeon Phi, Jarno Mielikainen, Bormin Huang, Univ. of Wisconsin-Madison (USA) ............................... [10430-17]

Optimizing the rapid radiative transfer model (RRTM) radiation scheme for Intel Many Integrated Core (MIC) architecture, Jarno Mielikainen, Bormin Huang, Univ. of Wisconsin-Madison (USA) ....... [10430-18]

GPGPU technology in tasks of construction contour image correlator using stochastic restricted Boltzmann machines, Maxim V. Akinin, Natalya V. Akinina, Alexander I. Taganov, Vladimir A. Balakin, Vladimir V. Kuznetsov, Ryazan State Radio Engineering Univ. (Russian Federation) ....................................... [10430-19]

Development of GNES (Geometry Normalized Electromagnetic System) instrument for metal defect detection, Zakaria Zakaria, Syiah Kuala Univ. (Indonesia); Mohamad Zubir Mat Jafri, Univ. Sains Malaysia (Malaysia); Muhammad Syukri Surbakti, Saumi Syahriza, Syiah Kuala Univ. (Indonesia); Kok Chooi Tan, Univ. Sains Malaysia (Malaysia) ............................... [10430-20]

High-performance technology for indexing of high volumes of Earth remote sensing data, Valery V. Strotov, Alexander I. Taganov, Aleksandr N. Kolesenkov, Boris V. Kostrov, Ryazan State Radio Engineering Univ. (Russian Federation) ......................................... [10430-21]

Scattering of a multilayered sphere by Laguerre-Gaussian vortex beam, Tan Qu, Jiaji Wu, Zhensen Wu, Qingchao Shang, Zheng Jun Li, Xidian Univ. (China) .............................................. [10430-22]

Remote sensing for aerosol particles in marine atmosphere using scattering of optical vortex, Mingjian Cheng, Lixin Guo, Qingqing Huang, Jiangting Li, Xu Yan, Songhua Liu, Xidian Univ. (China) ................................. [10430-23]
Remote Sensing Technologies and Applications in Urban Environments

Conference Chairs: Thilo Erbertseder, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Nektarios Chrysoulakis, Foundation for Research and Technology-Hellas (Greece); Ying Zhang, Natural Resources Canada (Canada)

Programme Committee: Matthias Budde, Karlsruhe Institute of Technology (Germany); Thomas Esch, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Christopher Small, The Earth Institute (USA); Carlos Tavares Calafate, Univ. Politécnica de Valencia (Spain)

MONDAY 11 SEPTEMBER

SESSION 1: MON 9:00 TO 10:30
Urban Air Quality and Climate I
Session Chair: Thilo Erbertseder, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)
Anthropogenic heat flux estimation from space: results of the final phase of the URBANFLUXES Project (Invited Paper), Nektarios Chrysoulakis, Foundation for Research and Technology-Hellas (Greece) .......................................................... [10431-1]
The impact of urban morphology and land cover on the sensible heat flux retrieved by simultaneous satellite and in-situ observations, Lech Gawuc, Warsaw Univ. of Technology (Poland) .................................................. [10431-2]
Urban design and urban heat island, Blanca Arellano, Josep Roca, Univ. Politécnica de Catalunya (Spain) ........................................... [10431-3]
Social vulnerability to heat in Greater Atlanta, USA: spatial pattern of heat, NDVI, socioeconomics and household composition, Sunhui Sim, Univ. of North Alabama .............................................................. [10431-4]

SESSION 2: MON 11:00 TO 12:40
Urban Air Quality and Climate II
Session Chair: Nektarios Chrysoulakis, Foundation for Research and Technology-Hellas (Greece)
Mapping urban porosity and roughness characteristics as a mean of defining urban ventilation corridors, Marzena Wicht, Warsaw Univ. of Technology (Poland); Andreas Wicht, GK (Germany); Katarzyna Osiriska-Skotak, Warsaw Univ. of Technology (Poland) ........................................... [10431-5]
Role of vegetation in maintaining the urban eco-environmental conditions: a case study of Islamabad, Shahid Naeem, Chun-xiang Gao, Chen Wei, Institute of Remote Sensing and Digital Earth (China); Aird U. Rehman, UN-Habitat (Pakistan) .................................................. [10431-6]
Dynamic relationship between land surface temperature and land use/land cover types for urban heat island zones in Raipur, India, Subhanil Guha, Himanshu Govil, National Institute of Technology, Raipur (India); Sandip Mukherjee, TERI Univ. (India) ............................ [10431-7]
Seasonal and temporal dynamics of urban heat island: Jaipur City, Surbhi Gaur, Jawaharlal Nehru Univ. (India) ........................................ [10431-8]
Estimation and modelling of land surface temperature from Landsat images using GIS and remote sensing: a case study of Khulna City Corporation (KCC), Tahmid Hossain, Rashed U. Zaman, Khulna Univ. of Engineering & Technology (Bangladesh) ........................................ [10431-9]

