

**SPIE**   
Security+Defence

**SPIE**   
Remote Sensing

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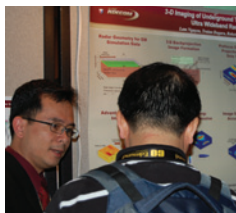
**Connecting minds for global solutions**

Technical Programme

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Conferences: 19-22 September 2011  
Exhibition: 20-21 September 2011

Clarion Congress Hotel Prague  
Prague, Czech Republic



# SPIE Remote Sensing

# SPIE Security+Defence



**Karin Stein**  
Fraunhofer-IOSB Institute of Optronics,  
System Technologies and Image Exploitation  
*2011 Symposium Chair*



**David H. Titterton**  
Defence Science and Technology Lab.,  
United Kingdom  
*2011 Symposium Chair*



**Charles R. Bostater**  
Marine-Environmental Optics Lab &  
Remote Sensing Center, Florida Institute of  
Technology (United States)  
*2011 Symposium Co-Chair*



**Reinhard H. Ebert**  
Fraunhofer IOSB, Germany  
*2011 Symposium Chair*



**Ľestmír Vlček,**  
Univ. of Defence, Czech Republic  
*2011 Symposium Chair*

## Cooperating Organisations

## Cooperating Organisations



SPIE would like to express its deepest appreciation to the symposium chairs, conference chairs, Programme committees, and session chairs who have so generously given of their time and advice to make this symposium possible. The symposium, like our other conferences and activities, would not be possible without the dedicated contribution of our participants and members.

This Programme is based on commitments received up to the time of publication and is subject to change without notice.



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SPIE Europe Ltd., a subsidiary of SPIE, is a not-for-profit UK-registered company serving SPIE constituents throughout Europe as an advocate and liaison to political and industry associations within the European optics and photonics community.

In addition to providing membership services, SPIE Europe Ltd. organises and manages internationally recognised conferences, education programmes, and technical exhibitions featuring emerging technologies in optics and photonics.

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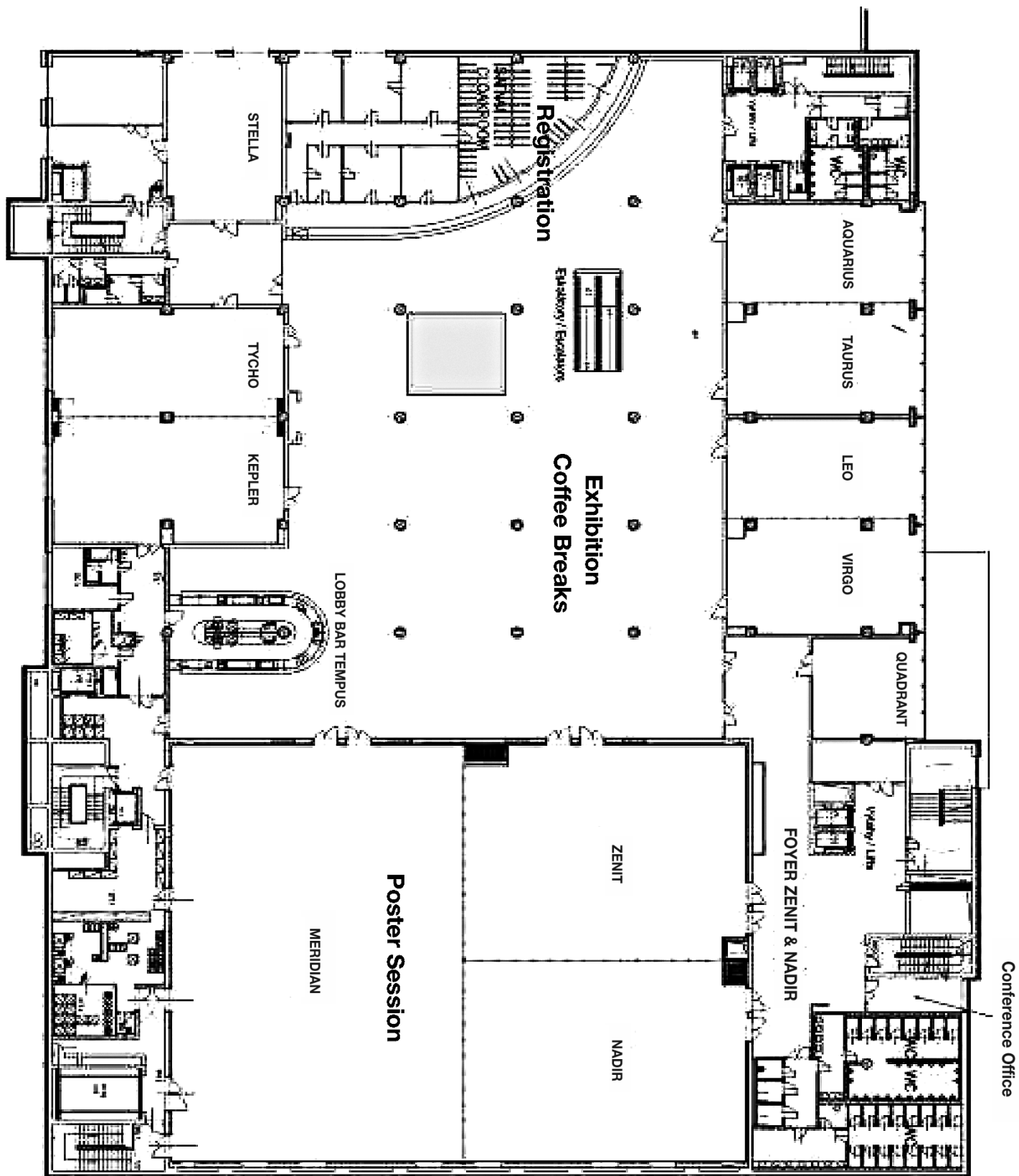
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Conf. 8176: <b>Sensors, Systems, and Next-Generation Satellites</b> (Meynart, Neeck, Shimoda) p. 22		Conf. 8177: <b>Remote Sensing of Clouds and the Atmosphere</b> (Kassianov, Schafer, Comeron, Picard) p. 26		
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Conf. 8182: <b>Lidar Technologies, Techniques, and Measurements for Atmospheric Remote Sensing</b> (Singh, Pappalardo) p. 39		Conf. 8183: <b>High-Performance Computing in Remote Sensing</b> (Huang, Plaza) p. 42		
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Conf. 8189A: <b>Optics and Photonics for Counterterrorism and Crime Fighting</b> (Lewis, Burgess) p. 65		Conf. 8189B: <b>Optical Materials in Defence Systems Technology</b> (Zamboni, Kajzar, Szep) p. 67		
Conf. 8189C: <b>Quantum-Physics-Based Information Security</b> (Gruneisen, Dusek, Rarity) p. 68				
<b>Special Events</b>				
Plenary Session	Welcome Reception		Poster Session	
	Plenary Session	10.00 to 17.00	<b>Exhibition</b>	10.00 to 16.00

# Special Events



## Welcome Reception

Monday 19 September, 18.45 to 21.00

### *Brevnov Monastery*

All attendees are invited to relax, socialise, and enjoy light refreshments. Please remember to wear your conference registration badges. Dress is casual.

### **Directions - Two Options:**

1. Take metro B from VYSOCANSKA (station is located just at the Clarion Congress Hotel) and go eight stops to NARODNI TRIDA. There change for tram No. 22 and go to the station BREVNOVSKY KLASTER:  
Time required: 45 minutes
2. Take metro B from the station VYSOCANSKA (station is located just at the Clarion Congress Hotel), go two stops to Palmovka. There change for tram No. 25 and go to the station BREVNOVSKY KLASTER.  
Time required: 42 minutes

## Poster Session

Wednesday 21 September, 17.30 to 19.00

Poster presenters can begin to post their papers at 10.00 on Wednesday. Each poster presenter is provided a space 0.95 x 1.20m in which to display a summary of the paper. Poster presenters will stand by their posters from 17.30 to 19.00 to answer questions. Poster presenters who have not set up by 17.30 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.



## Exhibition

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Exhibition: 20-21 September 2011  
Conferences: 19-22 September 2011  
Clarion Congress Hotel Prague  
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**SPIE Security + Defence** attracts more than 400 attendees working in the security and defence sector. Co-located with Remote Sensing, this exhibition enables exhibitors to reach two distinct yet relevant audiences.

2010 Security + Defence exhibition grew 23% and featured 45 top companies, and 2011 expects to repeat the success in Prague. View current list of SPIE Security + Defence Exhibitors at: [spie.org/sd11](http://spie.org/sd11)

Monday 19 September 09.00 to 10.45 | Room: Zenit

09.00 to 09.15

## Welcome and Introduction



**Karin Stein**, Fraunhofer-IOSB Institute of Optronics, System Technologies and Image Exploitation, Germany

2011 Symposium Chair



**Charles R. Bostater**, Marine-Environmental Optics Lab & Remote Sensing Center, Florida Institute of Technology, United States

2011 Symposium Chair

9.15 to 10.00

## Earth Observation from Space: The European Landscape in the Second Decade



**Frank L. Döngi**, Head of Future Programs, Business Division Earth Observation, Navigation, and Science, Astrium Satellites GmbH, Friedrichshafen, Germany

Spaceborne remote sensing has become a standard activity for European space nations. Today's landscape comprises civil institutional European programs led by ESA and EU as well as by various European national agencies like CNES, DLR, ASI, or CDTI. Major European space nations operate own or multi-lateral reconnaissance systems. In addition to these, commercial space imagery and data providers invest in Earth observation systems.

The lecture will give an overview of recent missions, ongoing developments, and future scenarios. Trends in sensors and satellites technologies will be highlighted as well as mission applications.

*Biography:* **Frank L. Döngi** was born 1966 in Germany. He received Dipl.-Ing. and Dr.-Ing. degrees in Aerospace Engineering from the University of Stuttgart, and a M.Phil. in Astronautics and Space Engineering from Cranfield Institute of Technology.

Dr. Frank Döngi started his professional career in 1996 at Dasa Dornier Satellitensysteme in Friedrichshafen, Germany, as a Structural Mechanics Engineer working mainly on Smart Structures R&D. In 1999, he moved to Jena-Optronik, Jena, Germany, as Head of System Design, and, later, Director Engineering & Projects, working on opto-electronic space sensors and instruments such as star and sun sensors, rendezvous & docking sensors, and spaceborne cameras. His further career path led him to EADS Astrium Satellites in Toulouse, France, where he held senior management positions in Astrium's Central Engineering entity from 2006 on. Since February 2011, Dr. Döngi is with Astrium Satellites Friedrichshafen, Germany, as Head of Future Programs in the Earth Observation, Navigation, and Science Division.

10.00 to 10.45

## Evolution of Airborne Chemical and Radiological Remote Sensing for Emergency and Natural Disaster Response



**Paul E. Lewis**, Program Manager and Scientist, Airborne Spectral Photometric Environmental Collection Technology (ASPECT) Research and Development Program (ARDP), National Geospatial Intelligence Agency, United States

In 2001 the United States Environmental Protection Agency's (EPA) Airborne Spectral Photometric Environmental Collection Technology (ASPECT) Program became the United States only civilian 24/7 operational airborne chemical, radiological, and situational awareness reporting capability. Since 2001 the ASPECT aircraft has completed 114 successful airborne emergency response and homeland security related missions. The ASPECT concept of operation combines an airborne operational remote sensing suite with a research and development support team to provide essential situational awareness information to first responders and their local, state and federal lead agencies in accordance with the United States' National Contingency Plan and the US-EPA's responsibility under Emergency Support Function 10 of the United States' National Response Plan. This presentation will showcase the effectiveness and necessity of the ASPECT airborne remote sensing capability in meeting the needs of the civil emergency response and homeland security communities.

Highlights from a variety of ASPECT airborne missions will be presented including industrial accidents, homeland security situational awareness missions, and natural and anthropogenic disasters such as Hurricane Katrina and the 2010 Deepwater Horizon Oil Spill along with issues, and lessons learned.

*Biography:* **Mr. Paul Lewis'** twenty three year career with the United States Federal Government has given him the opportunity to both conduct and manage research and development as well as practice the science of remote sensing for the National Photographic Interpretation Center (NPIC), the National Reconnaissance Office (NRO), the Department of Defense Central MASINT Organization (CMO), the Central Imagery Office (CIO), which subsequently was merged into the National Imagery and Mapping Agency (NIMA) and ultimately became the National Geospatial-Intelligence Agency (NGA).

Currently, Mr. Paul Lewis is the Program Manager and Scientist for the National Geospatial Intelligence Agency's Airborne Spectral Photometric Environmental Collection Technology (ASPECT) Research and Development Program (ARDP). Working closely with the Environmental Protection Agency (EPA), Mr. Lewis has provided the technical research and development, engineering studies, field and laboratory experimental support, and data analysis, dissemination, and display software development required to support the United States' only civilian operational airborne remotely sensed emergency response chemical detection-identification and radiological mapping capability. Mr. Paul Lewis and his ARDP colleagues continue to conduct and publish pioneering research on the application of imaging spectrometry systems to disaster response situations.



# Security+Defence Plenary Session

Monday 19 September 15.30 to 17.20 | Room: Zenit

15.30 to 15.45

## Welcome and Introduction



**David H. Titterton**, Defence Science and Technology Lab., United Kingdom  
*2011 Symposium Chair*



**Reinhard R. Ebert**, Fraunhofer-IOSB Institute of Optronics, System Technologies and Image Exploitation, Germany  
*2011 Symposium Chair*



**Āestmír Vlček**, Univ. of Defence, Czech Republic  
*2011 Symposium Chair*

15.45 to 16.30

## Remote Sensing Needs for Military Operations



**Keith Lewis**, Research Director, UK Electro-Magnetic Remote Sensing Defence Technology (United Kingdom)

Defence operations are becoming increasingly reliant on the provision of persistent surveillance for a wide range of military scenarios, especially in dealing with insurgency. To meet such goals, significant emphasis is being placed on the development of new sensing

technologies to safeguard operations in asymmetric threat environments. In countering insurgency there is a need to understand patterns of life, to detect and locate time-sensitive targets and to identify whether or not individuals pose a threat to the community at large. There are also requirements to protect forces by gathering information on supply chains for improvised explosive devices, as well as their manufacture, assembly and emplacement. The challenges facing the sensors community are related to generating militarily useful information from a range of sensor inputs without the penalty of undue latency arising from the communication, processing and analytical interpretation of data streams before presentation to military commanders. New toolsets are required to enhance the intelligence of sensors and to support that data extraction process.

Within the UK, the Electro-Magnetic Remote Sensing Defence Technology Centre (EMRS DTC) has supported the research and development of new capabilities including radio-frequency (RF) and electro-optic (EO) systems, as well as work on sensor exploitation, with a goal of developing solutions for enhancing situational awareness. The DTC was set up in 2003 as a partnership between Industry, the academic science base and the UK Ministry of Defence, to develop advanced and affordable technology to enhance mission-oriented defence capability. The DTC's activities have been supported by field trials to determine the efficacy of competing technologies in relation to realistic threat scenarios. This presentation will summarise some of the key outcomes of the DTC's activities, as well as other activity in related areas, emphasising their role in the provision of persistent surveillance.

**Biography:** **Professor Keith Lewis** took up the role of Research Director of the UK's Electromagnetic Remote Sensing Defence Technology Centre (EMRS DTC) in 2006. He began his career in the UK Ministry of Defence (MoD) in 1974, working initially at the Atomic Weapons Research Establishment, then at the Royal Signals and Radar Establishment at Malvern through to its incorporation as the Defence Evaluation and Research Agency, before becoming a Senior Fellow and Technical Director at QinetiQ Ltd where he was responsible for Research and Innovation across its Technology and Products Division.

He has played a leading role in defining and initiating aspects of Defence Programmes in specific areas of electro-optic technology, including the identification of areas of requirement and the development of effective technological solutions with a high degree of innovation. He has also played a key role at various times in formal collaborative activity with overseas organisations in Australia, Canada, New Zealand, the USA and Singapore. His personal research interests cover sea, land, air and space applications where he specialises in the integration of ideas from disparate areas of science and technology, ranging from biomimetics

and nanotechnology to advanced electro-optic systems, with concepts finding application not only in defence systems, but also in the commercial arena. He formed his own company (Sciovis Ltd) in 2005 and continues to support MoD as a member of the Defence Scientific Advisory Council's independent advisors register. He is also a member of the Steering Board of the UK's Electronics, Sensors and Photonics Knowledge Transfer Network. He is an SPIE Fellow, has worked in the field of optics and optical devices since the 1970s, and has contributed to over 300 scientific papers, reports and patents.

16.35 to 17.20

## Quantum Information Transfer and Processing



**Miloslav Dusek**, Vice-Dean, Faculty of Science, Palacký Univ. (Czech Republic)

At the beginning of the 20th century, in the light of new discoveries, physicists realized that to describe the behavior of the physical world a new theory was needed: quantum theory. Quantum theory has completely changed the paradigm in physics. Quantum systems behave more strangely than classical ones. They allow superpositions of states. Two or more particles can occur in the so called entangled states which have certain non-local properties. There is intrinsic randomness in nature which manifests itself in the outcomes of measurements. Moreover, measurement, or any interaction with the system, in general affects the state of the system substantially. However, it appears that these counter-intuitive quantum effects can be expediently employed in communication and information processing. They offer solutions to some tasks which cannot be solved in "classical" information theory or whose classical solution is unknown. The two examples are the secure distribution of a cryptographic key and the factorization of large numbers in polynomial time. What we can do with information depends on the physical system which carries it.

There are two important applications of quantum information science: Quantum cryptography, a method for secure communication whose security is guaranteed by the laws of physics and does not rely on computational complexity, and Quantum computers which can solve efficiently some of the "hard" computational problems. In the talk the basic concepts of quantum communication and information processing will be reviewed. Furthermore, the security of practical quantum key distribution devices will be discussed briefly and possible optical implementations of quantum gates will be mentioned.

**Biography:** **Miloslav Dusek** is a professor of physics at the Department of Optics and a vice-dean of the Faculty of Science of the Palacký University in Olomouc. He achieved his PhD in 1994 at the Faculty of Mathematics and Physics of the Charles University in Prague. His scientific interests cover quantum optics, foundations of quantum theory, quantum cryptography, and quantum information processing. In the 1990s he participated in the development of a prototype of a quantum key distribution device. Later, he was involved in the quantum information theory group within the European integrated project SECOQC devoted to the development of a quantum-based network for secure communication. Recently he has focused on experimental implementation of quantum gates and operations for quantum information processing using linear-optical elements.



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# General Information



## Registration Hours

Sunday 18 September . . . . .	16.00 to 18.00
Monday 19 September . . . . .	07.45 to 17.30
Tuesday 20 September . . . . .	07.45 to 17.30
Wednesday 21 September . . . . .	08.00 to 17.30
Thursday 22 September . . . . .	08.30 to 16:00

## Exhibition Registration

Tuesday 20 September . . . . .	10.00 to 17.00
Wednesday 21 September . . . . .	10.00 to 16.00

## Cashier Services

The SPIE Europe cashier can assist with registration payments, receipts, and badge corrections.

- *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 please see the onsite cashier at the Cashier station at the registration desk.
- *Receipts* - Preregistered attendees who did not receive a receipt prior to the meeting may obtain a new copy of their registration receipt onsite at the Cashier's desk.
- *Badge Corrections* - Attendees who need a correction to their badge information onsite may do so at the Cashier's desk. Please have your badge removed from the badge holder, marked with your changes, and ready to hand to the attendant upon approaching the counter.
- *Attendance Certificate* - Please leave your details at the registration desk and the certificate will be emailed to you after the event.

## Internet

There will be free Internet available for attendees. Speeds may vary depending on the number of simultaneous users.

## Message Center

Messages for attendees can be left by calling the Clarion Hotel and Congress Centre and asking for the Conference Partners Conference and Registration Desk. Messages will be taken during registration hours Monday - Thursday. It is the attendees' responsibility to check the message boards on a daily basis.

## Speaker Check-In Desk

- All Conference rooms will have a computer workstation, LCD projector, screen, lapel microphone, and laser pointer.
- All presenters are requested to use the rooms of their conference in the breaks or in the mornings to test their presentation.

## Audio, Video, Digital Recording Policy

*In the Meeting Rooms and Poster Sessions:* For copyright reasons, recordings of any kind are strictly prohibited without prior written consent of the presenter in any conference session, course or of posters presented. Each presenter being taped must file a signed written consent form. Individuals not complying with this policy will be asked to leave a given session and asked to surrender their film or recording media. Consent forms are available at the SPIE Speaker Check-In Desk.

*In the Exhibition Hall:* For security and courtesy reasons, photographing or videotaping individual booths and displays in the exhibition hall is allowed ONLY with explicit permission from onsite company representatives. Individuals not complying with this policy will be asked to surrender their film and to leave the exhibition hall.

## Underage Persons on Exhibition Floor Policy

For safety and insurance reasons, no persons under the age of 16 will be allowed in the exhibition area during move-in and move-out. During open exhibition hours, only children over the age of 12 accompanied by an adult will be allowed in the exhibition area.

## Unauthorized Solicitation Policy

Any manufacturer or supplier who is not an exhibitor and is observed to be soliciting business in the aisles, or in another company's booth, will be asked to leave immediately. Unauthorized solicitation in the exhibition hall is prohibited.

## Unsecured Items Policy

Personal belongings such as briefcases, backpacks, coats, book bags, etc., should not be left unattended in meeting rooms or public areas. These items will be subject to removal by security upon discovery.



# Exhibition Guide

## Don't miss Europe's top Security + Defence Exhibition

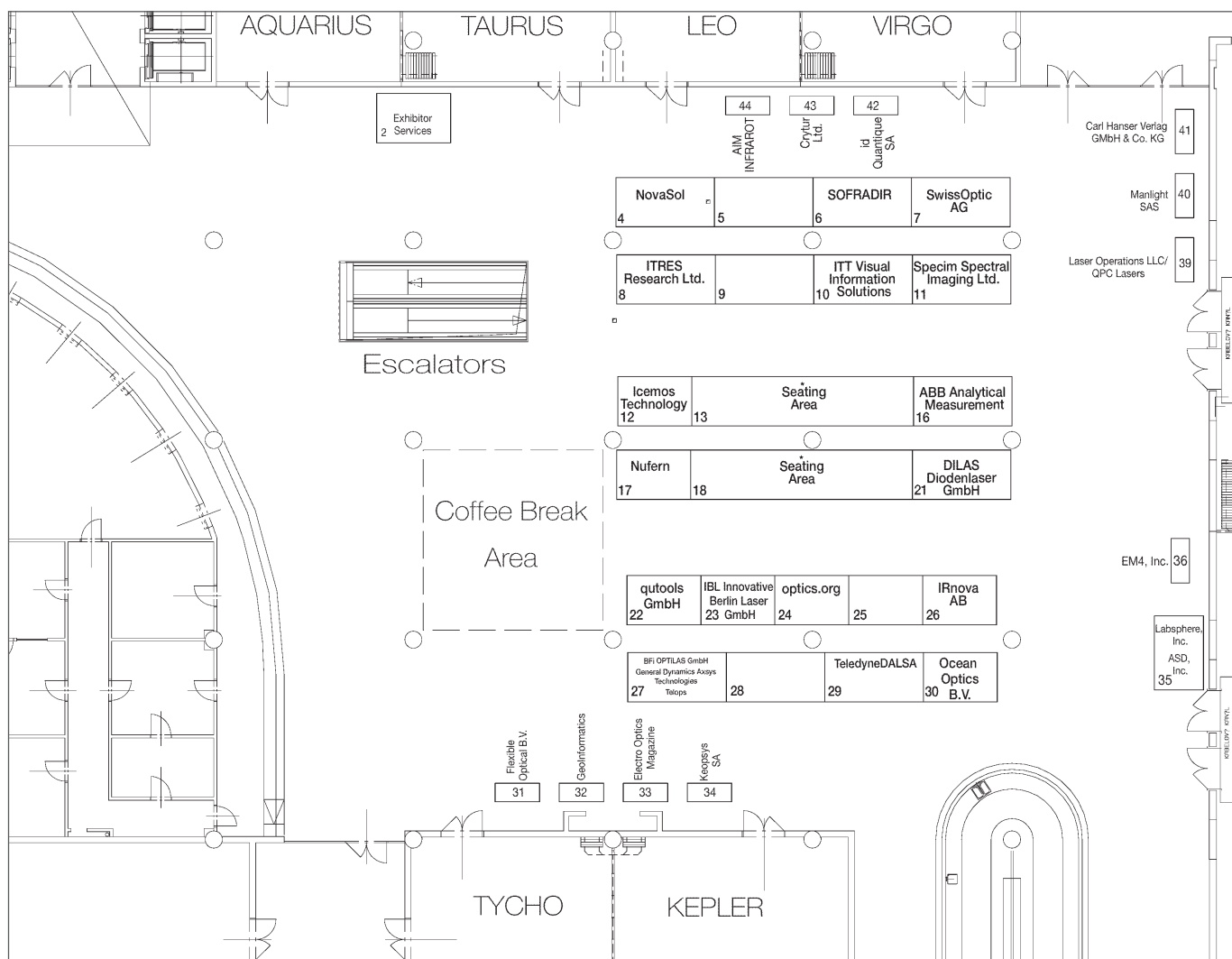
### Exhibition Hours

Tuesday 20 September • 10.00 to 17.00

Wednesday 21 September • 10.00 to 16.00

### Exhibitor List (Current as of 9/1/2011)

- ABB Analytical Measurement . . . . . #16
- Acal BFi Germany GmbH . . . . . #27
- AIM Infrarot-Module GmbH. . . . . #44
- ASD, Inc. . . . . #35
- Axsys Technologies, Inc. . . . . #27
- Carl Hanser Verlag. . . . . #41
- Crytur Ltd. . . . . #43
- Dilas Diodenlaser GmbH. . . . . #21
- Electro Optics Magazine . . . . . #33
- EM4 Inc. . . . . #36
- Flexible Optical B.V. . . . . #31
- Geoinformatics/CMedia BV. . . . . #32
- IBL Innovative Berlin Laser GmbH . . #23
- ICEMOS Technology, Ltd. . . . . #12
- ID Quantique . . . . . #42
- IRnova AB . . . . . #26
- ITRES Research Ltd. . . . . #8
- ITT Visual Information Solutions . . . #10
- Keopsys SA. . . . . #34
- Laser Operations LLC/QPC Lasers. . #39
- MANLIGHT . . . . . #40
- NovaSol. . . . . #4
- Nuferm . . . . . #17
- Ocean Optics B.V. . . . . #30
- optics.org . . . . . #24
- Qutools GmbH . . . . . #22
- Specim Spectral Imaging Ltd. . . . . #11
- SphereOptics GmbH. . . . . #35
- SwissOptic AG . . . . . #7
- Sofradir . . . . . #6
- Teledyne DALSA . . . . . #29
- Telops Inc. . . . . #27





# Exhibitor Listings

## ABB Analytical Measurement #16

**SPIE** Corporate Member

585 blvd Charest Est Ste 300, Québec, QC, G1K 9H4 Canada  
+1 418 877 2944; fax +1 418 877 2834  
ftir@ca.abb.com; www.abb.com/analytical

ABB Analytical continues to set the standards for FT-IR Spectroradiometry used in atmospheric sounding, military targets IR signature characterization and gas detection. ABB also develops solutions with reliable airborne and spaceborne optical instruments, infrared calibration systems, hyperspectral imagers, and software for ground segments and simulation. ABB counts several projects in Defense & Security and Space success stories, positioning her at the forefront of the Remote Sensing Industry.

## Acal BFi Germany GmbH #27

Oppelner Str 5, Gröbenzell, 82194 Germany  
+49 8142 6520-0; fax +49 8142 6520-190  
sales.de@bfioptilas.com; www.bfioptilas.de

## AIM INFRAROT-MODULE GmbH #44

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## ASD, Inc. #35

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info@asdi.com; www.asdi.com

ASD Inc. is a recognized world leader in reflectance spectroscopy for remote sensing. Researchers across the globe trust our instruments because they are portable, easy to use, and rugged - and, most importantly, provide research-critical measurements in the field. For an instrument that provides the freedom to rapidly collect spectra in the field, choose ASD. Our extensive line of FieldSpec® instruments and accessories can be adapted for unique field research needs. Learn more at asdi.com.

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## Crytur Ltd. #43

Palackeho 175, Turnov, 51101 Czech Republic  
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crytur@crytur.cz; www.crytur.cz/

## Dilas Diodenlaser GmbH #21

Galileo-Galilei-Str 10, Mainz-Hechtsheim, 55129 Germany  
+49 6131 9226 0; fax +49 6131 9226 253  
sales@dilas.de; www.dilas.de

DILAS, the diode laser company, develops and manufactures high-power semiconductor laser components, modules and systems within the industrial and defense markets enabling applications in high-energy lasers, illumination, gated imaging, targeting, range finding, LIDAR and many others Contact: Dr. Jörg Neukum, Dir. Marketing and Sales, sales@dilas.de



PROMOTIONAL PARTNER

## Electro Optics Magazine #33

The Spectrum Building, The Michael Young Centre, Purbeck Rd, Cambridge, CB2 8PD United Kingdom  
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sales.electro@europascience.com; www.electrooptics.com

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Electro Optics is available free to qualifying individuals at www.electrooptics.com/subscribe. Contact: Warren Clark, Publishing Director, warren.clark@europascience.com; Jon Hunt, Advertising Sales Manager, jon.hunt@europascience.com

## EM4, Inc. #36

7 Oak Park, Bedford, MA, 01730  
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Laser Operations LLC, manufacturer of the industry leading QPC Lasers product line, is a vertically integrated laser diode manufacturer shipping high brightness lasers globally into several markets including medical, defense, industrial and consumer displays, from its high volume 40,000 sq. ft. laser manufacturing facility located in Sylmar, CA. Contact: Laurent Vaissie, Senior Vice President of Marketing and Sales, lvaissie@laseroperations.net; Pierre Laygue, European Sales Manager, playgue@laseroperations.net
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# Exhibitor Listings

## Specim Spectral Imaging Ltd.

#11

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SPECIM Spectral Imaging Ltd. is the worlds' leading manufacturer of hyperspectral imaging instruments and systems. In addition to airborne remote sensing systems, SPECIM provides ImSpector Imaging Spectrographs, Spectral Cameras and Hyperspectral Imaging Solutions to an increasing range of demanding industrial and science applications like colour measurement, process analytical technology (PAT), life sciences, chemical imaging and forensics. Contact: Ana Aranda, Marketing Coordinator, ana.aranda@specim.fi;

## SphereOptics GmbH

#35

Bergstrasse 36, Uhlhingen, D 88690 Germany  
+49 7556 9299666; fax +49556 5108  
info@sphereoptics.de; www.sphereoptics.de

## SwissOptic AG

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## TeledyneDALSA

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605 McMurray Rd, Waterloo, ON Canada  
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Teledyne DALSA, a wholly-owned subsidiary of Teledyne Technologies since 2011, is an international leader in high performance digital imaging and semiconductors with approximately 1000 employees world-wide. Established in 1980 as DALSA Corporation, the company designs, develops, manufactures, and markets digital imaging products and solutions, in addition to providing semiconductor products and services. Teledyne DALSA's core competencies are in specialized integrated circuit and electronics technology, software, and highly engineered semiconductor wafer processing. For more than 30 years the company has designed, manufactured and deployed digital imaging components for machine vision applications. Today, Teledyne DALSA image sensors, cameras, frame grabbers and software are used in thousands of automated inspection systems around the world and across multiple industries including semiconductor, flat panel display, electronics, and manufacturing.

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### Basic Research, Science

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AIM INFRAROT-MODULE GmbH

### Chemical and Biological Analysis

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### Communications and Networking

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### Computing Systems, Data Processing

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### Defense, Security, Law Enforcement

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### Detectors, Sensors

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### Displays: Consumer, Information, Entertainment

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### Earth Sciences, Environmental Monitoring, Climate

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# SPIE Remote Sensing

Conferences: 19-22 September 2011  
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**Karin Stein**  
Fraunhofer-IOSB Institute of Optronics,  
System Technologies and Image  
Exploitation  
*2011 Symposium Chair*



**Charles R. Bostater**  
Marine-Environmental Optics Lab &  
Remote Sensing Center, Florida  
Institute of Technology (United States)  
*2011 Symposium Co-Chair*

## Technical Conferences

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8175 Remote Sensing of the Ocean, Sea Ice, Coastal Waters, and Large Water Regions 2011 .....	20
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## Technical Committee

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## Remote Sensing for Agriculture, Ecosystems, and Hydrology

Conference Chairs: **Christopher M. U. Neale**, Utah State Univ. (United States); **Antonino Maltese**, Univ. degli Studi di Palermo (Italy)

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### Monday 19 September

#### Opening Remarks

Room: Virgo . . . . . Mon. 11.15 to 11.20

**Christopher M. U. Neale**, Utah State Univ. (USA);  
**Antonino Maltese**, Univ. degli Studi di Palermo (Italy)

#### SESSION 1

Room: Virgo . . . . . Mon. 11.20 to 12.30

##### Snow

Session Chair: **Christopher M. U. Neale**,  
Utah State Univ. (United States)

11.20: **Remote sensing of snow cover and snow water equivalent for the historic snowstorms in the Baltimore/Washington area during February 2010** (*Invited Paper*), James L. Foster, Dorothy K. Hall, George A. Riggs, NASA Goddard Space Flight Ctr. (United States) . . . . . [8174-01]

11.50: **Snow evolution in Sierra Nevada (Spain) from an energy balance model validated with Landsat TM data**, Javier Herrero, Univ. de Granada (Spain); María José Polo, Univ. de Córdoba (Spain) . . . . . [8174-02]

12.10: **Characterization of snow pack over Pyrenees using remote sensed data for runoff modeling**, Laura Moreno, Antonio Reppucci, Xavier Banque, Starlab (Spain); Maria Jose Escorihuela, isardSAT (Spain); Miquel Aran, Applus Agroambiental, S.A. (Spain); Rafael Sanchez Diezma, HYDS (Spain) . . . . . [8174-03]

Lunch Break . . . . . 12.30 to 13.40

#### SESSION 2

Room: Virgo . . . . . Mon. 13.40 to 15.00

##### Hydrology I

Session Chair: **Goffredo La Loggia**, Univ. degli Studi di Palermo (Italy)

13.40: **Local effects on the water balance in flood plains induced by dam filling in Mediterranean environments**, Cristina Aguilar, María José Polo, Univ. de Córdoba (Spain) . . . . . [8174-04]

14.00: **The use of lidar derived high resolution DEM and intensity data to support urban flood modeling**, M. D. Aktaruzzaman, Universitätsbibliothek Kaiserslautern (Germany) . . . . . [8174-05]

14.20: **Tracking, sensing and predicting flood wave propagation using nomadic satellite communication systems and hydrodynamic models**, Renaud Hostache, Patrick Matgen, Laura Giustarini, Ctr. de Recherche Public - Gabriel Lippmann (Luxembourg) . . . . . [8174-06]

14.40: **River discharge estimation through MODIS data**, Angelica Tarpanelli, Luca Brocca, Florisa Melone, Tommaso Moramarco, Teodosio Lacava, Mariapia Faruolo, Nicola Pergola, Consiglio Nazionale delle Ricerche (Italy); Valerio Tramutoli, Univ. degli Studi della Basilicata (Italy) . . . . . [8174-07]

Coffee Break . . . . . 15.00 to 15.30

#### SESSION 3

Room: Virgo . . . . . Mon. 15.30 to 16.50

##### Hydrology II

Session Chair: **Christopher M. U. Neale**,  
Utah State Univ. (United States)

15.30: **Predicting soil erosion under land-use and climate changes using the revised universal soil loss equation (RUSLE)**, So Young Park, Cheung Gil Jin, Chul Uong Choi, Pukyong National Univ. (Korea, Republic of) . . . . . [8174-09]

15.50: **Perspectives of remote sensing of soil moisture for hydrological applications**, Luca Brocca, Florisa Melone, Tommaso Moramarco, Consiglio Nazionale delle Ricerche (Italy); Wolfgang Wagner, Technische Univ. Wien (Austria) . . . . . [8174-10]

16.10: **Interception modeling with vegetation time series derived from Landsat TM data**, María José Polo, Adolfo Díaz-Gutiérrez, Univ. de Córdoba (Spain); María Patrocinio González-Dugo, Instituto de Investigación y Formación Agraria y Pesquera (Spain) . . . . . [8174-12]

16.30: **Retrieving rainfall fields through tomographic processing applied to radiobase network signals**, Luca Facheris, Univ. degli Studi di Firenze (Italy); Fabrizio Cuccoli, Consorzio Nazionale Interuniversitario per le Telecomunicazioni (Italy); Stefano Gori, Univ. degli Studi di Firenze (Italy); Luca Baldini, Istituto di Scienze dell'Atmosfera e del Clima (Italy) . . . . . [8174-14]

### Tuesday 20 September

#### SESSION 4

Room: Stella . . . . . Tues. 08.40 to 10.00

##### Change Detection

Session Chair: **Katja Richter**,  
Ludwig-Maximilians-Univ. München (Germany)

08.40: **Damage estimation on agricultural crops by a flood**, Nalleli C. Silva, Alejandra A. López-Caloca, José L. Silván-Cárdenas, Ctr. de Investigación en Geografía y Geomática (Mexico) . . . . . [8174-15]

09.00: **Evaluation of time-series and phenological indicators for land cover classification based on 10 year of MODIS data**, Francesco Vuolo, Univ. für Bodenkultur Wien (Austria); Katja Richter, Ludwig-Maximilians-Univ. München (Germany); Matteo Mattiuzzi, Clement Atzberger, Univ. für Bodenkultur Wien (Austria) . . . . . [8174-16]

09.20: **A multispectral multiplatform based change detection tool for vegetation disturbance on Irish peatlands**, Jerome O'Connell, John Connolly, Nicholas M. Holden, Univ. College Dublin (Ireland) . . . . . [8174-17]

09.40: **Mapping peatland disturbance in Ireland: an object oriented approach**, John Connolly, Nicholas M. Holden, Univ. College Dublin (Ireland) . . . . . [8174-18]

Coffee Break . . . . . 10.00 to 10.20



## SESSION 5

Room: Stella . . . . . Tues. 10.20 to 11.50

## General Applications I

Session Chair: **Christopher M. U. Neale**,  
Utah State Univ. (United States)

10.20: **Unmanned aerial vehicle (UAV) operated spectral camera system for forest and agriculture applications** (*Invited Paper*), Heikki K. Saari, VTT Technical Research Ctr. of Finland (Finland); Ismo Pellikka, Univ. of Jyväskylä (Finland); Liisa Pesonen, MTT Agrifood Research Finland (Finland); Sakari Tuominen, Finnish Forest Research Institute (Finland); Jan Heikkilä, Pineering Ltd. (Finland); Christer Holmlund, Jussi H. Mäkynen, Kai M. Ojala, Tapani Antila, VTT Technical Research Ctr. of Finland (Finland). . . . . [8174-19]

