

SPIE. REMOTE
SENSING

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DEFENCE



REMOTE SENSING & SECURITY+ DEFENCE TECHNOLOGIES.

**TECHNICAL
PROGRAMME**

**EXHIBITION
GUIDE**

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Amsterdam RAI Exhibition and
Convention Centre
Amsterdam, Netherlands

Conferences: 22–25 September 2014
Exhibit: 23–24 September 2014

THE PREMIER EVENT FOR REMOTE SENSING

SPIE Remote Sensing is the European conference for international scientists and researchers focusing on satellite-based imaging systems and the data generated by them—an opportunity to apply technology to industry.

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

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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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EUROPE'S LEADING SECURITY AND DEFENCE MEETING

SPIE Security+Defence is a conference for international engineers, researchers and scientists involved in optical science and applied technologies in advanced security and defence systems; bringing production to practice.

SYMPOSIUM CHAIR



David H. Titterton
UK Defence Academy (United Kingdom)

SYMPOSIUM CO-CHAIRS



Reinhard Ebert
Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)

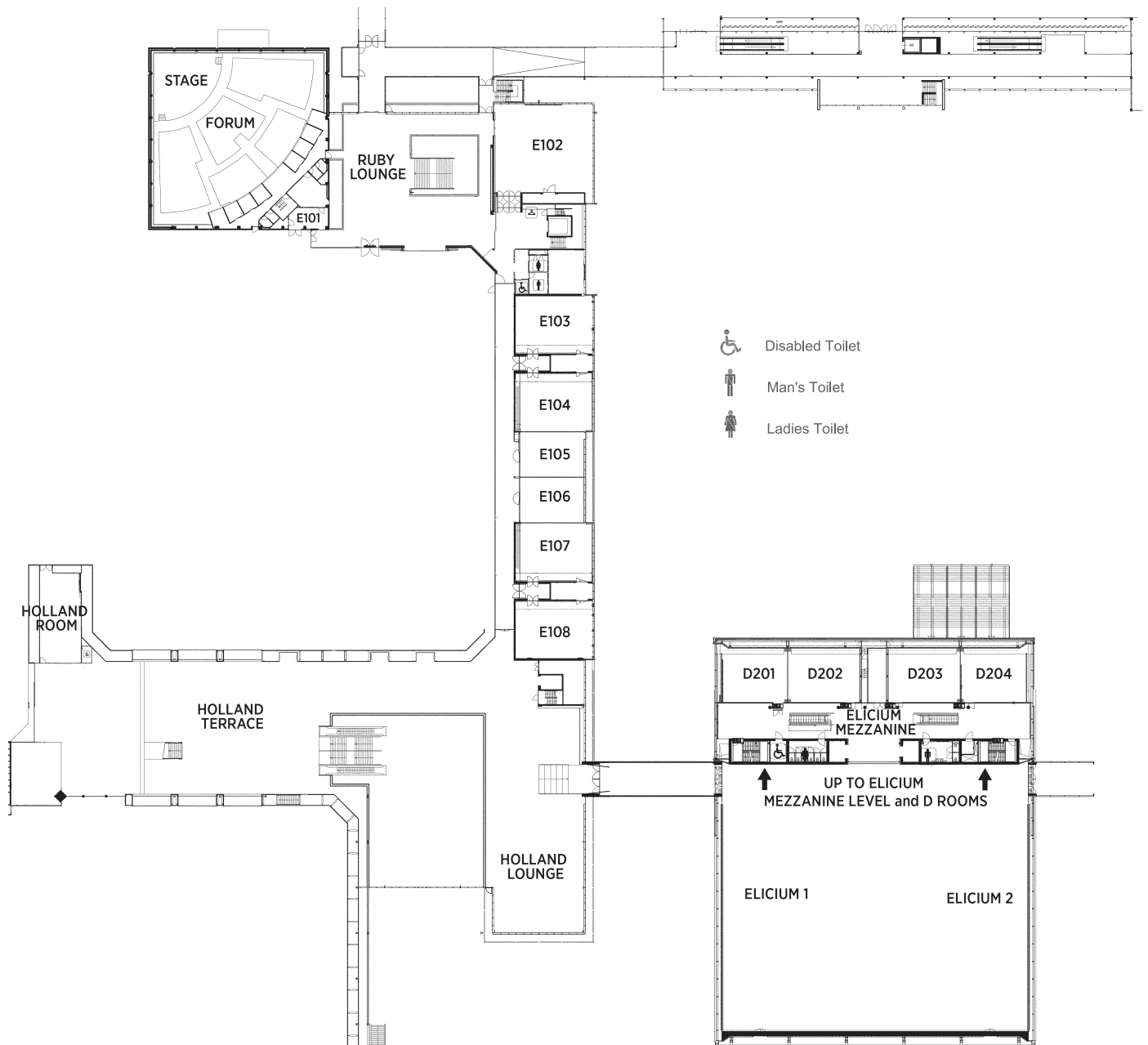


Ric Schleijsen
TNO Defence, Security and Safety (Netherlands)

CO-OPERATING ORGANISATIONS



RAI CONGRESS CENTRE FLOOR PLAN



Best Student Paper Awards

Best student papers will be awarded at the 2014 Remote Sensing and Security + Defence Europe Symposia. As a committed supporter of excellence in student research, SPIE supports Best Student Paper Awards at SPIE sponsored events across the globe. The awards are designed to encourage and acknowledge excellence in oral and poster student paper presentations.

Conference chairs will evaluate all presentations based on the Award entries and selected criteria. The winners will be recognized at the closing of the conference in which the presentation was made. Best Student Papers will be recognized in the conference proceedings, on the Remote Sensing and Security + Defence Europe website and in the 2015 Remote Sensing and Security + Defence Call for Papers, Advance and Final Programs. The winners will be formally notified by email, and will receive a certificate of award.

Information addressing the organization of the Best Student Awards for the 2014 symposium will be announced during the Remote Sensing and Security + Defence Europe Plenary Sessions.



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

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.

SPIE REMOTE SENSING

MONDAY	TUESDAY	WEDNESDAY	THURSDAY
CONFERENCES			
	Conf. 9239: Remote Sensing for Agriculture, Ecosystems, and Hydrology (Neale, Maltese) p.14		
		Conf. 9240: Remote Sensing of the Ocean, Sea Ice, Coastal Waters, and Large Water Regions 2011 (Bostater, Neyt, Mertikas) p.18	
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SPIE SECURITY + DEFENCE

MONDAY	TUESDAY	WEDNESDAY	THURSDAY
CONFERENCES			
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SPECIAL EVENTS

ESD Plenary Session

Welcome Reception

ERS Plenary Session

50th Anniversary of TNO Space

Poster Session

SECURITY + DEFENCE PLENARY SESSIONS.

Monday 22 September • Forum Hall
16:05 to 17:50

16:05 to 16:15

WELCOME AND INTRODUCTION

David H. Titterton, UK Defence Academy, United Kingdom
Reinhard Ebert, Fraunhofer-IOSB Institute of Optronics, System Technologies and Image Exploitation, Germany
Ric Schleijsen, TNO Defence, Security, and Safety, Netherlands

2014 Symposium Chairs

16:15 to 16:20

RUDOLF KINGSLAKE MEDAL AND PRIZE

The Rudolf Kingslake Medal is awarded annually in recognition of the most noteworthy original paper to appear in the Society's official journal, *Optical Engineering*, on the theoretical or experimental aspects of optical engineering.

The 2012 Rudolf Kingslake Medal and Prize is awarded to Maarten A. Hogervorst and Alexander Toet, of the TNO Defence Security and Safety, Human Factors, Netherlands, for their paper titled "Progress in color night vision," published in the January 2012 issue of *Optical Engineering*.

16:20 to 17:05

PHYSICS AND OPTICS IN SEMICONDUCTOR LITHOGRAPHY INDUSTRY



Jos Benschop, ASML (Netherlands)

Moore's Law dictates that every 18 months the number of transistors on an integrated chip doubles. This is first and foremost enabled by optical lithography printing ever smaller transistors on an integrated circuit. ASML is market and technology leader in this multi-billion euro industry. State-of-the art immersion scanners, using 193 nm light and immersion optics with numerical aperture of 1.35, print 40 nm

wide lines on a 300mm resist coated silicon wafer at a rate well above 200 wafers/hour. Extreme Ultra Violet scanners, using 13 nm light, print features well below 20nm. After an introduction into IC fabrication, the role of lithography and ASML, past present and future of optical lithography will be discussed. Examples how the extensive network of technology partners enables ASML to insert new technology in time will be shared.

Biography: **Jos Benschop** received his MSc (cum laude) and PhD from physics faculty in Twente University. From 1984 until 1997 he worked at Philips on optical metrology and optical recording. He joined ASML in 1997. ASML designs, builds and sells lithography and is world-wide market and technology in a multi B€ market. As Senior Vice President Technology he is responsible for the definition and execution of research/advanced-development program which is executed internal ASML and with an extensive network of international partners. Furthermore he is responsible for System Engineering which includes system specification and design as well as system integration and testing. He has published 27 papers and generated 15 patents. He is an SPIE fellow and part-time professor "Industrial Physics" at the University of Twente.

17:05 to 17:50

ADVANCES IN IMAGING AND ANALYSIS TECHNIQUES FOR DEFENSE AND SECURITY SURVEILLANCE



Peter H. N. de With, Technische Univ. Eindhoven (Netherlands)

The sensors of surveillance cameras are increasingly based on CMOS, which offers a high quality and sensitivity for a relatively low price, leading to a fast upgrading of camera solutions in terms of resolution. Besides this success, alternative sensing modalities are also more deployed, such as (near-) infrared sensing for depth reconstruction and hyper spectral imaging. With Ultra-High Definition resolution emerging (10-fold HD resolution), surveillance imaging is breaking the border for specific applications that would otherwise not be possible with HD imaging. In the presentation, we discuss key aspects for enabling of these novel applications. Examples of such aspects are advanced image analysis using context information in addition to object detection, stereo 3D camera processing and 3D reconstruction.