SESSION 3: MON 14:00 TO 15:20
Urban Air Quality and Climate III
Session Chair: Thilo Erbertseder, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)
Identifying the sources of radon gas in the city of Mumbai and minimizing its impact on the health of the people using remote sensing and GIS solutions, Leon Cruz Ratinam, Don Bosco Institute of Technology (India) .................................................. [10431-10]
Contributions of dust aerosol from the riverbed of Taiwan, Fajung Tsai, Ming-Long Lin, Wan-Chi Yao, National Taiwan Ocean Univ. (Taiwan) .................................................. [10431-11]
Concentrations retrieving by BP-ANN algorithm for multi-component air VOCs, Yudi Zhao, Ruiyi Wei, X‘ian Institute of Optics and Precision Mechanics, CAS (China); Xuebin Liu, X‘ian Institute of Optics and Precision Mechanics, CAS (China); Tao Yu, X‘ian Institute of Optics and Precision Mechanics, CAS (China) .................................................. [10431-12]
Seasonal variability of aerosols and their characteristics in urban and rural locations of Delhi-NCR, Purnima Bhargava, Alok K. Pandey, Krishan Kumar, Vinod K. Jain, Jawaharlal Nehru Univ. (India) ........................................ [10431-13]

TUESDAY 12 SEPTEMBER

SESSION 4: TUE 9:00 TO 10:30
Urban Monitoring and Planning I
Session Chair: Nektarios Chrysoulakis, Foundation for Research and Technology-Hellas (Greece)
Rapid EO-based mapping of urban imperviousness in supporting flood risk assessment (Invited Paper), Ying Zhang, Bert Guindon, Natural Resources Canada (Canada); Boyu Feng, Jinfel Wang, Western Univ. (Canada) .................................................. [10431-14]
Use of multitemporal lidar data to extract changes due to the 2016 Kumamoto earthquake, Fumio Yamazaki, Wen Liu, Chiba Univ. (Japan); Luis Moya, Tohoku Univ. (Japan) .................................................. [10431-15]
Multitemporal synthetic aperture radar for bridges monitoring, Serena Tessitore, Diego Di Martire, Domenico Calcaterra, Massimo Ramondini, Gianpiero Russo, Univ. degli Studi di Napoli Federico II (Italy) ............................ [10431-16]
The Interaction between building load and ground subsidence based on multisource remote sensing data, Qin Yang, Yinghai Ke, Capital Normal Univ. (China) .................................................. [10431-17]
SESSION 5 ............................... TUE 11:00 TO 12:20

Urban Monitoring and Planning II
Session Chair: Ying Zhang, Natural Resources Canada (Canada)

Defining urban and rural areas: a new approach. Josep Rocca, Blanca Arellano, Univ. Politècnica de Catalunya (Spain) .................................................................................................................................[10431-18]

Predicting urban expansion in Moscow based on night lights. Demetris N. Stathakis, Univ. of Thessaly (Greece); Karen Seto, Yale Univ. (USA); Igor Savin, RUDN Univ. (Russian Federation) .............................................. [10431-19]

Contribution of a local segmentation parameters optimization approach for mapping urban areas. Tais Grippa, Stefanos Georganos, Sabine G. Vanhuyse, Moritz Lennert, Eleonore Wolff, Univ. Libre de Bruxelles (Belgium) .................................................................................................................................[10431-20]

Urban land cover and land use classification based on high-resolution resolution satellite image using deep learning. Pengbin Zhang, Yinghai Ke, Capital Normal Univ. (China) .................................................................................................................................[10431-21]

Lunch/Exhibition Break ............................. TUE 12:20 to 13:40

SESSION 6 ............................... TUE 13:40 TO 15:20

Urban Monitoring and Planning III
Session Chair: Nektarios Chrysoulakis, Foundation for Research and Technology-Hellas (Greece)