10.50: **Automated object detection of climate tracers in remote-sensing data**, Lucia Tyrallova, Univ. Potsdam (Germany) . . . [8174-20]

11.10: **Novel applications of optical remote sensing in animal ecology**, Patrik Lundin, Mikkel Brydegaard, Mei Liang, Per Samuelsson, Lorenzo Cocola, Anna Runemark, Hiran Jayaweera, Maren Wellenreuther, Erik Svensson, Christer Löfstedt, Susanne Åkesson, Gabriel Somesfalean, Sune Svanberg, Lund Univ. (Sweden) . . . . . [8174-21]

11.30: **Methods and potentials for using satellite image classification in school lessons**, Kerstin Voss, Henryk Hodam, Roland Goetzke, Andreas Rienow, Rheinische Friedrich-Wilhelms- Univ. Bonn (Germany) . . . . . [8174-22]

Lunch/Exhibition Break . . . . . 11.50 to 13.10

## SESSION 6

Room: Stella . . . . . Tues. 13.10 to 14.50

## Irrigation and Energy Balance I

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

13.10: **Improvement of the triangle method for soil moisture evaluation by adding a third index: albedo or cellulose absorption index**, Jean-Claude Krapez, ONERA (France); Albert Olioso, Institut National de la Recherche Agronomique (France) . . . . . [8174-23]

13.30: **Energy balance modeling of agricultural areas by remote sensing**, Ana Andreu, Maria Patrocinio González-Dugo, Instituto de Agricultura Sostenible (Spain); María José Polo, Univ. de Córdoba (Spain); Francisco Luis M. Padilla, Pedro Gavilan, Instituto de Agricultura Sostenible (Spain) . . . . . [8174-24]

13.50: **On the use of MODIS fPAR and NDVI products for monitoring heterogeneous irrigated agriculture in western Uzbekistan**, Sebastian Fritsch, Miriam Machwitz, Christopher Conrad, Stefan W. Dech, Julius-Maximilians-Univ. Würzburg (Germany) . . . . . [8174-25]

14.10: **Comparing actual evapotranspiration and plant water potential on a vineyard**, Carmelo Cammalleri, Giuseppe Ciraolo, Francesco Colletti, Goffredo La Loggia, Antonino Maltese, Tanino Santangelo, Univ. degli Studi di Palermo (Italy) . . . . . [8174-26]

14.30: **Estimating evapotranspiration of riparian vegetation using high resolution multispectral, thermal infrared and Lidar data**, Christopher M. U. Neale, Hatim Geli, Saleh Taghvaeian, Ashish Masih, Robert T. Pack, Utah State Univ. (United States); Ronald Simms, Michael Baker, Jeff A. Milliken, Scott O'Meara, Amy J. Witherall, U.S. Bureau of Reclamation (United States). . . . . [8174-27]

Coffee Break . . . . . 14.50 to 15.20

## SESSION 7

Room: Stella . . . . . Tues. 15.20 to 17.50

## Vegetation

Session Chair: **Francesco Vuolo**, Univ. für Bodenkultur Wien (Austria)

15.20: **Why confining to vegetation indices? Exploiting the potential of improved spectral observations** (*Invited Paper*), Clement Atzberger, Francesco Vuolo, Univ. für Bodenkultur Wien (Austria); Katja Richter, Ludwig-Maximilians-Univ. München (Germany); Roshanak Darvishzadeh, Shahid Beheshti Univ. (Iran, Islamic Republic of) . . . . . [8174-28]

15.50: **Goodness-of-fit measures: what do they tell about variable retrieval performance from Earth observation data**, Katja Richter, Tobias Hank, Wolfram Mauser, Ludwig-Maximilians-Univ. München (Germany) . . . . . [8174-29]

16.10: **Chlorophyll and soil effects on vegetation colorimetric characteristics**, Rumiana H. Kancheva, Denitsa Borisova, Georgi K. Georgiev, Solar-Terrestrial Influences Lab. (Bulgaria) . . . . . [8174-31]

16.30: **Multispectral vegetative canopy parameter retrieval**, Christoph C. Borel, David J. Bunker, Air Force Institute of Technology (United States) . . . . . [8174-32]

16.50: **Exploiting the DMC satellite constellation for applications in agriculture and forest monitoring**, Gary Holmes, Paul Stephens, DMC International Imaging Ltd. (United Kingdom) . . . . . [8174-33]

17.10: **Evaluation of remote sensing DMP product using five years of savanna biomass field measurements in Senegal**, Francesco Nutini, Mirco Boschetti, Pietro A. Brivio, Daniela Stroppiana, Consiglio Nazionale delle Ricerche (Italy); Etienne Bartholome, European Commission Joint Research Ctr. (Italy); Gora Bèye, Ctr. de Suivi Ecologique (Senegal). . . . . [8174-34]

17.30: **Hybridizing multi- and mono-source classifications for tropical rainforest mapping**, Robin Pouteau, Benoît Stoll, Univ. de la Polynésie Française (French Polynesia) . . . . . [8174-35]

## Wednesday 21 September

## SESSION 8

Room: Stella . . . . . Wed. 08.30 to 10.10

## Late Breaking News

**Presentations will be announced at the start of the conference and in the onsite conference programme**

Coffee Break . . . . . 10.10 to 10.40

## Remote Sensing Plenary Session

Monday 19 September 09.00 to 10.45

For details, please see page 5

# Conference 8174

## SESSION 9

Room: Stella. . . . . Wed. 10.40 to 12.00

### Agriculture I

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

10.40: **Evaluation of rededge spectral information for biotope mapping using RapidEye**, Marcus Bindel, Sören Hese, Christian Berger, Christiane C. Schmulilius, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [8174-36]

11.00: **Estimation agricultural crops area by object based image analysis in Tabriz County, Iran**, Bkhtiar Feizizadeh, Thomas Blaschke, Univ. Salzburg (Austria) . . . . . [8174-37]

11.20: **Remote mapping of susceptible areas to soil salinity, based on hyperspectral and geochemical data in the southern part of Tunisia**, Moncef Bouaziz, Technische Univ. Bergakademie Freiberg (Germany) and National School of Engineers of Sfax (Tunisia); Richard Gloaguen, Technische Univ. Bergakademie Freiberg (Germany) . . . . . [8174-38]

11.40: **Multitemporal classification of agricultural crops in the Czech Republic**, Premysl Stych, Charles Univ. in Prague (Czech Republic) . . . . . [8174-39]

Lunch/Exhibition Break . . . . . 12.00 to 13.20

## SESSION 10

Room: Stella. . . . . Wed. 13.20 to 15.00

### Agriculture II

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

13.20: **Investigating agro-drought in the Lower Mekong Basin using MODIS NDVI and land surface temperature data**, Nguyen-Thanh Son, Chi-Farn Chen, Cheng-Ru Chen, National Central Univ. (Taiwan) . . . . . [8174-40]

13.40: **Potentials of RapidEye time series for improved classification of crop rotations in heterogeneous agricultural landscapes: experiences from irrigation systems in Central Asia**, Christopher Conrad, Miriam Machwitz, Gunther Schorcht, Fabian Loew, Sebastian Fritsch, Julius-Maximilians-Univ. Würzburg (Germany); Stefan W. Dech, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) and Julius-Maximilians-Univ. Würzburg (Germany) . . . . . [8174-41]

14.00: **Spectral and agronomic indicators of crop yield**, Rumiana H. Kancheva, Denitsa Borisova, Georgi K. Georgiev, Solar-Terrestrial Influences Lab. (Bulgaria) . . . . . [8174-42]

14.20: **Monitoring rice growing areas in the Lower Mekong subregion from MODIS satellite imagery**, Cheng-ru Chen, Chi-Farn Chen, Son T. Nguyen, National Central Univ. (Taiwan) . . . . . [8174-43]

14.40: **Plastic covered vineyard extraction from airborne sensor data with an object-oriented approach**, Eufemia Tarantino, Antonello Aiello, Univ. degli Studi di Bari (Italy) . . . . . [8174-44]

Coffee Break . . . . . 15.00 to 15.30

## SESSION 11

Room: Stella. . . . . Wed. 15.30 to 17.30

### Estuarine, Coastal, and Inland Waters

Session Chair: **Christopher M. U. Neale**, Utah State Univ. (United States)

15.30: **Monitoring Mediterranean marine pollution using remote sensing and hydrodynamic modelling**, Fulvio Capodici, Giuseppe Ciruolo, Univ. degli Studi di Palermo (Italy); Aldo Drago, Univ. of Malta (Malta); Goffredo La Loggia, Antonino Maltese, Univ. degli Studi di Palermo (Italy) . . . . . [8174-45]

15.50: **Ecological study wetland vegetations in Ichkeul marshes (north of Tunisia) by using remote sensing techniques and and field observations**, Kassouk Zeineb, Univ. Paris-Est Marne-la-Vallée (France); Zohra Lili, Institut National Agronomique Tunisie (Tunisia); Benoit Defontaine, Univ. Paris-Est Marne-la-Vallée (United States); Regis Caloz, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Marie Jose Elloumi, Agence Nationale de Protection de l'Environnement (Tunisia) . . . . . [8174-46]

16.10: **Jellyfish prediction of occurrence from remote sensing data and a non-linear pattern recognition approach**, Anton Albajes-Eizagirre, Masayo Haneda, Laia Romero, Aureli Soria-Frisch, Starlab (Spain); Quinten Vanhellefont, Institut Royal des Sciences Naturelles de Belgique (Belgium) . . . . . [8174-47]

16.30: **Characterizing the spectral signatures and optical properties of dams in Cyprus using field spectroradiometric measurements**, Diofantos G. Hadjimittis, Christiana Papoutsas, Cyprus Univ. of Technology (Cyprus) . . . . . [8174-48]

16.50: **Development of Japanese inland water surface temperature database using ASTER thermal infrared imagery**, Hideyuki Tonooka, Masayuki Hirayama, Ibaraki Univ. (Japan) . . . . . [8174-49]

17.10: **Preliminary work of mangrove ecosystem carbon stock mapping in small island using remote sensing: above and below ground carbon mapping on medium resolution satellite image**, Pramaditya Wicaksono, Hartono Hartono, Projo Danoedoro, Univ. Gadjah Mada (Indonesia); Udo Nehren, Lars Ribbe, Fachhochschule Köln (Germany) . . . . . [8174-50]

## Posters . . . . . Wed. 17.30 to 19.00

*Conference attendees are invited to attend the Remote Sensing Poster Session on Wednesday afternoon. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at [spie.org/x32234.xml](http://spie.org/x32234.xml)*

### Hydrology

**A diachronic analysis of estuarine turbidity due to a flood following an extreme rainfall event**, Giuseppe Ciruolo, Univ. degli Studi di Palermo (Italy); Antonino Granata, Agenzia Regionale per la Protezione Ambientale (Italy); Goffredo La Loggia, Antonino Maltese, Univ. degli Studi di Palermo (Italy) . . . . . [8174-52]

**Landscape freeze-thaw monitoring using passive microwave remote sensing**, Liying Li, Jiancheng Shi, Jinyang Du, Institute of Remote Sensing Applications (China) . . . . . [8174-54]

### Agriculture

**Use of imaging spectroscopy to assess different organic carbon fractions of agricultural soils**, Michael Vohland, Monika Harbich, Oliver Schmidt, Sören Thiele-Bruhn, Univ. Trier (Germany) . . [8174-56]

### Vegetation

**An improvement of satellite-based algorithm for gross primary production estimation optimized over Korea**, Kyoung-Jin Pi, Kyoung-Soo Han, In-Hwan Kim, Sang-Il Kim, Min-Ji Lee, Pukyong National Univ. (Korea, Republic of) . . . . . [8174-58]

**Assessment of tundra-taiga boundary changes using MODIS LAI data**, Min-Ji Lee, Kyoung-Soo Han, Kyoung-Jin Pi, Sang-Il Kim, In-Hwan Kim, Pukyong National Univ. (Korea, Republic of) . . . [8174-59]

**On the Influences of vegetation biomass on COSMO-Skymed X-band**, Fulvio Capodici, Univ. degli Studi di Napoli Federico II (Italy); Giuseppe Ciraolo, Univ. degli Studi di Palermo (Italy); Guido D'Urso, Univ. degli Studi di Napoli Federico II (Italy); Goffredo La Loggia, Antonino Maltese, Univ. degli Studi di Palermo (Italy) . . . . . [8174-60]

**Airborne spray drift measurement using passive collectors and lidar systems**, Eduard Gregorio, Univ. de Lleida (Spain); Francesc Solanelles, Generalitat de Catalunya (Spain); Francesc Rocadenbosch, Univ. Politècnica de Catalunya (Spain); J. R. Rosell, Ricardo Sanz, Univ. de Lleida (Spain). . . . . [8174-61]

#### Thermal IR

**Spatial analysis of LST in relation to surface moisture and NDBI using landsat imagery in Cheongju city**, Sang Il Na, Jong Hwa Park, Jin Ki Park, Shin Chul Beak, Chungbuk National Univ. (Korea, Republic of) . . . . . [8174-62]

**Development of land surface temperature retrieval algorithm from the first Korean geostationary satellite, COMS data**, Myoung-Seok Suh, Woo-Sun Park, Jeon-Ho Kang, Kongju National Univ. (Korea, Republic of) . . . . . [8174-63]

**Satellite remote sensing data for heat waves assessment in urban areas**, Maria A. Zoran, National Institute of Research & Development for Optoelectronics (Romania). . . . . [8174-64]

**Early warnings of Rhynchophorus ferrugineus infestation of Phoenix canariensis: a proximity thermal sensing approach**, Carmelo Cammalleri, Univ. degli Studi di Palermo (Italy); Fulvio Capodici, Univ. degli Studi di Napoli Federico II (Italy); Giuseppe Ciraolo, Giuseppe Filardo, Goffredo La Loggia, Antonino Maltese, Univ. degli Studi di Palermo (Italy). . . . . [8174-65]

#### Estuarine, Coastal and Inland Waters

**Spatio-temporal variability analysis of the Douro River plume through MERIS data for one hydrological year**, Ana C. Teodoro, Hélder Almeida, Univ. do Porto (Portugal) . . . . . [8174-67]

**The analysis about the characteristics of oil pollution and model of Yellow River delta**, Fan Yanguo, Yuanfang Sun, China Univ. of Petroleum (China) . . . . . [8174-68]

**A research on soil petroleum content hyperspectral model based on measured spectrum in Gudong oilfield**, Fan Yanguo, Lei Zhang, China Univ. of Petroleum (China) . . . . . [8174-69]

**Change actors' analysis of vegetation degradation from remote sensing data in parts of Niger delta region**, Oluseyi O. Fabiyi, Regional Ctr. for Training in Aerospace Surveys (Nigeria) . . . [8174-70]

**Applying remote sensing techniques to monitor mangrove changes in the Iranian coastal zone of Oman Gulf**, Alireza Salehipour Milani, Geological Survey of Iran (Iran, Islamic Republic of) . . . . . [8174-71]

**Multitemporal spatial pattern analysis of Tulum's tropical coastal landscape**, Sandra C. Ramirez-Forero, Alejandra A. López-Caloca, José L. Silván-Cárdenas, Ctr. de Investigación en Geografía y Geomática (Mexico) . . . . . [8174-72]

#### Change Detection

**A statistical model for the selection of ground observations of solar radiation: an application in producing a five-year dataset of radiation maps on Italian territory through correction of MSG-derived data**, Lorenzo Campo, Fabio Castelli, Univ. degli Studi di Firenze (Italy) . . . . . [8174-74]

**Ecosystem service value assessment by land use change in South Korea using remote sensing data and a geographic information system**, Young Hwa Jung, Chul Uong Choi, Ho-Yong Ahn, Pukyong National Univ. (Korea, Republic of) . . . . . [8174-75]

#### Irrigation and Energy Balance

**The theory of shortwave infrared perpendicular water stress index and its application in soil moisture retrieval under full covered vegetation condition**, Huai-liang Chen, Hong-wei Zhang, Henan Institute of Meteorological Science (China). . . . . [8174-76]

**Scaling from instantaneous remote-sensing-based latent heat flux to daytime integrated value with the help of SiB<sub>2</sub>**, Yi Song, Mingguo Ma, Xin Li, Xufeng Wang, Cold and Arid Regions Environmental and Engineering Research Institute (China) . . . . . [8174-77]

#### General Applications

**Spatial distribution of carbon dioxide absorption and emission in Chungcheongbuk-do, South Korea using RS and GIS method**, Jin Ki Park, Sang Il Na, Jong Hwa Park, Chungbuk National Univ. (Korea, Republic of) . . . . . [8174-78]

**Physical satellite observation collocation algorithms in polar-geostationary observation integration system**, Haibing Sun, Perot Systems Government Service (United States); Walter W. Wolf, National Oceanic and Atmospheric Administration (United States); Thomas S. King, Perot Systems Government Service (United States); Christopher D. Barnet, Mitchell D. Goldberg, National Oceanic and Atmospheric Administration (United States). . . . . [8174-79]

#### RS for Agriculture, Ecosystems, and Hydrology

**An insight of using remote sensing technique on water resources management**, Alireza Farid, Parisa Mirhosseini, Hamed Gazerani, Ferdowsi Univ. of Mashhad (Iran, Islamic Republic of); Ali Daneshvari, Islamic Azad Univ. (Iran, Islamic Republic of); Amir Mohammad Rafati Sokhangoo, Leila Rafati Sokhangoo, Ferdowsi Univ. of Mashhad (Iran, Islamic Republic of) . . . . . [8174-81]

**A remote sensing technique for the assessment of stable interannual dynamical patterns of vegetation**, Maxim Chernetskiy, Anatoly P. Shevyrnogov, Institute of Biophysics (Russian Federation) . . . . . [8174-82]

**Research on spectral imaging technology for medical imaging and remote sensing**, YongQuan Luo, Institute of Fluid Physics (China) . . . . . [8174-83]

**MODIS GPP product validation in Heihe River basin, China**, Xufeng Wang, Mingguo Ma, Xin Li, Guanghui Huang, Yi Song, Junlei Tan, Zhihui Zhang, Cold and Arid Regions Environmental and Engineering Research Institute (China) . . . . . [8174-84]

**Validation of MODIS land surface temperature products using ground measurements in Heihe River Basin, China**, Wenping Yu, Mingguo Ma, Xunfeng Wang, Cold and Arid Regions Environmental and Engineering Research Institute (China) . . . . . [8174-85]

**Agricultural land use classification using RapidEye satellite data in South Korea**, Hyun-Ok Kim, Jong-Min Yeom, Youn-Soo Kim, Korea Aerospace Research Institute (Korea, Republic of) . . . [8174-88]

**Rational design of long-wave infrared band for application of the earth surface temperature observation**, Yunfei Bao, Beijing Institute of Space Mechanics and Electricity (China) . . . . . [8174-89]

**A computer simulation model to compute the radiation transfer of mountainous regions**, Yuguang Li, Feng Zhao, BeiHang Univ. (China) . . . . . [8174-91]

**Mutual influence between climate and vegetation cover through satellite data in Egypt**, Mohammed A. El-Shirbeny, Mohamed A. Aboelghar, Sayed M. Arafat, National Authority for Remote Sensing and Space Sciences (Egypt); Abdel-Ghany M. El-Gindy, Ain Shams Univ. (Egypt) . . . . . [8174-92]

**DEM densification based on SFS from single multispectral remote sensing image**, Chen Zhe, Tao Sun, Qianqing Qin, Wuhan Univ. (China); Huaguo Zhang, The Second Institute of Oceanography, SOA (China) . . . . . [8174-94]

**Periodicity analysis of NDVI time series in Heihe River basin in China**, Huibang Han, Anhui Agricultural Univ. (China); Mingguo Ma, Cold and Arid Regions Environmental and Engineering Research Institute (China) . . . . . [8174-95]

**Passive microwave radiance estimation by coupling a land surface emissivity model with CRTM**, Huoping Pan, Jiancheng Shi, Institute of Remote Sensing Applications (China); Hu Yang, China Meteorological Administration (China) . . . . . [8174-96]

**The phenological characterization of the semi-arid regions of China based on remote sensing, flux tower observations and terrestrial ecosystem model**, Haibo Wang, Mingguo Ma, Cold and Arid Regions Environmental and Engineering Research Institute (China) . . . . . [8174-99]

**Angular and polarization measurements of snow and bare soil microwave reflective and emissive characteristics by Ka-band (37ghz), combined scatterometer-radiometer**, Malanya L. Grigoryan, Artashes K. Arakelyan, Astghik K. Hambaryan, Arsen A. Arakelyan, ECOSERV Remote Observation Ctr. Co. Ltd. (Armenia) . . . . . [8174-102]

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**Trajectories of land use change in huangshui river basin based on CLUE-S model**, Juan Gu, Cold and Arid Regions Environmental and Engineering Research Institute (China); Xiaohong Gao, Shichao Feng, Qinghai Normal Univ. (China) . . . . . [8174-103]

**Estimation of water budget by remote sensing in Taihu basin, China**, Xiaosong Zhao, Yuanbo Liu, Nanjing Institute of Geography and Limnology (China). . . . . [8174-104]

**Evaluation of MODIS and reanalysis atmospheric products for atmospheric correction in thermal infrared domain with ground measurements**, Hua Li, Qinhuo Liu, Yongming Du, Bo Zhong, Institute of Remote Sensing Applications (China). . . . . [8174-105]

**A radiosity-based model to compute the radiation transfer of soil surface**, Feng Zhao, Yuguang Li, BeiHang Univ. (China). . . [8174-106]

**Validation of the collection 5 MODIS LAI product by scaling-up method using in situ measurements**, Huazhu Xue, Jindi Wang, Beijing Normal Univ. (China) . . . . . [8174-107]

## **Remote Sensing Plenary Session**

Monday 19 September 09.00 to 10.45

For details, please see page 5



# Remote Sensing of the Ocean, Sea Ice, Coastal Waters, and Large Water Regions 2011

*Conference Chairs:* **Charles R. Bostater, Jr.**, Florida Institute of Technology (United States); **Stelios P. Mertikas**, Technical Univ. of Crete (Greece); **Xavier Neyt**, Royal Belgian Military Academy (Belgium); **Miguel Velez-Reyes**, Univ. de Puerto Rico Mayagüez (United States)

*Programme Committee:* **Karine Caillault**, ONERA (France); **Eurico D'Sa**, Louisiana State Univ. (United States); **Alex Gilerson**, The City College of New York (United States); **Ana M. Martins**, Univ. dos Açores (Portugal)

## Wednesday 21 September

### Opening Remarks

**Room: Leo** ..... **Wed. 08.45 to 08.50**

**Charles R. Bostater, Jr.**, Florida Institute of Technology (USA)

### SESSION 1

**Room: Leo** ..... **Wed. 08.50 to 10.20**

#### Ocean Colour

*Session Chair:* **Alex Gilerson**,  
The City College of New York (United States)

08.50: **Sea surface temperature and ocean colour (MODIS/AQUA) space and time variability in Indonesian Sea coral reef systems from 2002 to 2011** (*Invited Paper*), Rita A. Polonia, Univ. de Aveiro (Portugal); Miguel P. Figueiredo, Univ. dos Açores (Portugal); David F. R. Cleary, Univ. de Aveiro (Portugal); N. Voogd, Univ. Twente (Netherlands); Ana M. Martins, Univ. dos Açores (Portugal) . . [8175-01]

09.10: **Bathymetry mapping and sea floor classification using multispectral satellite data and standardized physics based data processing**, Thomas Heege, Sabine Ohlendorf, EOMAP GmbH & Co. KG (Germany); Sergio Cerdeira-Estrada, CONABIO (Mexico); Halina T. Kobryn, Murdoch Univ. (Australia) . . . . . [8175-02]

09.40: **Development of a remote sensing algorithm for Cyanobacterial phycocyanin pigment in the Baltic Sea using neural network approach**, Stefan Riha, Harald Krawczyk, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [8175-04]

10.00: **Uncertainties assessment and satellite validation over 2 years time series of multispectral, hyperspectral and polarization measurements in coastal waters at Long Island Sound Coastal Observatory**, Samir Ahmed, Tristan Harmel, Alex Gilerson, Alberto Tonizzo, Soe Hlaing, The City College of New York (United States); Alan Weidemann, Robert Arnone, U.S. Naval Research Lab. (United States) . . . . . [8175-05]

Coffee Break . . . . . 10.20 to 10.50

### SESSION 2

**Room: Leo** ..... **Wed. 10.50 to 12.20**

#### Surface and In-Situ Water Properties

*Session Chair:* **Eurico J. D'Sa**, Louisiana State Univ. (United States)

10.50: **Estimating uncertainties in bio-optical products derived from satellite ocean color imagery using an ensemble approach**, Richard W. Gould, Jr., Sean C. McCarthy, Igor Shulman, Emanuel Coelho, James Richman, U.S. Naval Research Lab. (United States) . . . . . [8175-07]

11.10: **Estimating errors in satellite retrievals of bio-optical properties due to incorrect aerosol model selection** (*Invited Paper*), Sean C. McCarthy, Richard W. Gould, Jr., Courtney Kearney, Adam Lawson, James Richman, U.S. Naval Research Lab. (United States) . . . . . [8175-06]

11.40: **Some insights of spectral optimization in ocean color inversion**, Zhongping Lee, Mississippi State Univ. (United States); Bryan Franz, NASA Goddard Space Flight Ctr. (United States); Shaoling Shang, Xiamen Univ. (China); Qiang Dong, Mississippi State Univ. (United States); Robert Arnone, U.S. Naval Research Lab. (United States) . . . . . [8175-08]

12.00: **Measuring underwater polarization field from above-water hyperspectral instrumentation for water composition retrieval**, Tristan Harmel, Alberto Tonizzo, Alex Gilerson, The City College of New York (United States); Jacek Chowdhary, Columbia Univ. (United States); Soe Hlaing, Samir Ahmed, The City College of New York (United States) . . . . . [8175-09]

Lunch/Exhibition Break . . . . . 12.20 to 13.30

### SESSION 3

**Room: Leo** ..... **Wed. 13.30 to 15.10**

#### Oil and Airborne Remote Sensing I

*Session Chair:* **Jean-Paul Bruyant**, ONERA (France)

13.30: **Remote sensing as input and validation tool for oil spill drift modelling**, Björn Baschek, Bundesanstalt für Gewässerkunde (Germany); Stephan Dick, Frank Janssen, Bundesamt für Seeschifffahrt und Hydrographie (Germany); Carina Kübert, Bundesanstalt für Gewässerkunde (Germany); Silvia Massmann, Bundesamt für Seeschifffahrt und Hydrographie (Germany); Marlon Pape, Michael Roers, Bundesanstalt für Gewässerkunde (Germany) . . . . . [8175-10]

13.50: **Airborne imaging sensors for environmental monitoring and surveillance in support of oil spills and recovery efforts**, Charles R. Bostater, Jr., James Jones, Heather Frystacky, Gaelle Coppin, Florian Leavaux, Florida Institute of Technology (United States) . . . . [8175-11]

14.10: **SETHI and SYSIPHE: the two new-generation airborne remote sensing systems**, Jean-Paul Bruyant, Philippe Dreuillet, Patrick Chervet, Laurent Rousset-Rouviere, ONERA (France) . . . . . [8175-12]

14.30: **Short gravity-capillary waves modulation due to long surface and internal wave: laboratory and field experiment**, Irina Sergievskaya, Stanislav A. Ermakov, Institute of Applied Physics (Russian Federation) . . . . . [8175-13]

14.50: **Development and testing of an improved optimal band selection methodology using hyperspectral, multispectral imagery and synthetic imagery for shoreline feature analysis**, Charles R. Bostater, Jr., Florian Leavaux, Gaelle Coppin, Heather Frystacky, James Jones, Florida Institute of Technology (United States); Xavier Neyt, Royal Belgian Military Academy (Belgium) . . . . . [8175-14]

Coffee Break . . . . . 15.10 to 15.40

### SESSION 4

**Room: Leo** ..... **Wed. 15.40 to 17.20**

#### Oil and Airborne Remote Sensing II

*Session Chair:* **Charles R. Bostater, Jr.**, Florida Institute of Technology (United States)

15.40: **Potential impacts of the Deepwater Horizon oil spill on large pelagic fishes** (*Invited Paper*), Sarrah Frias-Torres, Ocean Research & Conservation (United States); Charles R. Bostater, Jr., Florida Institute of Technology (United States) . . . . . [8175-15]

16.00: **High spectral resolution imager for solar induced fluorescence observation**, Alessandro Barducci, Vanni Nardino, Donatella Guzzi, Cinzia Lastri, Paolo Sandri, Ivan Pippi, Paolo Marcoionni, Valentina Raimondi, Istituto di Fisica Applicata Nello Carrara (Italy) . . . . . [8175-16]

16.20: **Airborne hydromapping and hydroconnect shallow water bathymetry: pioneering underwater insights**, Frank Steinbacher, Leopold-Franzens-Univ. Innsbruck (Austria) . . . . . [8175-17]

**16.40: Calibration, collection, and correction of airborne hyperspectral and high spatial resolution multispectral imagery for advanced coastal shoreline assessments**, Charles R. Bostater, Jr., Gaelle Coppin, Florian Leavaux, Florida Institute of Technology (United States); Xavier Neyt, Royal Belgian Military Academy (Belgium); Heather Frystacky, James Jones, Florida Institute of Technology (United States) . . . . . [8175-18]

**17.00: Mesoscale and submesoscale eddies on the sea shelf and their impact on oil spill spread**, Olga Y. Lavrova, Space Research Institute (Russian Federation); Andrey G. Kostianoy, P.P. Shirshov Institute of Oceanology (Russian Federation); Alexey Y. Storchkov, Space Research Institute (Russian Federation) . . . . . [8175-19]

## Posters . . . . . Wed. 17.30 to 19.00

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**In-orbit radiometric performance variations of geostationary ocean color imager**, Sun-Ju Lee, Seongick Cho, Hee-Jeong Han, Eunsong Oh, Joo-Hyung Ryu, Yu-Hwan Ahn, Korea Ocean Research & Development Institute (Korea, Republic of) . . . . . [8175-03]

**UAV remote sensing hazard assessment in Zhouqu debris flow disaster**, Qi Wen, Feng Xu, Shirong Chen, National Disaster Reduction Ctr. of China (China) . . . . . [8175-20]

**Is the katabatic wind the forcing factor of Terra Nova Bay polynya events?**, Fiorigi F. Parmiggiani, Istituto di Scienze dell'Atmosfera e del Clima (Italy) . . . . . [8175-36]

**Analysis of submarine sand wave imaging by SAR in Taiwan Shoal**, Kaiguo Fan, Weigen Huang, Bin Fu, The Second Institute of Oceanography, SOA (China) . . . . . [8175-37]

**Automatic procedure for oceanic internal wave detection on SAR image**, Kaiguo Fan, Xingxiu Yu, Linyi Univ. (China); Weigen Huang, Bin Fu, The Second Institute of Oceanography, SOA (China) . . . . [8175-38]

**Exploring nutrient dynamics in Tampa Bay via sea-land interactions using MODIS images and clustering analysis**, Ni-Bin Chang, Univ. of Central Florida (United States) . . . . . [8175-39]

**Integrated remote sensing and GIS applications in coastal environmental management and control based on high resolution satellite imagery data**, Nasser Najibi, Univ. of Tehran (Iran, Islamic Republic of) . . . . . [8175-41]

**Development of clarity model for Caspian Sea using MERIS images**, Hamid Taheri Shahraiyini, Tarbiat Modares Univ. (Iran, Islamic Republic of); Hosein Sharifi, Shahrood Univ. of Technology (Iran, Islamic Republic of); Melika Sanaeifar, Islamic Azad Univ. (Iran, Islamic Republic of) . . . . . [8175-43]

**Quasistationary areas of surface chlorophyll concentration as an indicator of the hydrological structure of the ocean based on satellite data**, Anatoly P. Shevyrnogov, Galina Vysotskaya, Institute of Biophysics (Russian Federation) . . . . . [8175-44]

**Is it possible to add total SWH of ocean waves to the Globwave SAR dataset?**, Jingsong Yang, The Second Institute of Oceanography, SOA (China) . . . . . [8175-45]

**Phytoplankton bloom and sea surface cooling induced by Category 5 Typhoon Megi in the South China Sea: direct multi-satellite observations**, Xiaoyan Chen, The Second Institute of Oceanography, SOA (China) and Zhejiang Univ. (China); Delu Pan, The Second Institute of Oceanography, SOA (China); Xianqiang He, The Second Institute of Oceanography, SOA (China) and Zhejiang Univ. (China); Yan Bai, Difeng Wang, The Second Institute of Oceanography, SOA (China) . . . . . [8175-47]

**Relationship between the colored dissolved organic matter and dissolved organic carbon and the application on remote sensing in East China Sea**, Liu Qiong, Wuhan Univ. (China) and The Second Institute of Oceanography, SOA (China); Yan Bai, Haiqing Huang, Qiankun Zhu, The Second Institute of Oceanography, SOA (China); Chen Zhe, Wuhan Univ. (China) . . . . . [8175-48]

**Study on long-term characteristics of suspended sediments in Minjiang Estuary based on MODIS DATA**, Xiaohui Xu, The Third Institute of Oceanography, SOA (China) and South China Sea Institute of Oceanology (China); Jian Chen, The Third Institute of Oceanography, SOA (China); Delu Pan, Zhihua Mao, Xiaoyan Chen, The Second Institute of Oceanography, SOA (China) . . . . . [8175-49]

**Optical absorption and scattering properties in the East China Sea**, Xuan Zhang, Xianqiang He, The Second Institute of Oceanography, SOA (China) . . . . . [8175-50]

**Remote sensing of water basins using optical range: time images of water surface**, Viktor I. Titov, Institute of Applied Physics (Russian Federation) . . . . . [8175-51]

**Research on sea surface wind field retrieval from SAR imagery along the Zhejiang coast**, Junfang Chang, Ocean University of China (China); WeiGeng Huang, XiuLin Lou, Kaiguo Fan, The Second Institute of Oceanography, SOA (China) . . . . . [8175-53]

**HAB detection based on absorption and backscattering properties of phytoplankton**, Hui Lei, The Second Institute of Oceanography, SOA (China) and Zhejiang Univ. (China); Delu Pan, Yan Bai, Xianqiang He, The Second Institute of Oceanography, SOA (China); Xiaoyan Chen, The Second Institute of Oceanography, SOA (China) and Zhejiang Univ. (China) . . . . . [8175-55]

**The internal waves' distribution of whole South China Sea extracted from ENVISAT and ERS2 SAR images**, Juan Wang, Ocean Univ. of China (China) . . . . . [8175-56]

**In-orbit image performance simulation for GOCI of using integrated ray tracing technique**, Eun-Song Oh, Korea Ocean Research & Development Institute (Korea, Republic of); Sug-Whan Kim, Yonsei Univ. (Korea, Republic of); Yukyong Jeong, I&A Tech, Inc. (Korea, Republic of); Soomin Jeong, LG Innotek (Korea, Republic of); Seongick Cho, Joo-Hyung Ryu, Yu-Hwan Ahn, Korea Ocean Research & Development Institute (Korea, Republic of) . . . . [8175-57]

**An extracting process of the retrieval coefficients for three frequency channel microwave radiometer**, Gang Zheng, The Second Institute of Oceanography, SOA (China) . . . . . [8175-59]

**Sea ice remote sensing using AMSR-E data: surface roughness and refractive index**, Inchul Shin, Jongseo Park, Aesook Suh, Sungwook Hong, Korea Meteorological Administration (Korea, Republic of) . . . . . [8175-60]

**The use of MERIS fluorescence bands for red tides monitoring in the East China Sea**, Bangyi Tao, Zhihua Mao, The Second Institute of Oceanography, SOA (China) . . . . . [8175-61]

**The preliminary analysis of Asian dust events impact on the concentration of chlorophyll a in the Yellow Sea**, Qianguang Tu, Zengzhou Hao, Fang Gong, Delu Pan, Xiaoyan Chen, The Second Institute of Oceanography, SOA (China) . . . . . [8175-62]

**Satellite observation of upwelling along the Zhejiang Coast of the East China Sea during 2007-2009**, Xiulin Lou, The Second Institute of Oceanography, SOA (China) . . . . . [8175-63]

**The buoy-based reversion of regional thermocline integrated with satellite observed SST in the margins off the Changjiang Estuary**, Lijin Liang, Jianyu Chen, Xiaoyan Chen, Haiqing Huang, The Second Institute of Oceanography, SOA (China) . . . . . [8175-64]

**On possibility of remote sensing of algae bloom using its effect on short surface waves**, Stanislav A. Ermakov, Irina Sergievskaya, Ivan Kapustin, Institute of Applied Physics (Russian Federation) . . [8175-65]

**Remote estimation of chlorophyll-a using MERIS and MODIS images in Tai lake, China**, Xiuzhen Han, Wei Zheng, National Satellite Meteorological Ctr. (China) . . . . . [8175-66]

**Robust scanning scheme over large area for airborne EO/IR camera**, Yongeun Yoon, Geon Hwan Yu, Chang Gyun Noh, Dae Beom Song, ADD, Agency for Defense Development (Korea, Republic of) . . . . . [8175-68]

**Platforms oil spill monitoring by means of TerraSAR-X: North Sea-Gulf of Mexico comparisons**, Domenico Velotto, Susanne Lehner, Xiao-Ming Li, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [8175-71]

Thursday 22 September

SESSION 5

Room: Leo .....Thurs. 08.40 to 10.20

Ocean and Coastal Sensing I

Session Chair: Sean C. McCarthy,  
U.S. Naval Research Lab. (United States)

08.40: **Testing the consistency between MODIS ocean colour data and in situ chlorophyll-a measurements within coastal waters of the Maltese Islands**, Alan Deidun, Univ. of Malta (Malta) and European Commission Joint Research Ctr. (Italy); Aldo Drago, Anthony Galea, Joel Azzopardi, Adam Gauci, Univ. of Malta (Malta); Frederic Melin, European Commission Joint Research Ctr. (Italy) . . . . [8175-21]

09.00: **Estimation of the seasonal sea level variations in the Gulf of Cadiz (SW Iberian Peninsula) from in-situ measurements, satellite altimetry and numerical models**, Irene M. Laiz, Jesus Gómez-Enrí, Begoña Tejedor, Alazne Aboitiz, Pilar Villares, Univ. de Cádiz (Spain) . . . . . [8175-23]

09.20: **The full-scale investigations of the action of internal waves and inhomogeneous flows on the wind waves in the White Sea**, Victor V. Bakhanov, Nikolai A. Bogatov, Aleksei V. Ermoshkin, Vadim N. Lobanov, Olga N. Kemarskaja, Victor I. Titov, Institute of Applied Physics (Russian Federation) . . . . . [8175-24]