An interesting Defense application that is discussed is change detection for real-time surveillance using UHD cameras. A UHD camera is mounted on a driving car which is inspecting the road ahead up to 50 meters, while the images are compared in real-time with previously recorded images to detect any possible changes. This system was evaluated in a recent NATO trial. Other applications are disparity processing and depth reconstruction to reliably detect traffic participants in front of a moving vehicle. In both applications context information and 3D depth processing adds additional performance and robustness.

Biography: **Peter H.N. de With** graduated in Electrical Engineering (MSc., Ir.) from Eindhoven University of Technology and received his Ph.D. degree from University of Technology Delft, The Netherlands. From 1984-1997 he worked for Philips Research Eindhoven, where worked on video compression chaired a cluster for programmable TV architectures as senior TV Systems Architect. From 1997-2000, he was full professor at the University of Mannheim, Germany, Computer Engineering, and chair of Digital Circuitry and Simulation. From 2000-2007, he was with LogicaCMG in Eindhoven as a principal consultant Technical SW and distinguished business consultant. He was also parttime professor at the University of Technology Eindhoven, heading the chair on Video Coding and Architectures. In the period 2008-2010, he was VP Video (Analysis) Technology at CycloMedia Technology. Since 2011, he is assigned full professor Video Coding and Content Analysis at Eindhoven University of Technology and appointed scientific director Care & Cure Technology and theme leader Smart Diagnosis in the University Health program. De With is a national and international expert in video surveillance for safety and security and has been involved in multiple EU projects on video analysis, featuring object and behavior recognition, and also surveillance projects with the Harbor of Rotterdam, Dutch Defense, Bosch Security Systems, TKH-Security, etc. He is board member of Dutch Institute of Technology for Safety and Security (DITSS) and R&D advisor to multiple companies. De With is Fellow of the IEEE, has (co-) authored about 50 journal papers and book chapters and over 300 conference papers on video coding, analysis, architectures, 3D processing and their realization. He is the (co-)recipient of multiple awards, such as the SMPTE team Award for the DV standard, a Philips Innovation Award, IEEE CES Chester Sall paper awards, VCIP paper award, best IEEE Transactions paper awards and Machine Vision Conference Paper Award.

REMOTE SENSING PLENARY SESSIONS.

Tuesday 23 September • Forum Hall
16:05 to 17:45

16:05 to 16:15

WELCOME AND INTRODUCTION

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

Ulrich Michel, University of Education, Germany

Bart Snijders, TNO, Netherlands

2014 Symposium Chairs

16:15 to 17:00

50 YEARS OF SPACE INSTRUMENTATION DEVELOPMENT IN THE NETHERLANDS



Bart Snijders, TNO, Netherlands

In 1964 the optics department of TNO got involved in the emerging field of space instrumentation, by developing a telescope and spectrometer for the European satellite TD14. Since then a growing list of optical sensors and instruments has been developed by a cluster of Dutch companies and research institutes, often driven by scientific objectives provided

by astronomers and climate researchers.

For Space Science missions such as HIPPARCOS, Hubble, Herschel and GAIA significant contributions were provided by the Dutch. In cooperation with ESA, NASA and European (industrial) partners several generations of spectrometers for monitoring atmospheric constituents have been developed successfully (e.g., GOME, SCIAMACHY, OMI). Currently the TROPOMI imaging spectrometer instrument is in its final stage of integration and test. Many of the instruments developed were based on unique concepts, technologies and components, some of which will be discussed.

Today technological developments still continue, as new instruments with ever increasing performance are required.

Biography: **Bart Snijders** is a Consultant and Business Developer for projects for Space, Astronomy, Industrial applications and Big Science with twenty eight years of experience in optical instrumentation development.

Bart graduated from the University of Delft with M.Sc. in Applied Physics. Since 2006 he has been in charge of coordination of internal research programs, cooperation with international companies and universities, e.g. Dutch Joint Aperture Synthesis Team with Sterrewacht Leiden, Dutch Space, SRON, Technical University Delft (Prof. J. Braat), Knowledge Centre Aperture Synthesis; as well as marketing, business development, and project acquisition. He is part of the program management team of the national preparation program ITER-NL.

Bart Snijders is currently responsible for network building and program development for Big Science, and member of ILO-net, a team of Industrial Liaison Officers from the major Dutch Scientific institutes; as well as the program management of TNO strategic research program for Space (Earth observation) and Mission Critical Components.

Mr. Snijders is one of the founders of the European Technology Platform Photonics21; he is also the Chairman of the Board of the Photonics Cluster Netherlands.

17:00 to 17:45

REMOTE SENSING AT THE NASA KENNEDY SPACE CENTER: A PERSPECTIVE FROM THE GROUND UP



Lisa Huddleston, NASA KSC Weather Office (United States)

This presentation provides an overview of ground based operational remote sensing activities that support a broad range of NASA missions at the Kennedy Space Center (KSC).

Many types of sensors are in use by KSC and across the Eastern Range. For this discussion, we will examine remote sensors for winds, lightning and electric fields, precipitation and storm hazards. These sensors provide data that are used to develop climatology databases to support NASA launch vehicle design studies; to assess and satisfy launch commit criteria and to ensure the safety of ground processing personnel and equipment. The wind sensors include the 50 MHz and 915 MHz Doppler Radar Wind Profilers (DRWP); the field mill network for sensing atmospheric electric field intensity; lightning aloft and cloud-to-ground lightning sensors; and the weather radars.

Next, we will discuss a field demonstration known as KaBOOM. Ka Band Object Observation and Monitoring is not an instrument, but rather is a field demonstration to determine the possibility of constructing an interplanetary radar instrument. KaBOOM is a phased array of three 12 meter antennas being built as a technology demonstration for a future radar system that could be used to track deep-space objects such as asteroids. Transmissions at Ka Band allow for higher bandwidth than at lower frequencies, but the signals are also far more susceptible to de-correlation from turbulence in the troposphere, as well as attenuation due to water vapor, which is plentiful in the Central Florida atmosphere. If successful, KaBOOM will pave the way for an array of many more elements that will enable us to reach the goal of tracking asteroids up to 45 million miles away, five times further than we can track today.

Finally, we will explore the use of Site Test Interferometers (STI) as an atmospheric sensor. The STI antennas continuously observe signals emitted by geostationary satellites and produce measurements of the phase difference between the received signals. STIs are usually located near existing or candidate antenna array sites to statistically characterize atmospheric phase delay fluctuation effects for the site. There is a three-element STI located at the KaBOOM site at KSC. An STI measures the fluctuations in the difference of atmospheric delay from an extraterrestrial source to two points on the Earth separated by a distance comparable to the separations between elements of microwave antennas that could be combined as phased arrays for communication and navigation.

Co-authors: **William Roeder**, US Air Force (United States); **Robert E. Barbre, Jr.**, **Ryan Decker**, NASA Marshall Space Flight Ctr. (United States); **Barry Geldzahler**, NASA Headquarters (United States); **Marc Seibert**, **Michael Miller**, **Jennifer Morgan**, NASA, Kennedy Space Center (United States); **David Morabito**, **Larry D'Addario**, Jet Propulsion Lab. (United States)

Biography: **Dr. Lisa Huddleston** is the Chief of NASA's Applied Meteorology Unit (AMU) at the Kennedy Space Center Weather Office. In this position, Lisa is responsible for leading the AMU in their primary mission of transitioning new technology from research to the operational environment. Dr. Huddleston has over 25 years of professional experience in space operations engineering and science and has published numerous scientific and technical papers. Her publications have spanned a broad range of topics including satellite remote sensing of the sea surface; data mining, Space Shuttle Orbiter thermal tile debris impact damage monitoring and trending, and most recently, assessing the probability that any individual cloud-to-ground lightning stroke was within any radius of any launch site facility. Lisa has received numerous awards and citations including two-time Engineer of the Year; NASA Space Flight Awareness Award and the coveted Silver Snoopy Award presented by the Astronaut Office. Dr. Huddleston holds a BS in Industrial Engineering from University of Missouri, an MS in Engineering Management and a PhD in Environmental Science from the Florida Institute of Technology.

SPECIAL EVENTS



Welcome Reception

Location: Strandzuid, The RAI Beach

Monday 22 September 18:30 to 21:00
All attendees are invited to relax, socialise, and enjoy light refreshments.

Due to limited space and numbers, guests will be admitted on a first-come, first-served basis. Please contact the onsite registration desk for tickets.

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

50th Anniversary of TNO Space

Location: Forum Hall

Wednesday 24 September 13:00 to 18:00

In 1964 TNO got involved in the emerging field of space instrumentation by developing a telescope and spectrometer for the European satellite TD14. Since then a growing list of mainly optical instruments and modules has been designed, built and calibrated by TNO. During the years the focus shifted from only astronomy to earth observation, a field in which TNO, together with its technology partners, has contributed by providing a family of innovative optical instruments. Today in 2014 technological developments still continue, as new instruments with ever-increasing performance are required.

In a dedicated session, hosted by TNO, we will focus on developments in the field of earth observation, regarding instrument design, manufacturing and calibration and downstream applications.