Assessing feature selection methods with various classifiers for very high resolution urban classification in Ouagadougou, Burkina Faso. Stefanos Georganos, Tais Grippa, Sabine G. Vanhuyse, Eleonore Wolff, Univ. Libre de Bruxelles (Belgium) .................................................................................................................................[10431-22]

Building change detection via a combination of CNNs using only RGB aerial imagery. Keiske Nemoto, Ryuhei Hara, Masakazu Satoh, Aito Fujita, Tomoyuki Imaizumi, Shuhei Hikosaka, PASCOCorp. (Japan) .................................................................................................................................[10431-23]

Using remote sensing and GIS in addressing the future decisions regarding underused urban spaces; Hajj sites in Mecca as case study. Ayman Imam, Univ. Politècnica de Catalunya (Spain) and King Abdulaziz Univ. (Saudi Arabia); Josep Rocca, Univ. Politècnica de Catalunya (Spain) .................................................................................................................................[10431-24]

2D intensity images from sparse lidar data in urban environment. Imran Ashraf, Soojung Hur, Yongwan Park, Yeungnam Univ. (Korea, Republic of) .................................................................................................................................[10431-25]

Implication of relationship between natural impacts and land use/land cover (LULC) changes of urban area in Mongolia. Byambakhui Gantumur, Falin Wu, Yan Zhao, Beihang Univ. (China); Baftsengel Vandansambuu, Erikhjargal Dalaibaatar, National Univ. of Mongolia (Mongolia); Fareda Itikthpan, Daurenbyek Shaimurat, Beihang Univ. (China) .................................................................................................................................[10431-26]

SESSION 7 ............................... TUE 15:50 TO 17:10

Smart Cities
Session Chair: Ying Zhang, Natural Resources Canada (Canada)

Towards a rational use of loading and unloading areas in urban environments. Daniel Barba, Sergio Garcia-Villanueva, Hector Del-Campo-Pardo, Univ. de Valladolid (Spain); Juan A. March, RDNest (Spain); Diego R. Llanos, Univ. de Valladolid (Spain) and RDNest (Spain) .................................................................................................................................[10431-27]

Valorisation of urban elements through 3D models generated from image matching point clouds and augmented reality visualization based in mobile platforms. Luis F. E. S. C. Marques, Univ. Politècnica de Catalunya (Portugal); Josep Rocca, Univ. Politècnica de Catalunya (Spain); Jose A. Tenedório, Univ. Nova de Lisboa (Portugal) .................................................................................................................................[10431-28]

On-field mounting position estimation of a lidar sensor. Owes Khan, René Bergelt, Wolfram Hardt, Technische Univ. Chemnitz (Germany) .................................................................................................................................[10431-29]

Application of Hymap image in the environmental survey in Shenzhen, China. Wei Pan, Beijing Research Institute of Uranium Geology (China); Xiaomaoyang, Peking Univ. (China); Xuejiao Chen, Beijing Research Institute of Uranium Geology (China); Ping Feng, National Key Lab. of Remote Sensing Information and Image Analysis Technology (China) .................................................................................................................................[10431-30]

POSTERS—TUESDAY .......................... TUE 17:45 TO 19:30

Conference attendees are invited to attend the Remote Sensing and Security+Defence poster session held on Tuesday 17:45 to 19:30. Posters will be on display after 13:00 hrs on Monday in the Universal Ballroom Foyer. Authors of poster papers will be present to answer questions concerning their papers during the Tuesday Poster Session. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/x32234.xml

State estimation with incomplete nonlinear constraint. Yuan Huang, Xueyung Wang, Wei An, National Univ. of Defense Technology (China) .................................................................................................................................[10431-31]

City landscape changes effects on land surface temperature in Bucharest metropolitan area. Maria A. Zoran, Roxana S. Savastru, Dan M. Savastru, National Institute of Research and Development for Optoelectronics (Romania); Adrian I. Didu, Transylvania Univ. of Brasov (Romania) .................................................................................................................................[10431-32]

Urban green land cover changes and their relation to climatic variables in an anthropogenically impacted area. Maria A. Zoran, National Institute of Research and Development for Optoelectronics (Romania); Adrian I. Didu, Transylvania Univ. of Brasov (Romania) .................................................................................................................................[10431-33]