09.40: **Coastal zone monitoring using high resolution X-band SAR sensor of TerraSAR-X**, Xiao-Ming Li, Susanne Lehner, Andrey Pleskachevsky, Stephan Bruschi, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [8175-69]

10.00: **Total suspended solids concentrations mapping by THEOS imagery over Penang Island, Malaysia**, Robabeh Asadpour, Lim Hwee San, Univ. Sains Malaysia (Malaysia); Saeid Kakoeei, Univ. Teknologi Petronas (Malaysia); Somayah Asadi Shekafti, Univ. Sains Malaysia (Malaysia) . . . . . [8175-40]

Coffee Break . . . . . 10.20 to 10.50

SESSION 6

Room: Leo .....Thurs. 10.50 to 11.30

Ocean and Coastal Sensing II

Session Chair: Ana M. Martins, Univ. dos Açores (Portugal)

10.50: **Bidirectional reflectance function in coastal waters: modeling and validation**, Alex Gilerson, Soe Hlaing, Tristan Harmel, Alberto Tonizzo, The City College of New York (United States); Robert Arnone, Alan Weidemann, U.S. Naval Research Lab. (United States); Samir Ahmed, The City College of New York (United States). [8175-25]

11.10: **Oceanic response around the Yucatan Peninsula to the 2005 hurricanes from remote sensing**, Eurico J. D'Sa, Nazanin Tehrani, Victor H. Rivera-Monroy, Louisiana State Univ. (United States) . . . . . [8175-26]

SESSION 7

Room: Leo .....Thurs. 11.30 to 12.50

Sensor Calibration, Retrievals, and Errors

Session Chair: Xavier Neyt, Royal Belgian Military Academy (Belgium)

11.30: **Generalized satellite image processing: eight years of ocean colour data for any region on earth**, Quinten Vanhellemont, Bouchra Nechad, Kevin Ruddick, Institut Royal des Sciences Naturelles de Belgique (Belgium) . . . . . [8175-28]

11.50: **Remote sensing and in situ observations of marine slicks associated with inhomogeneous coastal currents**, Stanislav A. Ermakov, Ivan Kapustin, Irina Sergievskaya, Institute of Applied Physics (Russian Federation) . . . . . [8175-29]

12.10: **Spring snow surface water content fluctuations as a tool to extract sea ice structures**, Eric Hudier, Drishty Ramdenee, Univ. du Québec a Chicoutimi (Canada) . . . . . [8175-30]

12.30: **Cross-comparison of ERS-2 and Metop-A scatterometers measurements using various methods**, A. Elyouncha, X. Neyt, Royal Belgian Military Academy (Belgium) . . . . . [8175-70]

Lunch Break . . . . . 12.50 to 13.50

SESSION 8

Room: Leo .....Thurs. 13.50 to 15.10

Microwave, Radar and Altimetry Sensing

Session Chair: Stelios P. Mertikas, Technical Univ. of Crete (Greece)

13.50: **Preparatory works for the altimeter calibration of the Sentinel-3 mission using the dedicated calibration site at Gavdos**, Stelios P. Mertikas, Antonis Daskalakis, Eftihis Koutroulis, Achilles Tripolitsiotis, Technical Univ. of Crete (Greece) . . . . . [8175-31]

14.10: **Quasi-operational marine wind retrieval system based on satellite-based synthetic aperture radar information**, Vladimir Zabeline, Environment Canada (Canada) . . . . . [8175-32]

14.30: **Directional ocean wave spectra estimation based on the joint measurement from synthetic aperture radar and wave spectrometer**, Ren Lin, Pan Delu, Zengzhou Hao, Zhihua Mao, Xianqiang He, The Second Institute of Oceanography, SOA (China) . . . . . [8175-33]

14.50: **Multifrequency and multipolarization measurements of water surface radar cross section and brightness temperature angular dependences**, Artashes K. Arakelyan, Astghik K. Hambaryan, Arsen A. Arakelyan, Melanya L. Grigoryan, ECOSERV Remote Observation Ctr. Co. Ltd. (Armenia) . . . . . [8175-34]

Remote Sensing Plenary Session

Monday 19 September 09.00 to 10.45

For details, please see page 5



# Conference 8176 · Room: Nadir

Monday-Thursday 19-22 September 2011 • Proceedings of SPIE Vol. 8176

## Sensors, Systems, and Next-Generation Satellites

*Conference Chairs:* **Roland Meynart**, European Space Research and Technology Ctr. (Netherlands); **Steven P. Neeck**, NASA Headquarters (United States); **Haruhisa Shimoda**, Japan Aerospace Exploration Agency (Japan)

*Programme Committee:* **Yann H. Kerr**, Ctr. d'Etudes Spatiales de la Biosphère (France); **Olivier Saint-Pe**, EADS Astrium (France); **Xiaoxiong Jack Xiong**, NASA Goddard Space Flight Ctr. (United States)

### Monday 19 September

#### Welcome and Introduction

**Room: Nadir . . . . . Mon. 11.10 to 11.15**

**Roland Meynart**, European Space Research and Technology Ctr. (Netherlands); **Steven P. Neeck**, NASA Headquarters (United States); **Haruhisa Shimoda**, Japan Aerospace Exploration Agency (Japan)

#### SESSION 1

**Room: Nadir . . . . . Mon. 11.15 to 13.05**

##### US Missions

*Session Chair:* **Steven P. Neeck**, NASA Headquarters (United States)

11.15: **NASA Earth Science Flight Program Overview** (*Invited Paper*), Steven P. Neeck, Stephen Volz, NASA Headquarters (United States) . . . . . [8176-01]

11.45: **Launch and on-orbit checkout of Aquarius/SAC-D Observatory: an international remote sensing satellite mission measuring sea surface salinity**, Amit Sen, Jet Propulsion Lab. (United States); Daniel Caruso, Comision Nacional de Actividades Espaciales (Argentina); David Durham, Jet Propulsion Lab. (United States); Carlos Falcon, Comision Nacional de Actividades Espaciales (Argentina) . . . . . [8176-02]

12.05: **The NASA NRC Decadal Survey HypsIRI Mission: Global Imaging Spectroscopy and Multi-Spectral Thermal Measurements for Critical Earth Science and Climate Variability Objectives**, Robert O. Green, Jet Propulsion Lab. (United States) . . . . . [8176-03]

12.25: **Joint Polar Satellite System**, Timothy G. Trenkle, NASA Goddard Space Flight Ctr. (United States); Phillip A. Driggers, SGT, Inc. (United States) . . . . . [8176-04]

12.45: **Preflight assessment of the cross-track infrared sounder (CRIS) performance**, Vladimir V. Zavyalov, Chad S. Fish, Gail E. Bingham, Mark Esplin, Mark Greenman, Deron Scott, Utah State Univ. Research Foundation (United States) . . . . . [8176-05]

Lunch Break . . . . . 13.05 to 14.15

#### SESSION 2

**Room: Nadir . . . . . Mon. 14.15 to 15.25**

##### European Missions I

*Session Chair:* **Roland Meynart**, European Space Research and Technology Ctr. (Netherlands)

14.15: **Status of new and future ESA missions** (*Invited Paper*), Roland Meynart, Pierluigi Silvestrin, European Space Research and Technology Ctr. (Netherlands) . . . . . [8176-06]

14.45: **Observation requirements for the second generation EUMETSAT polar system visible/infrared imager (VII)**, Pepe L. Phillips, Peter Schlüssel, Christophe J. Accadia, European Organisation for the Exploitation of Meteorological Satellites (Germany); Isabel Zerfowski, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [8176-07]

15.05: **PDR status for TROPOMI, the Sentinel 5 precursor instrument for air quality and climate observations**, Johan de Vries, Robert Voors, Dutch Space B.V. (Netherlands); Nick C. J. van der Valk, Gerard Otter, TNO Science and Industry (Netherlands); Ralph C. Snel, Ruud W. Hoogeveen, Ilse Aben, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands); Quintus Kleipool, Pepijn Veefkind, Koninklijk Nederlands Meteorologisch Instituut (Netherlands) . . . . . [8176-08]

Coffee Break . . . . . 15.25 to 15.50

#### SESSION 3

**Room: Nadir . . . . . Mon. 15.50 to 17.10**

##### European Missions II

*Session Chair:* **Roland Meynart**, European Space Research and Technology Ctr. (Netherlands)

15.50: **PREMIER's imaging IR limb sounder**, Stefan Kraft, Jerome C. Caron, Jean-Loup Bezy, Roland Meynart, Jörg Langen, Bernardo Carnicero Dominguez, Pierluigi Silvestrin, European Space Research and Technology Ctr. (Netherlands) . . . . . [8176-10]

16.10: **FIMAS: on the feasibility of a fluorescence imaging spectrometer to be flown on a small platform in tandem with Sentinel 3**, Stefan Kraft, Jean-Loup Bezy, Roland Meynart, European Space Research and Technology Ctr. (Netherlands) . . . . . [8176-11]

16.30: **Aalto-1: a hyperspectral earth observing nanosatellite**, Antti Näsilä, Anssi Hakkarainen, Jaan Praks, Martti Hallikainen, Aalto Univ. School of Science and Technology (Finland); Heikki K. Saari, Jarkko E. Antila, VTT Technical Research Ctr. of Finland (Finland); Pekka Janhunen, Finnish Meteorological Institute (Finland); Rami Vainio, Univ. of Helsinki (Finland) . . . . . [8176-13]

16.50: **Spectropolarimeter for planetary exploration (SPEX): performance measurements with a prototype**, Robert Voors, Dutch Space B.V. (Netherlands); Scott G. Moon, Sandro Hannemann, cosine Research B.V. (Netherlands); Jeroen H. H. Rietjens, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands); Gerard van Harten, Frans Snik, Utrecht Univ. (Netherlands); Martijn Smit, Daphne M. Stam, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands); Christoph U. Keller, Utrecht Univ. (Netherlands); Erik C. Laan, Adrianus L. Verlaan, Willem A. Vliegthart, TNO Science and Industry (Netherlands); Rik ter Horst, Ramón Navarro, ASTRON (Netherlands); Klaas Wielenga, Mecon Engineering B.V. (Netherlands) . . . . . [8176-14]

### Tuesday 20 September

#### SESSION 4

**Room: Nadir . . . . . Tues. 08.30 to 10.00**

##### Japanese Missions I

*Session Chair:* **Haruhisa Shimoda**, Japan Aerospace Exploration Agency (Japan)

08.30: **Overview of Japanese Earth observation programs** (*Invited Paper*), Haruhisa Shimoda, Japan Aerospace Exploration Agency (Japan) . . . . . [8176-15]

09.00: **Eleven years of ASTER onboard calibration**, Fumihiko Sakuma, Masakuni Kikuchi, Nagamitsu Ohgi, Japan Resources Observation System and Space Utilization Organization (Japan); Hitomi Inada, NEC TOSHIBA Space Systems, Ltd. (Japan); Shigeki Akagi, Mitsubishi Electric Corp. (Japan); Hidehiko Ono, Fujitsu Ltd. (Japan) . . . . . [8176-16]

09.20: **ALOS ("Daichi") Observation Results of the Great East Japan Earthquake in 2011.**, Masuo Takahashi, Masanori Shimada, Takeo Tadono, Japan Aerospace Exploration Agency (Japan) . . . . . [8176-17]

09.40: **On-orbit Status of TANSO onboard GOSAT**, Masakatsu Nakajima, Hiroshi Suto, Akihiko Kuze, Kei Shiomi, Japan Aerospace Exploration Agency (Japan) . . . . . [8176-18]

Coffee Break . . . . . 10.00 to 10.30



## SESSION 5

Room: Nadir . . . . . Tues. 10.30 to 12.10

## Japanese Missions II

*Session Chair: Haruhisa Shimoda,*  
Japan Aerospace Exploration Agency (Japan)10.30: **Update of the GOSAT higher level product status 2.5 years after the launch**, Hiroshi Watanabe, Akira Yuki, Kenji Hayashi, Fumie Kawazoe, Nobuyuki Kikuchi, Fumiho Takahashi, Tsuneo Matsunaga, Tatsuya Yokota, National Institute for Environmental Studies (Japan) . . . . . [8176-19]10.50: **Airborne flight campaign for GOSAT validation**, Daisuke Sakaizawa, Shuji Kawakami, Masakatsu Nakajima, Japan Aerospace Exploration Agency (Japan); Tomoaki Tanaka, Makoto Inoue, Isamu Morino, Osamu Uchino, National Institute for Environmental Studies (Japan) . . . . . [8176-20]11.10: **On orbit performance of radio spectrometers of Superconducting Submillimeter-Wave Limb-Emission Sounder (JEM/SMILES)**, Satoko Mizobuchi, Japan Aerospace Exploration Agency (Japan); Hiroyuki Ozeki, Kenta Tamaki, Toho Univ. (Japan); Kenichi Kikuchi, Toshiyuki Nishibori, Japan Aerospace Exploration Agency (Japan); Satoshi Ochiai, National Institute of Information and Communications Technology (Japan); Masato Shiotani, Kyoto Univ. (Japan); Chihiro Mitsuda, Fujitsu FIP Corp. (Japan) . . . . . [8176-21]11.30: **Measurement of chlorine species, HCl, HOCl, and ClO by ISS/JEM/SMILES**, Makoto Suzuki, Japan Aerospace Exploration Agency (Japan); Chihiro Mitsuda, Chikako Takahashi, Fujitsu FIP Corp. (Japan); Naohiro Manago, Japan Aerospace Exploration Agency (Japan); Koji Imai, Tome R&D Inc. (Japan); Yoshitaka Iwata, Takuki Sano, Japan Aerospace Exploration Agency (Japan); Kenshi Takahashi, Kyoto Univ. (Japan); Takeshi Imamura, Hideharu Akiyoshi, National Institute for Environmental Studies (Japan); Hiroo Hayashi, Yoko Naito, Masato Shiotani, Kyoto Univ. (Japan) . . . . . [8176-22]11.50: **Current status of level 2 product of Superconducting Submillimeter-Wave Limb- Emission Sounder (SMILES)**, Chihiro Mitsuda, Fujitsu FIP Corp. (Japan); Makoto Suzuki, Yoshitaka Iwata, Naohiro Manago, Japan Aerospace Exploration Agency (Japan); Yoko Naito, Kyoto Univ. (Japan); Chikako Takahashi, Fujitsu FIP Corp. (Japan); Koji Imai, Tome R&D Inc. (Japan); Eriko Nishimoto, Hiroo Hayashi, Masato Shiotani, Kyoto Univ. (Japan); Takuki Sano, Masahiro Takayanagi, Japan Aerospace Exploration Agency (Japan); Hirotomo Taniguchi, Fujitsu FIP Corp. (Japan) . . . . . [8176-23]  
Lunch/Exhibition Break . . . . . 12.10 to 13.30

## SESSION 6

Room: Nadir . . . . . Tues. 13.30 to 16.20

## Japanese Missions III

*Session Chair: Haruhisa Shimoda,*  
Japan Aerospace Exploration Agency (Japan)13.30: **Status of GCOM-W1/AMSR2 development, algorithms, and products**, Takashi Maeda, Keiji Imaoka, Misako Kachi, Hideyuki Fujii, Akira Shibata, Kazuhiro Naoki, Marehito Kasahara, Norimasa Ito, Keizo Nakagawa, Japan Aerospace Exploration Agency (Japan); Taikan Oki, Japan Aerospace Exploration Agency (Japan) and The Univ. of Tokyo (Japan) . . . . . [8176-24]13.50: **Outline GCOM - C1 / SGLI science**, Yoshiaki Honda, Chiba Univ. (Japan) . . . . . [8176-25]14.10: **Status of proto-flight test of the dual-frequency precipitation radar for the global precipitation measurement**, Takashi Miura, Masahiro Kojima, Kinji Furukawa, Yasutoshi Hyakusoku, Japan Aerospace Exploration Agency (Japan); Toshio Iguchi, Hiroshi Hanado, Katsuhiro Nakagawa, National Institute of Information and Communications Technology (Japan); Minoru Okumura, NEC TOSHIBA Space Systems, Ltd. (Japan) . . . . . [8176-26]14.30: **Development status of PALSAR-2 onboard ALOS-2**, Shinichi Suzuki, Yukihiro Kankaku, Yuji Osawa, Japan Aerospace Exploration Agency (Japan) . . . . . [8176-27]14.50: **Outline of Advanced Land Observing Satellite-3 and its instruments**, Hiroko Imai, Haruyoshi Katayama, Yasushi Hatoooka, Shinichi Suzuki, Yuji Osawa, Japan Aerospace Exploration Agency (Japan) . . . . . [8176-28]

Coffee Break . . . . . 15.10 to 15.40

15.40: **Retrieval of spectral response functions for the hyperspectral sensor of HISUI (Hyper-spectral Imager SUite) by means of onboard calibration sources**, Kenji Tatsumi, Nagamitsu Ohgi, Hisashi Harada, Toneo Kawanishi, Fumihiko Sakuma, Japan Resources Observation System and Space Utilization Organization (Japan); Hitomi Inada, Takahiro Kawashima, NEC TOSHIBA Space Systems, Ltd. (Japan); Akira Iwasaki, The Univ. of Tokyo (Japan) . . . . . [8176-29]16.00: **EarthCARE/CPR design and its evaluation status**, Toshiyoshi Kimura, Hirotaka Nakatsuka, Kenji Sato, Yoshihiro Seki, Yasuo Sakaide, Kazuyuki Okada, Jun Yamaguchi, Japan Aerospace Exploration Agency (Japan); Nobuhiro Takahashi, Yuichi Ohno, Hiroaki Horie, National Institute of Information and Communications Technology (Japan) . . . . . [8176-30]

## SESSION 7

Room: Nadir . . . . . Tues. 16.20 to 17.40

## Calibration I

*Session Chair: Xiaoxiong Xiong,*  
NASA Goddard Space Flight Ctr. (United States)16.20: **Designing an in-flight airborne calibration site using experience from vicarious radiometric satellite calibration**, Stefan Livens, Walter Debruyn, Sindy Sterckx, Ils Reusen, VITO NV (Belgium) . . . . . [8176-31]16.40: **Principal component noise filtering for NAST-I radiometric calibration**, Jialin Tian, NASA Langley Research Ctr. (United States); William L. Smith, Sr., Hampton Univ. (United States) and Univ. of Wisconsin - Madison (United States) . . . . . [8176-32]17.00: **SWIR calibration of Spectralon reflectance factor**, Georgi T. Georgiev, Sigma Space Corp. (United States); James J. Butler, NASA Goddard Space Flight Ctr. (United States); Catherine C. Cooksey, National Institute of Standards and Technology (United States); Leibo Ding, Sigma Space Corp. (United States); Kurtis J. Thome, NASA Goddard Space Flight Ctr. (United States) . . . . . [8176-33]17.20: **Analysis of MetOp/HIRS instrument self-emission and its impact on on-orbit calibration**, Tiejun Chang, I. M. Systems Group, Inc. (United States); Changyong Cao, National Oceanic and Atmospheric Administration (United States) . . . . . [8176-34]

## Wednesday 21 September

## SESSION 8

Room: Nadir . . . . . Wed. 08.30 to 10.10

## Calibration II

*Session Chair: Xiaoxiong Xiong,*  
NASA Goddard Space Flight Ctr. (United States)08.30: **Aqua MODIS on-orbit calibration and performance (2002-2011)**, Xiaoxiong Xiong, NASA Goddard Space Flight Ctr. (United States); William Barnes, Univ. of Maryland, Baltimore County (United States); Amit Angal, Science Systems and Applications, Inc. (United States) . . . . . [8176-35]08.50: **Terra MODIS band 27 electronic crosstalk: cause, impact, and mitigation**, Junqiang Sun, Sigma Space Corp. (United States); Sriharsha Madhavan, Science Systems and Applications, Inc. (United States); Brian Wenny, Sigma Space Corp. (United States); Xiaoxiong Xiong, NASA Goddard Space Flight Ctr. (United States) . . . . [8176-36]09.10: **Solar and lunar observation planning for Earth-observing sensor**, Junqiang Sun, Sigma Space Corp. (United States); Xiaoxiong Xiong, NASA Goddard Space Flight Ctr. (United States) . . . . [8176-37]09.30: **Using the Moon to track MODIS reflective solar bands calibration stability**, Xiaoxiong Xiong, NASA Goddard Space Flight Ctr. (United States); Xu Geng, Sigma Space Corp. (United States); William Barnes, Univ. of Maryland, Baltimore County (United States) . . . . . [8176-38]09.50: **Alternative approach of response versus scan-angle (RVS) for MODIS reflective solar bands**, Hongda Chen, Sigma Space Corp. (United States); Xiaoxiong Xiong, NASA Goddard Space Flight Ctr. (United States); Junqiang Sun, Aisheng Wu, Sigma Space Corp. (United States) . . . . . [8176-39]

Coffee Break . . . . . 10.10 to 10.40

# Conference 8176

## SESSION 9

Room: Nadir . . . . . Wed. 10.40 to 12.00

### Calibration III

Session Chair: Xiaoxiong Xiong,  
NASA Goddard Space Flight Ctr. (United States)

10.40: **MERIS calibration: 9th year in space**, Steven Delwart, European Space Agency Ctr. for Earth Observation (Italy); Ludovic Bourg, ACRI-ST (France) . . . . . [8176-40]

11.00: **Radiometric and geometric Scarab-Megha-Tropiques ground calibration**, Alain Rosak, Thierry L. Trémas, Nadia Karouche, Laurène Gillot, Olivier Simonella, Ctr. National d'Études Spatiales (France) . . . . . [8176-41]

11.20: **Radiometric traceability and providing continuity of the earth radiation budget climate data record, CERES FM-5 on the NPP observatory**, Kory J. Priestley, NASA Langley Research Ctr. (United States); Susan Thomas, George L. Smith, Science Systems and Applications, Inc. (United States) . . . . . [8176-42]

11.40: **Improved traceability of the on-orbit CERES reflected solar measurements through enhanced ground calibration**, Kory J. Priestley, Audra M. Bullock, NASA Langley Research Ctr. (United States); Susan Thomas, Science Systems and Applications, Inc. (United States); Herbert C. Bitting, Northrup Grumman Aerospace Systems (United States) . . . . . [8176-43]

Lunch/Exhibition Break . . . . . 12.00 to 13.20

## SESSION 10

Room: Nadir . . . . . Wed. 13.20 to 15.00

### Focal Plane Assemblies I

Session Chair: Olivier Saint-Pé, EADS Astrium (France)

13.20: **Orthogonal transfer CCD for compensation of image distortion**, Richard L. Kendrick, Lockheed Martin Space Systems Co. (United States); Samuel T. Thurman, Lockheed Martin Coherent Technologies (United States) . . . . . [8176-44]

13.40: **Recent developments of multi-spectral filter assemblies for CCD, CMOS and bolometer**, Roland Le Goff, François Tanguy, Philippe Fuss, Bruno Badoil, SODERN (France); Pierre Etchet, Ctr. National d'Études Spatiales (France) . . . . . [8176-45]

14.00: **Performances and reliability tests of AlGaIn based focal plane array for deep-UV imaging**, Jean-Luc Reverchon, Gaele Lehoucq, Thales Research & Technology (France); Jean-Patrick Truffer, Eric M. Costard, Alcatel-Thales III-V Lab. (France); Eric Frayssinet, Fabrice Semon, Jean-Yves Duboz, Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications (France); Alexandre Giuliani, Matthieu Refregiers, Mourad Idir, Synchrotron SOLEIL (France) . . . . . [8176-46]

14.20: **15 µm pixel-pitch VGA InGaAs module for very low background applications**, Anne Rouvrie, Odile Huet, Jean-Luc Reverchon, Jean-Alexandre Robo, Jean-Patrick Truffer, Jean Decobert, Eric M. Costard, Philippe Bois, Alcatel-Thales III-V Lab. (France) . . . . . [8176-47]

14.40: **Performance and reliability of the 3000-pixel Proba-V SWIR sensor**, Jonas L. Bentell, Peet Verbeke, Peter Deruytere, Koen Vanhollebeke, Thomas Bocquet, Jan P. Vermeiren, Koen Van Der Zanden, Patrick J. Merken, Bob Grietens, Xenics NV (Belgium) . . . . . [8176-48]

Coffee Break . . . . . 15.00 to 15.30

## SESSION 11

Room: Nadir . . . . . Wed. 15.30 to 17.50

### Focal Plane Assemblies II

Session Chair: Olivier Saint-Pé, EADS Astrium (France)

15.30: **Recent developments of CMOS image sensors for Earth observation applications**, Olivier Saint-Pé, Michel Bréart de Boisanger, Franck Larnaudie, Saiprasad Guiry, Erick Berdin, Michel Tulet, EADS Astrium (France); Pierre Magnan, Institut Supérieur de l'Aéronautique et de l'Espace (France) . . . . . [8176-49]

15.50: **Hybrid backside illuminated CMOS image sensors possessing low cross-talk**, Padmakumar Ramachandra Rao, Koen De Munck, Kyriaki Minoglou, Joeri De Vos, Deniz Sabuncuoglu, Piet De Moor, IMEC (Belgium) . . . . . [8176-50]

16.10: **Current status of the EarthCARE BBR detectors development**, Martin Allard, Louis Martin, Christian Proulx, Jean-Pierre Bouchard, El-Hassane Oulachgar, INO (Canada); John Delderfield, David Parker, Rutherford Appleton Lab. (United Kingdom); François Châteauneuf, INO (Canada) . . . . . [8176-51]

16.30: **SOFRADIR in space: an overview on the activity and on the main programs**, Patricia Pidancier, Philippe Chorier, SOFRADIR (France) . . . . . [8176-52]

16.50: **Sofradir hyperspectral detectors for space applications : latest results**, Yoanna-Reine Nowicki-Bringuier, Patricia Pidancier, Philippe Chorier, SOFRADIR (France) . . . . . [8176-53]

17.10: **Ultra low dark current CdHgTe FPAs in the SWIR range at CEA and Sofradir**, Olivier Gravrand, Laurent R. Mollard, Olivier Boulade, Vincent Moreau, Commissariat à l'Énergie Atomique (France); Eric Sanson, SOFRADIR (France); Gérard L. Destéfanis, Commissariat à l'Énergie Atomique (France) . . . . . [8176-54]

17.30: **Infrared ROIC for very low flux and very low noise applications**, Bruno Fièque, Lilian Martineau, Eric Sanson, Philippe Chorier, SOFRADIR (France) . . . . . [8176-55]

## Posters . . . . . Wed. 17.30 to 19.00

Conference attendees are invited to attend the Remote Sensing Poster Session on Wednesday afternoon. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at [spie.org/x32234.xml](http://spie.org/x32234.xml).

**A new space instrumental concept for the measurements of CO<sub>2</sub> concentration in the atmosphere**, Christian Buil, Véronique Pascal, Jacques Loesel, Clémence Pierangelo, Lionel Roucayrol, Laurie Tauziède, Ctr. National d'Études Spatiales (France) . . . . . [8176-12]

**A geometric algorithm for space optical imaging system based on topological mapping relationship**, Zhi Zhang, Zhou Feng, Wu L. Min, Beijing Institute of Space Mechanics and Electricity (China) . [8176-70]

**Short term operation planning for Japanese future hyperspectral and multispectral sensor: HISUI**, Kenta Ogawa, Rakuno Gakuen Univ. (Japan); Tsuneo Matsunaga, Satoru Yamamoto, National Institute for Environmental Studies (Japan); Osamu Kashimura, Tetsushi Tachikawa, Earth Remote Sensing Data Analysis Ctr. (Japan); Akira Iwasaki, The Univ. of Tokyo (Japan); Satoshi Tsuchida, National Institute of Advanced Industrial Science and Technology (Japan); Nagamitsu Ohgi, Japan Resources Observation System and Space Utilization Organization (Japan) . . . . . [8176-75]

**A study of calibration KOMPSAT-2 image by relative radiometric calibration**, Cheung Gil Jin, Ho Yong Ahn, Chul Uong Choi, Pukyong National Univ. (Korea, Republic of); Sun Gu Lee, Korea Aerospace Research Institute (Korea, Republic of) . . . . . [8176-76]

**Optical shutter for gating and defense of an optical sensors**, Pavlo A. Molchanov, Ampac Inc. (United States); Vincent M. Contarino, R Cubed, Inc. (United States); Olga Asmolova, Ampac Inc. (United States) . . . . . [8176-77]

**Earth observation mission operation of COMS during in-orbit test**, Young-Min Cho, Korea Aerospace Research Institute (Korea, Republic of) . . . . . [8176-78]

**The concept of a multibeam delay/Doppler radar altimeter**, Shuangbao Yang, Huguang Liu, Ctr. for Space Science and Applied Research (China) . . . . . [8176-79]

**Miniaturized spectral imager for Aalto-1 nanosatellite**, Rami M. Mannila, VTT Technical Research Ctr. of Finland (Finland); Antti Näsilä, Jaan Praks, Aalto Univ. School of Science and Technology (Finland); Heikki K. Saari, Jarkko E. Antila, VTT Technical Research Ctr. of Finland (Finland) . . . . . [8176-80]

**Image-based adaptive optics system with deformable mirror in small satellite remote sensing**, Norihide Miyamura, The Univ. of Tokyo Japan) . . . . . [8176-81]

**A comparative study of relationship to solar radiation and extraction of vegetation: using Kompsat-2 and IKONOS image**, Ho-Yong Ahn, So young Park, Chul Uong Choi, Pukyong National Univ. (Korea, Republic of) . . . . . [8176-82]

**Direct broadcast reception systems for the next generation**, Kota S. Prasad, Hae-Yong Shin, Karen Dubey, SeaSpace Corp. (United States) . . . . . [8176-83]

Thursday 22 September

SESSION 12

Room: Nadir . . . . . Thurs. 08.30 to 10.10

Missions and Sensing I

Session Chair: Haruhisa Shimoda,  
Japan Aerospace Exploration Agency (Japan)

08.30: **The atmospheric processes on climate and its changes (APOCC) initiative**, Martin Bergeron, Canadian Space Agency (Canada) . . . . . [8176-56]

08.50: **TICFIRE: a far infrared payload to monitor the evolution of thin ice clouds**, Jean-Pierre Blanchet, Univ. du Québec à Montréal (Canada); Alain Royer, Univ. de Sherbrooke (Canada); François Châteauneuf, INO (Canada); Pierre Gauthier, Univ. du Québec à Montréal (Canada); Norman T. O'Neill, Univ. de Sherbrooke (Canada); Ovidiu Pancrati, INO (Canada); Louis Garand, Environment Canada (Canada) . . . . . [8176-57]

09.10: **Image quality effects due to image plane sampling: experimental results**, Richard L. Kendrick, Andrew T. Cochrane, Kevin M. Schulz, Raymond M. Bell, Jr., Eric H. Smith, Lockheed Martin Space Systems Co. (United States) . . . . . [8176-58]

09.30: **Architecting the future of 'operational' earth monitoring satellites based on matured climate modeling and replicating existing sensor capabilities within constellation efficiencies**, Douglas B. Helmuth, Lockheed Martin Corp. (United States) . . . . . [8176-59]

09.50: **Development and fabrication of a hyperspectral, mirror based IR-telescope using ultra precise manufacturing and mounting techniques for a 'snap-in' system assembly**, Stefan Risse, Sebastian Scheiding, Andreas Gebhardt, Christoph Damm, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Wolfgang Holota, Holota Optics (Germany); Ramona Eberhardt, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) . . . . . [8176-60]

Coffee Break . . . . . 10.10 to 10.40

SESSION 13

Room: Nadir . . . . . Thurs. 10.40 to 12.00

Missions and Sensing II

Session Chair: Roland Meynart,  
European Space Research and Technology Ctr. (Netherlands)

10.40: **The design of a space-borne multispectral canopy lidar to estimate global carbon stock and gross primary productivity**, Emal Rumi, James W. Jack, The Univ. of Edinburgh (United Kingdom); David M. Henry, UK Astronomy Technology Ctr. (United Kingdom) . . . . . [8176-61]

11.00: **Realization of flight model of a stereoscopic imaging laser altimeter micropayload**, Scott G. Moon, Sandro Hannemann, Marco Esposito, cosine Research B.V. (Netherlands) . . . . . [8176-62]

11.20: **An update on the NAST-I airborne FTS**, Allen M. Larar, NASA Langley Research Ctr. (United States); William L. Smith, Sr., Hampton Univ. (United States); Daniel K. Zhou, Xu Liu, NASA Langley Research Ctr. (United States); Luc Rochette, LR Tech (Canada); Jialin Tian, NASA Langley Research Ctr. (United States) . . . . . [8176-63]

11.40: **Space-based hyperspectral imaging spectroradiometer for coastal studies**, Jeffery J. Puschell, John Silny, Lacy Cook, Shaun Champion, Stephen Schiller, Dave La Komski, Raytheon Space & Airborne Systems (United States); Neil Malone, Raytheon Vision Systems (United States); Curtiss Davis, Oregon State Univ. (United States) . . . . . [8176-64]

Lunch Break . . . . . 12.00 to 13.20

SESSION 14

Room: Nadir . . . . . Thurs. 13.20 to 15.20

Missions and Sensing III

Session Chair: Steven P. Neeck, NASA Headquarters (United States)

13.20: **Extreme hyperspectral imager using the new microslice technology**, Robert Content, Simon Blake, Colin Dunlop, Ray Sharples, Danny Donoghue, Gordon Talbot, Peter Luke, David Nandi, Patrice Carbonneau, Tom Shanks, Durham Univ. (United Kingdom) . . . . . [8176-65]

13.40: **Update on the DMC constellation and next generation satellites**, Gary Holmes, Paul Stephens, DMC International Imaging Ltd. (United Kingdom) . . . . . [8176-66]

14.00: **Dubaisat-1 mission overview**, Adnan Al Rais, Emirates Institution for Advanced Science and Technology (United Arab Emirates) . . . . . [8176-67]

14.20: **Optical configurations proposed for low cost Earth imaging payloads**, Mahmood Waqas, Aliza Jawed, Faryal Khan, The National Space Agency of Pakistan (Pakistan) . . . . . [8176-68]

14.40: **Gain control strategy for multispectral camera**, Dianzhong Wang, YiYun Man, Beijing Institute of Space Mechanics and Electricity (China); Xinhua Shi, Beijing Institute of Tracking and Telecommunication Technology (China) . . . . . [8176-69]

15.00: **Study on modeling and simulation techniques based on the whole imaging chain of optical remote sensing**, Ningjuan Ruan, Haibo Zhao, Yiyun Man, Chunxiao Xu, Beijing Institute of Space Mechanics and Electricity (China) . . . . . [8176-71]

Coffee Break . . . . . 15.20 to 15.50

SESSION 15

Room: Nadir . . . . . Thurs. 15.50 to 16.50

Addressing Natural Disasters and Sustainable Resources Using Satellite Data

Session Chair: Shahid Habib,  
NASA Goddard Space Flight Ctr. (United States)

15.50: **Use of SAR data for hydro-morphological characterization in sub-Saharan Africa: a case study**, Fabio Ciervo, C.U.G.RI. (Italy); Giuseppe Ruello, Univ. degli Studi di Napoli Federico II (Italy); Youssouf Koussoubé, Univ. de Ouagadougou (Burkina Faso); Maria Nicolina Papa, Univ. degli Studi di Salerno (Italy); Daniele Riccio, Univ. degli Studi di Napoli Federico II (Italy) . . . . . [8176-72]

16.10: **Application of satellite remote sensing techniques to flood risk assessment in Yialias catchment area in Cyprus**, Dimitris Alexakis, Diofantos G. Hadjimitsis, Athos Agapiou, Kyriacos Themistocleous, Cyprus Univ. of Technology (Cyprus); Adrianos Retalis, National Observatory of Athens (Greece) . . . . . [8176-73]

16.30: **Spatial and spatio-temporal remote-sensing image classification using support vector machines for fire monitoring**, Safa Rejichi, Ferdaous Chaabene, SUP'COM (Tunisia) . . . . . [8176-74]

Remote Sensing Plenary Session

Monday 19 September 09.00 to 10.45

For details, please see page 5



# Remote Sensing of Clouds and the Atmosphere

*Conference Chairs:* **Evgueni I. Kassianov**, Pacific Northwest National Lab. (United States); **Adolfo Comeron**, Univ. Politècnica de Catalunya (Spain); **Richard H. Picard**, ARCON Corp. (United States); **Klaus Schäfer**, Karlsruhe Institut für Technologie (Germany)

*Programme Committee:* **Aldo Amodeo**, Consiglio Nazionale delle Ricerche (Italy); **Christopher J. Mertens**, NASA Langley Research Ctr. (United States); **Didier F. Rault**, NASA Langley Research Ctr. (United States); **Nicolaos I. Sifakis**, National Observatory of Athens (Greece); **Konradin Weber**, Fachhochschule Düsseldorf (Germany); **Michiel van Weele**, Koninklijk Nederlands Meteorologisch Instituut (Netherlands)

## Wednesday 21 September

### Opening Remarks

**Room: Taurus** ..... **Wed. 08.50 to 09.00**

**Evgueni I. Kassianov**, Pacific Northwest National Lab. (USA)

### SESSION 1

**Room: Taurus** ..... **Wed. 09.00 to 12.00**

#### Lidar, Radar and Passive Atmospheric Measurements

*Session Chair:* **Adolfo Comeron**, Univ. Politècnica de Catalunya (Spain)

09.00: **Wind speed and direction measurements for a backscatter lidar with the contour correlation analysis**, Sergio Tomas, Michaël Sicard, Adolfo Comeron, Univ. Politècnica de Catalunya (Spain) ..... [8177-01]

09.20: **Wind speed and turbulence estimation for a backscatter lidar at a single line of sight**, Sergio Tomas, Michaël Sicard, Adolfo Comeron, Univ. Politècnica de Catalunya (Spain). ..... [8177-02]

09.40: **Adding confidence levels and error bars to mixing layer heights detected by ceilometer**, Christoph Münkkel, Vaisala GmbH (Germany); Klaus Schäfer, Stefan Emeis, Karlsruhe Institut für Technologie (Germany) ..... [8177-04]

10.00: **Advanced methods and means to improve atmospheric lidar stability against sky background clutter**, Ravil R. Agishev, Kazan State Technical Univ. (Russian Federation) ..... [8177-05]

Coffee Break ..... 10.20 to 10.50

10.50: **Atmospheric aerosol characterization combining multi-wavelength Raman lidar and MAX-DOAS measurements in Gwanju (Invited Paper)**, Jihyo Chong, Dong Ho Shin, Kwang Chul Kim, Gwangju Institute of Science and Technology (Korea, Republic of); Kwon-Ho Lee, Kyungil Univ. (Korea, Republic of); Young Joon Kim, Gwangju Institute of Science and Technology (Korea, Republic of) ..... [8177-06]