Programme

13:15: **Opening Remarks, Overview of TNO Space heritage**, Henri Werij, TNO (Netherlands)

Session 1 Wed. 13:45 to 14:45

13:45: **Dutch Space in cooperation with TNO: TROPOMI**, Tineke Bakker, Dutch Space (Netherlands)

14:05: **Trends in space: from institutional to commercial Earth observation**, Andy Court, TNO (Netherlands)

Break 14:20 to 14:25

14:25: **Future ESA missions for monitoring atmospheric chemistry: status and challenges**, Jean-Loup Bezy, ESA-ESTEC (Netherlands)

14:45: **Optical technologies for space instruments**, Kees Buijsrogge, TNO (Netherlands)

Coffee Break and Poster Session 15:00 to 15:45

Session 2 Wed 15:45 to 17:00

15:45: **NSO view on instrument development in the Netherlands**, Ger Nieuwpoort, NSO (Netherlands)

16:05: **Challenges in present space instrument projects**, Hans Bol, TNO (Netherlands)

Break 16:20 to 16:25

16:25: **Science and instrumentation for Earth observation**, Ruud Hoogeveen, SRON (Netherlands)

16:45: **Looking into the future of Earth observation**, Bryan de Goeij, TNO (Netherlands)

17:00: **Conclusions and Closing Remarks**, Henri Werij, TNO (Netherlands)

TNO Poster Session, Forum Hall Wed. 17:15-17:45



Poster Session

Location: Elicium 1

Wednesday 24 September 17:40 to 19:15

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

Poster presenters may begin posting their poster papers starting at 10:00 hrs on Wednesday in the Conference Area Hallway. Each poster presenter is provided a space 0.95 x 1.20m in which to display a summary of the paper. Poster authors are requested to attend the official poster session and should be at their papers on Wednesday from 17:40 to 19:15 hrs to answer questions from attendees. Poster presenters who have not set up by 17:40 on Wednesday will be considered a "no show" and their manuscript will not be published. SPIE assumes no responsibility for posters left up after 19:15 on Wednesday. Any papers left on the boards at that time will be considered unwanted and will be discarded.



Visit to the ESA

Friday 26 September 7:30 to 16:00

At the occasion of SPIE Security and Defence, and Remote Sensing Europe, the European Space Agency would like to use this opportunity and invite all interested experts to a lab tour and demonstrations at the ESTEC facility.

Departure: 7:30 from the RAI

Return: ca. 16:00

Cost: EU10.00

Space limited to the first 30 participants.

Please check the website for programme updates and more details.

Registration for the Tour is required. Please check the registration desk onsite.

E.

EXHIBITION

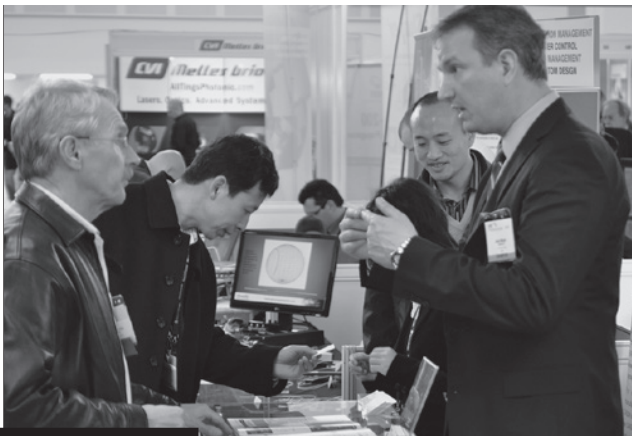


Tuesday 23 September
10:00 to 17:00

Wednesday 24 September
10:00 to 16:00

THE SPIE SECURITY+DEFENCE EXHIBITION, 23-24 SEPTEMBER 2014, THE INDUSTRY'S PREMIER EVENT.

ATTEND THE
SECURITY+DEFENCE EXHIBITION.



SEE THE LATEST IN TECHNOLOGY
INNOVATIONS AND FUTURE
APPLICATIONS.

SPIE Security+Defence (co-located with SPIE Remote Sensing) attracts more than 900 attendees in these combined technology areas. This event enables exhibitors to reach two distinct yet relevant audiences, while exploring new opportunities of collaboration with partners from other fields of activity.

Why walk the exhibit floor?

To get face-to-face time with products and research, as well as the experts (scientists, engineers, developers) who are behind them. Get questions answered that day while being able to make side-by-side comparisons, as well as another opportunity to network with your peers.

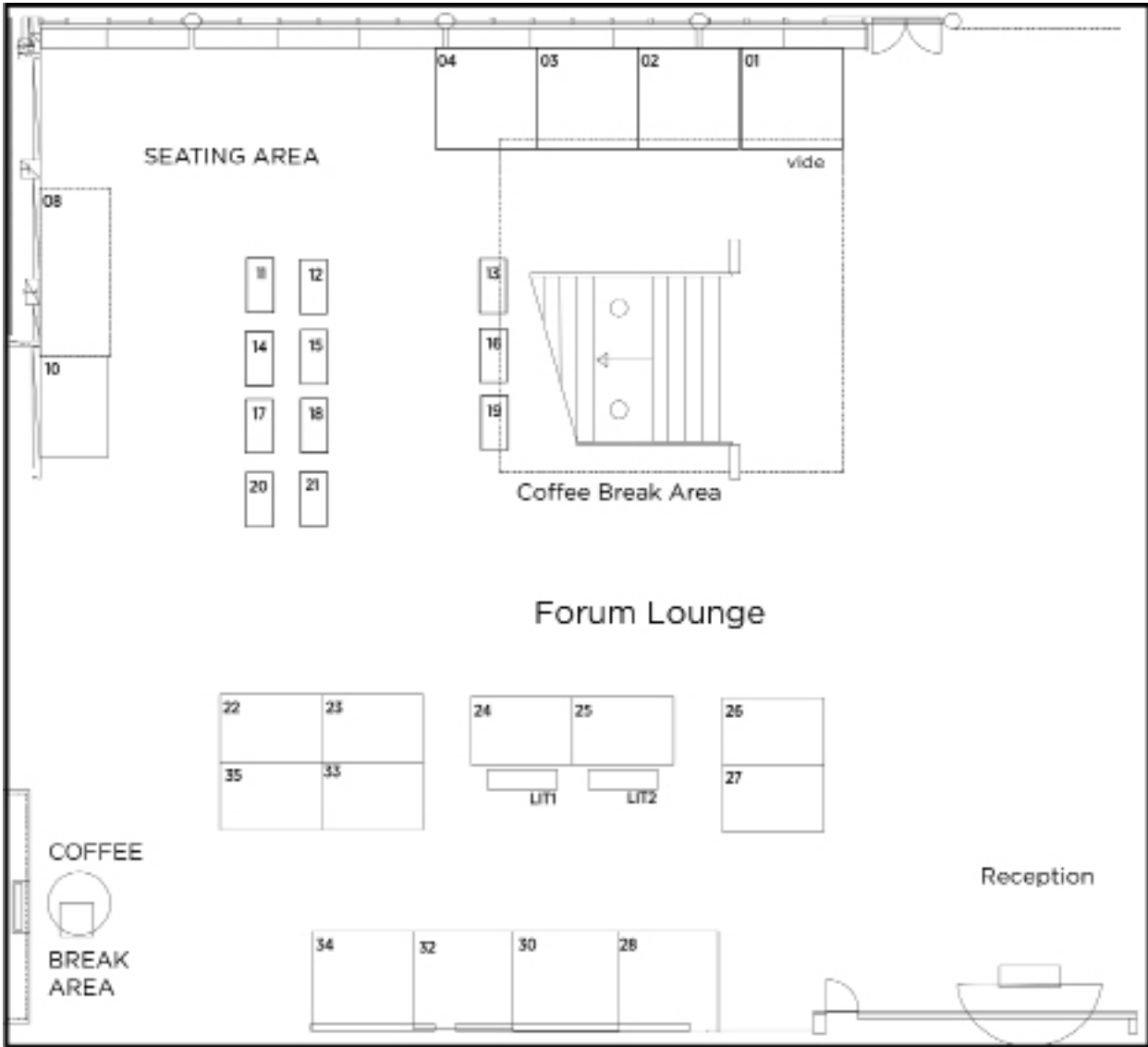
Make connections with suppliers and project partners. Exhibition admission is included with your technical registration, or you can register for the free exhibition only, onsite.

EXHIBITOR LISTINGS

SECURITY+DEFENCE EXHIBITION HOURS

TUESDAY 23 SEPTEMBER.....10:00 TO 17:00

WEDNESDAY 24 SEPTEMBER..... 10:00 TO 16:00



EXHIBITOR LIST (CURRENT AS OF 8/21/2014)

Company Name	Booth #	Company Name	Booth #	Company Name	Booth #
ABB Analytical Measurement.....	2	HGH Infrared Systems.....	25	Pixelteq, Inc.	35
AIM INFRAROT-MODULE GmbH.....	22	HySpex.....	1	Printech Circuit Labs. Ltd.....	33
Bruker Optik GmbH.....	28	IRnova AB.....	34	Pure Photonics.....	16
Carl Hanser Verlag.....	1LIT	Labsphere, Inc.....	8	Raptor Photonics Ltd.....	24
Diamond SA.....	19	Laser 2000.....	8	Rikola Ltd.....	15
DILAS Diodenlaser GmbH.....	20	Laser Quantum.....	11	RUAG Schweiz AG (RUAG Space).....	14
Electro Optics Magazine.....	2LIT	Nanomotion Ltd.....	26	SOFRADIR.....	30
EPIC.....	13	Nanoplus Nanosystems and Technologies GmbH.....	10	Teem Photonics.....	17
Flexible Optical B.V.....	21	Nufern.....	23	Telops.....	1
Fraunhofer Ctr. for Applied Photonics.....	12	Ophir Spiricon Europe GmbH.....	18	ThermoAnalytics, Inc.....	27
Gooch & Housego.....	3	optics.org.....	32		
Hellma Materials GmbH.....	4				

ABB Analytical Measurement

#2

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Featured Product: Remote sensing technologies.

ABB 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. Contact: Claude Roy, Product Line Manager, clauder.roy@ca.abb.com

AIM INFRAROT-MODULE GmbH

#22

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AIM is a leading developer and manufacturer of advanced IR-detectors and long life Stirling cryocoolers. Focusing on excellent E/O performance with minimum size, weight and power, AIM's state-of-the-art products meet the stringent requirements of military and space applications. Specialized in cooled IR-detectors, AIM's comprehensive detector portfolio covers spectral ranges from VIS-NIR to VLWIR using MCT and Type-II-Superlattice technologies.