Metal-coated optical fibers for high temperature sensing applications. Janusz D. Fidelus, Karol Wosykowski, Tomasz Stanczyc, Agnieszka Kolakowska, Piotr Naslowski, Stanislaw Lipinski, Tadeusz Tenderenda, Tomasz Naslowski, InPhoTech (Poland) .................................................................................................................................[10431-34]

Monitoring and localization hydrocarbon and sulfur oxides emissions by SRS-lidar. Alexandru S. Grishkanich, ITMO Univ. (Russian Federation); Dimitry N. Redka, Saint Petersburg Electrotechnical Univ. “LETI” (Russian Federation) .................................................................................................................................[10431-35]

Speed scanning system based on solid-state microchip laser for architectural planning. Alexandru S. Grishkanich, ITMO Univ. (Russian Federation); Dimitry N. Redka, Saint Petersburg Electrotechnical Univ. “LETI” (Russian Federation); Konstantin Tsvetkov, JSC Shipbuilding & Ship Repair Technology Ctr. (Russian Federation) .................................................................................................................................[10431-36]

Spatio-temporal variability of urban heat islands in local climate zones of Delhi-NCR, Bakul Budhiraja, Shiv Nadar Univ. (India); Prasad Pathak, Nalanda Technology Ctr. (India); Girish Agrawal, Shiv Nadar Univ. (India) .................................................................................................................................[10431-37]
Proceedings.

Paid conference registration includes online Proceedings of SPIE. In the tables below you will find product order numbers to use on the registration form.

Available as part of registration:

**Online Proceedings Volume**—access to a single conference proceedings volume via the SPIE Digital Library. Available as papers are published.

**Online Proceedings Collection**—access to multiple related proceedings volumes via the SPIE Digital Library. Available as papers are published.

Conference Attendees: You may purchase additional online collections for $155 each or additional online proceedings volumes for $60 each. Print conference proceedings volumes are also available; see pricing below.

### Accessing Online Proceedings

To access your proceedings:

- Go to [http://spiedigitallibrary.org](http://spiedigitallibrary.org) and sign in. If you do not have an SPIE account, create one using the email address you used to register for the conference.
- Click the My Account link at the top of the page, then find the My Conference Proceedings tab, which will show your available proceedings volumes.

You can also access this content via your organization’s SPIE Digital Library account.

For assistance, contact SPIE:

**Email**: SPIEDLsupport@spie.org

**Phone (North America)**: +1 888 902 0894

**Phone (Rest of World)**: +1 360 685 5580

### Online Proceedings Volumes

<table>
<thead>
<tr>
<th>Product Order Number (Online)</th>
<th>Volume Title/Volume Editors</th>
<th>Price for separate purchase</th>
<th>Meeting Attendees</th>
</tr>
</thead>
<tbody>
<tr>
<td>10421 DL 10421</td>
<td>Remote Sensing for Agriculture, Ecosystems, and Hydrology XIX Christopher M. U. Neale, Antonio Maltese</td>
<td>$127.75</td>
<td></td>
</tr>
<tr>
<td>10423 DL 10423</td>
<td>Sensors, Systems, and Next-Generation Satellite XXI Steven P. Nowak, Joan-Loup Bloy, Toshiyuki Kimura</td>
<td>$105.00</td>
<td></td>
</tr>
<tr>
<td>10424 DL 10424</td>
<td>Remote Sensing of Clouds and the Atmosphere XXII Adriano Comiter, Evgeni I. Kazianov, Klaus Schüfer</td>
<td>$67.50</td>
<td></td>
</tr>
<tr>
<td>10425 DL 10425</td>
<td>Optics in Atmospheric Propagation and Adaptive Systems XX Kwang U. Shin, Szymon Gladyz</td>
<td>$52.50</td>
<td></td>
</tr>
<tr>
<td>10426 DL 10426</td>
<td>Active and Passive Microwave Remote Sensing for Environmental Monitoring Claudia Nistamocia, Massimo Ferreira, Emanuele Santi</td>
<td>$60.00</td>
<td></td>
</tr>
<tr>
<td>10427 DL 10427</td>
<td>Image and Signal Processing for Remote Sensing XXII Lorenzo Bouzzone</td>
<td>$127.50</td>
<td></td>
</tr>
<tr>
<td>10428 DL 10428</td>
<td>Earth Resources and Environmental Remote Sensing/GIS Applications VIII Ulrich Michel, Karsten Schulz</td>
<td>$97.50</td>
<td></td>
</tr>
<tr>
<td>10429 DL 10429</td>
<td>Lidar Technologies, Techniques, and Measurements for Atmospheric Remote Sensing XII Upendra N. Singh, Dima Nicola Marie</td>
<td>$45.00</td>
<td></td>
</tr>
<tr>
<td>10430 DL 10430</td>
<td>High-Performance Computing in Geoscience and Remote Sensing VII Borrim Huang, Sebastian López, Zhenze Wu</td>
<td>$52.50</td>
<td></td>
</tr>
<tr>
<td>10431 DL 10431</td>
<td>Remote Sensing Technologies and Applications In Urban Environments II Thais Erbertedra, Nektarios Chrysoulias, Ying Zhang</td>
<td>$67.50</td>
<td></td>
</tr>
</tbody>
</table>