11.20: **Comparison of continuous detection of mixing layer heights by ceilometer with radiosonde observations**, Klaus Schäfer, Stefan Emeis, Renate Forkel, Markus Hoess, Peter Suppan, Karlsruhe Institut für Technologie (Germany); Christoph Münkkel, Vaisala GmbH (Germany) ..... [8177-07]

11.40: **Putting all CERES instruments (Terra/Aqua) on the same radiometric scale**, Zbigniew P. Szewczyk, Science Systems and Applications, Inc. (United States) ..... [8177-08]

Lunch/Exhibition Break ..... 12.00 to 13.40

### SESSION 2

**Room: Taurus** ..... **Wed. 13.40 to 16.50**

#### Radiative Transfer

*Session Chair:* **Richard H. Picard**, ARCON Corp. (United States)

13.40: **Expected data quality from the upcoming OMPS/LP mission**, Didier F. Rault, NASA Langley Research Ctr. (United States) ..... [8177-10]

14.00: **Ozone vertical profiles in the upper troposphere and stratosphere from the OMPS limb sensor**, Albert J. Fleig, PITA Analytic Science (United States); Didier F. Rault, NASA Langley Research Ctr. (United States) ..... [8177-11]

14.20: **Fast atmospheric correction algorithm based on the darkest pixel approach for retrieving the aerosol optical thickness: comparison with in-situ AOT measurements**, Diofantos G. Hadjimitsis, Kyriacos Themistocleous, Cyprus Univ. of Technology (Cyprus) ..... [8177-13]

14.40: **Ultraspectral sounding retrieval error budget and estimation**, Daniel K. Zhou, Allen M. Larar, Xu Liu, NASA Langley Research Ctr. (United States); William L. Smith, Jr., Hampton Univ. (United States); Larrabee Strow, Univ. of Maryland, Baltimore County (United States); Ping Yang, Texas A&M Univ. (United States); Nikita S. Pougatchev, Jet Propulsion Lab. (United States) ..... [8177-14]

Coffee Break ..... 15.00 to 15.30

15.30: **Optical properties of biomass burning aerosols during Russian forest fire events in 2010**, Itaru Sano, Sonoyo Mukai, Makiko Nakata, Kinki Univ. (Japan); Brent N. Holben, NASA Goddard Space Flight Ctr. (United States); Nobuyuki Kikuchi, National Institute for Environmental Studies (Japan) ..... [8177-15]

15.50: **Mueller matrix for preferably oriented ice crystal particles of cirrus clouds**, Alexey V. Burnashov, V.E. Zuev Institute of Atmospheric Optics (Russian Federation) ..... [8177-16]

16.10: **The successive scattering in radiative transfer theory and its application for aerosol retrieval**, Sonoyo Mukai, Takuma Yokomae, Itaru Sano, Makiko Nakata, Kinki Univ. (Japan) . . . [8177-17]

16.30: **A method for determination of the nitrogen dioxide content in the atmospheric boundary layer basing on zenith spectral observations**, Oleg V. Postlyakov, Alexander Elokho, Victor Ivanov, A.M. Obukhov Institute of Atmospheric Physics (Russian Federation) ..... [8177-18]

### Posters

**Wed. 17.30 to 19.00**

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**Application of short-range lidar in windshear alerting**, P. W. Chan, Hong Kong Observatory (Hong Kong, China) ..... [8177-37]

**Application of lidar-based F-factor in windshear alerting**, P. W. Chan, Hong Kong Observatory (Hong Kong, China). ..... [8177-38]

**A new false color composite technique for dust enhancement and point source determination in Middle East**, Khadijeh Karimi, Shahrood Univ. of Technology (Iran, Islamic Republic of); Hamid Taheri Shahraiyini, Tarbiat Modares Univ. (Iran, Islamic Republic of); Majid Habibi Nokhandan, Islamic Republic of Iran Meteorological Organization (Iran, Islamic Republic of); Naser Hafezi Moghaddas, Shahrood Univ. of Technology (Iran, Islamic Republic of); Melika Sanaeifar, Islamic Azad Univ. (Iran, Islamic Republic of) . . . [8177-39]

**The estimate of the cloud attenuation factor when retrieving insolation from MTSAT-1R data**, Jong-Min Yeom, Hyun Ok Kim, Youn-Soo Kim, Korea Aerospace Research Institute (Korea, Republic of) ..... [8177-40]

**The tropical cyclone intensity estimation based on MODIS data**, Zengzhou Hao, Fang Gong, Qianguang Tu, Delu Pan, Xiaoyan Chen, The Second Institute of Oceanography, SOA (China) . . . . . [8177-42]

**Physically based radar simulator for measurements of precipitation with polarimetric and spaceborne radar**, Takahisa Kobayashi, Kazuhiko Masuda, Meteorological Research Institute (Japan). . . . . [8177-44]



**SESSION 4**

**Room: Taurus . . . . .Thurs. 13.20 to 15.20**

**Remote Sensing of Clouds**

*Session Chair: Evgueni I. Kassianov, Pacific Northwest National Lab. (United States)*

- 13.20: **Detection of convective cells with a potential to produce local heavy rainfalls by a C-band polarimetric radar**, Ahoro Adachi, Takahisa Kobayashi, Hiroshi Yamauchi, Shigeru Onogi, Meteorological Research Institute (Japan). . . . . [8177-28]
- 13.40: **Atmospheric sounding from the joint polar satellite system**, Xu Liu, Allen M. Larar, Daniel K. Zhou, NASA Langley Research Ctr. (United States). . . . . [8177-29]
- 14.00: **A multispectral spatio-temporal approach for cloud screening of remotely sensed images**, Gemine Vivone, Rocco Restaino, Roberto Conte, Maurizio Longo, Paolo Addesso, Univ. degli Studi di Salerno (Italy) . . . . . [8177-30]
- 14.20: **Automatic cloud coverage assessment of Formosat-2 image**, Kuo-Hsien Hsu, National Space Organization (Taiwan) . . . . . [8177-32]
- 14.40: **Multi-summer climatology of cumuli at SGP site: vertical structure**, Larry K. Berg, Evgueni I. Kassianov, Pacific Northwest National Lab. (United States). . . . . [8177-33]
- 15.00: **Correlation and causal relationship between GPS water vapor measurements and rainfall intensities in a tropical region (Tahiti Island)**, Jonathan Serafini, Lydie Sichoix, Jean-Pierre Barriot, Univ. de la Polynésie Française (French Polynesia) . . . . . [8177-35]

- Retrieval of aerosol optical depth from synergy of the SEVIRI (MSG) and ground-based observations**, Olga Zawadzka, Univ. of Warsaw (Poland) and Div. of Physics and Radiochemistry, Faculty of Chemistry (Poland); Krzysztof M. Markowicz, Univ. of Warsaw (Poland). . . . . [8177-45]
- Evaluation of observed and pre-simulated passive microwave signatures over tropical oceans**, Eun-Kyoung Seo, Kongju National Univ. (Korea, Republic of); Michael Biggerstaff, The Univ. of Oklahoma (United States). . . . . [8177-47]
- Estimation of particulate matter from simulations and measurements**, Makiko Nakata, Toshiyuki Fujito, Masatoshi Yonemitsu, Itaru Sano, Sonoyo Mukai, Kinki Univ. (Japan) . . [8177-48]
- The detection and analysis for Asian dust aerosol over China Seas based on MTSAT observations**, Zengzhou Hao, Qianguang Tu, Fang Gong, Zhihua Mao, Xiaoyan Chen, The Second Institute of Oceanography, SOA (China). . . . . [8177-51]
- Retrieval of the aerosol and atmospheric boundary layer structure over mountain valley by ceilometer (Sofia, Bulgaria)**, Nikolay Kolev, Ivan Grigorov, Tsvetina Evgenieva, Dimitar Stoyanov, Institute of Electronics (Bulgaria); Evgeni Donev, Danko Ivanov, Sofia Univ. "St. Kliment Ohridski" (Bulgaria); Georgi Kolarov, Ivan Kolev, Institute of Electronics (Bulgaria). . . . . [8177-52]
- Lidar system developments for troposphere monitoring of aerosols and clouds properties**, Ovidiu-Gelu Tudose, Marius-Mihai Cazacu, Univ. Alexandru Ioan Cuza (Romania) and SC EnviroScopY SRL (Romania); Adrian Timofte, Univ. Alexandru Ioan Cuza (Romania) and Regional Forecast Ctr. Bacau (Romania); Ioan Balin, SC EnviroScopY SRL (Romania) and EnviroScopY SA (Switzerland) . . . . . [8177-55]

**Thursday 22 September**

**SESSION 3**

**Room: Taurus . . . . .Thurs. 08.30 to 11.20**

**Atmospheric Profiling of Aerosols, Trace Gases, and Meteorological Parameters of Remote Sensing**

*Session Chair: Klaus Schäfer, Karlsruher Institut für Technologie (Germany)*

- 08.30: **On a relation between particle size distribution and mixing layer height**, Klaus Schäfer, Stefan Emeis, Markus Hoess, Peter Suppan, Karlsruher Institut für Technologie (Germany); Josef Cyrys, Mike Pitz, Helmholtz Zentrum München GmbH (Germany); Christoph Muenkel, Vaisala GmbH (Germany) . . . . . [8177-19]
- 08.50: **Detection of the temporal and spatial structure of a volcanic plume by ground-based remote sensing**, Klaus Schäfer, Stefan Emeis, Peter Suppan, Karlsruher Institut für Technologie (Germany); Christoph Muenkel, Vaisala GmbH (Germany) . . . . [8177-20]
- 09.10: **Remote sensing of aerosol properties during CARES**, Evgueni I. Kassianov, James Barnard, Mikhail Pekour, Connor Flynn, Pacific Northwest National Lab. (United States); Richard Ferrare, NASA Langley Research Ctr. (United States) . . . . . [8177-21]
- 09.30: **Assessment of MODIS aerosol optical depth over oceans using 1-year data from maritime aerosol network**, Evgueni I. Kassianov, Duli Chand, Minghui Wang, Pacific Northwest National Lab. (United States). . . . . [8177-22]
- 09.50: **To analyze the effects of mixing with soot aggregates on retrieving dust properties for satellite observations in Asia**, Tang-Huang Lin, National Central Univ. (Taiwan); Yang Ping, Texas A&M Univ. (United States) . . . . . [8177-23]
- Coffee Break . . . . . 10.10 to 10.40
- 10.40: **Application of a multifilter shadowband radiometer and microwave radiometer for ground based evaluation of aerosol-cloud interactions**, Barry Gross, Lina Cordero, Julia He, Bomidi Madhalvan, Fred Moshary, Sam Ahmed, The City College of New York (United States). . . . . [8177-25]
- 11.00: **Capabilities and limitations of MISR aerosol retrievals in dust-laden conditions**, Olga V. Kalashnikova, Jet Propulsion Lab. (United States); Michael Garay, Raytheon Co. (United States); Ralph Kahn, NASA Goddard Space Flight Ctr. (United States); David Diner, John Martonchik, Jet Propulsion Lab. (United States) . . . . . [8177-26]
- Lunch Break . . . . . 11.20 to 13.20

**Remote Sensing Plenary Session**  
 Monday 19 September 09.00 to 10.45  
 For details, please see page 5

# Optics in Atmospheric Propagation and Adaptive Systems

*Conference Chairs:* **Karin Stein**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **John D. Gonglewski**, Air Force Research Lab. (United States)

*Programme Committee:* **Sylvain Cheinet**, Institut Franco-Allemand de Recherches de Saint-Louis (France); **David C. Dayton**, Applied Technology Associates (United States); **Denis Dion, Jr.**, Defence Research and Development Canada (Canada); **Stephen M. Hammel**, Space and Naval Warfare Systems Command (United States); **Vladimir P. Lukin**, V.E. Zuev Institute of Atmospheric Optics (Russian Federation); **Charles L. Matson**, Air Force Research Lab. (United States); **Sergio R. Restaino**, U.S. Naval Research Lab. (United States); **Jennifer C. Ricklin**, Lockheed Martin Corp. (United States); **Jim Riker**, Air Force Research Lab. (United States); **Marc J. F. Séchaud**, ONERA (France); **Alexander M. van Eijk**, TNO Defence, Security and Safety (Netherlands); **Arthur D. van Rheenen**, Norwegian Defence Research Establishment (Norway); **Mikhail A. Vorontsov**, Univ. of Dayton (United States)

## Tuesday 20 September

### Opening Remarks

**Room: Keppler . . . . . Tues. 08.25 to 08.30**

**Karin Stein**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)

### SESSION 1

**Room: Keppler . . . . . Tues. 08.30 to 10.30**

#### IR Imaging

*Session Chair:* **Denis Dion, Jr.**,

Defence Research and Development Canada, Valcartier (Canada)

08.30: **Seasonal trends and nightly fluctuations of SWIR airglow irradiance**, David C. Dayton, John Gonglewski, Michael M. Myers, Jeffrey Allen, Rudolph V. Nolasco, Applied Technology Associates (United States) . . . . . [8178-01]

08.50: **SWIR air glow imaging for detection of mesospheric gravity waves**, David C. Dayton, Jeffery Allen, Applied Technology Associates (United States); John Gonglewski, Michael M. Myers, Air Force Research Lab. (United States); Rudolph V. Nolasco, Applied Technology Associates (United States) . . . . . [8178-02]

09.10: **Investigations of SNR for a short-wave infrared intensity interferometer**, David C. Dayton, Applied Technology Associates (United States); Jeremy Murray-Krezan, John Gonglewski, Air Force Research Lab. (United States) . . . . . [8178-03]

09.30: **Validation of the background simulation model MATISSE: comparing results with MODIS satellite images.**, Karin Stein, Caroline Schweitzer, Norbert Wendelstein, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Luc Labarre, ONERA (France) . . . . . [8178-04]

09.50: **Multiresolution infrared optical properties for Gaussian sea surfaces: comparison against the MIRAMER campaign measurements in solar glint configurations**, Sandrine Fauqueux, Stephane Langlois, Claire Malherbe, Karine Caillault, Luc Labarre, ONERA (France) . . . . . [8178-05]

10.10: **On the characterization of IR signature of small surface crafts**, Denis Dion, Jr., Defence Research and Development Canada, Valcartier (Canada); Veronique Tremblay, AEREX avionique inc. (Canada) . . . . . [8178-06]

Coffee Break . . . . . 10.30 to 11.00

## SESSION 2

**Room: Keppler . . . . . Tues. 11.00 to 12.40**

### Characterization of Turbulence

*Session Chair:* **Marc J. F. Séchaud**, ONERA (France)

11.00: **Marine boundary layer investigations in the False Bay, supported by optical refraction and scintillation measurements**, Arie N. de Jong, TNO Defence, Security and Safety (Netherlands) . . . . . [8178-07]

11.20: **Stability and height dependant variations of the structure function parameters in the lower atmospheric boundary layer investigated from measurements of the long-term experiment VERTURM (vertical turbulence measurements)**, Detlev Sprung, Peter Grossmann, Erik Sucher, Karin Weiss-Wrana, Karin Stein, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) . . . . . [8178-08]

11.40: **Ground-based solar astrometric measurements during the PICARD mission**, Abdanour Irbah, Mustapha Meftah, Ctr. National de la Recherche Scientifique (France); Thierry Corbard, Observatoire de la Côte d'Azur (France); Rabah Ikhlef, Ctr. de Recherche en Astronomie, Astrophysique et Géophysique (Algeria); Frédéric Morand, Pierre Assus, Observatoire de la Côte d'Azur (France); Maamar Fodil, Ctr. de Recherche en Astronomie, Astrophysique et Géophysique (Algeria); Marc Lin, Patrick Lesueur, Germain Poiet, Lab. Atmosphères, Milieux, Observations Spatiales (France); Catherine Renaud, Observatoire de la Côte d'Azur (France) . . . . . [8178-09]

12.00: **Coherence of Bessel beams propagating in turbulent media**, Igor P. Lukin, V.E. Zuev Institute of Atmospheric Optics (Russian Federation) . . . . . [8178-10]

12.20: **Statistical properties of density fluctuations in the atmosphere**, Fedor V. Shugayev, Ludmila S. Shtemenko, Olga I. Dokukina, Oksana A. Nikolaeva, Tatiana A. Petrova, Oksana A. Solenaya, Lomonosov Moscow State Univ. (Russian Federation) . . . . . [8178-11]

Lunch/Exhibition Break . . . . . 12.40 to 14.20

**SESSION 3****Room: Kepler . . . . . Tues. 14.00 to 15.20****Propagation through Turbulent Media***Session Chair: David C. Dayton,*  
Applied Technology Associates (United States)**14.00: Increase of correction efficiency of turbulent distortions in AOS on basis of measurements by the Shack-Hartmann wave-front sensor,** Vladimir P. Lukin, Leonid V. Antoshkin, Lidia N. Lavrinova, Vitalii V. Lavrinov, V.E. Zuev Institute of Atmospheric Optics (Russian Federation) . . . . . [8178-12]**14.20: Free space propagation of wide band light pulses,** Olga V. Tikhomirova, V.E. Zuev Institute of Atmospheric Optics (Russian Federation) . . . . . [8178-13]**14.40: Applications of adaptive optics in coherent laser array techniques,** Yi Zheng, Feng Shen, Xinyang Li, Institute of Optics and Electronics (China). . . . . [8178-14]**15.00: TBA**

Coffee Break . . . . . 15.20 to 15.50

**SESSION 4****Room: Kepler . . . . . Tues. 15.50 to 17.30****Wavefront Correction***Session Chair: John Gonglewski,*  
Air Force Research Lab. (United States)**15.50: Development of adaptive optics devices for solar telescope,** Vladimir P. Lukin, Leonid V. Antoshkin, Nina N. Botugina, Oleg N. Emaleev, Peter A. Konyaev, Eugenii A. Kopylov, V.E. Zuev Institute of Atmospheric Optics (Russian Federation). . . . . [8178-16]**16.10: Compensating aberrations of a 6 inch concave membrane mirror,** Ivo Buske, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Peter Becker, RheinAhrCampus Remagen (Germany) . . . . . [8178-17]**16.30: New phasor reconstruction for speckle imaging,** Gregory C. Dente, GCD Associates (United States); Michael L. Tilton, Boeing-SVS, Inc. (United States) . . . . . [8178-18]**16.50: Compensating atmospheric distortions of point sources and extended objects through an adaptive iterative procedure,** Corinne Scheifling, Gabriele Marchi, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) . . . . . [8178-19]**17.10: Software-based turbulence mitigation of short exposure image data with motion detection and background segmentation,** Claudia S. Huebner, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany). . . . . [8178-20]**Wednesday 21 September****Posters . . . . . Wed. 17.30 to 19.00***Conference attendees are invited to attend the Remote Sensing Poster Session on Wednesday afternoon. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at [spie.org/x32234.xml](http://spie.org/x32234.xml).***Coherent beam combining of collimated fiber array based on target-in-the-loop technique,** Xinyang Li, Chao Geng, Xiaojun Zhang, Changhui Rao, Institute of Optics and Electronics (China) . . . [8178-21]**A novel wavefront sensing technique for high speed atmospheric measurement based on digital micromirror device,** Ping Yang, Shuang Wang, Institute of Optics and Electronics (China); Mingwu Ao, Univ. of Electronic Science and Technology of China (China); Bing Xu, Institute of Optics and Electronics (China) . . . . . [8178-22]**Remote Sensing Plenary Session**

Monday 19 September 09.00 to 10.45

For details, please see page 5

## SAR Image Analysis, Modeling, and Techniques

*Conference Chairs:* **Claudia Notarnicola**, EURAC research (Italy); **Simonetta Paloscia**, Istituto di Fisica Applicata Nello Carrara (Italy); **Nazzareno Pierdicca**, Univ. degli Studi di Roma La Sapienza (Italy)

*Programme Committee:* **Richard Bamler**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Fabio Covelto**, Agenzia Spaziale Italiana (Italy); **Mihai P. Datcu**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Fabio Del Frate**, Univ. degli Studi di Roma Tor Vergata (Italy); **Linda Marchese**, INO (Canada); **Antonio Moccia**, Univ. degli Studi di Napoli Federico II (Italy); **Francesco Nirchio**, Agenzia Spaziale Italiana (Italy); **Fabio L. Rocca**, Politecnico di Milano (Italy); **Emanuele Santi**, Istituto di Fisica Applicata Nello Carrara (Italy); **Stefan Schneiderbauer**, EURAC research (Italy); **David Small**, Univ. of Zürich (Switzerland)

### Wednesday 21 September

#### Welcome and Introduction

**Room: Quadrant . . . . . Wed. 08.30 to 08.40**

**Claudia Notarnicola**, EURAC research (Italy)

#### SESSION 1

**Room: Quadrant . . . . . Wed. 08.40 to 10.10**

#### SAR Applications I

*Session Chair:* **Claudia Notarnicola**, EURAC research (Italy)

08.40: **Sentinel-1A and Sentinel-1B CSAR status** (*Invited Paper*), Paul Snoeij, Mike Brown, Malcolm W. J. Davidson, Bjorn Rommen, Nicolas Floury, European Space Research and Technology Ctr. (Netherlands); Dirk Geudtner, Canadian Space Agency (Canada); Ramon Torres, European Space Research and Technology Ctr. (Netherlands) . . . . . [8179-01]

09.10: **Comparison of L and C band polarimetric SAR data for the retrieval of soil moisture in the Alps**, Luca Pasolli, Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy); Claudia Notarnicola, EURAC research (Italy) . . . . . [8179-02]

09.30: **Soil moisture mapping using Sentinel 1 images: the proposed approach and its preliminary validation carried out in view of an operational product**, Simonetta Paloscia, Istituto di Fisica Applicata Nello Carrara (Italy); Nazzareno Pierdicca, Univ. degli Studi di Roma La Sapienza (Italy); Claudia Notarnicola, EURAC research (Italy); Gaetano Pace, Advanced Computer Systems S.p.A. (Italy); Simone Pettinato, Istituto di Fisica Applicata Nello Carrara (Italy); Luca Pulvirenti, Univ. degli Studi di Roma La Sapienza (Italy); Antonio Reppucci, Starlab (Spain); Emanuele Santi, Istituto di Fisica Applicata Nello Carrara (Italy) . . . . . [8179-03]

09.50: **Effects of SAR resolution on forest backscattering including topography**, Ludovic Villard, Thuy Le Toan, Ctr. d'Etudes Spatiales de la Biosphère (France) . . . . . [8179-04]

Coffee Break . . . . . 10.10 to 10.40

#### SESSION 2

**Room: Quadrant . . . . . Wed. 10.40 to 12.10**

#### SAR Applications II

*Session Chair:* **Simonetta Paloscia**, Istituto di Fisica Applicata Nello Carrara (Italy)

10.40: **Integration of X-SAR observations with data of other remote sensing techniques: preliminary results achieved with Cosmo/SkyMed announcement of opportunity projects** (*Invited Paper*), Francesco Vespe, Agenzia Spaziale Italiana (Italy); Luca Baldini, Istituto di Scienze dell'Atmosfera e del Clima (Italy); Giovanni Celidonio, Telespazio S.p.A. (Italy); Claudia Notarnicola, EURAC research (Italy); Paolo Pampaloni, Istituto di Fisica Applicata Nello Carrara (Italy); Claudio Prati, The ICT Institute Politecnico di Milano (Italy) . . . . . [8179-05]

11.10: **Analysys of snow changes in alpine regions with X-band data: electromagnetic analysis and snow cover mapping**, Bartolomeo Ventura, Claudia Notarnicola, Thomas Schellenberger, Marc Zebisch, EURAC research (Italy); Raffaella Ratti, Vito Maddalena, Lucia Tampellini, Carlo Gavazzi Space S.p.A. (Italy) . . . . . [8179-06]

11.30: **Use of high resolution SAR data for the monitoring of water resources in Burkina Faso**, Fabio Ciervo, C.U.G.R.I. (Italy); Gerardo Di Martino, Antonio Iodice, Univ. degli Studi di Napoli Federico II (Italy); Youssouf Koussoube, Univ. de Ouagadougou (Burkina Faso); Maria Nicolina Papa, Univ. degli Studi di Salerno (Italy); Daniele Riccio, Giuseppe Ruello, Ivana Zinno, Univ. degli Studi di Napoli Federico II (Italy) . . . . . [8179-07]

11.50: **An image acquisition planning tool for optimizing information content in image data of spaceborne SAR systems**, Harald Anglberger, Sebastien Tailhades, Helmut Suess, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [8179-08]

Lunch/Exhibition Break . . . . . 12.10 to 13.40

#### SESSION JS1

**Room: Tycho . . . . . Wed. 13.40 to 15.00**

#### Joint Session: SAR Data Analysis I

*Session Chair:* **Claudia Notarnicola**, EURAC research (Italy)

Joint Session with Conference 8180,  
Image and Signal Processing for Remote Sensing

13.40: **SAR-based sea traffic monitoring: a reliable approach for maritime surveillance**, Alfredo Renga, Univ. degli Studi di Napoli Federico II (Italy); Maria D. Graziano, Marco D'Errico, Seconda Univ. degli Studi di Napoli (Italy); Antonio Moccia, Andrea Cecchini, Univ. degli Studi di Napoli Federico II (Italy) . . . . . [8179-09]

14.00: **An experimental study on ship detection based on the fixed-point polarimetric whitening filter**, Ding Tao, Univ. of Tromsø (Norway); Camilla Brekke, Stian N. Anfinsen, Univ. of Tromsø (Norway) . . . . . [8180-36]

14.20: **A novel paradigm for urban environment characterization using ascending and descending terrasar-x data**, Emanuele Angiuli, Giovanna Trianni, European Commission Joint Research Ctr. (Italy); Paolo Gamba, Univ. degli Studi di Pavia (Italy) . . . . . [8179-10]

14.40: **A radar target DB construction method using 3D scattering centers**, Ji Hee Yoo, Chan Hong Kim, Dae Young Chae, Kyoung-II Kwon, Agency for Defense Development (Korea, Republic of) [8180-37]

Coffee Break . . . . . 15.00 to 15.30

#### SESSION JS2

**Room: Tycho . . . . . Wed. 15.30 to 16.30**

#### Joint Session: SAR Data Analysis II

*Session Chair:* **Lorenzo Bruzzone**, Univ. degli Studi di Trento (Italy)

Joint Session with Conference 8180,  
Image and Signal Processing for Remote Sensing

15.30: **An unsupervised method for quality assessment of despeckling: an evaluation on COSMO-SkyMed data**, Bruno Aiazzi, Istituto di Fisica Applicata Nello Carrara (Italy); Luciano Alparone, Fabrizio Argenti, Univ. degli Studi di Firenze (Italy); Stefano Baronti, Istituto di Fisica Applicata Nello Carrara (Italy); Tiziano Bianchi, Alessandro Lapini, Univ. degli Studi di Firenze (Italy) . . . . . [8179-11]

15.50: **Basis for optronic ScanSAR processing**, Linda Marchese, Pascal Bourqui, Sandra Turgeon, INO (Canada); Bernd Harnish, Martin Suess, European Space Research and Technology Ctr. (Netherlands); François Châteauneuf, Alain Bergeron, INO (Canada) . . . . . [8179-12]



16.10: **Comparison of using single- or multi-polarimetric TerraSAR-X images for segmentation and classification of man-made maritime objects**, Michael Teutsch, Günter Saur, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) . . . . . [8180-38]

**Posters . . . . . Wed. 17.30 to 19.00**

*Conference attendees are invited to attend the Remote Sensing Poster Session on Wednesday afternoon. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at [spie.org/x32234.xml](http://spie.org/x32234.xml).*

**Moving target imaging by both Ka-band and Ku-band high-resolution radars**, Yunhua Zhang, Wenshuai Zhai, Xiangkun Zhang, Xiaojin Shi, Xiang Gu, Ingsan Jiang, Ctr. for Space Science and Applied Research (China) . . . . . [8179-26]

**Distinguishing ability analysis of compressed sensing radar imaging based on information theory model**, Hai Jiang, Institute of Electronics (China) and Graduate Univ. of Chinese Academy of Sciences (China); Bingchen Zhang, Yueguan Lin, Wen Hong, Yirong Wu, Institute of Electronics (China) . . . . . [8179-27]

**SAR image despeckling by matching pursuit of subband coherent structures using a library of wavelet bases**, Yuri S. Bekhtin, Ryazan State Radioengineering Univ. (Russian Federation); Andrey A. Bryantsev, Ryazan State Radio Engineering Univ. (Russian Federation) . . . . . [8179-28]

**Efficient and accurate algorithm for the evaluation of Kirchhoff scattering from fractal surfaces**, Antonio Iodice, Univ. degli Studi di Napoli Federico II (Italy); Stefano Perna, Univ. degli Studi di Napoli Parthenope (Italy) . . . . . [8179-29]

**Oil platform investigation by multitemporal SAR remote sensing image**, Chen Peng, The Second Institute of Oceanography, SOA (China) . . . . . [8179-30]

**Polarization scattering characteristics of some ships using polarimetric SAR images**, Juan Wang, Ocean Univ. of China (China) . . . . . [8179-31]

**Application of sparse array and MIMO in near range microwave imaging**, Yaolong Qi, Yanping Wang, Weixian Tan, Wen Hong, Institute of Electronics (China) . . . . . [8179-32]

**Comparison between ALOS PALSAR backscatter and AVNIR-2 NDMI on stem volume of mountainous forest**, Choan Kim, Min-Gee Hong, Kookmin Univ. (Korea, Republic of) . . . . . [8179-33]

**SAR image post-processing for the estimation of fractal parameters**, Daniele Riccio, Ivana Zinno, Gerardo Di Martino, Giuseppe Ruello, Univ. degli Studi di Napoli Federico II (Italy) . . . . . [8179-34]

**Retrieval of soil surface parameters via a polarimetric two-scale model in hilly or mountainous areas**, Antonio Iodice, Antonio Natale, Daniele Riccio, Univ. degli Studi di Napoli Federico II (Italy) . . . . . [8179-35]

**Japan-Touhoku Earthquake : ALOS/PALSAR observations for flooding area by tsunamis**, Noriyuki Kawano, Japan Aerospace Exploration Agency (Japan) . . . . . [8179-36]

**Neural networks algorithms for Oil spill detection using TerraSAR-X satellite data**, Ruggero G. Avezzano, Univ. degli Studi di Roma Tor Vergata (Italy); Matteo Soccorsi, Domenico Velotto, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Fabio Del Frate, Univ. degli Studi di Roma Tor Vergata (Italy); Susanne Lehner, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . [8179-39]

**Numerical weather prediction models and SAR interferometry: synergic use for meteorological and INSAR applications**, Nazzareno Pierdicca, Univ. degli Studi di Roma La Sapienza (Italy); Fabio Rocca, Politecnico di Milano (Italy); Daniele Perissin, Institute of Space and Earth Information Science (China); Rossella Ferretti, Univ. degli Studi dell'Aquila (Italy); Emanuela Pichelli, Univ. degli Studi dell'Aquila (Italy); Bjorn Rommen, European Space Research and Technology Ctr. (Netherlands); Nico Cimini, Istituto di Metodologie per l'Analisi Ambientale (Italy) . . . . . [8179-40]

**Exploring constraints and benefits of PSI technique for landslide detection and monitoring from space**, Christian Iasio, Stefan Schneiderbauer, EURAC research (Italy); Volkmar Mair, Claudia Strada, Provincia Autonoma di Bolzano Alto Adige (Italy) . . . [8179-41]

**Squint mode SAR raw data generation for moving ship on the ocean**, Diao Guijie, BeiHang Univ (China); Xiaojian Xu, BeiHang Univ. (China) . . . . . [8179-42]

**Evaluation of geometric accuracy and the features of TanDEM-X**, Takashi Nonaka, Kohta Imai, Toshifumi Hiramatsu, PASCO Corp. (Japan) . . . . . [8179-43]

**Thursday 22 September**

**SESSION 3**

**Room: Quadrant . . . . . Thurs. 09.00 to 10.00**

**SAR for Maritime Applications**

*Session Chair: Nazzareno Pierdicca, Univ. degli Studi di Roma La Sapienza (Italy)*

09.00: **The Gulf of Mexico oil rig accident: analysis by different SAR satellite images**, Fabio Del Frate, Andrea Giacomini, Daniele Latini, Domenico Solimini, Univ. degli Studi di Roma Tor Vergata (Italy); William J. Emery, Univ. of Colorado (United States) . . . . . [8179-14]

09.20: **Oil detection in Radarsat-2 quad-polarization imagery: implications for ScanSAR performance**, Angela Cheng, Roger De Abreu, Canadian Ice Service (Canada); Paris Vachon, John Wolfe, Defence Research and Development Canada (Canada) . . . . [8179-15]

09.40: **Multifractal analysis of oil slicks on SAR images**, Roberto Coscione, Gerardo Di Martino, Antonio Iodice, Daniele Riccio, Giuseppe Ruello, Univ. degli Studi di Napoli Federico II (Italy) [8179-16]

Coffee Break . . . . . 10.00 to 10.30

**SESSION 4**

**Room: Quadrant . . . . . Thurs. 10.30 to 12.20**

**SAR for Risk Assessment and Evaluation**

*Session Chair: Emanuele Santi, Istituto di Fisica Applicata Nello Carrara (Italy)*

10.30: **Flood detection using COSMO-SkyMed data through a joint use of electromagnetic scattering models and mathematical morphology (Invited Paper)**, Luca Pulvirenti, Nazzareno Pierdicca, Univ. degli Studi di Roma La Sapienza (Italy); Marco Chini, Istituto Nazionale di Geofisica e Vulcanologia (Italy); Leila Guerriero, Univ. degli Studi di Roma Tor Vergata (Italy) . . . . . [8179-17]

11.00: **Detection of fault creep around NAF by InSAR time series analysis using PALSAR data**, Tomonori Deguchi, Nittetsu Mining Consultants Co., Ltd. (Japan) . . . . . [8179-18]

11.20: **A new neural networks scheme for automatic seismic source analysis from DInSAR data**, Matteo Picchiani, Fabio Del Frate, Giovanni Schiavon, Univ. degli Studi di Roma Tor Vergata (Italy); Salvatore Stramondo, Istituto Nazionale di Geofisica e Vulcanologia (Italy) . . . . . [8179-19]

11.40: **Preliminary analysis of a correlation between ground deformations and rainfall: the Ivanchich landslide, central Italy**, Francesca Ardizzone, Mauro Rossi, F. Calò, L. Paglia, Michele Manunta, Consiglio Nazionale delle Ricerche (Italy); Alessandro Cesare Mondini, Consiglio Nazionale delle Ricerche (Italy) and Univ. degli Studi di Perugia (Italy); Giovanni Zeni, P. Reichenbach, Riccardo Lanari, Fausto Guzzetti, Consiglio Nazionale delle Ricerche (Italy) . . . . . [8179-20]

12.00: **Comparative analyses of multi-frequency PSI ground deformation measurements**, Jose R. Sabater, Javier Duro, David Albiol, Fifamè N. Koudogbo, Altamira Information (Spain) . . . [8179-21]

Lunch Break . . . . . 12.20 to 13.50

**Remote Sensing Plenary Session**  
 Monday 19 September 09.00 to 10.45  
 For details, please see page 5

# Conference 8179

## SESSION 5

Room: Quadrant . . . . .Thurs. 13.50 to 15.10

### SAR and Modelling Approach

*Session Chair: Claudia Notarnicola, EURAC research (Italy)*

13.50: **Dedicated SAR simulation tools for ATR and scene analysis,**  
Horst Hammer, Karsten Schulz, Fraunhofer-Institut für Optronik,  
Systemtechnik und Bildauswertung (Germany) . . . . . [8179-22]

14.10: **Target detection by change for SAR imagery,** Christopher J.  
Willis, BAE Systems (United Kingdom) . . . . . [8179-23]

14.30: **Microwave remote sensing of natural stratifications,**  
Pasquale Imperatore, Antonio Iodice, Daniele Riccio, Univ. degli Studi  
di Napoli Federico II (Italy) . . . . . [8179-24]

14.50: **Multiple reflections in SAR images of business districts,**  
Daniele Riccio, Daniela Di Leo, Univ. degli Studi di Napoli Federico II  
(Italy) . . . . . [8179-25]

### Remote Sensing Plenary Session

Monday 19 September 09.00 to 10.45

For details, please see page 5

## Image and Signal Processing for Remote Sensing

*Conference Chair:* **Lorenzo Bruzzone**, Univ. degli Studi di Trento (Italy)

*Conference Co-Chairs:* **Jon Atli Benediktsson**, Univ. of Iceland (Iceland); **Sebastiano Bruno Serpico**, Univ. degli Studi di Genova (Italy)

*Programme Committee:* **Luciano Alparone**, Univ. degli Studi di Firenze (Italy); **Selim Aksoy**, Bilkent Univ. (Turkey); **José M. Bioucas-Dias**, Univ. Técnica de Lisboa (Portugal); **Francesca Bovolo**, Univ. degli Studi di Trento (Italy); **Gustavo Camps-Valls**, Univ. de València (Spain); **Jocelyn Chanussot**, Lab. des Images et des Signaux (France); **Chi Hau Chen**, Univ. of Massachusetts Dartmouth (United States); **David A. Clausi**, Univ. of Waterloo (Canada); **Melba M. Crawford**, Purdue Univ. (United States); **Fabio Dell'Acqua**, Univ. degli Studi di Pavia (Italy); **Giles M. Foody**, The Univ. of Nottingham (United Kingdom); **Jordi Inglada**, Ctr. d'Etudes Spatiales de la Biosphère (France); **Gabriele Moser**, Univ. degli Studi di Genova (Italy); **Allan A. Nielsen**, Technical Univ. of Denmark (Denmark); **Ryuei Nishii**, Kyushu Univ. (Japan); **Antonio J. Plaza**, Univ. de Extremadura (Spain); **John A. Richards**, The Australian National Univ. (Australia); **Anne S. Solberg**, Univ. Oslo (Norway); **Josiane B. Zerubia**, INRIA Sophia Antipolis - Méditerranée (France)

### Monday 19 September

#### Opening Remarks

**Room: Tycho . . . . . Mon. 13.40 to 13.50**

**Lorenzo Bruzzone**, Univ. degli Studi di Trento (Italy)

#### SESSION 1

**Room: Tycho . . . . . Mon. 13.50 to 15.10**

#### Analysis of VHR Images and Pansharpening

*Session Chair:* **Lorenzo Bruzzone**, Univ. degli Studi di Trento (Italy)

13.50: **Multispectral pansharpening based on pixel modulation: state of the art and new results**, Bruno Aiazzi, Istituto di Fisica Applicata Nello Carrara (Italy); Luciano Alparone, Univ. degli Studi di Firenze (Italy); Stefano Baronti, Istituto di Fisica Applicata Nello Carrara (Italy); Andrea Garzelli, Univ. degli Studi di Siena (Italy); Massimo Selva, Istituto di Fisica Applicata Nello Carrara (Italy). . . . . [8180-01]

14.10: **A new geometric invariant to match regions within remote sensing images of different modalities**, Christophe Palmann, Sébastien Mavromatis, Jean Sequeira, Univ. de la Méditerranée (France). . . . . [8180-02]