Bruker Optik GmbH

#28

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Bruker is the leading manufacturer and worldwide supplier of Infrared, Near Infrared and Raman Spectrometers for various industries and applications including Remote Sensing. The HI 90 represents a state of the art high performance Hyperspectral Imaging System in Bruker's broad remote sensing product line, which also consists of the remote sensing spectrometer EM 27, the unique Scanning Infrared Gas Imaging System SIGIS 2 and the Open Path Spectrometer OPS. Recently the EM27/SUN, a dedicated system for environmental analysis at remote places with low infrastructure was added to round off the portfolio.

Carl Hanser Verlag

#1LIT

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DIAMOND is a worldwide leader in supplying high precision fiber optic solutions and has been serving successfully several markets for over 30 years. Is also, known as a dynamic and innovative company, able to develop reliable, customized components and equipment, in response to the increasingly demanding customer requirements. Diamond's headquarters, established in Switzerland in 1958, can count on an extensive international distribution network with 5 subsidiaries and over 20 representatives.

DILAS Diodenlaser GmbH

#20

SPIE Corporate
Member

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Featured Product: Diode Lasers

DILAS, the diode laser company, manufactures high-power diode laser components and systems in a wide range of output powers and wavelengths including fiber-coupled, direct beam and integrated solutions. Today, with over 300 employees on three continents, DILAS' strengths are in quality engineering, process control, product development and volume manufacturing. For more Information about DILAS, visit our Website at www.DILAS.com. Contact: Florian Lenhardt, Sales Engineer, F.Lenhardt@dilas.de; Kim Kreim, Sales Engineer, K.Kreim@dilas.de

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www.electrooptics.com

EPIC

#13

17 rue Hamelin, Paris, 75016 France
info@epic.assoc.com; www.epic-assoc.com

EPIC is the industry association that promotes the sustainable development of organisations working in the field of photonics in Europe. We foster a vibrant photonics ecosystem by maintaining a strong network and acting as a catalyst and facilitator for technological and commercial advancement. EPIC publishes market and technology reports, organizes technical workshops and B2B roundtables, coordinates EU funding proposals, advocacy and lobbying, education and training activities, standards and roadmaps, pavilions at exhibitions. www.epic-assoc.com

Flexible Optical B.V.

#21

SPIE Corporate
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Polakweg 10-11, Rijswijk, 2288 GG Netherlands
31 70 262 9420; fax 31 70 710 1400
oko@xs4all.nl; www.okotech.com

Fraunhofer Ctr. for Applied Photonics

#12

347 Cathedral St, Glasgow Scotland, G1 2TB United Kingdom
44 1415484667
www.fraunhofer.co.uk

Gooch & Housego

#3

SPIE Corporate
Member

Dowlsh Ford, Ilminster Somerset, TA19 0PF United Kingdom
+44 1460 256440
sales@goochandhousego.com; www.goochandhousego.com

G&H designs, engineers and manufactures photonic components and assemblies for harsh environments, based upon key enabling optical technologies: acousto-optics, electro-optics, fiber optics and precision optics (with our own coating, including IR, and polishing capabilities). Working from eight manufacturing sites, we provide the prime supply contractors to the aerospace, defense, security and space industries with the benefit of world class photonic engineering expertise. Contact: Ekkehard Overbeck, EU Sales Director, eoverbeck@goochandhousego.com; Trevor Cook, A&D Business Development Manager (Europe), adchance@goochandhousego.com

EXHIBITOR LISTINGS

Hellma Materials GmbH

Moritz-von-Rohr-Str 1, Jena, 07745 Germany
49 3641 2877 100; fax 49 3641 2877 203
info.materials@hellma.com; www.hellma-materials.com

#4

HGH Infrared Systems

10 rue Maryse Bastié, Igny, 91430 France
33 1 69 35 47 70; fax 33 1 69 35 47 80
hgh@hgh.fr; www.hgh.fr

#25

HySpex

Solheimveien 62 A, Lørenskog, 1473 Norway
hyspexsales@neo.no; www.hyspex.no

#1

Featured Product: HySpex hyperspectral cameras

Norsk Elektro Optikk (NEO) was established in 1985 as a privately owned research oriented company within the field of electro optics. NEO has grown to be the largest independent research and development organization in electro optics in Norway, and has in addition established itself as a manufacturer of advanced electro optical products for an international market. Contact: Hallvard Skjerping, Product Manager, hallvard@neo.no

IRnova AB

Electrum 236, Kista, 164 40 Sweden
46 8 793 66 00; fax 46 8 519 02518
info@ir-nova.se; www.ir-nova.se

#34

IRnova develops and supplies high quality, high performance infrared detectors and related components to infrared module, camera and system manufacturers all over the world. IRnova can offer you various types of IDCAs (Integrated Detector Cooler Assembly); compact integral solutions for small size/weight applications, as well as long life split cooler assemblies. IRnova has a long track record with thousands of supplied detectors and well established manufacturing with high yield and capability. Contact: Lars Karlsson, Sales Manager, lars.karlsson@ir-nova.se

Labsphere, Inc.

231 Shaker St, North Sutton, NH, 03260 United States
603 927 4266; fax 603 927 4694
labsphere@labsphere.com; www.labsphere.com

#8

Labsphere is integrating specialist and produces around that a range of diffuse reflection standards, lamp and LED analysers, UV-SPF analysers and uniform light sources.

Laser 2000

Voorbancken 13a, Vinkeveen, Netherlands
31 297 266 19; fax 31 297 266 134
info@laser2000.nl; www.laser2000.nl

#8

Laser 2000 Benelux is a highly specialized distributor in the photonics business. Their mission is to offer customers the latest available technologies. Keywords to identify their specialties are: Laser Measurement Instruments, Scientific and Industrial Lasers, Optical Filters, Motion and Vibration Control, Software, Light Sources, Light Measurement Instruments, Marking and Engraving and Laser Safety. They represent manufacturers of worldwide signature, like their co-exhibitor Labsphere.

Laser Quantum

Emery Court, Vale Rd, Stockport Cheshire, SK4 3GL United Kingdom
44 161 975 5300; fax 44 161 975 5309
sales@laserquantum.com; www.laserquantum.com

#11

Laser Quantum is a world-class designer and manufacturer of high quality solid-state and ultrafast laser sources. Our products are known throughout the world for their reliability, compactness, performance-excellence and long operational lifetime. You will find our products in laboratories and integrated into systems and machines worldwide. Contact: Justine Bentley, Sales Manager, jbentley@laserquantum.com

Nanomotion Ltd.

3 HaYetsira St, Yokneam, Israel
972 732498000; 972 732498099
nano@nanomotion.com; www.nanomotion.com

#26

Nanomotion designs and manufactures piezo based motion modules for shutters/filter changers, auto focus & zoom, gimbals and a variety of defense optronic applications. These modules optimize Size, Weight, and Power.

Nanoplus Nanosystems and Technologies GmbH

SPIE Corporate Member
Oberer Kirschberg 4, Gerbrunn, 97218 Germany
49 931 90 827 0; fax 49 931 90 827 19
info@nanoplus.com; www.nanoplus.com

#10

Featured Product: DFB lasers from 3 – 6 μm: monomode, continuous wave at room temperature with low power consumption

Nanoplus provides DFB lasers at any customer specific wavelength in the entire wavelength range from 760 to 14000 nm. The lasers' excellent performance is due to their very high spectral purity, narrow linewidth and excellent reliability. These superior key features make them the perfect light source for high-accuracy spectroscopic absorption measurements. nanoplus now also designs photo detectors for light detection in the wavelength range from 1000 - 2600 nm. Contact: Lars Hildebrandt, Divisional Director Sales, lars.hildebrandt@nanoplus.com; Gloria Gerlach, Key Account Manager, gloria.gerlach@nanoplus.com

Nufern

SPIE Corporate Member
7 Airport Park Rd, East Granby, CT, 06026-9523 United States
+1 860 408 5000; fax +1 860 844 0210
info@nufern.com; www.nufern.com

#23

Featured Product: High Power Fibers & Fiber Amplifiers

Nufern is a leading U.S. manufacturer of specialty optical fibers, gyro coil winding, fiber lasers and amplifiers serving diverse markets. Current products include over 300 standard fibers and range from sub-assemblies to complete turn-key fiber systems from mW to kW power levels. Nufern's integrated teams also provide rapid, cost-effective OEM fiber laser design, assembly and contract manufacturing. Contact: Andrzej Szkotnicki, Sales & Application Engineer - EU, aszkotnicki@nufern.eu; Peter Pietrzak, Sales & Application Engineer - EU, ppietrzak@nufern.eu

Ophir Spiricon Europe GmbH

Guerickeweg 7, Darmstadt, Germany
49 61517080; fax 49 6151708599
www.ophiropt.com/photonics

#18

optics.org

Ffordd Pengam, 2 Alexandra Gate, Cardiff, CF24 2SA United Kingdom
44 29 2089 4747; fax 44 29 2089 4750
sales@optics.org; www.optics.org

#32

optics.org is the longest-running online resource targeted toward OEMs and system integrators in the core growth markets for photonics applications, and is your gateway to thousands of potential new customers looking to buy your products and services. From LEDs to industrial lasers and from sensing to microscopy, optics.org covers all the latest company, product and business news as well as in-depth articles on product application and market analysis. Contact: Robert Fisher, rob.fisher@optics.org

Pixeltek, Inc.

SPIE Corporate Member
8060 Bryan Dairy Rd Ste A, Largo, FL, United States
+1 727 545 0741; +1 727 545 2241
info@pixeltek.com; www.pixeltek.com

#35

Printech Circuit Labs. Ltd.

#33

31-35 Haltwhistle Rd, South Woodham Ferrers, Chelmsford Essex, United Kingdom
44 1245 323244; 44 7817 997575
sales@rfpcbs.com; www.rfpcbs.com

Pure Photonics

#16

3851 Perie Lane, San Jose, CA, 95132 United States
510 566 3553
support@pure-photonics.com; www.pure-photonics.com

Featured Product: Low Noise Tunable Laser - 10kHz intr. linewidth and low FM noise. 40nm tunability around 1550nm

Pure Photonics provides narrow-linewidth, ultra-low noise 1550nm tunable laser solutions for high Signal-to-Noise Ratio applications, such as test and measurement and sensing. Using a volume-manufactured device, our solution is cost-effective and has proven performance and reliability. Our focus is niche-markets and we can customize the performance to your needs and/or provide integration solutions. Contact: Heino Bukkems, Manager, heino_bukkems@pure-photonics.com

Raptor Photonics Ltd.