### Online Proceedings Collections

<table>
<thead>
<tr>
<th>Product Order Number</th>
<th>Collection Title/Included Volumes</th>
<th>Price for separate purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>DLCE37</td>
<td>Remote Sensing 2017 (Volumes 10421, 10422, 10423, 10424, 10425, 10426, 10427, 10428, 10429, 10430, 10431)</td>
<td>$155.00</td>
</tr>
</tbody>
</table>
GENERAL INFORMATION

Registration

Onsite Registration and Badge Pick-up Hours
Ballroom Foyer
Sunday 10 September ............... 15:00 to 18:00 hrs.
Monday 11 September ............... 7:30 to 17:00 hrs.
Tuesday 12 September ............... 8:00 to 17:00 hrs.
Wednesday 13 September .......... 8:30 to 17:00 hrs.
Thursday 14 September .......... 8:30 to 16:00 hrs.

Conference Registration
Includes admission to all conference sessions, plenaries, panels, and poster sessions, admission to the Exhibition, Welcome Reception, coffee breaks, and a choice of online proceedings.

Exhibition Hours
Tuesday 12 September .......... 10:00 to 17:00 hrs.
Wednesday 13 September .......... 10:00 to 16:00 hrs.

Exhibition Registration
Exhibition-Only visitor registration is complimentary.

Early Registration Pricing and Dates
Conference registration prices increase by €135 after 21 August 2017. The online form will automatically display the increased prices.

SPIE Member, SPIE Student Member, and Student Pricing
- SPIE Members receive conference registration discounts. Discounts are applied at the time of registration.
- Student registration rates are available only to undergraduate and graduate students who are enrolled full time and have not yet received their Ph.D. Post-docs may not register as students. A student ID number or proof of student status is required with your registration.

Press Registration
For credentialed press and media representatives only. Please email contact information, title, and organization to media@spie.org.

SPIE Cashier
Registration Area
Open during registration hours

Registration Payments
If you are paying by cash or cheque as part of your onsite registration, wish to add a course, workshop, or special event requiring payment, or have questions regarding your registration, visit the SPIE Cashier.

Receipt and Certificate of Attendance
Preregistered attendees who did not receive a receipt or attendees who need a Certificate of Attendance may obtain those from the SPIE Cashier.

Badge Corrections
Badge corrections can be made by the SPIE Cashier. Please have your badge removed from the badge holder and marked with your changes before approaching the counter.

Refund Information
There is a €50 service charge for processing refunds. Requests for refunds must be received by 30 August 2017; all registration fees will be forfeited after this date. Membership dues, SPIE Digital Library subscriptions, or Special Events purchased are not refundable.

U.S. Government Credit Cards
U.S. Government credit card users: have your purchasing officer contact the credit card company and get prior authorization before attempting to register. Advise your purchasing agent that SPIE is considered a 5968 company for authorization purposes.
Author / Presenter Information

Speaker Check-In and Preview Station
Location posted later

Monday through Thursday .............. Open during Registration Hours

All conference rooms have a computer workstation, projector, screen, lapel microphone, and laser pointer. All presenters are requested to come to Speaker Check-In (their conference room during the breaks) with their memory devices or laptops to confirm their presentation display settings.

Poster Setup Instructions

Tuesday 12 September ............. 17:45 to 19:30 hrs.
Poster presenters can begin to post their papers at 13:00 on Monday. Each poster presenter is provided a space 0.95 x 1.20m in which to display a summary of the paper (The board will accommodate AO size poster in portrait orientation.) Poster presenters will stand by their posters from 17.45 to 19:15 to answer questions. Poster presenters who have not set up by 17.45 on Wednesday will be considered a “no show” and their manuscript will not be published. Posters must be removed at the end of the poster session since the poster boards will then be removed and the remaining posters discarded. SPIE assumes no responsibility for posters left up after the end of each poster session.