14.30: **The automated procedure for detection of IDP's dwellings using VHR satellite imagery**, Malgorzata Jenerowicz, Space Research Ctr. (Poland); Thomas Kemper, European Commission Joint Research Ctr. (Italy). . . . . [8180-03]

14.50: **Applying modulation transfer function in high resolution image fusion**, Xiao Ping Zhang, The Second Institute of Oceanography, SOA (China); Yonghong Jia, Wuhan Univ. (China); Delu Pan, The Second Institute of Oceanography, SOA (China); Shifeng Jia, The First Surveying and Mapping Institute of Zhejiang (China); Jianyu Chen, Xiaoyan Chen, The Second Institute of Oceanography, SOA (China). . . . . [8180-04]

Coffee Break . . . . . 15.10 to 15.40

#### SESSION 2

**Room: Tycho . . . . . Mon. 15.40 to 17.20**

#### Image Analysis and Sensors

*Session Chair:* **Luciano Alparone**, Univ. degli Studi di Firenze (Italy)

15.40: **Application of multispectral color enhancement for remote sensing**, Noriaki Hashimoto, Yuri Murakami, Masahiro Yamaguchi, Nagaaki Ohyama, Kuniaki Uto, Yukio Kosugi, Tokyo Institute of Technology (Japan). . . . . [8180-05]

16.00: **Automated texture mapping of 3D models**, Anna Pelagotti, Istituto Nazionale di Ottica (Italy); Francesca Uccheddu, Francesco Picchioni, Univ. degli Studi di Firenze (Italy). . . . . [8180-06]

16.20: **Radiometric correction of RapidEye imagery using the on-orbit side-slither method**, Cody Anderson, Denis Naughton, Andreas Brunn, Michael Thiele, RapidEye AG (Germany). . . . . [8180-07]

16.40: **Metrological performances of smart structures based on Bragg grating sensors**, Enrico de Cais, Marco Borotto, Marco Belloli, Andrea Bernasconi, Stefano Manzoni, Politecnico di Milano (Italy). . . . . [8180-08]

17.00: **The null space method of deblurring problem solution**, Yuriy Bunyak, InnoVinn (Ukraine); Roman Kvetnyy, Vinnitsa National Technical Univ. (Ukraine); Pavlo A. Molchanov, Ampac Inc. (United States) and Vinnitsya National Technical Univ. (Ukraine) and InnoVinn (Ukraine); Olga Sofina, Vinnitsa National Technical Univ. (Ukraine). . . . . [8180-09]

### Tuesday 20 September

#### SESSION 3

**Room: Tycho . . . . . Tues. 08.30 to 10.10**

#### Classification Techniques I

*Session Chair:* **Lorenzo Bruzzone**, Univ. degli Studi di Trento (Italy)

08.30: **Kernel methods in remote sensing data processing: tricks of the trade (Invited Paper)**, Gustavo Camps-Valls, Univ. de València (Spain). . . . . [8180-10]

09.10: **Active versus semisupervised learning paradigm for the classification of remote sensing images**, Claudio Persello, Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy). . . . . [8180-11]

09.30: **Selection of samples for active labeling in semi-supervised hyperspectral pixel classification**, Olga Rajadell, Institute of New Image Technologies, Univ. Jaume I (Spain); Viet Cuong Dinh, Robert P. W. Duin, Technische Univ. Delft (Netherlands); Pedro Garcia-Sevilla, Univ. Jaume I (Spain). . . . . [8180-12]

09.50: **An active transfer learning technique driven by change detection for classification of temporal series of images**, Begum Demir, Francesca Bovolo, Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy). . . . . [8180-13]

Coffee Break . . . . . 10.10 to 10.40

#### SESSION 4

**Room: Tycho . . . . . Tues. 10.40 to 12.00**

#### Classification Techniques II

*Session Chair:* **Gustavo Camps-Valls**, Univ. de València (Spain)

10.40: **Transfer component analysis for domain adaptation in image classification**, Giona Matasci, Michele Volpi, Univ. de Lausanne (Switzerland); Devis Tuia, Univ. de València (Spain); Mikhail Kanevski, Univ. de Lausanne (Switzerland). . . . . [8180-14]

11.00: **Texture-based approach for shadow detection and classification improvement: metropolitan area case study, Spain**, Bahaaeddin I. Z. Alhaddad, Josep Roca Cladera, Malcolm C. Burns, Univ. Politècnica de Catalunya (Spain). . . . . [8180-16]

11.20: **Large database coconut field classification by data mining on high-resolution Ikonos images**, Elise Desmier, Frédéric Flouvat, Univ. de la Nouvelle-Calédonie (New Caledonia); Benoit Stoll, Univ. de la Polynésie Française (French Polynesia); Nazha Selmaoui, Univ. de la Nouvelle-Calédonie (New Caledonia). . . . . [8180-17]

11.40: **Evaluation of textural features for multispectral images**, Ulya Bayram, Gulcan Can, Middle East Technical Univ. (Turkey). . . . . [8180-18]

Lunch/Exhibition Break . . . . . 12.00 to 14.00

## SESSION 5

Room: Tycho ..... Tues. 14.00 to 15.00

### Classification Techniques III

Session Chair: **Jordi Inglada**,  
Ctr. d'Etudes Spatiales de la Biosphère (France)

- 14.00: **Spectral-spatial classification of polarimetric SAR data using morphological profiles**, Prashanth R. Marpu, Univ. of Iceland (Iceland); Kun-Shan Chen, National Central Univ. (Taiwan); Jon A. Benediktsson, Univ. of Iceland (Iceland) ..... [8180-19]
- 14.20: **An efficient approach for multi-temporal hyperspectral images interpretation based on high order tensor**, Selim Hemissi III, Imed Riadh Farah, Karim Saheb Ettaba, Ecole Nationale des Sciences de l'Informatique (Tunisia); Basel Soulaïman, TELECOM Bretagne (France) ..... [8180-21]
- 14.40: **Temporal interpolation and image fusion for improved land-cover maps**, Jordi Inglada, Ctr. d'Etudes Spatiales de la Biosphère (France) ..... [8180-22]
- Coffee Break ..... 15.00 to 15.30

## SESSION 6

Room: Tycho ..... Tues. 15.30 to 17.10

### Analysis of Hyperspectral Data

Session Chair: **Antonio J. Plaza**, Univ. de Extremadura (Spain)

- 15.30: **An endmember extraction strategy for geometrical methods based on spectral-spatial information**, Mario Beauchemin, Natural Resources Canada (Canada) ..... [8180-23]
- 15.50: **Content-based hyperspectral image retrieval using spectral unmixing**, Antonio J. Plaza, Univ. de Extremadura (Spain) . . [8180-24]
- 16.10: **Endmember detection in marine environment with oil spill event**, Charoula Andreou, Vassilia Karathanassi, National Technical Univ. of Athens (Greece) ..... [8180-25]
- 16.30: **Illumination and shadow compensation of hyperspectral images using a digital surface model and nonlinear least squares estimation**, Ola Friman, Gustav Tolt, Jörgen Ahlberg, Swedish Defence Research Agency (Sweden) ..... [8180-26]
- 16.50: **Spatial/spectral area-wise analysis for the classification of hyperspectral data**, Roussel Guillaume, Véronique Achard, Alexandre Alakian, ONERA (France); Jean-Claude Fort, Univ. Paris Descartes (France) ..... [8180-27]

## Wednesday 21 September

## SESSION 7

Room: Tycho ..... Wed. 09.00 to 10.00

### Change Detection and Analysis of Multitemporal Images

Session Chair: **Allan A. Nielsen**,  
Technical Univ. of Denmark (Denmark)

- 09.00: **Sparse principal component analysis in hyperspectral change detection**, Allan A. Nielsen, Rasmus Larsen, Technical Univ. of Denmark (Denmark) ..... [8180-28]
- 09.20: **Change detection over Sokolov open-pit mine areas, Czech Republic, using multi-temporal HyMAP data (2009-2010)**, Eyal Bendor, Tel Aviv Univ. (Israel) ..... [8180-29]
- 09.40: **Urban land cover change of Olomouc city using Landsat images**, Milos Marjanovic, Jan Harbula, Jaroslav Burian, Jakub Mirijovsky, Palacky Univ. Olomouc (Czech Republic); Veronika Kopacková, Czech Geological Survey (Czech Republic) . . . . [8180-30]
- Coffee Break ..... 10.00 to 10.30

## SESSION 8

Room: Tycho ..... Wed. 10.30 to 11.30

### Lidar and SAR Processing

Session Chair: **Jordi Inglada**,  
Ctr. d'Etudes Spatiales de la Biosphère (France)

- 10.30: **Lidar-based measurement of surface roughness features of single tree crowns**, Melanie Kolditz, Petra Krahwinkel, Jürgen Roßmann, RWTH Aachen (Germany) ..... [8180-32]
- 10.50: **Dynamic and data-driven classification for polarimetric SAR images**, Stefan Uhlmann, Serkan Kiranyaz, Tampere Univ. of Technology (Finland); Turker Ince, Izmir Univ of Economics (Turkey); Moncef Gabbouj, Tampere Univ. of Technology (Finland) . . . [8180-33]
- 11.10: **Performance evaluation for blind methods of noise characteristic estimation for TerraSAR-X images**, Vladimir V. Lukin, Dmitriy V. Fevrarev, Nikolay N. Ponomarenko, Sergey K. Abramov, National Aerospace Univ. (Ukraine); Karen Egiazarian, Tampere Univ. of Technology (Finland); Benoit Vozel, Kacem Chehdi, Univ. de Rennes 1 (France); Jaakko T. Astola, Tampere Univ. of Technology (Finland) ..... [8180-35]
- Lunch/Exhibition Break ..... 11.30 to 13.40

## SESSION JS1

Room: Tycho ..... Wed. 13.40 to 15.00

### Joint Session: SAR Data Analysis I

Session Chair: **Claudia Notarnicola**, EURAC research (Italy)

Joint Session with Conference 8179,  
SAR Image Analysis, Modeling and Techniques

- 13.40: **SAR-based sea traffic monitoring: a reliable approach for maritime surveillance**, Alfredo Renga, Univ. degli Studi di Napoli Federico II (Italy); Maria D. Graziano, Marco D'Errico, Seconda Univ. degli Studi di Napoli (Italy); Antonio Moccia, Andrea Cecchini, Univ. degli Studi di Napoli Federico II (Italy) ..... [8179-09]
- 14.00: **An experimental study on ship detection based on the fixed-point polarimetric whitening filter**, Ding Tao, Univ of Tromsø (Norway); Camilla Brekke, Stian N. Anfinsen, Univ. of Tromsø (Norway) ..... [8180-36]
- 14.20: **A novel paradigm for urban environment characterization using ascending and descending terrasar-x data**, Emanuele Angiuli, Giovanna Trianni, European Commission Joint Research Ctr. (Italy); Paolo Gamba, Univ. degli Studi di Pavia (Italy) ..... [8179-10]
- 14.40: **A radar target DB construction method using 3D scattering centers**, Ji Hee Kim, Chan Hong Kim, Dae Young Chae, Kyoung-Il Kwon, Agency for Defense Development (Korea, Republic of) [8180-37]
- Coffee Break ..... 15.00 to 15.30

## SESSION JS2

Room: Tycho ..... Wed. 15.30 to 16.30

### Joint Session: SAR Data Analysis II

Session Chair: **Lorenzo Bruzzone**, Univ. degli Studi di Trento (Italy)

Joint Session with Conference 8179,  
SAR Image Analysis, Modeling and Techniques

- 15.30: **An unsupervised method for quality assessment of despeckling: an evaluation on COSMO-SkyMed data**, Bruno Aiazzi, Istituto di Fisica Applicata Nello Carrara (Italy); Luciano Alparone, Fabrizio Argenti, Univ. degli Studi di Firenze (Italy); Stefano Baronti, Istituto di Fisica Applicata Nello Carrara (Italy); Tiziano Bianchi, Alessandro Lapini, Univ. degli Studi di Firenze (Italy) ..... [8179-11]
- 15.50: **Basis for optronic ScanSAR processing**, Linda Marchese, Pascal Bourqui, Sandra Turgeon, INO (Canada); Bernd Harnish, Martin Suess, European Space Research and Technology Ctr. (Netherlands); François Châteauneuf, Alain Bergeron, INO (Canada) ..... [8179-12]
- 16.10: **Comparison of using single- or multi-polarimetric TerraSAR-X images for segmentation and classification of man-made maritime objects**, Michael Teutsch, Günter Saur, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) ..... [8180-38]



**Posters . . . . . Wed. 17.30 to 19.00**

Conference attendees are invited to attend the Remote Sensing Poster Session on Wednesday afternoon. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at [spie.org/x32234.xml](http://spie.org/x32234.xml).

**Image segmentation by hierarchical Markov model**, Tiancan Mei, Sidong Zhong, Wuhan Univ. (China) . . . . . [8180-40]

**Metrological performances of fiber Bragg grating sensors and comparison with electrical strain gages**, Marco Borotto, Enrico de Cais, Marco Belloli, Andrea Bernasconi, Stefano Manzoni, Politecnico di Milano (Italy) . . . . . [8180-41]

**Geometric superresolution using optical mask(OM) and subpixeling**, Mohammad Sohail, Asloob Mudassar, Pakistan Institute of Engineering and Applied Sciences (Pakistan) . . . . . [8180-42]

**Cross-calibrating reflective bands of NOAA17/AVHRR using MODIS over a desert site**, Bo Zhong, Institute of Remote Sensing Applications (China); Haixia Huang, Institute of Remote Sensing Applications (China) and College of Geo-resources and Information (China); Yuhuan Zhang, Institute of Remote Sensing Applications (China) and Shandong Univ. of Science and Technology (China); Qin-Huo Liu, Institute of Remote Sensing Applications (China) . . . [8180-45]

**Identification the informal buildings using object-oriented analysis in Jazan, Saudi Arabia**, Housein A. Mashee, King Abdulaziz City for Science & Technology (Saudi Arabia) . . . . . [8180-46]

**Characteristic analyses of the reflected components of IR signals due to multiple reflections on object surface**, Dong-Geon Kim, Jun-Hyuk Choi, Tae-Kuk Kim, Chung-Ang Univ. (Korea, Republic of) . . . . . [8180-48]

**Remote sensing image denoising based on partial difference equation and using auxiliary image as priors**, Peng Liu, Dingsheng Liu, Ctr. for Earth Observation and Digital Earth (China) . . . . [8180-49]

**Enhancing the actual operational performance of coaxial three-mirror anastigmatic optical system by wavefront coding**, Bing-Long Zhang, Bo Li, Bin Hu, Yun Su, Beijing Institute of Space Mechanics and Electricity (China) . . . . . [8180-50]

**A new coastline extraction in remote sensing images**, Kun Xing, Beijing Institute of Space Mechanics and Electricity (China); Yili Fu, Harbin Institute of Technology (China) . . . . . [8180-51]

**Lossless compression of images from China-Brazil Earth Resources Satellite**, Marcelo S. Pinho, Instituto Tecnológico de Aeronáutica (Brazil) . . . . . [8180-52]

**Improvement of appropriate training area selection method for texture classification based on advanced genetic algorithms**, Hiroshi Okumura, Mai Fukusaki, Shoichiro Takubo, Kohei Arai, Saga Univ. (Japan) . . . . . [8180-53]

**Impact of informative band selection on target detection performance**, Hamed Gholizadeh, Mohammad J. Valadan Zoej, K.N. Toosi Univ. of Technology (Iran, Islamic Republic of); Barat Mojaradi, Iran Univ. of Science and Technology (Iran, Islamic Republic of) . . . . . [8180-54]

**Comparison of supervised classification methods applied on high-resolution satellite images**, Ayse Öztürk, Yalova Univ. (Turkey) . . . . . [8180-55]

**Joint high dynamic range imaging and color demosaicing**, Johannes Herwig, Josef Pauli, Univ. of Duisburg-Essen (Germany) . . . . . [8180-56]

**Object-oriented high-resolution remote sensing image information extraction of urban green space based on support vector machine**, Xuerong Li, Qianguo Xing, Ping Shi, Yantai Institute of Coastal Zone Research (China); Chao Xu, South China Sea Institute of Oceanology (China) . . . . . [8180-57]

**Fusion of hyperspectral and lidar data using morphological profiles**, Mattia Pedernana, Univ. of Iceland (Iceland) and Univ degli Studi di Trento (Italy); Prashanth R. Marpu, Univ. of Iceland (Iceland); Mauro Dalla Mura, Univ. degli Studi di Trento (Italy); Jon A. Benediktsson, Univ. of Iceland (Iceland); Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy) . . . . . [8180-58]

**Spectral dimensionality reduction based on intergrated bispectrum phase for hyperspectral image analysis**, Deok-Hwan Kim, Khairul Muzzammil Saipullah, Inha Univ. (Korea, Republic of) . . . . . [8180-59]

**Remote Sensing Plenary Session**

Monday 19 September 09.00 to 10.45

For details, please see page 5

# Earth Resources and Environmental Remote Sensing/GIS Applications

*Conference Chairs:* **Ulrich Michel**, Univ. of Education Heidelberg (Germany); **Daniel L. Civco**, Univ. of Connecticut (United States)  
*Conference Co-Chairs:* **Manfred Ehlers**, Univ. Osnabrück (Germany); **Karsten Schulz**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Konstantinos G. Nikolakopoulos**, Institute of Geology & Mineral Exploration (Greece)

*Programme Committee:* **Thomas Blaschke**, Paris-Lodron-Univ. Salzburg (Austria); **Tilman U. Bucher**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Ni-Bin Chang**, Univ. of Central Florida (United States); **Garik Gutman**, NASA Headquarters (United States); **Martin Kappas**, Georg-August-Univ. Göttingen (Germany); **Rosa Lasaponara**, Consiglio Nazionale delle Ricerche (Italy); **Marguerite M. Madden**, The Univ. of Georgia (United States); **Derya Maktav**, Istanbul Technical Univ. (Turkey); **Nicola Masini**, Consiglio Nazionale delle Ricerche (Italy); **Matthias S. Möller**, Beuth Univ. of Applied Sciences Berlin (Germany); **Pablo H. Rosso**, Univ. Osnabrück (Germany); **Florian Savopol**, Natural Resources Canada (Canada); **Jochen Schiewe**, HafenCity Univ. Hamburg (Germany); **Wenzhong Shi**, The Hong Kong Polytechnic Univ. (Hong Kong, China); **Alexander Siegmund**, Univ. of Education Heidelberg (Germany); **Karl Staenz**, Univ. of Lethbridge (Canada); **Josef Strobl**, International Institute for Geo-Information Science and Earth Observation (Netherlands); **John L. van Genderen**, International Institute for Geo-Information Science and Earth Observation (Netherlands); **Kerstin Voss**, Rheinische Friedrich-Wilhelms-Univ. Bonn (Germany); **Christiane H. Weber**, Univ. of Strasbourg/Faculty of Geography (France)

## Tuesday 20 September

### Welcome and Introduction

**Room: Virgo . . . . . Tues. 08.50 to 09.00**

**Ulrich Michel**, Univ. of Education Heidelberg (Germany)

### SESSION 1

**Room: Virgo . . . . . Tues. 09.00 to 10.10**

#### Processing Methodologies I: Accuracy Assessment

*Session Chair:* **Ulrich Michel**, Univ. of Education Heidelberg (Germany)

09.00: **Accuracy analysis of DEM extraction over Japan using ALOS PRISM stereo images** (*Invited Paper*), Yoshiyuki Kawata, Tatsunori Sasakawa, Satoshi Yoshii, Yukihiro Funatsu, Kazuya Takemata, Kanazawa Institute of Technology (Japan) . . . . . [8181-01]

09.30: **Validation of ALOS DSM**, Konstantinos G. Nikolakopoulos, Institute of Geology & Mineral Exploration (Greece); Aristides D. Vaiopoulos, Univ. of Athens (Greece) . . . . . [8181-02]

09.50: **Positioning accuracy of GeoEye-1 RPC/Ortho pan-sharpened color imagery**, Mitsuharu Tokunaga, Manabu Ichihara, Kanazawa Institute of Technology (Japan) . . . . . [8181-03]

Coffee Break . . . . . 10.10 to 10.40

### SESSION 2

**Room: Virgo . . . . . Tues. 10.40 to 12.00**

#### Hazard Mitigation I: Geologic Applications

*Session Chair:* **Konstantinos G. Nikolakopoulos**, Institute of Geology & Mineral Exploration (Greece)

10.40: **An integrated tool supporting volcanic activity monitoring**, Massimo Musacchio, Malvina Silvestri, Istituto Nazionale di Geofisica e Vulcanologia (Italy); Simona Zoffoli, Agenzia Spaziale Italiana (Italy); Fabrizia Buongiorno, Istituto Nazionale di Geofisica e Vulcanologia (Italy) . . . . . [8181-05]

11.00: **Spectroscopy as a tool for geochemical modelling**, Veronika Kopacková, Czech Geological Survey (Czech Republic); Stephane Chevrel, Anna Bourguignon, BRGM (France) . . . . . [8181-06]

11.20: **Time series geospatial data for seismic precursors assessment**, Maria A. Zoran, National Institute of Research & Development for Optoelectronics (Romania) . . . . . [8181-07]

11.40: **Discrimination of basement rocks in the Eastern Desert of Egypt based on spectral characterizations, ASTER TIR bands and data fusion of EGYPTSAT-1 and Landsat ETM**, Mohamed Fouad Sadek, Safaa M. Hassan Sayed, National Authority for Remote Sensing and Space Sciences (Egypt) . . . . . [8181-08]

Lunch/Exhibition Break . . . . . 12.00 to 13.40

### SESSION 3

**Room: Virgo . . . . . Tues. 13.40 to 15.00**

#### Processing Methodologies II

*Session Chair:* **Ni-Bin Chang**, Univ. of Central Florida (United States)

13.40: **Simulation of operation of future Japanese spaceborne hyperspectral imager: HISUI**, Tsuneo Matsunaga, Satoru Yamamoto, Soshi Kato, National Institute for Environmental Studies (Japan); Osamu Kashimura, Tetsushi Tachikawa, Earth Remote Sensing Data Analysis Ctr. (Japan); Kenta Ogawa, Rakuno Gakuen Univ. (Japan); Akira Iwasaki, The Univ. of Tokyo (Japan); Satoshi Tsuchida, National Institute of Advanced Industrial Science and Technology (Japan); Nagamitsu Ohgi, Japan Resources Observation System and Space Utilization Organization (Japan); Shuichi Rokugawa, The Univ. of Tokyo (Japan) . . . . . [8181-09]

14.00: **Analysis of high-resolution remote sensing imagery with textures derived from single pixel objects**, Roeland de Kok, Kadim Tasdemir, European Commission Joint Research Ctr. (Italy) . [8181-11]

14.20: **Developing Matlab scripts for image analysis and quality assessment**, Aristidis D. Vaiopoulos, Univ. of Athens (Greece) . . . . . [8181-12]

14.40: **Integrating remote sensing images on a contextual mobile GIS**, Erick López-Ornelas, Rocio Abascal-Mena, Univ. Autónoma Metropolitana (Mexico) . . . . . [8181-13]

Coffee Break . . . . . 15.00 to 15.30

### SESSION 4

**Room: Virgo . . . . . Tues. 15.30 to 17.30**

#### Infrastructures and Urban Areas

*Session Chair:* **Karsten Schulz**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)

15.30: **Object-based detection of destroyed buildings based on remotely sensed data and GIS**, Natalia Sofina, Manfred Ehlers, Univ. Osnabrück (Germany); Ulrich Michel, Pädagogische Hochschule Heidelberg (Germany) . . . . . [8181-14]

15.50: **Building detection from single polarized TerraSAR-X data**, Martin Schmidt, Thomas Esch, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Michael Thiel, Julius-Maximilians-Univ. Würzburg (Germany); Stefan W. Dech, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [8181-15]

16.10: **Land use and land cover classification with evolutionary support vector machine (ESVM) and SPOT-5 images in Dalian, China**, Ni-Bin Chang, Univ. of Central Florida (United States); Min Han, Wei Yao, Shiguo Xu, Dalian Univ. of Technology (China) . . . [8181-16]

16.30: **Wireless sensors network innovative application for structural industrial works monitoring**, Dumitru Ulieru, SITEX 45 (Romania); Florian N. Pistritu, National Institute for Research and Development in Microtechnologies (Romania) . . . . . [8181-17]

16.50: **Using the SLEUTH urban growth model to simulate the impacts of future policy scenarios on urban land use in Tehran metropolitan area in Iran**, Shaghayegh Kargozar Nahavandy, Mohammad Reza Saradjian, Univ. of Tehran (Iran, Islamic Republic of) . . . . . [8181-18]

17.10: **Application of GIS for the modeling of spatial distribution of air pollutants in Tehran**, Saeed Sargazi, Hamid Taheri Shahrainyi, Tarbiat Modares Univ. (Iran, Islamic Republic of); Majid Habibi Nokhandan, Islamic Republic of Iran Meteorological Organization (Iran, Islamic Republic of); Melika Sanaeifar, Islamic Azad Univ. (Iran, Islamic Republic of) . . . . . [8181-19]

### Wednesday 21 September

#### SESSION 5

**Room: Virgo . . . . . Wed. 08.50 to 10.10**

#### Hazard Mitigation II: Geologic Applications

*Session Chair: Konstantinos G. Nikolakopoulos, Institute of Geology & Mineral Exploration (Greece)*

08.50: **High resolution remote sensing information identification for characterizing uranium mineralization setting in Namibia**, Jie-Lin Zhang, Beijing Research Institute of Uranium Geology (China) . . . . . [8181-20]

09.10: **Hyperspectral remote sensing applied for hydrogeological mapping in a hard-rock terrain for water resource management**, Amit Singh, Saumitra Mukherjee, Jawaharlal Nehru Univ. (India) . . . . . [8181-21]

09.30: **Using satellite imagery and Geospatial Information Systems to make a better decision in geological interpretation**, Foroogh Beik, Zahra Naseri, National Iranian Oil Co. (Iran, Islamic Republic of) . . . . . [8181-22]

09.50: **Mineral detection in hyperspectral data using characteristics of spectral profiles**, Majid M. Oskouei, Sahand Univ. of Technology (Iran, Islamic Republic of) . . . . . [8181-23]

Coffee Break . . . . . 10.10 to 10.40

#### SESSION 6

**Room: Virgo . . . . . Wed. 10.40 to 12.20**

#### Environmental Monitoring I

*Session Chair: Holger Thunig, Univ. of Education Heidelberg (Germany)*

10.40: **Object-based rapid change detection for disaster management**, Holger Thunig, Ulrich Michel, Pädagogische Hochschule Heidelberg (Germany); Manfred Ehlers, Univ. Osnabrück (Germany); Peter Reinartz, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [8181-24]

11.00: **Object-Based vs. Per-Pixel Classification of Aster Imagery for Land Cover Mapping in Semi-Arid Areas**, Mustafa M. El Abbas, Elmar Csaplovics, Technische Univ. Dresden (Germany) . . . . [8181-25]

11.20: **Estimating vegetation phenological trends using MODIS NDVI time series**, Markus Törmä, Mikko Kervinen, Saku Anttila, SYKE Finnish Environment Institute (Finland) . . . . . [8181-26]

11.40: **Change detection for Finnish CORINE land cover classification**, Markus Törmä, Pekka Härmä, Suvi Hatunen, Riitta Teiniranta, Minna Kallio, Elise Järvenpää, SYKE Finnish Environment Institute (Finland) . . . . . [8181-27]

12.00: **Hazards analysis and prediction from remote sensing and GIS using spatial data mining and knowledge discovery: a case study for landslide hazard mitigation**, Pai-Hui Hsu, National Taiwan Univ. (Taiwan); Wen-Ray Su, National Science and Technology Ctr. for Disaster Reduction (Taiwan) . . . . . [8181-28]

Lunch/Exhibition Break . . . . . 12.20 to 13.40

#### SESSION 7

**Room: Virgo . . . . . Wed. 13.40 to 15.20**

#### Environmental Monitoring II

*Session Chair: Karsten Schulz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)*

13.40: **Structural analysis of forest areas in high-resolution SAR images**, Markus Boldt, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Antje Thiele, Karlsruher Institut für Technologie (Germany); Karsten Schulz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Stefan Hinz, Karlsruher Institut für Technologie (Germany) . . . . . [8181-29]

14.00: **Coastal water quality near to desalination project in Cyprus using Earth observation**, Diofantos G. Hadjimitsis, Christina Papoutsas, Cyprus Univ. of Technology (Cyprus) . . . . . [8181-30]

14.20: **Land degradation monitoring in the Ocnele Mari salt mining area using satellite imagery**, Violeta D. Poenaru, Alexandru Badea, Elena Savin, Romanian Space Agency (Romania); Valentin Poncos, Delia Teleaga, Advanced Studies and Research Ctr. (Romania) . . . . . [8181-31]

14.40: **Landslide detection and monitoring using remote sensing and spatial analysis in Taiwan**, Fuan Tsai, Tang-Huang Lin, Liang-Chien Chen, National Central Univ. (Taiwan); Walter W. Chen, National Taipei Univ. of Technology (Taiwan) . . . . . [8181-32]

15.00: **Application of hyperspectral remote sensing at Edwards Air Force Base**, Renee Walmsley, Tetra Tech (United States); Michael Frank, Galileo Group, Inc. (United States) . . . . . [8181-10]

Coffee Break . . . . . 15.20 to 15.50

#### SESSION 8

**Room: Virgo . . . . . Wed. 15.50 to 17.10**

#### Environmental Monitoring III

*Session Chair: Diofantos G. Hadjimitsis, Cyprus Univ. of Technology (Cyprus)*

15.50: **Coastal geomorphology changes of Quatre Bay of Iran using satellite data**, Alireza Salehipour Milani, Geological Survey of Iran (Iran, Islamic Republic of); Parvaneh Akhgar, Ministry of Education (Iran, Islamic Republic of) . . . . . [8181-35]

16.10: **Geoinformatics applications for flood mapping and management in Haryana State, India: key issues**, Bhagwan S. Chaudhary, Kurukshetra Univ. (India) . . . . . [8181-36]

16.30: **Remote sensing and GIS for the safety management of the interactions between natural and industrial hazard**, Mariano Ciucci, Alessandra Marino D.V.M., Istituto Superiore per la Prevenzione e la Sicurezza del Lavoro (Italy) . . . . . [8181-72]

16.50: **Soil erosion risk assessment using GIS and CORINE model: a case study from western Shiraz, Iran**, Mahboobeh Tayebi, Abdolmajid Sameni, Mohammad H. Tayebi, Shiraz Univ. (Iran, Islamic Republic of) . . . . . [8181-37]

**Posters . . . . . Wed. 17.30 to 19.00**

*Conference attendees are invited to attend the Remote Sensing Poster Session on Wednesday afternoon. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at [spie.org/x32234.xml](http://spie.org/x32234.xml).*

**Study on the ecosystem health assessment for wetland of Lianyungang**, Haiying Li, Hongchun Peng, Huaihai Institute of Technology (China); Junling Nie, Shouguang Modern School (China); Yueru Wu, Cold and Arid Regions Environmental and Engineering Research Institute (China) . . . . . [8181-34]

**Lightning hazard evaluation by integrating surface electromagnetic and physical properties**, Jin Baek, Jeong Woo Kim, Xin Wang, Univ. of Calgary (Canada); Dong-Cheon Lee, Sejong Univ. (Korea, Republic of) . . . . . [8181-43]



# Conference 8181

**Automatic dust storm detection in desert region based on supervised classification of multitemporal MODIS data**, Juan Gu, Cold and Arid Regions Environmental and Engineering Research Institute (China); Gregory S. Okin, Univ. of California, Los Angeles (United States); Xin Li, Chunlin Huang, Cold and Arid Regions Environmental and Engineering Research Institute (China) . . . [8181-45]

**Land use/land cover changes and flooding surface estimation in Alqueva (Portugal) using 18 years of Landsat data**, Ana C. Teodoro, Sofia Rios, Dário Ferreira, Univ. do Porto (Portugal) . . . . . [8181-46]

**Empirical model for salinity assessment on lacustrine and coastal waters by remote sensing**, Gabriele Bitelli, Pietro V. Curzi, Enrico Dinelli, Emanuele Mandanici, Univ. degli Studi di Bologna (Italy) . . . . . [8181-47]

**Modeling of temporal-spatial dynamics of sediment supply in farms of a watershed, considering the annual variability of surface runoff**, Luiz Henrique Pereira, Sergio dos Anjos Ferreira Pinto, Univ. Estadual Paulista (Brazil) . . . . . [8181-48]

**Detection of ancient Egyptian archaeological sites using satellite remote sensing and digital image processing**, Robert Corrie, John Baines, Gary Lock, Univ. of Oxford (United Kingdom) . . . . . [8181-49]

**Sub-pixel method for analysis of optical data in determining the overburden dumps and open pit mines**, Denitsa Borisova, Hristo N. Nikolov, Doyno Petkov, Solar-Terrestrial Influences Lab. (Bulgaria); Banush Banushev, Univ. of Mining and Geology (Bulgaria) . . [8181-50]

**Generation of thematic maps using KOMPSAT-2 image data**, Kwangjae Lee, Younsoo Kim, Korea Aerospace Research Institute (Korea, Republic of) . . . . . [8181-52]

**Based on MODIS NDVI data to monitor the growing season of the deciduous forest in Beijing, China**, Ke Xu, Xuexia Zhang, Bin Chen, Kai Hua, Kaidi Zheng, Ting Wu, Beijing Forestry Univ. (China) . . . . . [8181-51]

**Air pollution detection using MODIS data**, Jan Harbula, Palacky Univ. Olomouc (Czech Republic); Veronika Kopacková, Czech Geological Survey (Czech Republic) . . . . . [8181-53]

**An object-based multisensoral approach for the derivation of urban land use structures in the city of Rostock, Germany**, Martin Lindner, Sören Hese, Christian Berger, Christiane C. Schmillius, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [8181-54]

**Analysis of cultivated land change by remote sensing data in Huangshui River watershed, northwestern China**, Xiaohong Gao, Shichao Feng, Jiaan Xie, Jinshan Li, Qinghai Normal Univ. (China) . . . . . [8181-55]

**Estimation of Leaf Area Index (LAI) using IRS-LISSIII Satellite data (Case study: Neishaboor plain, Iran)**, Alireza Farid, Alireza Astaraei, Seyed Hossein Sanaei-Nejad, Parisa Mirhossieni Moosavi, Ferdowsi Univ. of Mashhad (Iran, Islamic Republic of) . . . . . [8181-56]

**Object-based detection of LUCC with special regard to agricultural abandonment on Tenerife (Canary Islands)**, Sebastian Günthert, Alexander Siegmund, Ulrich Michel, Holger Thunig, Pädagogische Hochschule Heidelberg (Germany) . . . . . [8181-57]

**Object-based change detection: dimension of damage in residential areas of Abu Suruj, Sudan**, Timo Demharter, Ulrich Michel, Pädagogische Hochschule Heidelberg (Germany); Manfred Ehlers, Univ. Osnabrück (Germany); Peter Reinartz, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [8181-58]

**Development of a satellite-based multi-scale land use classification system for land and water management in Uzbekistan and Kazakhstan**, Fabian Löw, Christopher Conrad, Julius-Maximilians-Univ. Würzburg (Germany); Stefan W. Dech, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Ulrich Michel, Pädagogische Hochschule Heidelberg (Germany) . . . [8181-59]

**Improvement of the spatial resolution of MODIS coastal waters thermal mapping**, Sergio Teggi, Francesca Despini, Matteo Serafini, Univ. degli Studi di Modena e Reggio Emilia (Italy) . . . . . [8181-60]

**A oceanic satellite data service system based on web**, Yan Kang, Delu Pan, Xianqiang He, Difeng Wang, Jianyu Chen, Xiaoyan Chen, The Second Institute of Oceanography, SOA (China) . . . . . [8181-61]

**Research trend analysis of Qinghai-Tibet Plateau based on the spatial information mining from scientific literature**, Xuemei Wang, Mingguo Ma, Cold and Arid Regions Environmental and Engineering Research Institute (China) . . . . . [8181-62]

**Modelling the backscattering coefficient of salt-affected soils using AIEM model**, Yueru Wu, Weizhen Wang, Cold and Arid Regions Environmental and Engineering Research Institute (China) . . [8181-64]

**A first reference dataset for the evaluation of geometric correction methods under the scope of remote sensing applications**, Hernâni Gonçalves, Ana C. Teodoro, José A. Gonçalves, Luís Corte-Real, Univ. do Porto (Portugal) . . . . . [8181-65]

**Study on urban heat island of Lian Yungang based on remote sensing**, Haiying Li, Hongchun Peng, Huaihai Institute of Technology (China); Yueru Wu, Cold and Arid Regions Environmental and Engineering Research Institute (China); Junling Nie, Shouguang Modern School (China) . . . . . [8181-66]

**Fuzzy logic for North-Western Black Sea coastal zone land cover change quantifying**, Liviu Florin V. Zoran, Carmen C. Ionescu Golovanov, Polytechnical Univ. of Bucharest (Romania); Maria A. Zoran, National Institute of Research & Development for Optoelectronics (Romania) . . . . . [8181-67]

**Comprehensive high-speed simulation software for lidar systems**, Seongjoon Kim, Seran Hwang, Impyeong Lee, The Univ. of Seoul (Korea, Republic of) . . . . . [8181-68]

**Satellite remote sensing for assessment of environment quality and impacts of nuclear power plants**, Maria A. Zoran, National Institute of Research & Development for Optoelectronics (Romania) . . . . . [8181-69]

**Research on LC-based spectral imaging system for visible band**, Zhixue Shen, China Academy of Engineering Physics (China) . . . . . [8181-70]

**The use of high resolution satellite and GIS modelling for epidemic diseases (malaria) in Part Saudi Arabia**, Kamel M. Sheikho, King Abdulaziz City for Science & Technology (Saudi Arabia); Abdullah M. Al-Rabeah, Ministry of Health (Saudi Arabia) . . . . . [8181-73]

## Thursday 22 September

### SESSION 9

**Room: Virgo . . . . . Thurs. 08.40 to 10.20**

#### Experimental Monitoring IV

*Session Chair: Ulrich Michel,*  
Univ. of Education Heidelberg (Germany)

08.40: **Satellite data applications for monitoring Arabian Sea tropical cyclone**, Lubna Rafiq, Thomas Blaschke, Univ. Salzburg (Austria); K. R. Fawz Ul-Haq, The National Space Agency of Pakistan (Pakistan) . . . . . [8181-38]

09.00: **SOLDEO: an innovative solution for environmental monitoring using a low cost lidar mobile system**, Marco Piras, Andrea Lingua, Politecnico di Torino (Italy) . . . . . [8181-39]