#24

SPiE Corporate Member

Willowbank Business Park, Larne N Ireland, BT40 2SF United Kingdom
44 2828 270141; fax 44 2828 275685
sales@raptorphotonics.com; www.raptorphotonics.com

Featured Product: OWL 640 VIS-SWIR - The best VIS-SWIR camera in the world, with maximum sensitivity and small pixels, now with M42 mount option

Raptor Photonics is a leading developer and supplier of next generation, high performance digital camera solutions for the Scientific, Surveillance and Industrial markets, offering a range of CCD, EMCCD, Scientific CMOS and InGaAs solutions. As well as COTS products, Raptor provides custom solutions to OEM and Instrumentation companies throughout the World. Raptor is based in the UK and is a ISO9001:2008 certified company and all cameras are built to MILSPEC standards. Contact: Mark Donaghy, VP Sales & Marketing, md@raptorphotonics.com; Aaron Kearney, Sales Manager, ak@raptorphotonics.com

Rikola Ltd.

#15

Kaitovayla 1 F2, Oulu, 90590 Finland
358 8 405908794; fax +3580515545
info@rikola.fi; www.rikola.fi

Featured Product: Rikola Hyperspectral Camera

Rikola Ltd. offers small and lightweight hyperspectral camera for UAVs. This innovative product is a frame-based spectral system providing true snapshot images for all the wavelength bands at a time. The frame based approach enables an easy image stitching for the mosaics with high resolution images. In addition, the approach doesn't need IMU for its operations, which makes the system low cost and low weight. The camera system is very flexible, and it enables handheld use with computers too. Contact: Jussi Soukkamaki, CTO, Jussi@rikola.fi; Raimo Rikola, CEO, Raimo.Rikola@rikola.fi

RUAG Schweiz AG (RUAG Space)

#14

Schaffhauserstr 580, Zürich, 8052 Switzerland
41 44 306 2211; fax 41 44 306 2910
info.space@ruag.com; www.ruag.com

Featured Product: OPTEL-u - Small Laser Communication Terminal for high-speed payload data transmission

RUAG Space is the leading supplier of products for the space industry in Europe. Experience, outstanding reliability, customer focus and a comprehensive, clearly structured product portfolio all make RUAG Space the partner of choice for manufacturers of satellites and launchers across the globe. Contact: Klaus Buchheim, Manager Sales OptoElectronics & Instruments, klaus.buchheim@ruag.com

SOFRADIR

#30

364 route de Valence, Actipole CS 10021, Veurey-Voroize, 38113 France
33 4 76 28 77 00; fax 33 4 76 53 85 97
www.sofradir.com

Sofradir is the number one developer and manufacturer of key classes infrared (IR) detectors for multiple military, space, commercial and scientific applications. These include thermal imagers, missile seekers, surveillance systems, machine vision, targeting systems or observation satellites. It specializes in cooled IR detectors based on a sophisticated high performance technology, MCT, to which InSb, InGaAs and QWIP technologies are now added. Contact: Claire Valentin, Marketing Director, claire.valentin@sofradir.com; Jamila Louaar, Executive Assistant, jamila.louaar@sofradir.com

Teem Photonics

#17

61 Chemin du Vieux Chêne, Meylan Cedex, 38240 France
33 4 76 04 05 06; fax 33 4 76 04 03 02
sales@teemphotonics.com; www.teemphotonics.com

Teem Photonics™ is the leader in passively Q-switched microlasers, with 500 picosecond length pulses at various wavelengths. Teem Photonics provides cost and size-effective UV solutions at 266 and 355nm, as well as green and IR solutions up to 1550nm. Products are small, rugged and compact lasers for materials processing, metrology and scientific applications. Contact: Rainer Hoereth, Sales Manager Europe, r.hoereth@teemphotonics.com

Telops

#1

SPiE Corporate Member

100-2600 St-Jean-Baptiste Ave, Québec, QC, G2E 6J5 Canada
418 864 7808; fax 418 864 7843
contact@telops.com; www.telops.com

Featured Product: TS-IR MW High Performance Versatile Infrared Camera

Telops is a leading supplier of high performance infrared cameras and hyperspectral imaging systems for defence and security, environmental and industrial applications. Telops has developed a series of infrared cameras which includes five families of application specific, scientific cameras including high-definition, rapid frame rate, multispectral and versatile, high performance infrared cameras. Contact: Eric Guyot, General Manager Europe, eric.guyot@telops.com

ThermoAnalytics, Inc.

#27

23440 Airpark Blvd, Calumet, MI, 49913 United States
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info@thermoanalytics.com; www.thermoanalytics.com

ThermoAnalytics provides Software and Engineering Solutions for complex heat transfer and infrared problems and engineering analysis. Our RadTherm software is the leading thermal analysis program for rapid design and optimization of heat transfer problems, including military equipment, scene simulations, vehicle systems such as brakes, underhood models, exhaust and underbody simulation, HVAC, cabin, battery packs for HEV/EV, electronics and other thermal and infrared sensitive components.



PRODUCT CATEGORIES

Astronomy

ABB Analytical
Measurement

Basic Research, Science

HGH Infrared Systems

Cameras and Imaging systems

ABB Analytical
Measurement
HGH Infrared Systems

Chemical and Biological Analysis

ABB Analytical
Measurement

Communications & Networking

Diamond SA

Defence, Security, Law Enforcement

ABB Analytical
Measurement
Gooch & Housego
HGH Infrared Systems

Detectors, Sensors

ABB Analytical
Measurement
HGH Infrared Systems

Earth Sciences, Environmental Monitoring, Climate

ABB Analytical
Measurement

Fiber Optics and Accessories

ABB Analytical
Measurement
Diamond SA
Gooch & Housego

Industrial Sensing and Measurement

ABB Analytical
Measurement
HGH Infrared Systems

Laser Components and Accessories

Gooch & Housego

Lighting and Illumination

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Spectroscopy Devices and Equipment

ABB Analytical
Measurement

Structural and Infrastructure Sensing

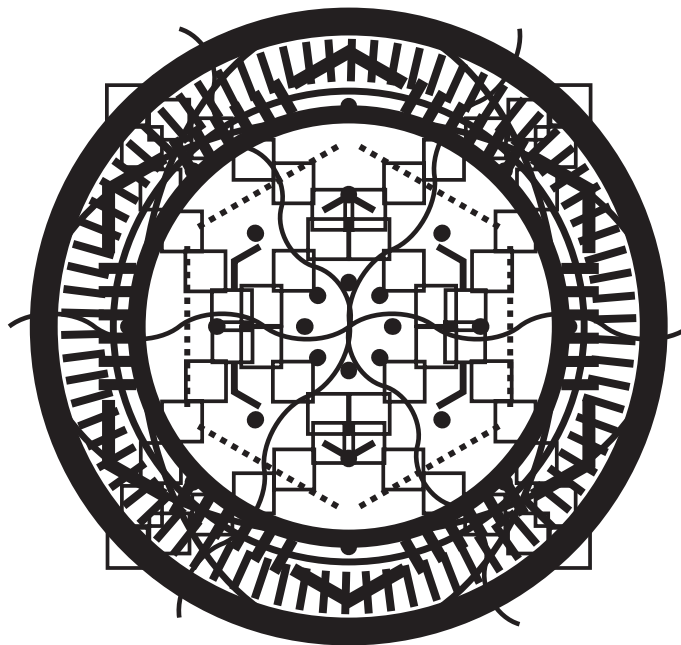
Gooch & Housego

Test and Measurement, Metrology

HGH Infrared Systems

Vacuum, Cooling, Gas Handling Equipment

HGH Infrared Systems



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CONFERENCE 9239 - ROOM: E104

Tuesday - Thursday 23-25 September 2014 • Proceedings of SPIE Vol. 9239

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)

Tuesday 23 September

SESSION 1

Room: E104 Tue 8:30 to 10:20

Microwave and Radar Applications

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

8:30: **Monitoring land surface with time series of satellite data: outliers, cloud cover and gap-filling** (*Invited Paper*), Massimo Menenti, Technische Univ. Delft (Netherlands) and Institute of Remote Sensing and Digital Earth (China); H. Ghafarian Malamiri, Technische Univ. Delft (Netherlands); Huazhe Shang, Jianmin Zhou, Technische Univ. Delft (Netherlands) and Institute of Remote Sensing and Digital Earth (China); S. M. Alfieri, Istituto per i Sistemi Agricoli e Forestali del Mediterraneo (Italy) and Technische Univ. Delft (Netherlands); Li Jia, Institute of Remote Sensing and Digital Earth (China) and Wageningen Univ. (Netherlands) [9239-1]

9:00: **Passive microwave response to vegetation and soil moisture on agricultural fields**, Brian J. Miller, Paul R. Bullock, Univ. of Manitoba (Canada) [9239-2]

9:20: **Rainfall estimation with a commercial tool for satellite Internet in Ka band: concept and data analysis**, Clio Mugnai, Francesco Sermi, Fabrizio Cuccoli, Consorzio Nazionale Interuniversitario per le Telecomunicazioni (Italy) [9239-3]

9:40: **The effect of land cover type on radar altimeter response and its influence on retracker algorithms**, Eric O. Pereira, Philippe Maillard, Univ. Federal de Minas Gerais (Brazil) [9239-4]

10:00: **A study on the use of passive microwave radiometry for the detection of buried objects and their associated hydrological changes**, Robbert J. N. van de Ven, Richard A. M. de Jeu, Vrije Univ. Amsterdam (Netherlands); Roland Haarbrink, Miramap Co. (Netherlands) [9239-5]