Food and Beverage Services

Coffee Breaks
Monday and Thursday – outside meeting rooms
Tuesday and Wednesday
Universal Ballroom, Exhibition Area

Complimentary coffee will be served twice daily, at 10:00 and 15:00 hrs. Check individual conference listings for exact times and locations.

Food & Refreshments for Purchase
Hotel Restaurant
The DoubleTree Hilton Hotel offers lunch packages to attendees which may be booked at the same time as the hotel room for those staying at the DoubleTree. For all other attendees, lunch packages may be booked on the day via the hotel reception.

Onsite Services

Wireless Internet Access
Complimentary Internet will be available. Connection speeds will depend on the number of users. Please read the SPIE Wireless Internet Service Policy.

SPIE Conference and Exhibition App
Download the free SPIE Conference App, available for iPhone and Android phones. Search and browse the programme, special events, participants, exhibitors, and more.

SPIE Exhibitor Directory
Search exhibitors by name or booth numbers, browse products, and search technologies.

SPIE Publications
Registration Desk
Browse the latest SPIE Press Books and proceedings.

Business Centre
First Floor of the Doubletree Hotel
24-hour
Computers and a printer are freely available for guests.

SPIE Luggage + Coat Check
Hotel Cloakroom, to the left of the Hotel Front Desk
Front Desk hours
Luggage, package, and coat storage are available free of charge.

Urgent Message Line
An urgent message line is available during registration hours. Please call the hotel’s central number and ask to be put through to the SPIE Registration Desk: +48-22-2780000. Attendees should check the message board in the registration area for any messages held for them.
GENERAL INFORMATION

Travel Information

Shuttle Service Airport – Doubletree – Sofitel/Novotel – Doubletree - Airport
A shuttle service will be organised free for all attendees to run between these stops throughout the day.

Hotels

DOUBLETREE BY HILTON HOTEL & CONFERENCE CENTRE WARSAW
Skalnicowa Street 21, 04-797 Warsaw, Poland
Located in the capital city and close to the financial and embassy districts; 25 minutes from Warsaw Chopin Airport, and 20 minutes from the city center. A shuttle service will run from 7:00 to 19:00 hrs between this hotel and the city centre. To book accommodation at reduced SPIE rates, please use the links found on the hotel page: www.spie.org/rs17programme

SOFITEL WARSAW VICTORIA
Królewska 11, 00-065 Warszawa, Poland
Located in the city centre, this landmark Warsaw hotel has hosted many Polish movies and international celebrities. A shuttle service will run from 7:00 to 19:00 hrs between this hotel and the event venue. The stop services both the Sofitel and the Novotel. To book this hotel at reduced SPIE rates, please see the hotel page: www.spie.org/rs17programme

NOVOTEL WARSZAWA CENTRUM
ul. Marszałkowska 94/98, 00-510 Warsaw, Poland
This 4-star hotel is located 5 minutes’ walk from the Central Train Station with historic sites, monuments, shops and cultural institutions close by for great sightseeing. A shuttle service will run from 7:00 to 19:00 hrs. between this hotel and the event venue. The stop services both the Sofitel and the Novotel. To book this hotel at reduced SPIE rates, please see the hotel page: www.spie.org/rs17programme

Airport Information

WARSZAW CHOPIN AIRPORT
• The largest and main international airport, sometimes referred to as Okęcie Airport
• Services approximately 300 scheduled flights daily and is about 6 miles southwest of Warsaw
• Handles just under 40% of the country’s air passenger traffic

WARSZAW–MODLIN AIRPORT
• The newer airport at Modlin, serving as Warsaw–Modlin Airport for budget airlines
• Located 25 miles north of Warsaw’s city center
• The airport is the 5th busiest in Poland

Transportation from the Airport
A shuttle service will be organized free of charge for attendees to run from 7:00 to 19:00 hrs between the airport and the event venue. Outside those hours, travelling to, and in and around Warsaw offers many options; bus, train, taxi etc.