09.20: **Towards an open geospatial service architecture supporting heterogeneous Earth observation missions**, Thomas Usländer, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) . . . . . [8181-40]

09.40: **GMES services for irrigation water management: SIRIUS project**, Carlo De Michele, Francesco Vuolo, Ariespace s.r.l. (Italy); Filiberto Altobelli, Pasquale Nino, Istituto Nazionale di Economia Agraria (Italy) . . . . . [8181-41]

10.00: **Wetland landscape pattern analysis with remote sensing images in Ximen Island special marine protected area**, Huaguo Zhang, The Second Institute of Oceanography, SOA (China) . . . . . [8181-42]

#### Closing Remarks

**Room: Virgo . . . . . Thurs. 10.20 to 10.25**

**Ulrich Michel,** Univ. of Education Heidelberg (Germany)



# Lidar Technologies, Techniques, and Measurements for Atmospheric Remote Sensing

*Conference Chairs:* **Upendra N. Singh**, NASA Langley Research Ctr. (United States); **Gelsomina Pappalardo**, Consiglio Nazionale delle Ricerche (Italy)

*Programme Committee:* **Arnoud Apituley**, Rijksinstituut voor Volksgezondheid en Milieu (Netherlands); **Andreas Behrendt**, Univ. Hohenheim (Germany); **Alain M. Dabas**, Météo-France CNRM (France); **Gerhard Ehret**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Martin Endemann**, European Space Research and Technology Ctr. (Netherlands); **Pierre Henri Flamant**, Lab. de Météorologie Dynamique (France); **Barry Gross**, The City College of New York (United States); **Philippe L. Keckhut**, Univ. de Versailles Saint-Quentin-en Yvelines (France); **Eduardo Landulfo**, Instituto de Pesquisas Energéticas e Nucleares (Brazil); **Gennadii G. Matvienko**, V.E. Zuev Institute of Atmospheric Optics (Russian Federation); **Doina Nicoleta Nicolae**, National Institute of Research & Development for Optoelectronics (Romania); **Alexandros D. Papayannis**, National Technical Univ. of Athens (Greece); **Vincenzo Rizi**, Univ. degli Studi dell'Aquila (Italy); **Laurent Sauvage**, Leosphere France (France); **Valentin B. Simeonov**, Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Ulla Wandinger**, Leibniz Institut für Troposphärenforschung (Germany); **David M. Winker**, NASA Langley Research Ctr. (United States)

## Monday 19 September

### Opening Remarks

**Room: Taurus . . . . . Mon. 11.10 to 11.15**

**Upendra N. Singh**, NASA Langley Research Ctr. (USA);  
**Gelsomina Pappalardo**, Consiglio Nazionale delle Ricerche (Italy)

### Keynote Session

**Room: Taurus . . . . . Mon. 11.15 to 11.45**

**11.15: Active optical technology: recent developments and lessons learned**, George Komar, NASA Goddard Space Flight Ctr. (United States) . . . . . [8182-01]

### SESSION 1

**Room: Taurus . . . . . Mon. 11.45 to 12.45**

#### Space-based Lidar Development I

*Session Chairs:* **Upendra N. Singh**, NASA Langley Research Ctr. (United States); **Gelsomina Pappalardo**, CNR Istituto di Metodologie per l'Analisi Ambientale (Italy)

**11.45: Development and infusion of lidar technologies for NASA science missions** (*Invited Paper*), Stephen P. Sandford, William C. Edwards, Upendra N. Singh, NASA Langley Research Ctr. (United States) . . . . . [8182-02]

**12.15: Spaceborne lasers development for future remote sensing applications** (*Invited Paper*), Anthony W. Yu, NASA Goddard Space Flight Ctr. (United States) . . . . . [8182-03]

Lunch Break . . . . . 12.45 to 14.00

### SESSION 2

**Room: Taurus . . . . . Mon. 14.00 to 15.30**

#### Space-based Lidar Development II

*Session Chairs:* **Upendra N. Singh**, NASA Langley Research Ctr. (United States); **Gelsomina Pappalardo**, Istituto di Metodologie per l'Analisi Ambientale (Italy)

**14.00: The MERLIN Mission: a space-based IPDA lidar for methane monitoring** (*Invited Paper*), Pierre H. Flamant, Lab. de Météorologie Dynamique (France); Gerhard Ehret, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [8182-04]

**14.30: Optical parametric oscillators and amplifiers for airborne and spaceborne active remote sensing of CO<sub>2</sub> and CH<sub>4</sub>**, Andreas Fix, Christian Büdenbender, Martin Wirth, Mathieu Quatrevalet, Axel Amediek, Christoph Kiemle, Gerhard Ehret, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [8182-05]

**14.50: Development effort of the airborne lidar simulator for the lidar surface topography (LIST) mission**, Anthony W. Yu, NASA Goddard Space Flight Ctr. (United States) . . . . . [8182-06]

**15.10: In space performance of the lunar orbiter laser altimeter (LOLA) laser transmitter**, Anthony W. Yu, NASA Goddard Space Flight Ctr. (United States) . . . . . [8182-07]

Coffee Break . . . . . 15.30 to 16.00

## SESSION 3

**Room: Taurus . . . . . Mon. 16.00 to 17.30**

### Raman Lidar Observations

*Session Chairs:* **Doina Nicoleta Nicolae**, National Institute of Research & Development for Optoelectronics (Romania); **Eduardo Landulfo**, Instituto de Pesquisas Energéticas e Nucleares (Brazil)

**16.00: Examination of possible synergy between lidar and ceilometer for the monitoring of atmospheric aerosols** (*Invited Paper*), Ioannis Biniotoglou, Aldo Amodeo, Giuseppe D'Amico, Aldo Giunta, Fabio Madonna, Lucia Mona, Gelsomina Pappalardo, CNR Istituto di Metodologie per l'Analisi Ambientale (Italy) . . . . . [8182-08]

**16.30: Preliminary measurements of tropospheric water vapor using Raman lidar system in the Great Lakes area**, Watheq Al-Basheer, Kevin B. Strawbridge, Bernard J. Firanski, Environment Canada (Canada) . . . . . [8182-09]

**16.50: Validation of COSMIC water vapor profiles using Raman lidar measurements performed at CIAO**, Fabio Madonna, CNR Istituto di Metodologie per l'Analisi Ambientale (Italy); Pasquale Burlizzi, Univ. del Salento (Italy); Aldo Giunta, CNR Istituto di Metodologie per l'Analisi Ambientale (Italy); Maria Rita Perrone, Univ. del Salento (Italy); Gelsomina Pappalardo, CNR Istituto di Metodologie per l'Analisi Ambientale (Italy) . . . . . [8182-10]

**17.10: One year of regular aerosol observations with a multi-wavelength Raman lidar in Portugal**, Jana Preissler, Frank Wagner, Juan Luis Guerrero-Rascado, Ana Maria Silva, Univ. de Évora Portugal) . . . . . [8182-12]

## Tuesday 20 September

### SESSION 4

**Room: Taurus . . . . . Tues. 08.30 to 10.40**

### Carbon Dioxide Sensing

*Session Chairs:* **George Komar**, NASA Goddard Space Flight Ctr. (United States); **Stephen P. Sandford**, NASA Langley Research Ctr. (United States)

**08.30: Analysis of pulsed airborne lidar measurements of atmospheric CO<sub>2</sub> column absorption from 3-13 km altitudes** (*Invited Paper*), James B. Abshire, Clark J. Weaver, Haris Riris, Jianping Mao, Xiaoli Sun, NASA Goddard Space Flight Ctr. (United States); Graham Allan, William E. Hasselbrack, Sigma Space Corp. (United States); Edward V. Browell, NASA Langley Research Ctr. (United States) . . . . . [8182-13]

**09.00: Improvement of the 1.57-micron laser absorption sensor with chirp modulation to evaluate spatial averaging carbon dioxide density**, Daisuke Sakaizawa, Shuji Kawakami, Tomoaki Tanaka, Masakatsu Nakajima, Japan Aerospace Exploration Agency (Japan) . . . . . [8182-14]

**09.20: Pulsed laser transmitter development for direct detection of CO<sub>2</sub> from space**, Upendra N. Singh, Jirong Yu, NASA Langley Research Ctr. (United States) . . . . . [8182-15]

09:40: **Direct detection 1.6µm DIAL for measurements of CO2 concentration profiles in the troposphere**, Chikao Nagasawa, Makoto Abo, Yasukuni Shibata, Tokyo Metropolitan Univ. (Japan); Tomohiro Nagai, Meteorological Research Institute (Japan); Makoto Tsukamoto, Eko Instruments Co., Ltd. (Japan). . . . . [8182-16]

10:00: **New broadband lidar for greenhouse carbon dioxide gas sensing in the Earth's atmosphere**, Elena M. Georgieva, William S. Heaps, NASA Goddard Space Flight Ctr. (United States); Wen Huang, Science Systems and Applications, Inc. (United States) . . . . [8182-17]

10:20: **TBA** . . . . . [8182-48]

Coffee Break . . . . . 10.40 to 11.00

## SESSION 5

**Room: Taurus . . . . . Tues. 11.00 to 12.00**

### Coherent and Direct Detection of Wind

11:00: **Airborne direct-detection and coherent wind lidar measurements along the east coast of Greenland in 2009 supporting ESA's Aeolus mission**, Uwe Marksteiner, Oliver Reitebuch, Stephan Rahm, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Ines Nikolaus, Physics Solutions (Germany); Christian Lemmerz, Benjamin Witschas, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [8182-18]

11:20: **Field programmable gate array processing of eye-safe all-fiber coherent wind Doppler lidar return signals**, Sameh Abdelazim, David Santoro, Mark Arend, Fred Moshary, Sam Ahmed, The City College of New York (United States). . . . . [8182-19]

11:40: **Estimation of radial wind velocity for the non-Gaussian statistics of the Doppler lidar signal in the turbulent atmosphere**, Evgeniya A. Shelekhova, Institute of Monitoring of Climatic and Ecological Systems and V.E. Zuev Inst. of Atmospheric Optics (Russian Federation); Alexander P. Shelekhov, V.E. Zuev Institute of Atmospheric Optics (Russian Federation). . . . . [8182-20]

Lunch/Exhibition Break . . . . . 12.00 to 13.30

## SESSION 6

**Room: Taurus . . . . . Tues. 13.30 to 15.00**

### Aerosols and DIAL Measurements I

*Session Chairs: James B. Abshire, NASA Goddard Space Flight Ctr. (United States); Chikao Nagasawa, Tokyo Metropolitan Univ. (Japan)*

13:30: **The Canadian observational research aerosol lidar network (CORALNet) (Invited Paper)**, Kevin B. Strawbridge, Environment Canada (Canada). . . . . [8182-21]

14:00: **Ineractive aerosol lidar monitor for multiple displays and users via a network multicast**, Joshua P. Herron, Utah State Univ. (United States); George W. Lemire, James T. Pearson, Martin S. Marshall, U.S. Army Dugway Proving Ground (United States) . . . . . [8182-22]

14:20: **Long term observation of low altitude atmosphere by high precision polarization lidar**, Tatsuo Shiina, Chiba Univ. (Japan); Kazuo Noguchi, Chiba Institute of Technology (Japan); Tetsuo Fukuchi, Central Research Institute of Electric Power Industry (Japan). . . . . [8182-24]

14:40: **Application of lidar and ceilometers to probe the vertical structure of the urban boundary layer and assess anomalies in air quality model PM2.5 forecasts**, Barry Gross, Chuen Gaan, Fred Moshary, Sam Ahmed, The City College of New York (United States) . . . . . [8182-25]

Coffee Break . . . . . 15.00 to 15.30

## SESSION 7

**Room: Taurus . . . . . Tues. 15.30 to 17.40**

### Aerosols and DIAL Measurements II

*Session Chairs: Anthony W. Yu, NASA Goddard Space Flight Ctr. (United States); Fabio Madonna, CNR Istituto di Metodologie per l'Analisi Ambientale (Italy)*

15:30: **Depolarization lidar profiling during volcanic ash intrusion. Comparison between software and hardware techniques. (Invited Paper)**, Doina N. Nicolae, Livio Belegante, Emil Carstea, Camelia Talianu, National Institute of Research & Development for Optoelectronics (Romania) . . . . . [8182-26]

16:00: **Planetary boundary layer height retrieval at UMBC in the frame of NOAA/ARL campaign**, Simone Lolli, Leosphere France (France); Ruben Delgado, Jaime Compton, Ray Hoff, Univ. of Maryland, Baltimore County (United States). . . . . [8182-27]

16:20: **Tropospheric ozone investigations based on ozone DIAL measurements and photochemical regional modeling in Bucharest area**, Livio Belegante, Razvan Radulescu, Cristian Radu, National Institute of Research & Development for Optoelectronics (Romania); Ioan Balin, EnviroScopY SA (Switzerland) . . . . . [8182-28]

16:40: **Vertical resolved separation of aerosol types using CALIPSO level-2 products**, Elina Giannakaki, Dimitris S. Balis, Aristotle Univ. of Thessaloniki (Greece); Vassilis Amiridis, National Observatory of Athens (Greece) . . . . . [8182-29]

17:00: **Indirect aerosol hygroscopic growth observations with a backscattering lidar, part II: six day breeze onset data analyses**, Eduardo Landulfo, Patricia F. Rodrigues, Renata F. da Costa, Fábio Juliano da Silva Lopes, Walter M. Nakaema, Instituto de Pesquisas Energéticas e Nucleares (Brazil) . . . . . [8182-30]

17:20: **Supercontinuum laser absorption spectroscopy in the mid-infrared range for remote identification and concentration estimation of a multi-component atmospheric gas mixture**, Nicolas Cezard, Alexandre Dobroc, Guillaume Canat, Mathieu Duhant, Sidonie Lefebvre, ONERA (France); Julien Fade, Institut de Physique de Rennes (France) . . . . . [8182-31]

## Wednesday 21 September

**Posters . . . . . Wed. 17.30 to 19.00**

*Conference attendees are invited to attend the Remote Sensing Poster Session on Wednesday afternoon. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at [spie.org/x32234.xml](http://spie.org/x32234.xml)*

**Six-channel polychromator design and implementation for the UPC elastic/Raman lidar**, Dhiraj Kumar, Francesc Rocadenbosch, Sergio Tomás, Michaël Sicard, Adolfo Comeron, Constantino Muñoz, Diego Lange, Univ. Politècnica de Catalunya (Spain) . . . . . [8182-11]

**Development of white light polarization lidar system**, Toshihiro Somekawa, Osaka Univ. (Japan); Kazuhiko Oka, Hokkaido Univ. (Japan); Masayuki Fujita, Osaka Univ. (Japan) . . . . . [8182-34]

**Lidar real time mapping of industrial flares in an industrial site in Cubatão/Brazil**, Juliana Steffens, Roberto Guardani, Escola Politècnica da Univ. de São Paulo (Brazil); Eduardo Landulfo, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Paulo Firmino Moreira Junior, Escola Politècnica da Univ. de São Paulo (Brazil); Fábio Juliano da Silva Lopes, Instituto Nacional de Pesquisas Espaciais (Brazil); Renata F. da Costa, Instituto de Pesquisas Energéticas e Nucleares (Brazil) . . . . . [8182-35]

**Remote sensing detection of atmospheric pollutants using lidar, sodar and correlation with air quality data in an industrial area**, Juliana Steffens, Roberto Guardani, Escola Politècnica da Univ. de São Paulo (Brazil); Eduardo Landulfo, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Paulo Firmino Moreira Junior, Escola Politècnica da Univ. de São Paulo (Brazil); Renata F. da Costa, Fábio Juliano da Silva Lopes, Instituto de Pesquisas Energéticas e Nucleares (Brazil) . . . . . [8182-36]

- Experimental evaluation of a model for the influence of coherent wind lidars on their remote measurements of atmospheric boundary-layer turbulence**, Mikael Sjöholm, Torben Mikkelsen, Leif Kristensen, Risø National Lab. (Denmark); Stefan Kapp, Robert Bosch GmbH (Germany) . . . . . [8182-37]
- Retrieval of aerosol optical thickness from synergy of ceilometer, aethalometer and nephelometer observations during nights**, Krzysztof M. Markowicz, Olga Zawadzka, Univ. of Warsaw (Poland) . . . . . [8182-38]
- Uncertainty computation in aerosol size distribution retrieval in multiwavelength lidar extended to IR wavelengths above 1.5 $\mu$ m**, Benjamin R. Herman, Finnish Meteorological Institute (Finland) . . . . . [8182-39]
- First open field measurements with a portable CO<sub>2</sub> Lidar dial system for early forest fires detection**, Pasquale Gaudio, Michela Gelfusa, Ivan Lupelli, Andrea Malizia, Camilla Serafini, Maria Richetta, Univ. degli Studi di Roma Tor Vergata (Italy); Carlo Bellecci, CRATI S.c.r.l. (Italy) . . . . . [8182-40]
- Initial analysis from a lidar observation campaign of sugar cane fires in the Central and Western portion of the São Paulo State, Brazil**, Fábio Juliano da Silva Lopes, Patricia F. Rodrigues, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Jose M. Bassan, Instituto de Pesquisas Meteorológicas (Brazil); Gerhard Held, Univ. Estadual de São Paulo (Brazil); Eduardo Landulfo, Instituto de Pesquisas Energéticas e Nucleares (Brazil) . . . . . [8182-41]
- Validation of CALIPSO level-2 products using a ground-based lidar in Thessaloniki, Greece**, Elina Giannakaki, Eleni Vraimaki, Dimitris S. Balis, Aristotle Univ. of Thessaloniki (Greece) . . . . [8182-42]
- The usage of multiwavelength micropulse lidar in atmospheric aerosols study**, Michal Posyniak, Szymon P. Malinowski, Tadeusz Stacewicz, Krzysztof M. Markowicz, Univ. of Warsaw (Poland); Tymon Zielinski, Tomasz Petelski, Przemyslaw Makuch, Institute of Oceanology (Poland) . . . . . [8182-43]
- Estimating the relationship between aerosol optical thickness and PM10 using lidar and meteorological data in Limassol, Cyprus**, Diofantos G. Hadjimitsis, Argyro Nisantzi, Cyprus Univ. of Technology (Cyprus) . . . . . [8182-44]
- The equation of optical location for supergaussian fan lidar**, Georgii M. Krekov, Gennadii G. Matvienko, Andrei A. Lisenko, V.E. Zuev Institute of Atmospheric Optics (Russian Federation) . . [8182-46]
- Multiwave lidar sensing of atmospheric aerosol based on a genetic algorithm**, Georgii M. Krekov, Gennadii G. Matvienko, Alexander J. Sukhanov, V.E. Zuev Institute of Atmospheric Optics (Russian Federation) . . . . . [8182-47]

**Remote Sensing Plenary Session**

Monday 19 September 09.00 to 10.45

For details, please see page 5



# High-Performance Computing in Remote Sensing

Conference Chairs: **Bormin Huang**, Univ. of Wisconsin-Madison (United States); **Antonio J. Plaza**, Univ. de Extremadura (Spain)

Programme Committee: **Philip E. Ardanuy**, Raytheon Intelligence & Information Systems (United States); **Chein-I Chang**, Univ. of Maryland, Baltimore County (United States); **Yang-Lang Chang**, National Taipei Univ. of Technology (Taiwan); **David J. Crain**, ITT Communications Systems (United States); **Qian Du**, Mississippi State Univ. (United States); **Yong Fang**, Northwest A&F Univ. (China); **Samuel D. Gasster**, The Aerospace Corp. (United States); **Mitchell D. Goldberg**, National Environmental Satellite, Data, and Information Service (United States); **Hung-Lung Allen Huang**, Univ. of Wisconsin-Madison (United States); **Roger L. King**, Mississippi State Univ. (United States); **Chulhee Lee**, Yonsei Univ. (Korea, Republic of); **Tsengdar J. Lee**, NASA Headquarters (United States); **Yunsong Li**, Xidian Univ. (China); **Sebastián López Suárez**, Univ. de Las Palmas de Gran Canaria (Spain); **Enrico Magli**, Politecnico di Torino (Italy); **Jarno S. Mielikainen**, Univ. of Eastern Finland (Finland); **Abel Paz**, Univ. de Extremadura (Spain); **John J. Pereira**, National Environmental Satellite, Data, and Information Service (United States); **Jordi Portell de Mora**, Institut d'Estudis Espacials de Catalunya (Spain); **Jeffery J. Puschell**, Raytheon Space & Airborne Systems (United States); **Shen-En Qian**, Canadian Space Agency (Canada); **Stefan A. Robila**, Montclair State Univ. (United States); **Joan Serra-Sagrasta**, Univ. Autònoma de Barcelona (Spain); **Roger W. Saunders**, Met Office (United Kingdom); **Yuliya Tarabalka**, Univ. of Iceland (Iceland); **Carole Thiebaud**, Ctr. National d'Études Spatiales (France); **Miguel Velez-Reyes**, Univ. de Puerto Rico Mayagüez (United States); **Raffaele Vitulli**, European Space Research and Technology Ctr. (Netherlands); **Shih-Chieh Wei**, Tamkang Univ. (Taiwan); **Jiaji Wu**, Xidian Univ. (China)

## Monday 19 September

### Opening Remarks

Room: Quadrant . . . . . Mon. 13.15 to 13.20

**Bormin Huang**, Univ. of Wisconsin-Madison (USA);  
**Antonio J. Plaza**, Univ. de Extremadura (Spain)

### SESSION 1

Room: Quadrant . . . . . Mon. 13.20 to 15.00

#### HPC for Remote Sensing and Astronomical Data Processing

Session Chair: **Antonio J. Plaza**, Univ. de Extremadura (Spain)

13.20: **Fuzzy clustering of large satellite images using high performance computing**, Dana Petcu, Daniela Zaharie, Silviu Panica, Univ. de Vest din Timisoara (Romania); Ashraf S. Hussein, Ain Shams Univ. (Egypt); Ahmed T. Sayed, Hisham E. El-Shishiny, IBM Ctr. for Advanced Studies in Cairo (Egypt) . . . . . [8183-01]

13.40: **3D-processor arrays accelerators for highPerformance computing in remote sensing applications**, Alejandro Castillo Atoche, Univ. Autónoma de Yucatán (Mexico); Javier Vazquez Castillo, Univ. de Quinatana Roo (Mexico) . . . . . [8183-02]

14.00: **A GPU accelerated extended Kalman filter**, Shih-Chieh Wei, Tamkang Univ. (Taiwan); Bormin Huang, Univ. of Wisconsin-Madison (United States) . . . . . [8183-03]

14.20: **Efficient data storage of astronomical data using HDF5 and PEC compression**, Carlos Estepa, Institute for Space Studies of Catalonia (Spain); Jordi Portell de Mora, Institut d'Estudis Espacials de Catalunya (Spain) and Institute for Cosmos Sciences (ICCUB) (Spain); Enrique García-Berro, Univ. Politècnica de Catalunya (Spain); Javier Castañeda, Univ. de Barcelona (Spain); Marcial Clotet, Institute for Space Studies of Catalonia (Spain) . . . . . [8183-04]

14.40: **An efficient framework for Java data processing systems in HPC environments**, Aidan D. Fries, Jordi Portell de Mora, Univ. de Barcelona (Spain) and Institute for Cosmos Sciences (ICCUB) (Spain); Raúl Sirvent, Ctr. Nacional de Supercomputación (Spain); Guillermo L. Taboada, Univ. of A Coruña (Spain); Javier Castañeda, Yago Isasi, Univ. de Barcelona (Spain) and Institute for Cosmos Sciences (ICCUB) (Spain) . . . . . [8183-05]

Coffee Break . . . . . 15.00 to 15.30

### SESSION 2

Room: Quadrant . . . . . Mon. 15.30 to 17.30

#### HPC for Remote Sensing Data Compression

Session Chair: **Bormin Huang**,  
Univ. of Wisconsin-Madison (United States)

15.30: **Geostatistical analysis of Landsat-TM lossy compression images in a high performance computing environment**, Lluís Pesquer, Ana Cortés, Ivette Serral, Xavier Pons, Univ. Autònoma de Barcelona (Spain) . . . . . [8183-06]

15.50: **Accelerating the CCSDS rice coding on graphics processing units**, Xianyun Wu, Yunsong Li, Xidian Univ. (China); Bormin Huang, Univ. of Wisconsin-Madison (United States) . . . . . [8183-07]

16.10: **Heterogeneous computing system with GPU-based IDWT and CPU-based SPIHT and Reed-Solomon decoding for satellite image decompression**, Changhe Song, Yunsong Li, Xidian Univ. (China); Bormin Huang, Univ. of Wisconsin-Madison (United States) . . . . . [8183-08]

16.30: **Parallel design of JPEG-LS encoder on graphics processing units**, Yong Fang, Northwest A&F Univ. (China) . . . . . [8183-09]

16.50: **Accelerating arithmetic coding on GPUs**, Yong Fang, Northwest A&F Univ. (China) . . . . . [8183-10]

17.10: **High-performance computing in the remote sensing image data compression**, Albert Lin, National Space Program Office of Taiwan (Taiwan); C. F. Chang, National Space Organization (Taiwan); M. C. Lin, L. J. Jan, Chung-Shan Institute of Science and Technology (Taiwan) . . . . . [8183-11]

## Tuesday 20 September

## SESSION 3

Room: Quadrant . . . . . Tues. 08.40 to 10.00

**HPC for Hyper- and Multispectral Remote Sensing I***Session Chair: Jarno Mielikainen, Univ. of Eastern Finland (Finland)*08.40: **Parallel implementation of linear and nonlinear spectral unmixing of remotely sensed hyperspectral images**, Antonio J. Plaza, Javier Plaza, Univ. de Extremadura (Spain) . . . . . [8183-12]09.00: **A comparative analysis of GPU implementations of spectral unmixing algorithms**, Sergio Sanchez, Antonio J. Plaza, Univ. de Extremadura (Spain) . . . . . [8183-13]09.20: **FPGA implementation of endmember extraction algorithms from hyperspectral imagery: pixel purity index versus N-FINDR**, Carlos Gonzalez, Daniel Mozos, Univ. Complutense de Madrid (Spain); Javier Resano, Univ. de Zaragoza (Spain); Antonio J. Plaza, Univ. de Extremadura (Spain) . . . . . [8183-14]09.40: **Lossy hyperspectral image compression with state-of-the-art video encoder**, Lucana Santos Falcon, Sebastian López Suarez, Gustavo Marrero Callicó, Jose Francisco López, Roberto Sarmiento Rodriguez, Univ. de Las Palmas de Gran Canaria (Spain) . . . [8183-15]

Coffee Break . . . . . 10.00 to 10.30

## SESSION 4

Room: Quadrant . . . . . Tues. 10.30 to 11.50

**HPC for Hyper- and Multispectral Remote Sensing II***Session Chair: Yang-Lang Chang, National Taipei Univ. of Technology (Taiwan)*10.30: **GPU implementation of JPEG2000 for hyperspectral image compression**, Milosz Ciznicki, Krzysztof Kurowski, Poznan Supercomputing and Networking Ctr. (Poland); Antonio J. Plaza, Univ. de Extremadura (Spain) . . . . . [8183-16]10.50: **Parallel implementation of RX anomaly detection on multi-core processors: impact of data partitioning strategies**, Jose M. Molero, Ester Martin, Inmaculada Garcia, Univ. de Almería (Spain); Antonio J. Plaza, Univ. de Extremadura (Spain) . . . . . [8183-17]11.10: **Real time orthorectification of high resolution airborne pushbroom imagery**, Javier Reguera-Salgado, Univ. de Vigo (Spain) and Sound of Numbers, S.L. (Spain); Julio Martin-Herrero, Univ. de Vigo (Spain) . . . . . [8183-18]11.30: **Design and analysis of algorithms for enhancing the quality and the resolution of Dubai Sat-1 images**, Saeed H. AL-Mansoori, Emirates Institution for Advanced Science and Technology (United Arab Emirates) . . . . . [8183-19]

Lunch/Exhibition Break . . . . . 11.50 to 13.10

## SESSION 5

Room: Quadrant . . . . . Tues. 13.10 to 14.50

**GPU Processing of Remote Sensing Data***Session Chair: Antonio J. Plaza, Univ. de Extremadura (Spain)*13.10: **Development of the GPU-based Hilbert-Huang transform**, Jun Wang, Bormin Huang, Univ. of Wisconsin-Madison (United States) . . . . . [8183-20]13.30: **GPU acceleration of the solution to the polarized atmospheric radiative transfer model**, Changhe Song, Yunsong Li, Xidian Univ. (China); Bormin Huang, Univ. of Wisconsin-Madison (United States) . . . . . [8183-21]13.50: **Massively parallelizing the CIMSS IASI radiative transfer model on GPUs**, Jarno Mielikainen, Bormin Huang, Hung-Lung A. Huang, Univ. of Wisconsin-Madison (United States) . . . . . [8183-22]14.10: **An efficient GPU-based implementation of Kalman filter**, Yang-Lang Chang, Min-Yu Huang, Tung-Ju Hsieh, National Taipei Univ. of Technology (Taiwan) . . . . . [8183-23]14.30: **GPU implementation of orthogonal matching pursuit for compressive sensing**, Yong Fang, Northwest A&F Univ. (China) . . . . . [8183-24]

Coffee Break . . . . . 14.50 to 15.20

## SESSION 6

Room: Quadrant . . . . . Tues. 15.20 to 17.40

**Applications of HPC in Remote Sensing***Session Chairs: Yunsong Li, Xidian Univ. (China); Jiaji Wu, Xidian Univ. (China)*15.20: **Efficient GPU Implementation of Tsunami Simulation Based on the MacCormack Scheme**, Shih-Chieh Wei, Tamkang Univ. (Taiwan); Bormin Huang, Univ. of Wisconsin-Madison (United States); Tung-Ju Hsieh, Wen-Yew Liang, Yang-Lang Chang, National Taipei Univ. of Technology (Taiwan) . . . . . [8183-25]15.40: **Accelerating the Weather Research and Forecast (WRF) Purdue Lin microphysics scheme on NVidia graphics processing units**, Jun Wang, Bormin Huang, Univ. of Wisconsin-Madison (United States); Jarno Mielikainen, Univ. of Eastern Finland (Finland); Hung-Lung A. Huang, Univ. of Wisconsin-Madison (United States); Mitchell D. Goldberg, National Oceanic and Atmospheric Administration (United States) . . . . . [8183-26]16.00: **GPU acceleration of WRF WSM5 microphysics**, Jarno Mielikainen, Univ. of Eastern Finland (Finland); Bormin Huang, Hung-Lung A. Huang, Univ. of Wisconsin-Madison (United States); Mitchell D. Goldberg, National Oceanic and Atmospheric Administration (United States) . . . . . [8183-27]16.20: **High-performance visual analytics of terrestrial LIDAR data for cliff erosion assessment on large displays**, Tung-Ju Hsieh, Yang-Lang Chang, National Taipei Univ. of Technology (Taiwan); Bormin Huang, Univ. of Wisconsin-Madison (United States) . . . . . [8183-28]16.40: **Efficient GPU implementation of the weather research and forecasting (WRF) Kesler Microphysics Scheme**, Jun Wang, Bormin Huang, Univ. of Wisconsin-Madison (United States); Jarno Mielikainen, Univ. of Eastern Finland (Finland); Hung-Lung A. Huang, Univ. of Wisconsin-Madison (United States); Mitchell D. Goldberg, National Oceanic and Atmospheric Administration (United States) . . . [8183-29]17.00: **Development of the GPU-based Stony-Brook University 5-class microphysics scheme in the Weather Research and Forecasting (WRF) Model**, Jarno Mielikainen, Univ. of Eastern Finland (Finland); Bormin Huang, Hung-Lung A. Huang, Univ. of Wisconsin-Madison (United States); Mitchell D. Goldberg, National Oceanic and Atmospheric Administration (United States) . . . . . [8183-30]17.20: **Calculating the electromagnetic scattering of vegetation model by Monte Carlo and CUDA**, Zhen-Sen Wu, Xiang Su, Jia-Ji Wu, Xidian Univ. (China) . . . . . [8183-31]**Remote Sensing Plenary Session**

Monday 19 September 09.00 to 10.45

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### Remote Sensing Plenary Session

Monday 19 September 09.00 to 10.45

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# SPIE Security+Defence

Conferences: 19-22 September 2011

Exhibition: 20-21 September 2011

Clarion Congress Hotel Prague  
Prague, Czech Republic



**David H. Titterton**  
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Fraunhofer IOSB, Germany  
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Univ. of Defence, Czech Republic  
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# Unmanned/Unattended Sensors and Sensor Networks

*Conference Chair:* **Edward M. Carapezza**, DARPA and Univ. of Connecticut (United States)

*Programme Committee:* **James S. Albus**, National Institute of Standards and Technology (United States); **A. F. Mehdi Anwar**, Univ. of Connecticut (United States); **Mark E. Campbell**, Cornell Univ. (United States); **Pierre J. Corriveau**, Naval Undersea Warfare Ctr. (United States); **Sachi V. Desai**, U.S. Army Armament Research, Development and Engineering Ctr. (United States); **John M. Dolan**, Carnegie Mellon Univ. (United States); **Grant R. Gerhart**, U.S. Army Tank-Automotive Research, Development and Engineering Ctr., Retired (United States); **Todd M. Hintz**, Space and Naval Warfare Systems Command (United States); **Myron E. Hohil**, U.S. Army Armament Research, Development and Engineering Ctr. (United States); **Ivan Kadar**, Interlink Systems Sciences, Inc. (United States); **Leslie Laycock**, BAE Systems (United Kingdom); **Tariq Manzur**, Naval Undersea Warfare Ctr. (United States); **George McNamara**, Naval Undersea Warfare Ctr. (United States); **Nino Srour**, U.S. Army Research Lab. (United States); **Huub A.J.M. van Hoof**, TNO Defence, Security and Safety (Netherlands); **Henry J. White**, BAE Systems (United Kingdom)

## Tuesday 20 September

### Opening Remarks

**Room: Zenit** ..... **Tues. 09.20 to 09.30**

**Edward M. Carapezza**,  
Defense Advanced Research Projects Agency (USA)

### SESSION 1

**Room: Zenit** ..... **Tues. 09.30 to 10.30**

#### Unattended Sensors and Systems I

*Session Chairs:* **Sachi V. Desai**, U.S. Army Armament Research, Development and Engineering Ctr. (United States); **Myron E. Hohil**, U.S. Army Armament Research, Development and Engineering Ctr. (United States)

09.30: **Netforce and bluewater cyberboats**, Sandy Allsopp, Allsopp Helikites Ltd. (United Kingdom). . . . . [8184-01]

09.50: **Photon discrimination and signal integrity of a wireless radiation sensor**, Dimosthenis Katsis, Athena Energy Corp. (United States); Marc S. Litz, U.S. Army Research Lab. (United States) . . . . . [8184-02]

10.10: **Stereo vision aided automatic target recognition for ground vehicle applications**, Vishal C. Ravindra, Venkatesh K. Madyastha, National Aerospace Labs. (India); Ravi K. Gupta, Univ. of Amsterdam (Netherlands) and National Aerospace Labs. (India); Marco Guerriero, ELETTRONICA S.p.A. (Italy); Girija Gopalratnam, National Aerospace Labs. (India) . . . . . [8184-06]

Coffee Break . . . . . 10.30 to 11.00

### SESSION 2

**Room: Zenit** ..... **Tues. 11.00 to 12.40**

#### Unattended Sensors and Systems II

*Session Chairs:* **Sachi V. Desai**, U.S. Army Armament Research, Development and Engineering Ctr. (United States); **Myron E. Hohil**, U.S. Army Armament Research, Development and Engineering Ctr. (United States)

11.00: **Ten years of the LuAG-based scintillators development: state of art and prospects**, Martin Nikl, Jiri A. Mares, Institute of Physics of the ASCR, v.v.i. (Czech Republic); Akira Yoshikawa, Tohoku Univ. (Japan); Hiraku Ogino, The Univ. of Tokyo (Japan); Karel Nejezchleb, Karel Blazek, Crytur Ltd. (Czech Republic); Anna G. Vedda, Univ. degli Studi di Milano-Bicocca (Italy) . . . . . [8184-07]

11.20: **Integrated mobile radar-camera system in airport perimeter security**, Marek Zyczkowski, Mieczyslaw Szustakowski, Wieslaw M. Ciurapinski, Rafal Dulski, Mariusz Kastek, Piotr Trzaskawka, Military Univ. of Technology (Poland) . . . . . [8184-08]

11.40: **Gas sensing and focal plane array imaging based on optical properties of crystalline silicon carbide**, Geunsik Lim, CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States); Tariq Manzur, Naval Undersea Warfare Ctr. (United States); Aravinda Kar, CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States) . . . . . [8184-09]

12.00: **EO/IR sensor development using nanostructures for unattended ground sensor applications**, Ashok K. Sood, John W. Zeller, Yash R. Puri, Magnolia Optical Technologies, Inc. (United States); Tariq Manzur, Naval Undersea Warfare Ctr. (United States); Nibir K. Dhar, Defense Advanced Research Projects Agency (United States); A. F. Mehdi Anwar, Univ. of Connecticut (United States) . . . . . [8184-10]

12.20: **Adaptive fusion of infrared and visible images in dynamic scene**, Guang Yang, Yafeng Yin, Hong Man, Stevens Institute of Technology (United States); Sachi Desai, US Army RDECOM (United States) . . . . . [8184-11]

Lunch/Exhibition Break . . . . . 12.40 to 14.20

### SESSION 3

**Room: Zenit** ..... **Tues. 14.20 to 15.00**

#### Force Protection and Security

*Session Chairs:* **Sachi V. Desai**, U.S. Army Armament Research, Development and Engineering Ctr. (United States); **Myron E. Hohil**, U.S. Army Armament Research, Development and Engineering Ctr. (United States)

14.20: **Precision Long-Range Projectile Tracker**, Slobodan Rajic, Oak Ridge National Laboratory (United States) . . . . . [8184-14]

14.40: **Model for small arms fire muzzle blast wave propagation in air**, Juan R. Aguilar, Academia Politécnica Militar. Ejército de Chile. Avenida Valenzuela Llanos 623. Santiago 7860251. (Chile) and Facultad de Ingenierías. Universidad de San Buenaventura. Carrera 56C N° 5190. Medellín 050010. (Colombia); Sachi V. Desai, U. S. Army, Armament Research, Development and Engineering Center. Picatinny NJ 07608. (United States) . . . . . [8184-15]

Coffee Break . . . . . 15.00 to 15.30

### SESSION 4

**Room: Zenit** ..... **Tues. 15.30 to 16.50**

#### Free-Space Optical Communication

*Session Chairs:* **Ferhat Culfaz**, BAE Systems (United Kingdom); **Tariq Manzur**, Naval Undersea Warfare Ctr. (United States)

15.30: **Effects of evaporation layer on free-space optical communication links near sea surface at 1.55 μm**, John W. Zeller, Tariq Manzur, Naval Undersea Warfare Ctr. (United States). . [8184-16]