Coffee Break Tue 10:20 to 10:50

SESSION 2

Room: E104 Tue 10:50 to 12:20

Thermal Infrared Remote Sensing

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

10:50: **Combining land surface models and remote sensing data to estimate evapotranspiration for drought monitoring in Europe** (*Invited Paper*), Carmelo Cammalleri, European Commission Joint Research Ctr. (Italy); Guadalupe Sepulcre-Cantó, Univ. Catholique de Louvain (Belgium); Juergen Vogt, European Commission Joint Research Ctr. (Italy) [9239-6]

11:20: **Surface soil water content estimation based on thermal inertia and bayesian smoothing**, Paolo Addesso, Univ. degli Studi di Salerno (Italy); Antonino Maltese, Fulvio Capodici, Univ. degli Studi di Palermo (Italy); Guido D'Urso, Univ. degli Studi di Napoli Federico II (Italy); Maurizio Longo, Rocco Restaino, Gemine Vivone, Univ. degli Studi di Salerno (Italy) [9239-8]

11:40: **Temperature monitoring along the Rhine River based on airborne thermal infrared remote sensing: qualitative results compared to satellite data and validation with in situ measurements**, Katharina Fricke, Björn Baschek, Bundesanstalt für Gewässerkunde (Germany) [9239-9]

12:00: **Integration of the Standardized Precipitation Index (SPI) and remote sensing for drought monitoring in Sulaimaniya, the Kurdistan region of Iraq**, Ayad M. Fadhil, Salahaddin Univ.-Hawler (Iraq); Sarchil H. Qader, Univ. of Southampton (United Kingdom) [9239-10]

Lunch/Exhibition Break Tue 12:20 to 13:40

Please Note: Session 3 and Session 4 Run Concurrently

SESSION 3

Room: E104 Tue 13:40 to 15:40

Monitoring of Rangeland and Forests

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

13:40: **Integrating remote sensing and conventional grazing/browsing models for modelling carrying capacity in Southern African rangelands**, Clement Adjorlolo, South African National Space Agency (SANSA) (South Africa); Cobus Botha, KZN Dept. of Agriculture and Environmental Affairs (South Africa); Paidamwoyo Mangara, South African National Space Agency (SANSA) (South Africa); Onesimo Mutanga, John Odindi, School of Agric. Earth & Environ Sciences, University of KwaZulu Natal (South Africa) [9239-13]

14:00: **A potential for the spectral configurations of Sentinel-2 to assess rangeland quality**, Abel Ramoelo, Moses Cho, Renaud Mathieu, Council for Scientific and Industrial Research (South Africa); Andrew K. Skidmore, Univ. Twente (Netherlands) [9239-15]

14:20: **Quantitative assessment of locust habitats in inland eastern Australia using remote-sensing and GIS technologies**, Haikou Wang, Australian Government (Australia) [9239-17]

14:40: **A simplified approach for localization of acacia cyanophylla in Akrotiri Cyprus using NDVI enhanced Quickbird imagery for classification**, Vasileios Vamvakousis, Dimitrios P. Skarlatos, Cyprus Univ. of Technology (Cyprus); Thomas Hadjikyriakou, Akrotiri Environmental Education and Information Ctr. (Cyprus) [9239-19]

15:00: **Identification of long-term trends in vegetation dynamics in the Guinea savannah region of Nigeria**, Babatunde A. Osunmadewa, Christine Wessollek, Pierre Karrasch, Technische Univ. Dresden (Germany) [9239-21]

15:20: **Object based technique for delineation and mapping 15 tree species using VHR WorldView-2 (WV-2) imagery**, Yaseen T. Mustafa, Univ. of Zakho (Iraq); Hindav N. Habeeb, Directorate of Forestry (Iraq) [9239-23]

Coffee Break Tue 15:40 to 16:00

SESSION 4

Room: D202 Tue 13:30 to 15:30

Utilization and Validation of RS Observations and Tools for Hydrology, Agriculture, and Flood Mapping and Modeling

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

13:30: **Hemispherical directional reflectance factor using UAV and hyperspectral camera, validation and crop field test**, Teemu Hakala, Eija Honkavaara, Lauri Markelin, Finnish Geodetic Institute (Finland) [9239-11]

13:50: **Suitability of DSM derived from remote sensing data for automatic drainage extraction**, Konstantinos G. Nikolakopoulos, Sofia Geniatiaki, Stefania Gianou, Univ. of Patras (Greece) [9239-12]

14:10: **Multihazard risk analysis using the FP7 RASOR Platform**, Fifamè N. Koudogbo, Javier Duro, Altamira Information (Spain); Roberto Rudari, CIMA Research Foundation (Italy); Andrew Eddy, Athena Global (France) [9239-14]

14:30: **Evapotranspiration and energy balance components spatial distribution in the north region of Minas Gerais, Brazil, using the SEBAL model and Landsat 5 TM images**, Reinaldo L. Gomide, EMBRAPA (Brazil); Isa Maria de Paula Boratto, PUC/MG (Brazil) [9239-16]

14:50: **A sampling strategy based on CGM for LAI measurements over non-uniform surface**, Xiaohua Zhu, Lingling Ma, Yongguang Zhao, Academy of Opto-Electronics (China) [9239-18]

15:10: **Linking in situ LAI and fine resolution remote sensing data to estimate the reference LAI for the coarse resolution satellite LAI products validation based on the geostatistical regression**, Yan Chen Bo, Yaqian He, Beijing Normal Univ. (China) [9239-20]

Coffee Break Tue 15:30 to 16:00

PLENARY SESSION

Room: E104 Tue 16:05 to 17:40

Remote Sensing 2014

For details, please see special events section in the printed programme or visit <http://spie.org/remote-sensing-europe.xml>

Wednesday 24 September

SESSION 5

Room: E104 Wed 8:30 to 10:00

Energy Balance and Evapotranspiration I

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

8:30: **River basin scale water accounting for the planning of irrigated agriculture** (*Invited Paper*), Wim G. M. Bastiaanssen, International Water Management Institute (Sri Lanka); Peter van der Zaag, UNESCO-IHE (Netherlands); Lisa-Marie Robelo, International Water Management Institute (Sri Lanka); Jippe Hoogeveen, FAO Rome (Italy) [9239-24]

9:00: **Energy balance with Landsat images in irrigated central pivots with corn crop in the São Paulo State, Brazil**, Antonio H. C. Teixeira, Embrapa Monitoramento por Satélite (Brazil); Fernando T. Hernandez, UNESP (Brazil); Ricardo G. Andrade, Janice F. Leivas, Embrapa Monitoramento por Satélite (Brazil) [9239-25]

9:20: **Improvements in irrigation system modelling when using remotely-sensed ET for calibration**, Jonna D. Van Opstal, Utah State Univ. (United States); Christopher M. U. Neale, Univ. of Nebraska-Lincoln (United States); Sergio Lecina, Centro de Investigación y Tecnología Agroalimentaria de Aragón (Spain) [9239-26]

9:40: **Estimation of land surface albedo time series and trends based on MODIS data**, Nikolaos Benas, Nektarios Chrysoulakis, Foundation for Research and Technology-Hellas (Greece) [9239-27]

Coffee Break Wed 10:00 to 10:30

SESSION 6

Room: E104 Wed 10:30 to 12:00

Energy Balance and Evapotranspiration II

Session Chair: **Massimo Menenti**, Technische Univ. Delft (Netherlands)

10:30: **Spectral and lag-correlation analysis of turbulence over a vine canopy in central California** (*Invited Paper*), John H. Prueger, Joseph G. Alfieri, William P. Kustas, Agricultural Research Service (United States); Lawrence E. Hipps, Utah State Univ. (United States); Lynn G. McKee, Agricultural Research Service (United States); Christopher M. U. Neale, Univ. of Nebraska-Lincoln (United States); Martha Anderson, Jerry L. Hatfield, Agricultural Research Service (United States) [9239-28]

11:00: **An approach to vineyard zonal management by combining airborne remote sensed imagery and soil sensors**, Irene Bonilla, José Antonio Martínez-Casasnovas, Univ. de Lleida (Spain); Fernando Martínez De Toda, Univ. De La Rioja (Spain) [9239-29]

11:20: **E.O.-based estimation of evapotranspiration and crop water requirements for vineyards: a case study in Southern Italy**, Guido D'Urso, Univ. degli Studi di Napoli Federico II (Italy); Antonino Maltese, Univ. degli Studi di Palermo (Italy); Mario Palladino, Univ. degli Studi di Napoli Federico II (Italy) [9239-30]

11:40: **Estimating evapotranspiration of vineyards using high-resolution airborne multispectral and thermal imagery**, Christopher M. U. Neale, Hatim Geli, Utah State Univ. (United States); William P. Kustas, John H. Prueger, Agricultural Research Service (United States) [9239-31]

Lunch/Exhibition Break Wed 12:00 to 13:20

SESSION 7

Room: E104 Wed 13:20 to 15:00

Crop Yield Monitoring

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

13:20: **Analyzing C-band SAR polarimetric information for crop yield estimations**, Ramses Molijn, Lorenzo Iannini, Alijafar Mousivand, Ramon Hanssen, Technische Univ. Delft (Netherlands) [9239-32]

13:40: **Coupling MODIS images and agrometeorological data for agricultural water productivity analyses in the Mato Grosso State, Brazil**, Antonio H. C. Teixeira, Daniel C. Victoria, Ricardo G. Andrade, Janice F. Leivas, Edson L. Bolfe, Embrapa Monitoramento por Satélite (Brazil) [9239-33]

14:00: **SSD-hierarchical Bayesian model for soybean yield estimation**, Yoriko Kazama, Toshihiro Kujirai, Hitachi, Ltd. (Japan) [9239-34]

14:20: **Estimation of corn and soybeans yield using remote sensing and crop yield data in the United States**, Nari Kim, Pukyong National Univ. (Korea, Republic of) [9239-35]