Warsaw Getting Around
www.warsawGuide.com

Driving Directions and Parking
Directions from the Hotel Staff
To Hotel from the Airport: Take Zwirki i Wigury Street for 2.2 km, turn right into Sasanki Street and continue on Marynarska Street. Turn right into Rzymowskiego Street and follow the road until you cross the Vistula River by the Siekierkowski Bridge. Take the first right and continue on Wal Miedzeszynski Street for 4.5 km. Turn left into Skalnicowa Street.
To Hotel from the City Center: Cross the river by the Lazienkowski Bridge, and turn right to Wal Miedzyszynski Street, continue about 7.7 km, and turn left into Skalnicowa Street. You will see the hotel on your left.
For further information, please visit the Hotel’s website:
DoubleTree Hilton Hotel
Parking for 340 cars is available free of charge at the Hilton Doubletree open air car park. Garage parking with security is also available at 5 PLN/hour or 50 PLN for 24 hours.

Car Rental
Hertz Car Rental is the selected as the official car rental agency for this Event. To reserve a car as a Remote Sensing conference attendee, follow the steps below.

• Call the Hertz International Reservation Center at 1-800-654-3001 in the USA or your local Hertz Reservations Center to receive a special discount for SPIE. Reservations may also be placed on-line at www.hertz.com. You will receive 15% off qualifying Affordable rates at participating locations in Poland.
• Be sure to identify yourself as a SPIE attendee. The PC# 137480 must be on your advance reservation to receive this special offer. You must present this coupon at the time of rental in order to receive this discount.
• This special offer is available for rentals from September 1-30, 2017.
Submit your next paper to an SPIE Journal

All SPIE journals are part of the SPIE Digital Library, the world’s largest collection of optics and photonics research.

Choose Open Access for your paper and increase its visibility: www.spie.org/JournalsOA

Join SPIE and get a subscription to one online journal with your membership, or request access from your librarian.

www.spie.org/journals
SPIE Event Policies

Acceptance of Policies and Registration Conditions

The following Policies and Conditions apply to all SPIE Events. As a condition of registration, you will be required to acknowledge and accept the SPIE Registration Policies and Conditions contained herein.

Granting Attendee Registration and Admission

SPIE, or their officially designated event management, in their sole discretion, reserves the right to accept or decline an individual’s registration for an event. Further, SPIE, or event management, reserves the right to prohibit entry or remove any individual whether registered or not, be they attendees, exhibitors, representatives, or vendors, who in their sole opinion are not, or whose conduct is not, in keeping with the character and purpose of the event. Without limiting the foregoing, SPIE and event management reserve the right to remove or refuse entry to any attendee, exhibitor, representative, or vendor who has registered or gained access under false pretenses, provided false information, or for any other reason whatsoever that they deem is cause under the circumstances.

SPIE Safe Meeting and Misconduct Policy

SPIE is a professional, not-for-profit society committed to providing valuable and safe conference and exhibition experiences. SPIE is dedicated to equal opportunity and treatment for all its members, meeting attendees, staff, and contractors. Attendees are expected to be respectful to other attendees, SPIE staff, and contractors. Harassment and other misconduct will not be tolerated; violators will be addressed promptly and seriously. Consequences up to and including expulsion from the event as appropriate will be implemented immediately.

The SPIE anti-harassment policy can be found at http://spie.org/policy.

Reporting of Unethical or Inappropriate Behavior

SPIE is an organization with strong values of responsibility and integrity. Our Harassment Policy, Ethics Statement, and Code of Professional Conduct contain general guidelines for behavior and for conducting business with the highest standards of ethics.

Onsite at a SPIE meeting, contact any SPIE Staff member with concerns or questions for thorough follow-up. If you feel in immediate danger, please dial 112 for police intervention.

SPIE has established a confidential reporting system for staff and all meetings participants to raise concerns about possible unethical or inappropriate behavior within our community. Complaints may be filed at www.SPIE.ethicspoint.com and, if preferred, may be made anonymously.

Identification

To verify registered participants and provide a measure of security, SPIE will ask attendees to present a government-issued Photo ID at registration to collect registration materials.

Individuals are not allowed to pick up badges for attendees other than themselves. Further, attendees may not have some other person participate in their place at any conference-related activity. Such other individuals will be required to register on their own behalf to participate.

Access to Technical and Networking Events

All technical and networking events require a conference badge for admission. Registered attendees may bring their children with them as long as everyone is badged. Registration badges for children under 18 are free and available at the SPIE registration desk onsite. Children under 14 years of age must be accompanied by an adult at all times, and guardians are asked to help maintain a professional, disturbance-free conference environment.