15.50: **5.625 Gbps bidirectional laser communications measurements between the NFIRE satellite and an optical ground**, Carl T. Lunde, The Aerospace Corp. (United States); Mark Gregory, Bernhard Wandernoth, Tesat-Spacecom GmbH & Co. KG (Germany); David Kozlowski, Harold T. Yura, The Aerospace Corp. (United States); Frank F. Heine, Tesat-Spacecom GmbH & Co. KG (Germany); Andreas Paape, German Liaison Office for Defense Material (Germany); Rolf Meyer, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Robert L. Wong, Josef M. Wicker, Renny A. Fields, The Aerospace Corp. (United States); William Hartmann, Orbital Sciences Corp. (United States) . . . . . [8184-17]

16.10: **Design and early development of a UAV terminal and a ground station for laser communications**, Alberto Carrasco Casado, Ricardo Vergaz Benito, José M. Sánchez Pena, Univ. Carlos III de Madrid (Spain) . . . . . [8184-18]

16.30: **Nonmechanical beam steering using optical phased arrays**, Thomas E. Dillon, Christopher A. Schuetz, Richard D. Martin, Phase Sensitive Innovations, Inc. (United States); Petersen F. Curt, James Bonnett, EM Photonics, Inc. (United States); Daniel Mackrides, Phase Sensitive Innovations, Inc. (United States); Dennis W. Prather, Univ. of Delaware (United States) . . . . . [8184-19]

**Wednesday 21 September**

**SESSION 5**

**Room: Zenit . . . . . Wed. 09.20 to 11.30**

**Unmanned Systems Technologies**

*Session Chairs:* **Sachi V. Desai**, U.S. Army Armament Research, Development and Engineering Ctr. (United States); **Myron E. Hohil**, U.S. Army Armament Research, Development and Engineering Ctr. (United States)

09.20: **Development of a single-chip 6 DOF MEMS IMU for robotic and UV navigation**, Mark Boysel, Tim E. Fiscus, Louis J. Ross, Virtus Advanced Sensors (United States) . . . . . [8184-21]

09.40: **A versatile sensor network for urban search and rescue operations**, Klaus M. Käsälä, Aki Mäyrä, VTT Automation (Finland) . . . . . [8184-22]

Coffee Break . . . . . 10.00 to 10.30

10.30: **Managing heterogeneous networks of mobile and stationary sensors**, Axel Bürkle, Peter Solbrig, Florian Segor, Michael Arens, Dimitri Bulatov, Kai Jüngling, Peter Wernerus, Matthias Kollmann, Sven Müller, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) . . . . . [8184-23]

10.50: **Toward the development of tamper-resistant, ground-based mobile sensor nodes**, David Mascarenas, Christopher J. Stull, Benjamin Z. Klein, Charles R. Farrar, Los Alamos National Lab. (United States) . . . . . [8184-24]

11.10: **An adaptive filter for a small attitude and heading reference system using low-cost sensors**, Zhenbang Gong, Tongyue Gao, Jinjun Rao, Jun Luo, Shanghai Univ. (China) . . . . . [8184-25]

**Security + Defence Plenary Session**  
 Monday 19 September 09.00 to 10.45  
 For details, please see page 6

# Electro-Optical and Infrared Systems: Technology and Applications

*Conference Chairs:* **David A. Huckridge**, Ridgeway Consulting (United Kingdom); **Reinhard R. Ebert**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)

*Programme Committee:* **Christopher C. Alexay**, StingRay Optics, LLC (United States); **Jan Yngve Andersson**, Acreo AB (Sweden); **Rainer Breiter**, AIM INFRAROT-MODULE GmbH (Germany); **Gordon A. Cain**, Vision4ce Ltd. (United Kingdom); **David J. Clarke**, SELEX Galileo Ltd. (United Kingdom); **Stefania De Vito**, SELEX Galileo S.p.A. (Italy); **Gérard L. Destéfanis**, Commissariat à l'Énergie Atomique (France); **Jean-Claude L. Fontanella**, Thales Optronique S.A. (France); **Natan S. Kopeika**, Ben-Gurion Univ. of the Negev (Israel); **José Manuel López-Alonso**, Univ. Complutense de Madrid (Spain); **John F. Parsons**, Thales Optronics Ltd. (United Kingdom); **Stanley R. Rotman**, Ben-Gurion Univ. of the Negev (Israel); **Armin L. Schneider**, Institut Franco-Allemand de Recherches de Saint-Louis (France); **Chris Slinger**, QinetiQ Ltd. (United Kingdom); **Johan C. van den Heuvel**, TNO Defence, Security and Safety (Netherlands)

## Wednesday 21 September

### Opening Remarks

**Room: Keppler. . . . . Wed. 08.30 to 08.40**

*Session Chairs:* **David A. Huckridge**, Ridgeway Consulting (United Kingdom); **Reinhard R. Ebert**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)

### Keynote Session

**Room: Keppler. . . . . Wed. 08.40 to 09.10**

*Session Chairs:* **Reinhard R. Ebert**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **David A. Huckridge**, Ridgeway Consulting (United Kingdom)

08.40: **Defence electro-optics: European perspective** (*Invited Paper*), Jari A. Hartikainen, European Defence Agency (Belgium) . . . . . [8185-31]

### SESSION 1

**Room: Keppler. . . . . Wed. 09.10 to 12.00**

#### Detector and Material Technology

*Session Chairs:* **Reinhard R. Ebert**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **David A. Huckridge**, Ridgeway Consulting (United Kingdom)

09.10: **Latest developments in advanced infrared cooled detectors**, Y. Reibel, R. Laurent, A. Kerlain, F. Chabuel, SOFRADIR (France); G. L. Destéfanis, J. P. Baylet, L. R. Mollard, Y. Rothman, CEA-LETI (France) . . . . . [8185-01]

09.30: **High operating temperature IR-modules with small pitch for SWaP reduction and high performance applications**, Holger Lutz, Rainer Breiter, Detlef Eich, Stefan Rutzinger, Timo Schallenberg, Joachim Wendler, Richard Wollrab, Johann Ziegler, AIM INFRAROT-MODULE GmbH (Germany) . . . . . [8185-02]

09.50: **MWIR mercury cadmium telluride detectors for high operating temperatures**, Peter Knowles, Les Hipwood, Luke Pillans, Richard Ash, Paul Abbott, SELEX Galileo Infrared Ltd. (United Kingdom) . . . . . [8185-03]

Coffee Break . . . . . 10.10 to 10.40

10.40: **New InGaAs SWIR imaging solutions from 3-5Lab**, Jean-Luc Reverchon, Anis Djedidi, Odile Huet, Anne Rouvie, Jean-Patrick Truffer, Eric M. Costard, Alcatel-Thales III-V Lab. (France); Yang Ni, Bogdan Arion, Y. M. Zhu, Pierre Potet, New Imaging Technologies SAS (France) . . . . . [8185-04]

11.00: **High-performance LWIR microbolometer with Si/SiGe quantum well thermistor and wafer level packaging**, Audun Roer, Sensor Technologies AS (Norway) . . . . . [8185-05]

11.20: **Design and performance evaluation of graphene-based infrared detectors**, Ning Xi, Michigan State Univ. (United States) . . . . . [8185-06]

11.40: **Longwave infrared metamaterials and nano-materials design, simulation, and laboratory test for target camouflage in the defence application**, Alessandro Albertoni, BFI OPTILAS S.A. (Italy) . . . . . [8185-07]

Lunch/Exhibition Break . . . . . 12.00 to 13.40

### SESSION 2

**Room: Keppler. . . . . Wed. 13.40 to 15.00**

#### Active Systems and Technology

*Session Chairs:* **David J. Clarke**, SELEX Galileo Ltd. (United Kingdom); **Christopher C. Alexay**, StingRay Optics, LLC (United States); **Rainer Breiter**, AIM INFRAROT-MODULE GmbH (Germany)

13.40: **A Performance Figure of Merit for Focal Plane Array Semi-Active Laser Seekers**, Mark Bray, SELEX Galileo Ltd. (United Kingdom) . . . . . [8185-08]

14.00: **Response analysis of thermal field disturbance sensor**, Filip Dvorák, Jan Maschke, Cestmír Vlcek, Univ. Obrany (Czech Republic) . . . . . [8185-09]

14.20: **Adaptive optimization of infrared emission from femtosecond filaments**, Dominik Walter, Helge Bürsing, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) . . . . . [8185-10]

14.40: **Assessing EO image degradation from underwater optical turbulence**, Weilin W. Hou, Andrey V. Kanaev, Sarah Woods, U.S. Naval Research Lab. (United States) . . . . . [8185-11]

Coffee Break . . . . . 15.00 to 15.30

### SESSION 3

**Room: Keppler. . . . . Wed. 15.30 to 17.50**

#### Passive Sensor Systems and Technology

*Session Chairs:* **Jean-Claude L. Fontanella**, Thales Optronique S.A. (France); **Armin L. Schneider**, Institut Franco-Allemand de Recherches de Saint-Louis (France); **Gordon A. Cain**, Vision4ce Ltd. (United Kingdom); **Chris Slinger**, QinetiQ Ltd. (United Kingdom)

15.30: **A MWIR terrestrial demonstrator using adaptive coded aperture imaging** (*Invited Paper*), Chris Slinger, Malvern Innovations (United Kingdom); Helen Bennett, Geoffrey de Villiers, Kevin Gilholm, Neil T. Gordon, David A. Huckridge, Mark McNie, QinetiQ Ltd. (United Kingdom); Kevin Rice, Goodrich Corp. (United States); Kevin Ridley, Lee Russell, Philip J. Watson, QinetiQ Ltd. (United Kingdom) . . . . . [8185-13]

16.10: **Optical sensors for urban search and rescue operations**, Aki P. Mäyrä, VTT Technical Research Ctr. of Finland (Finland); Agapios Agapiou, National Technical Univ. of Athens (Greece); Lars Hildebrand, Technische Univ. Dortmund (Germany); Kai M. Ojala, VTT Technical Research Ctr. of Finland (Finland); Katerina Mikedi, Miit Statheropoulos, National Technical Univ. of Athens (Greece) . . . . . [8185-15]

16.30: **Protection concepts for optronical sensors against laser radiation**, Gunnar Ritt, Bernd Eberle, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) . . . . . [8185-16]

16.50: **Canopy induced aberration correction in airborne electro-optical imaging systems**, James A. Harder, Michaelene W. Sprague, Elbit Systems of America (United States) . . . . . [8185-17]

17.10: **Architectural solutions of conformal network-centric staring-sensor systems with spherical field of view**, Andrey V. Makarenko, Andrey V. Pravdivtsev, Constructive Cybernetics (Russian Federation) . . . . . [8185-18]



17.10: **Cryogenic solid Schmidt camera as a base for future wide-field IR systems**, Alexey N. Yudin, Consultant (Russian Federation) ..... [8185-19]

**Posters ..... Wed. 17.30 to 19.00**

*Conference attendees are invited to attend the Security and Defence Poster Session on Wednesday afternoon. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at [spie.org/x32248.xml](http://spie.org/x32248.xml).*

**Optical liquid-level sensor system using collimator in a metal pipe with small holes**, Cherl-Hee Lee, Jonghun Lee, Daegu Gyeongbuk Institute of Science & Technology (Korea, Republic of) . . . . [8185-32]

**Detection of small surface vessels in near, medium and far infrared spectral bands.**, Rafal Dulski, Mariusz Kastek, Stanislaw Milewski, Mięczyślaw Szustakowski, Wiesław M. Ciurapinski, Marek Zyczkowski, Military Univ. of Technology (Poland) . . . . . [8185-33]

**Coatings masking in near, medium and far-infrared used for ship camouflage**, Stanislaw Milewski, Rafal Dulski, Mariusz Kastek, Jaroslaw Barela, Krzysztof Firmanty, Piotr Trzaskawka, Military Univ. of Technology (Poland) . . . . . [8185-34]

**Study of time-varying velocity measurement using self-mixing laser diode by Polynomial phase parameter estimation method**, Zhaoyun Zhang, Yang Gao, China Academy of Engineering Physics (China) . . . . . [8185-36]

**Robust scanning scheme over large area for airborne EO/IR camera**, Yongeun Yoon, Gun Hwan Yu, Chang Gyun Noh, Dae Beom Song, ADD, Agency for Defense Development (Korea, Republic of) . . . . . [8185-38]

**The design for embedded network infrared video monitoring system based on Linux OS**, Lei Liu, Nanjing Univ. of Science & Technology (China); Chen Ning, ; Xiaojun Zhou, Tao Pan, Nanjing Univ. of Science & Technology (China) . . . . . [8185-39]

**Thursday 22 September**

**SESSION 4**

**Room: Keppler. .... Thurs. 09.00 to 09.40**

**Testing and Measurement Technology**

*Session Chairs: Natan S. Kopeika*, Ben-Gurion Univ. of the Negev (Israel); *Jose F. Alonso*, TTI Norte SL (Spain)

09.00: **FSR: a field portable spectral reflectometer to measure ground targets from NIR to LWIR**, Florent M. Prel, Louis M. Moreau, Hugo A. Bourque, Claude B. Roy, Christian A. Vallieres, Luc E. Levesque, ABB Analytical Measurement (Canada) . . . . . [8185-22]

09.40: **Remote sensing and field test capabilities at U.S. Army Dugway Proving Ground**, James T. Pearson, U.S. Army Dugway Proving Ground (United States); Joshua P. Herron, Space Dynamics Lab. (United States); Martin S. Marshall, George W. Lemire, U.S. Army Dugway Proving Ground (United States) . . . . . [8185-20]

**SESSION 5**

**Room: Keppler. .... Thurs. 09.40 to 12.30**

**Processing and Tracking**

*Session Chairs: Stanley R. Rotman*, Ben-Gurion Univ. of the Negev (Israel); *Jan Yngve Andersson*, Acreo AB (Sweden); *Johan C. van den Heuvel*, TNO Defence, Security and Safety (Netherlands); *John F. Parsons*, Thales Optronics Ltd. (United Kingdom)

09.40: **Automatic adjustment of difference of Gaussian (DOG) filter to improve OT-MACH filter performance for target-recognition applications**, Ahmad T. Alkandri, Nagachetan Bangalore, Akber A. Gardezi, Philip M. Birch, Rupert C. Young, Chris R. Chatwin, Univ. of Sussex (United Kingdom) . . . . . [8185-23]

10.00: **Classification of small moving objects in atmospherically-degraded video**, Eli Chen, Yitzhak Yitzhaky, Ben-Gurion Univ. of the Negev (Israel) . . . . . [8185-24]

Coffee Break . . . . . 10:20 to 10:50

10.50: **Multi-frame underwater image restoration**, Andrey V. Kanaev, Weilin W. Hou, Sarah Woods, U.S. Naval Research Lab. (United States) . . . . . [8185-26]

11.10: **A new TBD-DP algorithm using multiple IR sensors to locate the target launch point**, Hoonkyung Cho, Joohwan Chun, KAIST (Korea, Republic of) . . . . . [8185-27]

11.30: **Aircraft recognition and tracking device**, Dimitrios Filis, Research and Informatics Office (SAEP) (Greece); Christos Renios, Institut Supérieur de l'Aeronautics et de l' Espace (France) . . [8185-28]

11.50: **3D target tracking in infrared imagery by SIFT-based distance histograms**, Ruicheng Yan, Zhiguo Cao, Huazhong Univ. of Science and Technology (China) . . . . . [8185-29]

12.10: **Multi-band infrared image for object discrimination based on Gabor tensor filter**, Yongqiang Zhao, Northwestern Polytechnical Univ. (China) . . . . . [8185-30]

**Security + Defence Plenary Session**

Monday 19 September 09.00 to 10.45

For details, please see page 6

## Electro-Optical Remote Sensing

*Conference Chairs:* **Gary W. Kamerman**, FastMetrix, Inc. (United States); **Ove Steinvall**, Swedish Defence Research Agency (Sweden); **Keith L. Lewis**, Sciovis Ltd. (United Kingdom)

*Programme Committee:* **Laurent Hespel**, ONERA (France); **Dennis Killinger**, Univ. of South Florida (United States); **Peter Lutzmann**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Kenneth John McEwan**, Defence Science and Technology Lab. (United Kingdom); **Vasyl Molebny**, National Taras Shevchenko Univ. of Kyiv (Ukraine); **Russell Philbrick**, North Carolina State Univ. (United States); **Peter N. Randall**, QinetiQ Ltd (United Kingdom); **Philippe Réfrégier**, Institut Fresnel (France); **Monte D. Turner**, Defense Advanced Research Projects Agency (United States); **Klamer Schutte**, TNO Defence, Security and Safety (Netherlands); **Maria Josefa Yzuel**, Univ. Autònoma de Barcelona (Spain)

### Wednesday 21 September

#### Opening Remarks

**Room: Zenit . . . . . Wed. 13.15 to 13.20**

**Gary W. Kamerman**, FastMetrix, Inc. (USA);  
**Ove Steinvall**, Swedish Defence Research Agency (Sweden)

#### SESSION 1

**Room: Zenit . . . . . Wed. 13.20 to 15.10**

#### Ladar Systems and Applications I

*Session Chair:* **Gary W. Kamerman**, FastMetrix, Inc. (United States)

13.20: **Laser vibrometry** (*Invited Paper*), Peter Lutzmann, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) . . . . . [8186A-01]

13.50: **New approaches of 3D range-gated imaging in scattering environments**, Martin Laurenzis, Frank Christnacher, Emmanuel Bacher, Nicolas Metzger, Stephane Schertzer, Institut Franco-Allemand de Recherches de Saint-Louis (France); T. Scholz, Technical Ctr. for Ships and Naval Weapons (Germany) . . . . . [8186A-02]

14.10: **Investigation of the image coding method for 3D range-gated imaging**, Martin Laurenzis, Emmanuel Bacher, Stephane Schertzer, Frank Christnacher, Institut Franco-Allemand de Recherches de Saint-Louis (France) . . . . . [8186A-03]

14.30: **See around the corner using active imaging**, Ove Steinvall, Swedish Defence Research Agency (Sweden) . . . . . [8186A-04]

14.50: **Performance evaluation of systems for laser illumination through the atmosphere with adverse condition**, Hespel Laurent, Nicolas Rivière, Ceolato Romain, ONERA (France) . . . . . [8186A-05]

Coffee Break . . . . . 15.10 to 15.40

#### SESSION 2

**Room: Zenit . . . . . Wed. 15.40 to 17.30**

#### Signal and Image Processing

*Session Chair:* **Ove Steinvall**,  
Swedish Defence Research Agency (Sweden)

15.40: **Signal processing for imaging and mapping ladars** (*Invited Paper*), Christina A. Grönwall, Gustav Tolt, Swedish Defence Research Agency (Sweden) . . . . . [8186A-06]

16.10: **3D reconstruction from a monocular vision system for unmanned ground vehicles**, Richard C. Tompkins, Yakov Diskin, Menatoallah Youssef, Vijayan K. Asari, Univ. of Dayton (United States) . . . . . [8186A-07]

16.30: **Waveform analysis for airborne and terrestrial laser scanning**, Andreas Ullrich, Martin Pfennigbauer, RIEGL Laser Measurement Systems GmbH (Austria) . . . . . [8186A-08]

16.50: **Resolving range ambiguities in high-repetition rate airborne lidar applications**, Peter Rieger, Andreas Ullrich, RIEGL Laser Measurement Systems GmbH (Austria) . . . . . [8186A-09]

17.10: **Multiple object tracking based on the partition of the bipartite graph**, Pavel V. Babayan, Boris A. Alpatov, Ryazan State Radio Technical Univ. (Russian Federation) . . . . . [8186A-10]

### Thursday 22 September

#### SESSION 3

**Room: Zenit . . . . . Thurs. 08.40 to 10.10**

#### Multisensor and Imaging Systems

*Session Chair:* **Laurent Hespel**, ONERA (France)

08.40: **SNIPOD: an EDA multisensor study for sniper detection** (*Invited Paper*), Gilles Fournier, Gérard-Pascal Piau, Yohann Duval, EADS France (France); Ove Steinvall, Lars J. Sjöqvist, Ingmar G. Renhorn, Leif Carlsson, Hans Habberstad, David Lindgren, Swedish Defence Research Agency (Sweden); Dirk Bank, EADS Deutschland GmbH (Germany); Mariusz Kastek, Rafal Dulski, Piotr Trzaskawka, Military Univ. of Technology (Poland); Ragnvald Otterlei, Snipos AS (Norway); François Pierre, Régis Grasser, Christophe Jacqueland, CILAS (France) . . . . . [8186A-11]

09.10: **Multisensor configurations for early sniper detection**, David Lindgren, Swedish Defence Research Agency (Sweden); Dirk Bank, EADS Deutschland GmbH (Germany); Leif Carlsson, Swedish Defence Research Agency (Sweden); Rafal Dulski, Military Univ. of Technology (Poland); Yohann Duval, Gilles Fournier, EADS France (France); Régis Grasser, CILAS (France); Hans Habberstad, Swedish Defence Research Agency (Sweden); Christophe Jacqueland, CILAS (France); Mariusz Kastek, Military Univ. of Technology (Poland); Ragnvald Otterlei, Snipos AS (Norway); Gérard-Pascal Piau, EADS France (France); François Pierre, CILAS (France); Ingmar G. Renhorn, Lars J. Sjöqvist, Ove Steinvall, Swedish Defence Research Agency (Sweden); Piotr Trzaskawka, Military Univ. of Technology (Poland) . . . [8186A-12]

09.30: **MR-i, high-speed dual-cameras hyperspectral imaging FTS**, Florent M. Prel, Louis M. Moreau, Stéphane Lantagne, Claude B. Roy, Christian A. Vallieres, Luc E. Lévesque, ABB Analytical Measurement (Canada) . . . . . [8186A-13]

09.50: **Image-based systems for space surveillance: from images to collision avoidance**, Marine Pyanet, Bernard Martin, Nicolas Fau, Sophie Vial, EADS Astrium (France); Chantal Chalfe, Pascal Beraud, Philippe Fuss, Roland Le Goff, SODERN (France) . . . . . [8186A-14]

Coffee Break . . . . . 10.10 to 10.40

**SESSION 4****Room: Zenit . . . . .Thurs. 10.40 to 12.00****Ladar System and Applications II***Session Chair: Peter Lutzmann, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)*

10.40: **Polarimetric wavelet fractal remote sensing principles for space materials**, George C. Giakos, The Univ. of Akron (United States); Richard H. Picard, Phan D. Dao, Peter N. Crabtree, Patrick J. McNicholl, Air Force Research Lab. (United States) . . . . .[8186A-15]

11.00: **4D active imaging systems to perform the strategic surveillance of an aircraft environment in bad weather conditions**, Nicolas Rivière, Hespel Laurent, Ceolato Romain, ONERA (France) . . . . .[8186A-16]

11.20: **Shipborne hydrographic laser scanning**, Martin Pfennigbauer, Peter Rieger, RIEGL Laser Measurement Systems GmbH (Austria); Martin Schaich, ArcTron GmbH (Germany) [8186A-17]

11.40: **Remote optical timing system for cycling**, Ferhat Culfaz, Andrew G. McCarthy, Hywel McArdle, Leslie Laycock, BAE Systems (United Kingdom); Paul Barratt, English Institute of Sport (United Kingdom); Matt Parker, British Cycling (United Kingdom); Stephen Rose, McLaren Applied Technologies (United Kingdom) . . .[8186A-18]

Lunch Break . . . . . 12.00 to 13.40

**SESSION 5****Room: Zenit . . . . .Thurs. 13.40 to 14.40****New Methods and Techniques***Session Chair: Gary W. Kamerman, FastMetrix, Inc. (United States)*

13.40: **Hardware implementation of fuzzy logic for image stabilization**, Ehsan Koohestani, Safir Informatics (Iran, Islamic Republic of) . . . . .[8186A-20]

14.00: **A novel technique for accurate velocity measurement using LFM radar**, Chao Ma, Xiaojian Xu, BeiHang Univ. (China) . .[8186A-21]

14.20: **Results of ACTIM, an EDA study on spectral laser imaging**, Dominique Hamoir, Laurent Hespel, Philippe Deliot, Y. Boucher, ONERA (France); Ove Steinvall, Jörgen Ahlberg, Håkan Larsson, Dietmar Letalick, Swedish Defence Research Agency (Sweden); Peter Lutzmann, Endre Repasi, Gunnar Ritt, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) . . . . .[8186A-25]

**SESSION 6****Room: Zenit . . . . .Thurs. 14.40 to 15.40****Photonic Components and Architectures in Defence Systems***Session Chair: Keith L. Lewis, Sciovis Ltd. (United Kingdom)*

14.40: **The top down design flow of a-Si:H photodiodes with multivariate methods of analysis**, Christian Merfort, Konstantin Seibel, Andreas Bablich, Krystian Watty, Markus Böhm, Univ. Siegen (Germany) . . . . .[8186A-22]

15.00: **Near-infrared power LED for emerging security and defence applications**, Joerg Heerlein, Martin Behringer, Claus Jaeger, OSRAM Opto Semiconductors GmbH (Germany) . .[8186A-23]

15.20: **Interference fiber ring perimeter with FFT analysis**, Vladimír Va?inek, Jan Vitasek, Stanislav Hejduk, Jiri Bocheza, Jan Látal, Petr Koudelka, Technical Univ. of Ostrava (Czech Republic) . . .[8186A-24]

**Security + Defence Plenary Session**

Monday 19 September 09.00 to 10.45

For details, please see page 6



# Military Applications in Hyperspectral Imaging and High Spatial Resolution Sensing

Conference Chairs: **Gary J. Bishop**, BAE Systems (United Kingdom); **John D. Gonglewski**, Air Force Research Lab. (United States)

Programme Committee: **David C. Dayton**, Applied Technology Associates (United States); **Detlev M. Even**, NovaSol (United States); **Michael M. Myers**, Air Force Research Lab. (United States); **Michael F. Reiley**, H-Nu Photonics (United States)

## Monday 19 September

### Opening Remarks

Room: Keppler. . . . . Mon. 08.50 to 09.00

Gary J. Bishop, BAE Systems (United Kingdom)

### SESSION 7

Room: Keppler. . . . . Mon. 09.00 to 10.00

#### Military Applications in Hyperspectral Imaging and High Spatial Resolution Sensing I

Session Chair: **Gary J. Bishop**, BAE Systems (United Kingdom)

09.00: **Gas detection from smoke stacks: finding multiple constituent gases in a plume using infrared hyperspectral data**, Daniel N. Rotman, Technion-Israel Institute of Technology (Israel); Stanley R. Rotman, Dan G. Blumberg, Ben-Gurion Univ. of the Negev (Israel); David W. Messinger, Erin Ontiveros, Rochester Institute of Technology (United States) . . . . . [8186B-30]

09.20: **Design and evaluation of robust matched filters for chemical agent detection**, Dimitris Manolakis, MIT Lincoln Lab. (United States); Sidi Niu, Northeastern Univ. (United States); Steven Golowich, MIT Lincoln Lab. (United States) . . . . . [8186B-31]

09.40: **Remote sensing of gases by hyperspectral imaging: results of measurements in the Hamburg port area**, Samer Sabbah, Peter Rusch, Joern-Hinnrich Gerhard, Christian Stoeckling, Roland Harig, Bruker Sigma GmbH (Germany) . . . . . [8186B-32]

Coffee Break . . . . . 10.00 to 10.30

### SESSION 8

Room: Keppler. . . . . Mon. 10.30 to 11.50

#### Military Applications in Hyperspectral Imaging and High Spatial Resolution Sensing II

Session Chair: **Gary J. Bishop**, BAE Systems (United Kingdom)

11.10: **Overview of Novosol's hyperspectral capabilities**, Rick E. Holasek, Detlev M. Even, NovaSol (United States) . . . . . [8186B-35]

10.50: **Miniaturized VNIR and SWIR HSI for airborne and ground-based applications**, Rick E. Holasek, Detlev M. Even, NovaSol (United States) . . . . . [8186B-34]

10.30: **Maritime Hawaii hyperspectral measurements using a SWIR hyperspectral scanning system**, David C. Dayton, Rudolph V. Nolasco, Applied Technology Associates (United States); Gregory Fertig, Michael M. Myers, John Gonglewski, Air Force Research Lab. (United States); Detlev M. Even, NovaSol (United States) . . [8186B-33]

11.30: **Compact snapshot real-time imaging spectrometer**, Michael Kudenov, university of Arizona (United States); Eustace L. Dereniak, College of Optical Sciences, The Univ. of Arizona (United States) . . . . . [8186B-36]

Lunch Break . . . . . 11.50 to 13.20

### SESSION 9

Room: Keppler. . . . . Mon. 13.20 to 14.40

#### Military Applications in Hyperspectral Imaging and High Spatial Resolution Sensing III

Session Chair: **John Gonglewski**, Air Force Research Lab. (United States)

13.20: **Sub-pixel target detection using local spatial information in hyperspectral images**, Yuval Cohen, Dan G. Blumberg, Stanley R. Rotman, Ben-Gurion Univ. of the Negev (Israel) . . . . . [8186B-37]

13.40: **Unmanned aerial vehicle (UAV) operated megapixel spectral camera**, Jussi H. Mäkynen, Christer Holmlund, Heikki K. Saari, Kai M. Ojala, Tapani Antila, VTT Technical Research Ctr. of Finland (Finland) . . . . . [8186B-38]

14.00: **Thermal characterization of a NIR hyperspectral camera**, Francisca I. Parra, Pablo F. Meza, Jorge E. Pezoa, Sergio N. Torres, Univ. de Concepción (Chile) . . . . . [8186B-40]

14.20: **Developments in real time hyperspectral image processing and target detection**, Ainsley Killey, BAE Systems (United Kingdom) . . . . . [8186B-41]

## Technologies for Optical Countermeasures

*Conference Chairs:* **David H. Titterton**, Defence Science and Technology Lab. (United Kingdom); **Mark A. Richardson**, Cranfield Univ. (United Kingdom)

*Programme Committee:* **Zahir Daya**, Defence Research and Development Canada (Canada); **Brian Butters**, Chemring Countermeasures Ltd. (United Kingdom); **Marc Eichhorn**, Institut Franco-Allemand de Recherches de Saint-Louis (France); **Ian F. Elder**, SELEX Galileo Ltd. (United Kingdom); **Robert J. Grasso**, Northrop Grumman Electronic Systems (United States); **Helena Jelinková**, Czech Technical Univ. in Prague (Czech Republic); **Stephen P. McGeoch**, Thales Optronics Ltd. (United Kingdom); **Espen Lippert**, Norwegian Defence Research Establishment (Norway); **Benoit Mellier**, DGA/DCE/CELAR (France); **Ric H. M. A. Schleijsen**, TNO Defence, Security and Safety (Netherlands); **Dirk Peter Seiffer**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Ove Steinvall**, Swedish Defence Research Agency (Sweden); **Mark R.G. Taylor**, Defence Science and Technology Organisation (Australia); **Hans-Dieter Tholl**, Diehl BGT Defence GmbH & Co. KG (Germany)

### Wednesday 21 September

#### Welcome Remarks

**Room: Aquarius . . . . . Wed. 08.35 to 08.45**

**David H. Titterton**, Defence Science and Technology Lab. (United Kingdom); **Mark A. Richardson**, Cranfield Univ. (United Kingdom)

#### SESSION 1

**Room: Aquarius . . . . . Wed. 08.45 to 11.30**

#### High Power Lasers I

*Session Chair:* **David H. Titterton**, Defence Science and Technology Lab. (United Kingdom)

08.45: **Recent advances with laser DEW** (*Keynote Presentation*), Don D. Seeley, High Energy Laser Joint Technology Office (United States) . . . . . [8187-01]

09.30: **Overview and plans for High Power Laser Conference** (*Invited Paper*), Harro Ackermann, High Energy Laser Joint Technology Office (United States) . . . . . [8187-02]

Coffee Break . . . . . 10.00 to 10.30

10.30: **High power solid state laser and solid state laser testbed experiment** (*Invited Paper*), Michael Lavan, U.S. Army Space and Missile Defense Command (United States) . . . . . [8187-03]

11.00: **High energy laser test demonstrator** (*Invited Paper*), Michael Lavan, U.S. Army Space and Missile Defense Command (United States) . . . . . [8187-04]

#### SESSION 2

**Room: Aquarius . . . . . Wed. 11.30 to 12.30**

#### High Power Lasers II

*Session Chair:* **Harro Ackermann**, High Energy Laser Joint Technology Office (United States)

11.30: **Cryo thin disc laser** (*Invited Paper*), Tim C. Newell, Air Force Research Lab. (United States) . . . . . [8187-05]

12.00: **Diode pumped alkali lasers** (*Invited Paper*), Boris V. Zhdanov, Randall J. Knize, U.S. Air Force Academy (United States) . . . [8187-06]

Lunch/Exhibition Break . . . . . 12.30 to 14.00

#### SESSION 3

**Room: Aquarius . . . . . Wed. 14.00 to 15.20**

#### High Power Lasers III

*Session Chair:* **Harro Ackermann**, High Energy Laser Joint Technology Office (United States)

14.00: **Basic research high-peak power OPO** (*Invited Paper*), Czeslaw Radzewicz, Univ. of Warsaw (Poland) . . . . . [8187-07]

14.30: **Guiding electric discharge by combined nanosecond and femtosecond pulses** (*Invited Paper*), Andrey A. Ionin, P.N. Lebedev Physical Institute (Russian Federation) . . . . . [8187-08]

15.00: **Single-mode high-power narrow line-width fiber amplifiers**, John Edgecumbe, Josh Galipeau, David Björk, Chih-Hao Wang, Kanxian Wang, Scott Christensen, Imtiaz Majid, Kanishka Tankala, Nufern (United States) . . . . . [8187-28]

Coffee Break . . . . . 15.20 to 15.50

#### SESSION 4

**Room: Aquarius . . . . . Wed. 15.50 to 17.20**

#### Semiconductor Lasers

*Session Chair:* **Mark A. Richardson**, Cranfield Univ. (United Kingdom)

15.50: **Recent progress in quantum cascade lasers** (*Invited Paper*), Erwan L. Normand, Cascade Technologies Ltd. (United Kingdom) . . . . . [8187-09]

16.20: **Coherent monolithic Quantum Cascade Laser  $\mu$ -stripes array**, Mathieu Carras, Guy-Mael De Naurois, Bouzid Simozrag, Olivier Patard, François Alexandre, Xavier Marcadet, Alcatel-Thales III-V Lab. (France) . . . . . [8187-10]

16.40: **Coherent combining of quantum-cascade lasers with a binary phase grating**, Guillaume Bloom, Christian Larat, Eric Lallier, Gaelle Lehoucq, Shailendra Bansropun, Mane-Si L. Lee-Bouhours, Brigitte Loiseau, Thales Research & Technology (France); Mathieu Carras, Xavier Marcadet, Alcatel-Thales III-V Lab. (France); Gaelle Lucas-Leclin, Patrick Georges, Lab. Charles Fabry (France) . . . . . [8187-11]

17.00: **High power, military ruggedized QCL-based laser systems**, Eric B. Takeuchi, William B. Chapman, Dave Caffey, Dave Arnone, Allen Priest, Michael Pushkarsky, Michael Young, Timothy Day, Daylight Solutions Inc. (United States) . . . . . [8187-12]

### Thursday 22 September

#### SESSION 5

**Room: Aquarius . . . . . Thurs. 08.40 to 10.00**

#### Mid-IR Laser Technology

*Session Chair:* **Brian Butters**, Chemring Countermeasures Ltd. (United Kingdom)

08.40: **Progress with OPO based systems for mid-IR generation** (*Invited Paper*), Espen Lippert, Norwegian Defence Research Establishment (Norway) . . . . . [8187-13]

09.10: **Development on ceramic host materials** (*Invited Paper*), Jasbinder S. Sanghera, U.S. Naval Research Lab. (United States) . . . . . [8187-14]

09.40: **Compact efficient mid-infrared laser source: OP-GaAs OPO pumped by Ho:YAG laser**, Anne Hildenbrand, Christelle Kieleck, Marc Eichhorn, Institut Franco-Allemand de Recherches de Saint-Louis (France); Eric Lallier, David Faye, Arnaud Grisard, Thales Research & Technology (France); Bruno P. Gérard, Alcatel-Thales III-V Lab. (France) . . . . . [8187-15]

Coffee Break . . . . . 10.00 to 10.20

#### Security + Defence Plenary Session

Monday 19 September 09.00 to 10.45

For details, please see page 6

## SESSION 6

Room: Aquarius . . . . .Thurs. 10.20 to 12.00

### Applications I

Session Chair: **Lars J. Sjöqvist**,

Swedish Defence Research Agency (Sweden)

10.20: **Spectroscopic methods for detection of impurities** (*Invited Paper*), Yehoshua Y. Kalisky, Nuclear Research Ctr. Negev (Israel) . . . . . [8187-16]

10.50: **Role of single photon detection in pulse laser-based optical navigation**, Josef Blazej, Ivan Prochazka, Czech Technical Univ. in Prague (Czech Republic). . . . . [8187-17]

11.10: **Infrared laser irradiation breadboard: dazzling sensitivity analysis of a HgCdTe focal plane array**, Anne Durécu, Pierre Bourdon, Didier Fleury, Didier Goular, Christophe Planchat, Sylvain Rommeluère, Olivier Vasseur, ONERA (France) . . . . . [8187-18]

11.30: **Recent advances in helicopter self-protection technology** (*Invited Paper*), Kenneth A. Sarkady, U.S. Naval Research Lab. (United States) . . . . . [8187-29]

Lunch Break . . . . . 12.00 to 13.00

## SESSION 7

Room: Aquarius . . . . .Thurs. 13.00 to 14.30

### Applications II

Session Chair: **Tim C. Newell**, Air Force Research Lab. (United States)

13.00: **Turbulence effects in a horizontal propagation path close to ground: implications for optics detection** (*Invited Paper*), Lars J. Sjöqvist, Lars Allard, Ove K. Gustafsson, Markus Henriksson, Magnus Pettersson, Swedish Defence Research Agency (Sweden) . . [8187-19]

13.30: **Time-correlated single-photon counting laser radar in turbulence**, Markus Henriksson, Lars J. Sjöqvist, Swedish Defence Research Agency (Sweden) . . . . . [8187-20]

13.50: **Statistical characteristics of the laser field speckle structure registered in a focal plane of receiving objective**, Yuri A. Rezunkov, NIIKI OEP (Russian Federation). . . . . [8187-21]

14.10: **Optical techniques: using coarse and detailed scans for the preventive acquisition of fingerprints with chromatic white-light sensors**, Mario Hildebrandt, Jana Dittmann, Otto-von-Guericke-Univ. Magdeburg (Germany); Claus Vielhauer, Fachhochschule Brandenburg (Germany) . . . . . [8187-22]

## SESSION 8

Room: Aquarius . . . . .Thurs. 14.30 to 17.00

### Algorithms and Modelling

Session Chair: **Helena Jelinková**,

Czech Technical Univ. in Prague (Czech Republic)