14:40: **Evaluation of winter wheat yield prediction by assimilation of three different leaf area index datasets into the WOFOST model**, Jianxi Huang, Junming Liu, Wei Su, Xiaodong Zhang, Dehai Zhu, China Agricultural Univ. (China) [9239-36]

Coffee Break Wed 15:00 to 15:20

SESSION 8

Room: E104 Wed 15:20 to 18:00

High-Resolution Remote Sensing: Spatial and Spectral

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

15:20: **Vegetation index correction to reduce background effects in orchards with high spatial resolution imagery**, Jonathan Van Beek, Laurent Tits, Ben Somers, Katholieke Univ. Leuven (Belgium); Tom Deckers, pcfuit (Belgium); Pieter Janssens, Bodemkundige Dienst van België vzw (Belgium); Pol Coppin, Katholieke Univ. Leuven (Belgium) [9239-37]

15:40: **Insights and recommendations of use of UAV platforms in precision agriculture in Brazil**, Lucio A. Jorge, Ziany N. Brandão, Ricardo Y. Inamasu, EMBRAPA (Brazil) [9239-38]

16:00: **UAV-based hyperspectral monitoring of small freshwater area**, Ilkka Pölonen, Hannu-Heikki Puupponen, Univ. of Jyväskylä (Finland); Eija Honkavaara, Finnish Geodetic Institute (Finland); Antti Lindfors, Luode Consulting Ltd. (Finland); Heikki Saari, VTT Technical Research Ctr. of Finland (Finland); Lauri Markelin, Teemu Hakala, Kimmo Nurminen, Finnish Geodetic Institute (Finland) [9239-39]

16:20: **Hyperspectral remote sensing for estimating coastal water quality: case study on the coast of Black Sea, Romania**, Semhar G. Ghezehegn, Water Insight (Netherlands) [9239-40]

16:40: **Hyperspectral band selection and classification of Hyperion image of Bhitarkanika mangrove ecosystem, eastern India**, Lavanya Ashokkumar, Swansea Univ. (United Kingdom); Sanjeevi Shanmugam, Anna Univ. Chennai (India) [9239-41]

17:00: **Independent Component Analysis (ICA) performance to bathymetric estimation using high resolution satellite data in an estuarine environment**, Ana C. Teodoro, Ctr. de Investigação em Ciências Geo-Espaciais (Portugal); Rute Almeida, Marcelo Gonçalves, Univ. do Porto (Portugal) [9239-77]

17:20: **Hyperspectral measurements for discriminating natural vegetation in Sinai Sahara of Egypt**, Mohamed A. Aboelghar, National Authority for Remote Sensing and Space Sciences (Egypt); Usama Kamal, Ain Shams Univ. (Egypt); Sayed Madany, Ghada A. Ali, National Authority for Remote Sensing and Space Sciences (Egypt) [9239-43]

17:40: **Hyperspectral indices for assessing damage by the red palm weevil *Rhynchophorus ferrugineus* (Coleoptera: Curculionidae) in date palms**, Mona S. Yones, Mohamed A. Aboelghar, Mohammed A. El-Shirbeny, Ghada A. Khdry, Abdelraouf M. Ali, Nasser H. Saleh, National Authority for Remote Sensing and Space Sciences (Egypt) [9239-44]

POSTERS—WEDNESDAY

Room: Elicium 1 Wed 17:40 to 19:15

Conference attendees are invited to attend the Remote Sensing poster session held on Wednesday 17:40 to 19:15. Posters will be on display after 10:00

Wednesday morning in the Conference Centre. Authors of poster papers will be present to answer questions concerning their papers during the Wednesday Poster Session. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x32234.xml> and under general information in the printed programme.

Detection of calcium carbide on fruits using imaging type two-dimensional Fourier spectroscopy, Pradeep K. W. Abeygunawardhana, Kagawa Univ. (Japan) [9239-64]

The difference of normal segmentation method for unorganized point-cloud data generated by laser scanning: description and case studies for vegetation and buildings, Xiaodong Zhang, Wei Su, Ting Liu, China Agricultural Univ. (China) [9239-65]

Retrieval of LAI and leaf chlorophyll content from remote sensing data by agronomy mechanism knowledge to solve the ill-posed inverse problem, Zhenhai Li, Xiaojuan Cheng, Xingang Xu, Guijun Yang, Xiu-Liang Jin, Ji Hua Wang, National Engineering Research Ctr. for Information Technology in Agriculture (China) [9239-68]

Mangrove forest extraction and change detection in Sri Lanka, Chandana D. Parape, Masayuki Tamura, Kyoto Univ. (Japan) [9239-69]

CONFERENCE 9239 - ROOM: E104

Validation of smoke plume rise models using ground-based Lidar, Vladimir A. Kovalev, Shawn Urbanski, U.S. Forest Service (United States); Alexander Petkov, Andrew Scalise, Cyle Wold, Wei Min Hao, U.S. Forest Service (United States) [9239-70]

Crop monitoring using X-band SAR interferometry in the Lombardy region, Italy, Ramin Azar, Politecnico di Milano (Italy); Giacomo Fontanelli, Paolo Villa, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy) [9239-71]

Runoff estimation using satellite-derived rainfall data on Gapcheon watershed, South Korea, Kyung-Tak Kim, Joo-Hun Kim, Yun-Seok Choi, Korea Institute of Construction Technology (Korea, Republic of) [9239-72]

Remote sensing of climate changes effects on forest biophysical variables, Maria A. Zoran, National Institute of Research and Development for Optoelectronics (Romania); Adrian I. Dida, Transilvania Univ. of Brasov (Romania); Liviu-Florin V. Zoran, Univ. Politehnica of Bucharest (Romania) [9239-74]

Fitness evaluation of CMORPH satellite-derived precipitation data in the Korean Peninsula, Kyung-Tak Kim, Joo-Hun Kim, Yun-Seok Choi, Korea Institute of Construction Technology (Korea, Republic of) [9239-75]

Land drainage system detection using IR and visual imagery taken from autonomous mapping airship and evaluation of physical and spatial parameters of suggested method, Bronislav Koska, Tomáš Kremen, Martin Stroner, Jiri Pospisil, Czech Technical Univ. in Prague (Czech Republic); Vladimír Jirka, ENKI, o.p.s. (Czech Republic) [9239-76]

Grassland ecosystem monitoring with remote sensing data, Cailan T. Gong II, Shanghai Institute of Technical Physics (China) [9239-78]

Evapotranspiration in pastures with different indicators of degradation in the watershed of Alto Tocantins in Brazilian savanna, Ricardo G. Andrade, Embrapa Monitoramento por Satélite (Brazil); Antonio H. C. Teixeira, Embrapa Semiárido (Brazil); Janice F. Leivas, Daniel C. Victoria, Embrapa Monitoramento por Satélite (Brazil); Edson E. Sano, Sandra F. Nogueira, EMBRAPA (Brazil) [9239-79]

Spectral reflectance of satellite images using geostatistics methods to estimate growth and cotton yield, Ziany N. Brandão, Célia R. Grego, Ricardo Y. Inamasu, Lucio A. Jorge, EMBRAPA (Brazil) [9239-80]

Estimation of atmospheric downward longwave and shortwave radiation from MODIS data in polar regions, Ru Zhang, Xiaozhou Xin, Hailong Zhang, Shanshan Yu, Institute of Remote Sensing and Digital Earth (China) . . . [9239-83]

Remote sensing of water level and ice cover of large- and middle-sized lakes of Russia, Galina Rybushkina, Institute of Applied Physics (Russian Federation); Yuliya Troitskaya, Institute of Applied Physics (Russian Federation) and Obukhov Institute of Atmospheric Physics (Russian Federation); Irina Soustova, Institute of Applied Physics (Russian Federation) [9239-84]

The effect of complex terrain on retrieving surface solar radiation with remote sensing data, Li Feng Gong, Xiaozhou Xin, Hailong Zhang, Qinhua Liu, Institute of Remote Sensing and Digital Earth (China) [9239-85]

Water productivity of different land uses in watersheds assessed from satellite imagery Landsat 5 Thematic Mapper, Renato M. Franco, Fernando T. Hernandez, UNESP (Brazil); Antonio H. C. Teixeira, Embrapa Monitoramento por Satélite (Brazil) [9239-86]

Biophysical parameters in wheat producer region in southern Brazil, Janice F. Leivas, Embrapa Monitoramento por Satélite (Brazil); Antonio H. C. Teixeira, Embrapa Semiárido (Brazil); Ricardo G. Andrade, Daniel Victoria, Edson L. Bolfe, Embrapa Monitoramento por Satélite (Brazil) [9239-87]

Analysis of fraction of absorbed photosynthetically active radiation direct and diffuse characteristics based on long-term field automatic observation data, Li Li, Institute of Remote Sensing and Digital Earth (China) [9239-88]

Assessing Cd-induced stress from plant spectral response, Rumiana Kancheva, Denitsa Borisova, Georgi Georgiev, Space Research and Technology Institute (Bulgaria) [9239-89]

The synergy of water quality and sea surface currents data in determining the spatio-temporal evolution of large-scale circulation features, Fulvio Capodici, Univ. degli Studi di Palermo (Italy); Simone Cosoli, Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (Italy); Antonino Maltese, Giuseppe Ciruolo, Univ. degli Studi di Palermo (Italy) [9239-90]

Monitoring an earthen dam using GNSS and remote sensing, Gino Dardanelli, Goffredo La Loggia, Univ. degli Studi di Palermo (Italy); Nicola Perfetti, Geotop s.r.l. (Italy); Luigi Puccio, Univ. degli Studi di Palermo (Italy); Fulvio Capodici, Univ. degli Studi di Palermo (Italy); Antonino Maltese, Univ. degli Studi di Palermo (Italy) [9239-91]

Eco-geographical analysis of desertification and desert locust infestation problem in Sudan, Mohammed Eltoum, Mohamed Salih Daffala Mohamed, Univ. of Khartoum (Sudan) [9239-92]