Exhibition Hall Policy

Everyone who attends the exhibition must be registered and have a badge. Badges for children are free and available onsite at the registration desk. Children under 14 years of age must be accompanied by an adult at all times. Guardians are asked to help maintain a professional, disturbance-free exhibition environment. For safety and insurance reasons, children under 18 are not allowed in the exhibition area during exhibition move-in and move-out.

Payment Method

Registrants for paid elements of the event, who do not provide a method of payment, will not be able to complete their registration. Individuals with incomplete registrations will not be able to attend the conference until payment has been made. SPIE accepts VISA, MasterCard, American Express, Discover, Diner’s Club, checks and wire transfers. Onsite registrations can also pay with Cash.

Authors/Coauthors

By submitting an abstract, you agree to the following conditions:

- An author or coauthor (including keynote, invited, and solicited speakers) will register at the author registration rate, attend the meeting, and make the presentation as scheduled.
- A manuscript (minimum 6 pages, maximum 20 pages) for any accepted oral, invited, keynote, or poster presentation will be submitted for publication in the Proceedings of SPIE in the SPIE Digital Library. Some SPIE events have other requirements that the author is made aware of at the time of submission.
- Only papers presented at the conference and received according to publication guidelines and timelines will be published in the Proceedings of SPIE in the SPIE Digital Library (or via the requirements of that event).

Audio, Video, Digital Recording Policy

Conferences, courses, and poster sessions: For copyright reasons, recordings of any kind are prohibited without prior written consent of the presenter or instructor. Attendees may not capture or use the materials presented in any meeting/course room or in course notes on display without written permission. Consent forms are available at Speaker Check-In.

Individuals not complying with this policy will be asked to leave a given session and/or asked to surrender their recording media.
Capture and Use of a Person’s Image

By registering for an SPIE event, I grant full permission to SPIE to capture, store, use, and/or reproduce my image or likeness by any audio and/or visual recording technique (including electronic/digital photographs or videos), and create derivative works of these images and recordings in any SPIE media now known or later developed, for any legitimate SPIE marketing or promotional purpose.

By registering for an SPIE event, I waive any right to inspect or approve the use of the images or recordings or of any written copy. I also waive any right to royalties or other compensation arising from or related to the use of the images, recordings, or materials. By registering, I release, defend, indemnify and hold harmless SPIE from and against any claims, damages or liability arising from or related to the use of the images, recordings or materials, including but not limited to claims of defamation, invasion of privacy, or rights of publicity or copyright infringement, or any misuse, distortion, blurring, alteration, optical illusion or use in composite form that may occur or be produced in taking, processing, reduction or production of the finished product, its publication or distribution.

Wireless Internet Service Policy

At SPIE events where wireless is included with your registration, SPIE provides wireless access for attendees during the conference and exhibition but cannot guarantee full coverage in all locations, all of the time. Please be respectful of your time and usage so that all attendees are able to access the internet.

Excessive usage (e.g., streaming video, gaming, multiple devices) reduces bandwidth and increases cost for all attendees. No routers may be attached to the network. Properly secure your computer before accessing the public wireless network. Failure to do so may allow unauthorized access to your laptop as well as potentially introduce viruses to your computer and/or presentation. SPIE is not responsible for computer viruses or other computer damage.

Mobile Phones and Related Devices Policy

Mobile phones, tablets, laptops, pagers, and any similar electronic devices should be silenced during conference sessions. Please exit the conference room before answering or beginning a phone conversation.

Smoking

For the health and consideration of all attendees, smoking, including e-cigarettes, is not permitted at any event elements, such as but not limited to: plenaries, conferences, workshops, courses, poster sessions, hosted meal functions, receptions, and in the exhibit hall. Most facilities also prohibit smoking and e-cigarettes in all or specific areas. Attendees should obey any signs preventing or authorizing smoking in specified locations.

Hold Harmless

Attendee agrees to release and hold harmless SPIE from any and all claims, demands, and causes of action arising out of or relating to your participation in the event you are registering to participate in and use of any associated facilities or hotels.

Event Cancellation

If for some unforeseen reason SPIE should have to cancel the event, registration fees processed will be refunded to registrants. Registrants will be responsible for cancellation of travel arrangements or housing reservations and the applicable fees.
The world’s largest collection of optics and photonics applied research
More than 460,000 interdisciplinary academic & research papers from around the world.

SPIEDigitalLibrary.org