14.30: **Infrared decoy and obscurant modelling and simulation for ship protection** (*Invited Paper*), Brian Butters, Edgar Nicholls, Roy H. Walmsley, Chemring Countermeasures Ltd. (United Kingdom) . . . . . [8187-23]

15.00: **Signature modelling and radiometric rendering equations in infrared scene simulation systems** (*Invited Paper*), Cornelius J. Willers, Council for Scientific and Industrial Research (South Africa); Maria Willers, Denel Dynamics (South Africa); Niek Sanders, Rochester Institute of Technology (United States); Fabian D. Lapiere, Royal Belgian Military Academy (Belgium) . . . . . [8187-24]

Coffee Break . . . . . 15.30 to 16.00

16.00: **Modelling a man-portable air-defence (MANPAD) system with a conical scan two-colour infrared (IR) seeker**, James Jackman, Mark A. Richardson, Cranfield Univ. (United Kingdom); Brian Butters, Roy H. Walmsley, Chemring Countermeasures Ltd. (United Kingdom); Peter W. Yuen, David B. James, Cranfield Univ. (United Kingdom) . . . . . [8187-25]

16.20: **Feature-based tracking algorithms for imaging infrared anti-ship missile seekers**, Greer J. Gray, Mark A. Richardson, Nabil Aouf, Cranfield Univ. (United Kingdom); Brian Butters, Roy H. Walmsley, Edgar Nicholls, Chemring Countermeasures Ltd. (United Kingdom) . . . . . [8187-26]

16.40: **The new optimization method of actively Q-switched quasi-three-level lasers**, Jan K. Jabczynski, Lukasz Gorajek, Mateusz Kaskow, Jacek Kwiatkowski, Waldemar Zendzian, Military Univ. of Technology (Poland) . . . . . [8187-27]



# Millimetre Wave and Terahertz Sensors and Technology

Conference Chairs: **Keith A. Krapels**, U.S. Army Night Vision & Electronic Sensors Directorate (United States); **Neil Anthony Salmon**, QinetiQ Ltd. (United Kingdom); **Eddie Jacobs**, The Univ. of Memphis (United States)

Programme Committee: **Amir Abramovich**, Ariel Univ. Ctr. of Samaria (Israel); **Nicholas J. Bowring**, Manchester Metropolitan Univ. (United Kingdom); **Markus Peichl**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Douglas T. Petkie**, Wright State Univ. (United States); **Chris Schuetz**, Phase Sensitive Innovations, Inc. (United States)

## Monday 19 September

### Welcome and Introduction

Room: Leo ..... Mon. 08.30 to 08.40

Neil Anthony Salmon, QinetiQ Ltd. (United Kingdom);  
Eddie Jacobs, The Univ. of Memphis (USA)

### SESSION 1

Room: Leo ..... Mon. 08.40 to 10.10

#### Systems: Passive Imagers and Spectrometers I

Session Chairs: **Nicholas J. Bowring**, Manchester Metropolitan Univ. (United Kingdom); **Neil Anthony Salmon**, QinetiQ Ltd. (United Kingdom)

08.40: **Investigation of security related fully polarimetric signatures of radiometer measurements at W band** (*Invited Paper*), Stephan Dill, Markus Peichl, Daniel Rudolf, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) ..... [8188-01]

09.10: **Reducing the acquisition time in a single-sensor passive-millimetre wave (PMMW) imaging system utilizing compressive sensing**, Juan Nogueira-Nine, Sony Deutschland GmbH (Germany); Richard Stirling-Gallacher, Sony Deutschland GmbH (United States) ..... [8188-02]

09.30: **First results of a high-power, narrow linewidth, dual-color IR laser for the testing of electro-optic based THz spectrometers**, Don J. Burdette, Cosmin Blaga, Chris Roedig, Erwin Grabisna, Alex Mooney, Lee Mosbacher, Traycer Diagnostic Systems, Inc. (United States) ..... [8188-03]

09.50: **First measurements of the 22-GHz Technology Strategy Board (TSB) aperture synthesis passive millimetre wave imager**, Neil A. Salmon, QinetiQ Ltd. (United Kingdom) ..... [8188-04]

Coffee Break ..... 10.10 to 10.40

### SESSION 2

Room: Leo ..... Mon. 10.40 to 11.50

#### Systems: Passive Imagers and Spectrometers II

Session Chairs: **Markus Peichl**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Eddie L. Jacobs**, The Univ. of Memphis (United States)

10.40: **Design of a distributed aperture millimeter-wave imaging system for "see-through" imaging in rotary craft induced degraded visual environments** (*Invited Paper*), Richard D. Martin, Christopher A. Schuetz, Thomas E. Dillon, Daniel Mackrides, Phase Sensitive Innovations, Inc. (United States); Shouyuan Shi, Dennis W. Prather, Univ. of Delaware (United States) ..... [8188-05]

11.10: **Design and performance of a full-Stokes millimeter-wave polarimeter utilizing optical up conversion**, John Wilson, Univ. of Delaware (United States); Christopher A. Schuetz, Richard D. Martin, Thomas E. Dillon, Phase Sensitive Innovations, Inc. (United States); Maciej Murakowski, Univ. of Delaware (United States); Peng Yao, Phase Sensitive Innovations, Inc. (United States); Dennis W. Prather, Univ. of Delaware (United States) ..... [8188-06]

11.30: **Minimising the costs aperture synthesis passive millimetre wave imaging systems**, Neil A. Salmon, QinetiQ Ltd. (United Kingdom) ..... [8188-07]

Lunch Break ..... 11.50 to 13.10

### SESSION 3

Room: Leo ..... Mon. 13.10 to 15.00

#### Active Systems: Imagers and Radars

Session Chairs: **Neil Anthony Salmon**, QinetiQ Ltd. (United Kingdom); **Christopher A. Schuetz**, Phase Sensitive Innovations, Inc. (United States); **Nicholas J. Bowring**, Manchester Metropolitan Univ. (United Kingdom)

13.10: **Standoff imaging of a masked human face using a 670 GHz high-resolution radar** (*Invited Paper*), Jan A. Kjellgren, Jan Svedin, Swedish Defence Research Agency (Sweden); Ken B. Cooper, Jet Propulsion Lab. (United States) ..... [8188-08]

13.40: **Super resolution and optical properties of THz double line array based on Glow Discharge Detector (GDD) pixel**, Amir Abramovich, Ariel Univ. Ctr. of Samaria (Israel); Natan S. Kopeika, Ben-Gurion Univ. of the Negev (Israel); Daniel Rozban, Ariel Univ. Ctr. of Samaria (Israel) and Ben-Gurion Univ. of the Negev (Israel); Assaf Levanon, Ben-Gurion Univ. of the Negev (Israel); Avihai Akram, Ariel Univ. Ctr. of Samaria (Israel) and Ben-Gurion Univ. of the Negev (Israel); Hezi Joseph, Orly Yacid-Pecht, Alex Belenky, Ben-Gurion Univ. of the Negev (Israel) ..... [8188-09]

14.00: **First results of an 80 x 64 pixel, broadband, real-time THz imager**, Don J. Burdette, Traycer Diagnostic Systems, Inc. (United States); Patrick Fay, Univ. of Notre Dame (United States); Kubilay Sertel, Georgios C. Trichopoulos, Kagan Topalli, The Ohio State Univ. (United States); Ze Zhang, Univ. of Notre Dame (United States); Lee Mosbacher, Traycer Diagnostic Systems, Inc. (United States) ..... [8188-10]

14.20: **Active THz imaging system to measure water content evolution in leaves**, David Etayo, Juan Carlos Iriarte, Inés Palacios, Inigo Ederra, Ramón Gonzalo, Univ. Pública de Navarra (Spain) ..... [8188-11]

14.40: **Active millimeter wave imaging system for material analysis and object detection**, Christian Zech, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) and Karlsruher Institut für Technologie (Germany); Axel Hülsmann, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Ingmar Kalfass, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) and Karlsruher Institut für Technologie (Germany); Axel Tessmann, Arnulf Leuther, Michael Schlechtweg, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Oliver Ambacher, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) and Albert-Ludwigs-Univ. Freiburg (Germany) ..... [8188-12]

#### Security + Defence Plenary Session

Monday 19 September 09.00 to 10.45

For details, please see page 6

# Conference 8188

## Tuesday 20 September

### SESSION 4

Room: Leo ..... Tues. 08.30 to 10.00

#### Devices

Session Chairs: **Nicholas J. Bowring**, Manchester Metropolitan Univ. (United Kingdom); **Christopher A. Schuetz**, Phase Sensitive Innovations, Inc. (United States)

08.30: **Development and characterization of LiNbO<sub>3</sub> electro-optic phase modulator at 170 GHz for mmw imaging system** (*Invited Paper*), Julien Macario, Peng Yao, Univ. of Delaware (United States); Christopher A. Schuetz, Phase Sensitive Innovations, Inc. (United States); Shouyuan Shi, Dennis W. Prather, Univ. of Delaware (United States) ..... [8188-13]

09.00: **260GHz SiGe BiCMOS manufacturing process platform for mmWave applications**, Arjun Kar-Roy, Edward J. Preisler, George Talor, Jr., Zhixin Yan, Roger Booth, Jie Zheng, Samir Chaudhry, David Howard, Marco Racanelli, TowerJazz (United States) ..... [8188-14]

09.20: **Type-II InAs/GaN<sub>1-x</sub>Sb superlattices for terahertz range photodetectors**, Mikhail A. Patrashin, Iwao Hosako, National Institute of Information and Communications Technology (Japan) . . . [8188-15]

09.40: **On body concealed weapon detection using UWB phased array**, Shawn Cole, Manchester Metropolitan Univ. (United Kingdom)..... [8188-26]

Coffee Break ..... 10.00 to 10.30

### SESSION 5

Room: Leo ..... Tues. 10.30 to 12.40

#### Signatures, Interpretation and System Performances

Session Chairs: **Neil Anthony Salmon**, QinetiQ Ltd. (United Kingdom); **Markus Peichl**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)

10.30: **Resolution capability comparison of infrared and terahertz imagers** (*Invited Paper*), Linda Marchese, François Châteauneuf, Éric Savard, Loïc Le Noc, Martin Bolduc, Denis G. Dufour, Marc Terroux, INO (Canada); Denis Tang, Dept. of National Defence (Canada); Alain Bergeron, INO (Canada) ..... [8188-17]

11.00: **Enhanced terahertz imaging system performance analysis and design tool for concealed weapon identification**, Steven R. Murrill, U.S. Army Research Lab. (United States); Charmaine C. Franck, CACI Technologies, Inc. (United States); Richard L. Espinola, U.S. Army Night Vision and Electronic Sensors Directorate (United States); Douglas T. Petkie, Wright State Univ. (United States); Frank C. De Lucia, The Ohio State Univ. (United States); Eddie L. Jacobs, The Univ. of Memphis (United States) ..... [8188-18]

11.20: **New superresolution ranging technique for FMCW radar systems**, Miquel Testar, Richard Stirling-Gallacher, Sony Deutschland GmbH (Germany) ..... [8188-19]

11.40: **Millimetre radar threat level evaluation at stand off ranges**, Stuart W. Hamer, Nicholas Bowring, David Andrews, Manchester Metropolitan University (United Kingdom); Nacer Rezgui, . . . [8188-20]

12.00: **Comparison of Schemes for Active Sub-millimeter Wave Imaging**, Orges Furxhi, Eddie L. Jacobs, The Univ. of Memphis (United States)..... [8188-21]

12.20: **Explosives characterization in terahertz range**, Itziar Maestrojuan Biurrun, David Etayo, Ines Palacios, Juan Carlos Iriarte, Inigo Ederra, Ramon Gonzalo, Univ. Pública de Navarra (Spain) ..... [8188-22]

Closing Remarks ..... Tues. 12.40 to 12.45

## Wednesday 21 September

Posters ..... Wed. 17.30 to 19.00

Conference attendees are invited to attend the Security & Defence Poster Session on Wednesday afternoon. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers.

Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at [spie.org/x32248.xml](http://spie.org/x32248.xml).

**Feature extraction techniques to reduce dimensionality of the acquired THz spectra response**, Radoslaw Ryniec, Mieczyslaw Szustakowski, Military Univ. of Technology (Poland) ..... [8188-23]

**Low-cost THz heterodyne detection by miniature neon indicator lamp glow discharge detector**, Hezi Joseph, Norman S. Kopeika, Amir Abramovich, Avihai Akram, Assaf Levanon, Daniel Rozban, Ben-Gurion Univ. of the Negev (Israel) ..... [8188-24]

17.30: **A Fourier transform spectrometer design for measurement of broadband THz radiation**, X. Lin, Beijing Institute of Space Mechanics and Electricity (China); J. Zhang, Shanghai Institute of Applied Physics (China); F. Zhou, Beijing Institute of Space Mechanics and Electricity (China); Z. Dai, Shanghai Institute of Applied Physics (China) ..... [8188-25]

### Security + Defence Plenary Session

Monday 19 September 09.00 to 10.45

For details, please see page 6

# Optics and Photonics for Counterterrorism and Crime Fighting

Conference Chairs: **Colin Lewis**, Ministry of Defence (United Kingdom); **Douglas Burgess**, Burgess Consulting (United Kingdom)

Programme Committee: **David A. Atkinson**, Pacific Northwest National Lab. (United States); **Benedicte Bascle**, Thales Optronique S.A. (France); **Richard Botten**, Ministry of Defence (United Kingdom); **Antonio A. Cantu**, System Planning Corp (United States); **David J Clarke**, Selex Galileo Ltd. (United Kingdom); **Giovanni Cocca**, Selex Galileo (Italy); **Howard J. Cummins**, Her Majesty's Government Communications Ctr. (United Kingdom); **Bruno Desruelle**, Direction Générale de L'armement (France); **Brian E. Foulger**, Ministry of Defence (United Kingdom); **Gillian F. Marshall**, QinetiQ Ltd. (United Kingdom); **Niamh NicDaeid**, Univ. of Strathclyde (United Kingdom); **Svante Ödman**, Swedish Civil Contingencies Agency (Sweden); **Harbinder S. Rana**, Defence Science and Technology Lab. (United Kingdom); **Salman Rosenwaks**, Ben-Gurion Univ. of the Negev (Israel); **Andrew M. Scott**, QinetiQ Ltd. (United Kingdom); **Neil C. Shand**, Defence Science and Technology Lab. (United Kingdom); **Robert J. Stokes**, Univ. of Strathclyde (United Kingdom); **Mauro G. Varasi**, Finmeccanica (Italy); **Peter W T Yuen**, Cranfield Univ. (United Kingdom)

## Monday 19 September

### Welcome and Introduction

Room: Aquarius . . . . . Mon. 08.55 to 09.00

Colin Lewis, Ministry of Defence (United Kingdom);  
Douglas Burgess, Burgess Consulting (United Kingdom)

### SESSION 1

Room: Aquarius . . . . . Mon. 09.00 to 10.30

#### Sensing and Screening I

09.00: **Proximal and point detection of contaminated surfaces using Raman spectroscopy** (*Invited Paper*), Jason A. Guicheteau, Steven D. Christesen, U.S. Army Edgewood Chemical Biological Ctr. (United States); Ashish Tripathi, SAIC (United States); Erik D. Emmons, Phillip G. Wilcox, Darren K. Emge, U.S. Army Edgewood Chemical Biological Ctr. (United States); Ian Pardoe, EXCET, Inc. (United States); Augustus W. Fountain III, U.S. Army Edgewood Chemical Biological Ctr. (United States) . . . . . [8189A-01]

09.30: **Discrimination of new and aged post-blast explosives residues**, Anders Elfving, Dennis Menning, Hans G. Önerud, Erik Holmgren, Mona Brantlind, Ulla Hedebrant, Henric Östmark, Rose-Marie Karlsson, Swedish Defence Research Agency (Sweden) . . . . . [8189A-02]

09.50: **Stand-off Raman spectroscopy: qualitative and quantitative analysis**, Bernhard Zachhuber, Christoph Gasser, Bernhard Lendl, Technische Univ. Wien (Austria) . . . . . [8189A-03]

10.10: **Raman database considerations for near-infrared systems**, Brenda M. Kunkel, Yin-Fong Su, Russell G. Tonkyn, Eric G. Stephan, Alan G. Joly, Jerome C. Birnbaum, Kristin H. Jarman, Timothy J. Johnson, Pacific Northwest National Lab. (United States) . . [8189A-04]

Coffee Break . . . . . 10.30 to 11.00

### SESSION 2

Room: Aquarius . . . . . Mon. 11.00 to 12.40

#### Sensing and Screening II

11.00: **Broad band tunable external cavity quantum cascade laser system for stand off detection of explosives** (*Invited Paper*), Frank Fuchs, Stefan Hugger, Quankui K. Yang, Michel Kinzer, Wolfgang Bronner, Rainer Lösch, Rolf Aidam, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Kai A. Degreif, Sven Rademacher, Fraunhofer-Institut für Physikalische Messtechnik (Germany); Frank H. Schnürer, Wenka Schweikert, Fraunhofer-Institut für Chemische Technologie (Germany) . . . . . [8189A-05]

11.30: **The microfluidic bioagent autonomous networked detector (M-BAND): an update**, M. Allen Northrup, Microfluidic Systems, Inc. (United States) . . . . . [8189A-06]

11.50: **Infrared signatures to discriminate viability of autoclaved bacillus spores**, Matthew D. W. Schneider, Nancy B. Valentine, Timothy J. Johnson, Pacific Northwest National Lab. (United States) . . . . . [8189A-07]

12.10: **Optical sensing solutions for defence and security application** (*Invited Paper*), John D. Dougherty, Jim Lane, David Fish, Ocean Thin Films, Inc. (United States); Jason M. Eichenholz, Nick J. Barnett, David Creasey, Ocean Optics, Inc. (United States); Neil C. Shand, Defence Science and Technology Lab. (United Kingdom) . . . . . [8189A-09]

Lunch Break . . . . . 12.30 to 13.50

## SESSION 3

Room: Aquarius . . . . . Mon. 13.50 to 15.10

### Sensing and Screening III

13.50: **Detection for security applications utilising quantum cascade lasers: research, technology and operations**, Erwan L. Normand, Deeph Chana, Michael T. McCulloch, Cascade Technologies Ltd. (United Kingdom) . . . . . [8189A-10]

14.10: **Spatially offset Raman spectroscopy (SORS) for through-barrier chemical and explosive detection**, Alexander Frisby, Linda Lee, Rebecca J. Hopkins, Defence Science and Technology Lab. (United Kingdom) . . . . . [8189A-11]

14.30: **Spatially offset Raman spectroscopy for liquid screening**, Paul W. Loeffen, Guy T. Maskall, Stuart Bonthron, Matthew Bloomfield, Cobalt Light Systems Ltd. (United Kingdom); Pavel Matousek, Cobalt Light Systems Ltd. (United Kingdom) and Central Laser Facility (United Kingdom) . . . . . [8189A-12]

14.50: **Tip-based nanolithography for the nanofabrication of sensors and advanced optical structures**, Robert J. Stokes, Univ. of Strathclyde (United Kingdom) and Nanoink Inc. (United States) . . . . . [8189A-13]

Coffee Break . . . . . 15.10 to 15.30

## Tuesday 20 September

### SESSION 4

Room: Aquarius . . . . . Tues. 08.50 to 10.10

#### Sensing and Screening IV

08.50: **BioSense/SR-BioSpectra: demonstrations of wide-area/early warning for bio-aerosol threats: overall program description and early T&E results**, Jean-Robert Simard, Buteau Sylvie, Pierre Lahaie, Pierre Mathieu, Gilles A. Roy, Denis Nadeau, John E. McFee, Susan Rowsell, Jim Ho, Defence Research and Development Canada (Canada); Nicolas Ho, François Babin, Daniel Cantin, INO (Canada); Jennifer H. Robinson, Scott Wood, Jack Hsu, Peter Findlay, MacDonald, Dettwiler and Associates Ltd. (Canada) . . . . . [8189A-14]

09.10: **iCATSI: multi-pixel imaging differential spectroradiometer for standoff detection and quantification of chemical threats**, Florent M. Prel, Louis M. Moreau, ABB Analytical Measurement (Canada); Hugo Lavoie, François Bouffard, Jean-Marc Thériault, Defence Research and Development Canada (Canada); Christian A. Vallieres, Claude B. Roy, ABB Analytical Measurement (Canada); Denis Dubé, Defence Research and Development Canada (Canada) . . . . . [8189A-15]

09.30: **Remote detection of liquid surface contamination by imaging infrared spectroscopy: measurements and modelling**, Samer Sabbah, Jens Eichmann, René Braun, Roland Harig, Bruker Sigma GmbH (Germany); Chris R. Howle, Defence Science and Technology Lab. (United Kingdom) . . . . . [8189A-16]

09.50: **Hazardous liquid detection using active hyperspectral imaging**, Chris R. Howle, Alastair J. S. McIntosh, Defence Science and Technology Lab. (United Kingdom); David J. M. Stothard, Malcolm H. Dunn, Univ. of St. Andrews (United Kingdom); Gordon Robertson, William Miller, Graeme P. A. Malcolm, Gareth T. Maker, M Squared Lasers Ltd. (United Kingdom) . . . . . [8189A-17]

Coffee Break . . . . . 10.10 to 10.40



# Conference 8189A

## SESSION 5

Room: Aquarius . . . . . Tues. 10.40 to 12.40

### Sensing and Screening V

10.40: **Efficiency of the detection of explosive using the spectral dynamics analysis of reflected signal**, Vyacheslav A. Trofimov, Svetlana A. Varentsova, Lomonosov Moscow State Univ. (Russian Federation); Mieczyslaw Szustakowski, Norbert Palka, Tomasz Trzcinski, Military Univ. of Technology (Poland) . . . . . [8189A-18]

11.00: **Screening mail for powders using terahertz technology**, Michael C. Kemp, Iconal Technology Ltd. (United Kingdom) . . . . . [8189A-19]

11.20: **Near infrared transmission through clothing: applications in sensing and screening**, David Hutchins, Aamer Saleem, Celine Canal, Lee A. J. Davis, The Univ. of Warwick (United Kingdom) . . . . . [8189A-32]

11.40: **Possible way for increasing the quality of imaging from THz passive device**, Vyacheslav A. Trofimov, Vladislav V. Trofimov, Lomonosov Moscow State Univ. (Russian Federation); Cunlin Zhang, Chao Deng, Yuan-meng Zhao, Capital Normal Univ. (China) . . . . . [8189A-20]

12.00: **An immuno-based surface plasmon resonance biosensor for ephedrine detection**, Sabato D'Auria, Antonio Varriale, Consiglio Nazionale delle Ricerche (Italy); Alberto Secchi, Dispenza Massimiliano, Luigi Pierno, Anna Maria Fiorello, SELEX Sistemi Integrati S.p.A. (Italy) . . . . . [8189A-21]

12.20: **Two secure facilities for Egyptian nuclear weapons**, Ashraf Elsayed El Mohamed, Consultant (Egypt) . . . . . [8189A-22]

Lunch/Exhibition Break . . . . . 12.40 to 14.00

## SESSION 6

Room: Aquarius . . . . . Tues. 14.00 to 15.00

### Imaging Techniques I

14.00: **Colour invariant target recognition in multiple camera CCTV surveillance**, Umair Soori, Peter W. Yuen, Izzati Ibrahim, Aris Tsitiridis, Tong Chen, Kan Hong, David B. James, Mark A. Richardson, Cranfield Univ. (United Kingdom) . . . . . [8189A-24]

14.20: **User-assisted visual search and tracking across distributed multi-camera networks**, Yogesh Raja, Shaogang Gong, Tao Xiang, Vision Semantics Ltd. (United Kingdom) . . . . . [8189A-25]

14.40: **Application of speed enhanced spatial domain correlation filters for real-time security monitoring**, Akber A. Gardezi, Ahmed Alkandri, Nagachetan B. Manjunathamurthy, Philip M. Birch, Rupert C. Young, Chris R. Chatwin, Univ. of Sussex (United Kingdom) . . . . . [8189A-26]

Coffee Break . . . . . 15.00 to 15.30

## SESSION 7

Room: Aquarius . . . . . Tues. 15.30 to 16.40

### Imaging Techniques II

15.30: **Machine-assisted verification of latent fingerprints: first results for nondestructive contact-less optical acquisition techniques with a CWL sensor**, Mario Hildebrandt, Stefan Kiltz, Jana Dittmann, Claus Vielhauer, Otto-von-Guericke-Univ. Magdeburg (Germany) . . . . . [8189A-27]

15.50: **A first framework for the development of age determination schemes for latent biometric fingerprint traces using a chromatic white light (CWL) sensor**, Ronny Merkel, Jana Dittmann, Stefan Kiltz, Claus Vielhauer, Otto-von-Guericke-Univ. Magdeburg (Germany) . . . . . [8189A-28]

16.20: **Separation and sequence detection of overlapped fingerprints: experiments and first results**, Rainer Kärger, Sascha Giebel, Marcus Leich, Jana Dittmann, Otto-von-Guericke-Univ. Magdeburg (Germany) . . . . . [8189A-30]

### Video Analytics: Where is it Going and How Can it Help us?

Room: Aquarius . . . . . Tues. 16.40 to 17.30

#### Roundtable Discussion

Moderators: **Colin Lewis**, Ministry of Defence (United Kingdom); **Doug Burgess**, Burgess Consulting (United Kingdom)

*Come and join us in an open discussion about whether Video Analytics is delivering up to its claims. This is the opportunity for those of you who have tried it to share your experiences, and for those thinking about dipping their toes into this particular water to explain what they are hoping to achieve.*

## Wednesday 21 September

Posters . . . . . Wed. 17.30 to 19.00

*Conference attendees are invited to attend the Security & Defence Poster Session on Wednesday afternoon. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers.*

*Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at [spie.org/x32248.xml](http://spie.org/x32248.xml)*

**Through-barrier detection of explosive components for security screening applications**, Linda Lee, Rebecca J. Hopkins, Alexander Frisby, Ralph Mansson, Defence Science and Technology Lab. (United Kingdom) . . . . . [8189A-31]

# Optical Materials in Defence Systems Technology

*Conference Chairs:* **Roberto Zamboni**, Consiglio Nazionale delle Ricerche (Italy); **François Kajzar**, Univ. d'Angers (France); **Attila A. Szep**, Air Force Research Lab. (United States)

*Programme Committee:* **Chantal Andraud**, Ecole Normale Supérieure de Lyon (France); **Andre-Jean Attias**, Univ. Pierre et Marie Curie (France); **Carrie M. Bartsch**, Air Force Research Lab. (United States); **Werner J. Blau**, Trinity College Dublin (Ireland); **Fabrice Charra**, Commissariat à l'Énergie Atomique (France); **Larry R. Dalton**, Univ. of Washington (United States); **Manfred Eich**, Technische Univ. Hamburg-Harburg (Germany); **Patrick Fenevrou**, Thales Research & Technology (France); **Barrett Flake**, European Office of Aerospace Research and Development (United States); **Marina Grenzer**, Leibniz-Institut für Polymerforschung Dresden e.V. (Germany); **Emily M. Heckman**, Air Force Research Lab. (United States); **Charles Y. C. Lee**, Air Force Office of Scientific Research (United States); **Antoni C. Mitus**, Wroclaw Univ. of Technology (Poland); **Dieter Neher**, Univ. Potsdam (Germany); **Robert L. Nelson**, Air Force Research Lab. (United States); **Fahima Ouchen**, Air Force Research Lab. (United States); **Ulrich Pietsch**, Univ. Siegen (Germany); **Ileana Rau**, Polytechnical Univ. of Bucharest (Romania); **Niyazi Serdar Sariciftci**, Johannes Kepler Univ. Linz (Austria); **Kenneth D. Singer**, Case Western Reserve Univ. (United States)

## Monday 19 September

### Opening Remarks

**Room: Quadrant . . . . . Mon. 08.30**

**Roberto Zamboni**, Consiglio Nazionale delle Ricerche (Italy)

### SESSION 8

**Room: Quadrant . . . . . Mon. 08.40 to 10.20**

#### Nonlinear Optics

*Session Chair:* **Roberto Zamboni**,  
Consiglio Nazionale delle Ricerche (Italy)

08.40: **Second-order nonlinear optics of silicon nitride films and gratings**, Martti Kauranen, Ravi Kumar, Saurav Kumar, Tingyin Ning, Henna Pietarinen, Goëry Genty, Outi Hyvärinen, Janne Simonen, Tampere Univ. of Technology (Finland); Tommi Kaplas, Univ. of Eastern Finland (Finland) . . . . . [8189B-43]

09.20: **Chromophores design for optical power limiting at telecommunications wavelength** (*Invited Paper*), Chantal Andraud, Ecole Normale Supérieure de Lyon (France) . . . . . [8189B-47]

09.50: **The substituted [2.2] paracyclophanes as versatile platform for a design of new optical materials** (*Invited Paper*), Lada N. Puntus, Institute of Radio Engineering and Electronics (Russian Federation); Elena V. Sergeeva, Konstantin A. Lyssenko, A.N. Nesmeyanov Institute of Organoelement Compounds (Russian Federation); Irina Pekareva, Institute of Radio Engineering and Electronics (Russian Federation); François Kajzar, Univ. d'Angers (France) . . . . . [8189B-46]

Coffee Break . . . . . 10.20 to 10.50

### SESSION 9

**Room: Quadrant . . . . . Mon. 10.50 to 12.50**

#### Materials and Applications

*Session Chair:* **Attila A. Szep**, Air Force Research Lab. (United States)

10.50: **A platform for nanosensors** (*Invited Paper*), André-Jean Attias, Antoine Colas, David Kreher, Fabrice Mathevet, Univ. Pierre et Marie Curie (France); Fabrice Charra, Commissariat à l'Énergie Atomique (France) . . . . . [8189B-45]

11.20: **Photo-induced deformation of azobenzene elastomers: theory and simulations** (*Invited Paper*), Marina Saphiannikova Grenzer, Vladimir P. Toshchevnikov, Leibniz-Institut für Polymerforschung Dresden e.V. (Germany); Jaroslav Illytskyi, Institute for Condensed Matter Physics (Ukraine); Gert Heinrich, Leibniz-Institut für Polymerforschung Dresden e.V. (Germany) . . . . . [8189B-40]

11.50: **Chalcogenide and Germanium hybrid optics**, Gabriel S. Cogburn, LightPath Technologies, Inc. (United States) . . . . [8189B-42]

12.10: **Use of nonscanning coherence radar for distance measurement**, Dumitru Ulieru, SITEX 45 (Romania); Florian N. Pistritu, National Institute for Research and Development in Microtechnologies (Romania) . . . . . [8189B-41]

12.30: **Hyperspectral polarized and angular measurements for laser imaging and target characterization**, Ceolato Romain, Nicolas Rivière, Hespel Laurent, ONERA (France) . . . . . [8189B-44]

**Security + Defence Plenary Session**

Monday 19 September 09.00 to 10.45

For details, please see page 6

# Quantum-Physics-Based Information Security

**Conference Chairs:** **Mark T. Gruneisen**, Air Force Research Lab. (United States); **Miloslav Dusek**, Palacky Univ. Olomouc (Czech Republic); **John G. Rarity**, Univ. of Bristol (United Kingdom)

**Programme Committee:** **Robert W. Boyd**, Univ. of Ottawa (Canada); **John D. Gonglewski**, Air Force Research Lab. (United States); **Richard J. Hughes**, Los Alamos National Lab. (United States); **Gregory S. Kanter**, NuCrypt LLC (United States); **Prem Kumar**, Northwestern Univ. (United States); **Norbert Lütkenhaus**, Univ. of Waterloo (Canada); **Ronald E. Meyers**, U.S. Army Research Lab. (United States); **Jane E. Nordholt**, Los Alamos National Lab. (United States); **Momtchii Peev**, Austrian Research Ctrs. GmbH (Austria); **Renato Renner**, ETH Zurich (Switzerland); **Andrew J. Shields**, Toshiba Research Europe Ltd. (United Kingdom); **Rupert Ursin**, Univ. Wien (Austria)

## Monday 19 September

### Opening Remarks

**Room: Stella. . . . . Mon. 08.50 to 09.00**

**Mark T. Gruneisen**, Air Force Research Lab. (USA)

### SESSION 10

**Room: Stella. . . . . Mon. 09.00 to 10.30**

#### Security Analysis and Novel Protocols for Quantum Communication

*Session Chair:* **James Dynes**, Toshiba Research Europe Ltd. (United Kingdom)

09.00: **Fundamental and practical problems of QKD security: the real versus the mis-perceived situation** (*Invited Paper*), Horace P. Yuen, Northwestern Univ. (United States) . . . . . [8189C-50]

09.30: **Quantitative analysis of quantum noise masking in quantum stream cipher by intensity modulation operating at G-bit/sec-data rate**, Takehisa Iwakoshi, Fumio Futami, Osamu Hirota, Tamagawa Univ. (Japan) . . . . . [8189C-51]

09.50: **Quantum cryptography and authentication with low key consumption**, Aysajan Abidin, Linköping Univ. (Sweden); Christoph Pacher, Thomas Lorünser, Austrian Research Ctrs. GmbH - ARC (Austria); Jan-Ake Larsson, Linköping Univ. (Sweden); Momtchil Peev, Austrian Research Ctrs. GmbH - ARC (Austria) . . . . . [8189C-52]

10.10: **Finite-key analysis of the six-state protocol with photon number resolution detectors**, Silvestre Abruzzo, Hermann Kampermann, Sylvia Bratzik, Markus Mertz, Dagmar Bruss, Heinrich-Heine-Univ. Düsseldorf (Germany) . . . . . [8189C-53]

Coffee Break . . . . . 10.30 to 11.00

### SESSION 11

**Room: Stella. . . . . Mon. 11.00 to 12.30**

#### Quantum Communication Subsystems: Sources, Optical Channels, Detectors, and Information Processing

*Session Chair:* **Miloslav Dusek**, Palacky Univ. (Czech Republic)

11.00: **Single photon detection for high bit rate quantum communication** (*Invited Paper*), James Dynes, Zhiliang Yuan, Andrew Sharpe, Andrew Shields, Toshiba Research Europe Ltd. (United Kingdom) . . . . . [8189C-54]

11.30: **A parallel, event-driven software approach for quantum key**, Gregory E. Brittle, Boeing-SVS, Inc. (United States) . . . . . [8189C-55]

11.50: **A high brightness source of polarization entangled photons**, Fabian O. Steinlechner, ICFO - Instituto de Ciencias Fotónicas (Spain); Pavel Trojek, qutools GmbH (Germany) and Ludwig-Maximilians-Univ. München (Germany) and Max-Planck-Institut für Quantenoptik (Germany); Marc Jofre, Arnaud Gardelein, ICFO - Instituto de Ciencias Fotónicas (Spain); Harald Weinfurter, Ludwig-Maximilians-Univ. München (Germany) and Max-Planck-Institut für Quantenoptik (Germany); Valerio Pruneri, ICFO - Instituto de Ciencias Fotónicas (Spain) and ICREA-Institució Catalana de Recerca i Estudis Avançats (Spain) . . . . . [8189C-56]

12.10: **Free-space quantum key distribution with spatial modes of the optical field**, Mark T. Gruneisen, Air Force Research Lab. (United States); Raymond C. Dymale, Boeing-SVS, Inc. (United States); Kurt E. Stoltenberg, Air Force Research Lab. (United States) . . . . . [8189C-57]

Lunch Break . . . . . 12.30 to 14.00

### SESSION 12

**Room: Stella. . . . . Mon. 14.00 to 15.00**

#### Terrestrial and Space-Based Quantum Key Distribution Systems

*Session Chair:* **Mark T. Gruneisen**, Air Force Research Lab. (United States)

14.00: **Quantum key distribution from a space-based platform** (*Invited Paper*), Rupert Ursin, Univ. Wien, Institute for Quantum Optics and Quantum Information (Austria) . . . . . [8189C-58]

14.30: **Performances of the SwissQuantum network over 21 months** (*Invited Paper*), Damien Stucki, Matthieu Legré, Laurent Monat, Samuel Robyr, Patrick Trinkler, Grégoire Ribordy, id Quantique SA (Switzerland); Rob Thew, Nino Walenta, Nicolas Gisin, Univ. of Geneva (Switzerland); François Buntschu, Didier Perroud, Gerald Litzistorf, Univ. of Applied Sciences Western Switzerland (Switzerland); Stefano Ventura, Pascal Junod, Ecole d'Ingénieurs du Canton de Vaud (Switzerland) . . . . . [8189C-59]

#### Security + Defence Plenary Session

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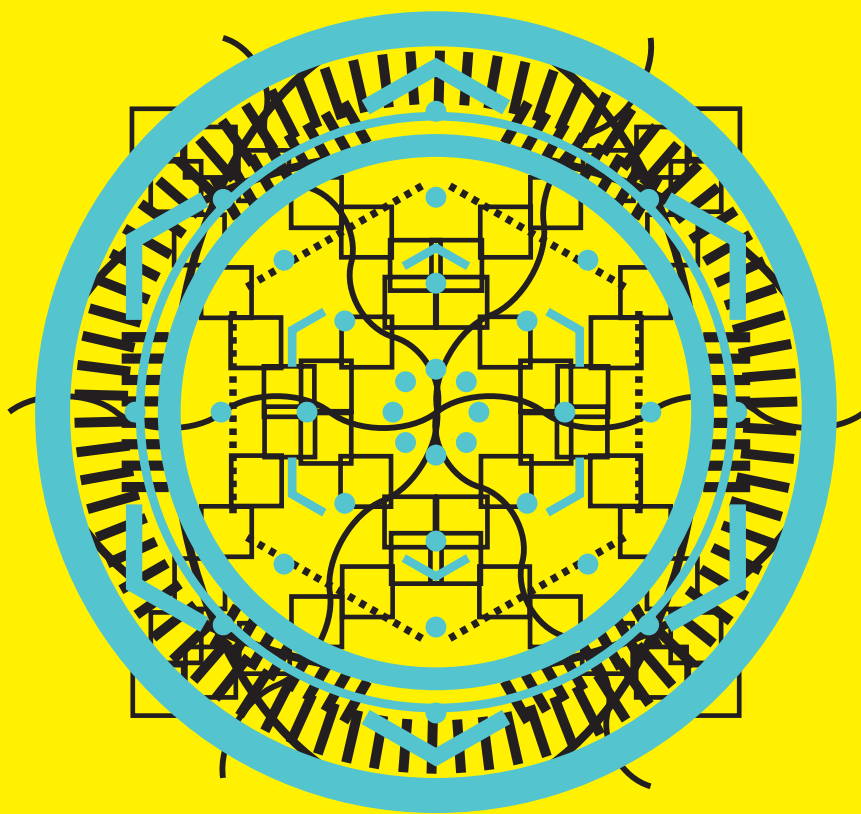
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