Multispectral remote sensing for mapping land degradation using the key indicators of grass species and soil quality, Khalid M. Y. Mansour, Al-Fashir Univ. (Sudan) [9239-93]

Evaluating the potential of GeoEye data in retrieving LAI at watershed scale, Mariella Aquilino, Politecnico di Bari (Italy); Antonio Novelli, DICATECH Department, Politecnico di Bari (Italy); Eufemia Tarantino, Politecnico di Bari (Italy); Francesco Gentile, Univ. degli Studi di Bari Aldo Moro (Italy); Vito Iacobellis, Politecnico di Bari (Italy) [9239-94]

Application of different quality indexes for irrigation water, Marcio A. Vilas Boas, Claudia F. Reis, UNIOESTE (Brazil) [9239-96]

Sensitivity analysis and uncertainty in hydrosedimentological models: correlation between estimation of soil loss and scale of analysis, Luiz Henrique Pereira, Sergio A. Ferreira Pinto, Univ. Estadual Paulista "Júlio de Mesquita Filho" (Brazil) [9239-98]

Thursday 25 September

SESSION 9

Room: E104 Thu 9:00 to 10:00

Water Resources I

Session Chair: **John H. Prueger**, Agricultural Research Service (United States)

9:00: **Analysis of snow spatial and temporary variability through the study of terrestrial photography in the Trevezal river valley**, Maria Jose Perez-Palazon, Univ. de Córdoba (Spain); Rafael Pimentel, Javier Herrero, Univ. de Granada (Spain); María José Polo-Gómez, Univ. de Córdoba (Spain) [9239-45]

9:20: **Drainage network extraction of Brazilian semiarid region with potential flood indication areas**, Sergio Rosim, Jussara de Oliveira Ortiz, Miguel Z. Cuellar, João R. de Freitas Oliveira, Alexandre C. Jardim, Instituto Nacional de Pesquisas Espaciais (Brazil) [9239-46]

9:40: **A combined remote sensing and geochemical tracing approach for localising and assessing groundwater discharge to lakes**, Jean Wilson, Carlos Rocha, Trinity College Dublin (Ireland) [9239-47]

Coffee Break Thu 10:00 to 10:30

SESSION 10

Room: E104 Thu 10:30 to 11:50

Water Resources II

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

10:30: **A model based on satellite altimetry and imagery to evaluate water volume changes in a reservoir in Brazil**, Luiza G. A. C. Abreu, Philippe Maillard, Univ. Federal de Minas Gerais (Brazil) [9239-49]

10:50: **Delimitation of permanent protected areas of rivers in Brazil**, Silvia S. Leonardi, João R. de Freitas Oliveira, Henrique R. de Azeredo Freitas, Sergio Rosim, Instituto Nacional de Pesquisas Espaciais (Brazil) [9239-50]

11:10: **Acquisition of underwater topography in a mountain channel using terrestrial laser scanning**, Naoko Miura, Yuko Asano, The Univ. of Tokyo (Japan) [9239-51]

Lunch Break Thu 11:50 to 13:00

SESSION 11

Room: E104 Thu 13:00 to 14:20

Surface Characterization

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

13:00: **Automatic detection and agronomic characterization of olive groves using high-resolution imagery and Lidar data**, Tiziano Caruso, Giada La Scalia, Francesco Marra, Juliane Rühl, Rosanna Sciortino, Univ. degli Studi di Palermo (Italy) [9239-53]

13:20: **Accurate crop classification using hierarchical genetic fuzzy rule-based systems**, Charalampos A. Topaloglou, Stelios K. Mylonas, Dimitris G. Stavrakoudis, Aristotle Univ. of Thessaloniki (Greece); Paris A. Mastorocostas, Technological Educational Institution of Serres (Greece); John B. Theocharis, Aristotle Univ. of Thessaloniki (Greece) [9239-54]

13:40: **The use of full range spectroradiometer data to assess properties of a heterogeneous soil set in a regional scale survey**, Monika Harbich, Thomas Udelhoven, Univ. Trier (Germany); Andras Jung, Michael Vohland, Univ. Leipzig (Germany); Marie Ludwig, Sören Thiele-Bruhn, Univ. Trier (Germany) . . [9239-52]

14:00: **Entropy-based noise clustering soft classification for identification of wheat crop using WorldView-2 data**, Priyadarshi Upadhyay, S. K. Ghosh, Indian Institute of Technology Roorkee (India); Anil Kumar, Indian Institute of Remote Sensing (India) [9239-57]

SESSION 12

Room: E104 Thu 14:20 to 16:40

Change Detection and Vegetation MonitoringSession Chair: **Christopher M. U. Neale**, Utah State Univ. (United States)

14:20: **A new approach for agroecosystems monitoring using high-revisit multitemporal satellite data series**, Mónica Díez, Elecnor Deimos Imaging S.L. (Spain); Fabrizio Pirondini, Elecnor Deimos Space S.L.U. (Spain) [9239-58]

14:40: **Change detection of land use/land cover categories in the Nile Delta region using remote sensing and GIS**, Sayed M. Arafat, National Authority for Remote Sensing and Space Sciences (Egypt); Afify A. Afify, Soil, Water and Environment Research Inst. (Egypt); Nagwan M. Afify III, Mohamed M. Elsharkawy, National Authority for Remote Sensing and Space Sciences (Egypt) [9239-59]

Coffee Break Thu 15:00 to 15:20

15:20: **Estimating primary productivity of tropical oil palm in Malaysia using remote sensing technique and ancillary data**, Kasturi D. Kanniah, Kian Pang Tan, Univ. Teknologi Malaysia (Malaysia); Arthur P. Cracknell, Univ. of Dundee (United Kingdom) [9239-60]

15:40: **Rice area and probable transplanting dates inventory through an enhanced remote sensing based algorithm**, Ashraf M. Elshorbagy, Ministry of Water Resources and Irrigation (Egypt); Emad H. Imam, The American Univ. in Cairo (Egypt); Mohamed H. Nour, Cairo Univ. (Egypt) [9239-61]

16:00: **Regional winter wheat late freezing disaster monitoring based on phenology and MODIS land surface temperature products**, Junming Liu, China Agricultural Univ. (China); Chunyan Wang, Chinese Academy of Agricultural Sciences (China); Jianxi Huang, Wei Su, China Agricultural Univ. (China); Maosong Li, Chinese Academy of Agricultural Sciences (China); Qiaoling Hu, China Agricultural Univ. (China) [9239-62]

16:20: **Remote sensing evaluation of ecosystem service value of gas regulation with time series Landsat images**, Xiaohe Gu, Wei Guo, Yancang Wang, Guijun Yang, National Engineering Research Ctr. for Information Technology in Agriculture (China) [9239-63]

CONFERENCE 9240 - ROOM: D204

Wednesday - Thursday 24-25 September 2014 • Proceedings of SPIE Vol. 9240

REMOTE SENSING OF THE OCEAN, SEA ICE, COASTAL WATERS, AND LARGE WATER REGIONS 2014

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)

Programme Committee: **Richard J. Breitlow**, Agfa Corp. (United States); **Jean-Paul Bruyant**, ONERA (France); **Alexander Gilerson**, The City College of New York (United States); **Carlton R. Hall**, Dynamac Corp. (United States); **Heinz-Detlef Kronfeldt**, Technische Univ. Berlin (Germany); **Frederic Lamy**, ONERA (France); **Ana M. Martins**, Univ. dos Açores (Portugal); **Caroline Nichol**, The Univ. of Edinburgh (United Kingdom); **Petri Pellikka**, Univ. of Helsinki (Finland)

Wednesday 24 September

SESSION 1

Room: D204 Wed 9:00 to 10:00

Sea Ice Remote Sensing and Analysis

Session Chair: **Yi Luo**, Environment Canada (Canada)

9:00: **Assimilation of AVHRR data for sea ice analysis**, Yi Luo, Environment Canada (Canada) [9240-1]

9:20: **Sea-ice distribution and variability in the East Greenland Sea, 2003-13**, Mauro Bocolari, Lorenzo Guerrieri, Univ. degli Studi di Modena e Reggio Emilia (Italy); Fiorigi F. Parmiggiani, Istituto di Scienze dell'Atmosfera e del Clima (Italy) [9240-2]

9:40: **First year sea ice characterization from QUAD-POL anisotropy/ anisotropy/alpha angle classification**, Eric Hudier, Univ. du Québec (Canada) [9240-4]

Coffee Break Wed 10:00 to 10:30

SESSION 2

Room: D204 Wed 10:30 to 11:50

Space-based Ocean Remote Sensing

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

10:30: **The NASA CYGNSS mission: a pathfinder for GNSS scatterometry remote sensing applications**, Randall J. Rose, Scott Gleason, Southwest Research Institute (United States); Christofer Ruf, Univ. of Michigan (United States) [9240-5]

10:50: **Analysis of the C-band spaceborne scatterometer thermal noise**, Anis Elyouncha, Xavier Neyt, Royal Belgian Military Academy (Belgium) [9240-6]

11:10: **Analysis of the reflectance spectra of oil emulsion spilled on the sea surface**, Marc Lennon, ACTIMAR (France); Veronique Miegbielle, Dominique Dubucq, Total E&P (France); Guillaume Sicot, ACTIMAR (France) [9240-7]

11:30: **Shallow water bottom mapping by lidar satellite on quasi sun synchronous orbit**, Qiang Dou, Yan Zhang, Jun Zhu, Qipeng Cao, DFH Satellite Co, Ltd. (China) [9240-8]

Lunch/Exhibition Break Wed 11:50 to 13:20

SESSION 3

Room: D204 Wed 13:20 to 15:20

Ocean Surface Pollution Assessment

Session Chair: **Peer Helmke**, Bundesanstalt für Gewässerkunde (Germany)

13:20: **Bistatic scattering from a contaminated sea surface observed in C, X And Ku bands**, Helmi Ghanmi, Ali Khenchaf, Fabrice Comblet, ENSTA Bretagne (France) [9240-9]

13:40: **Measuring marine oil spill extent by Markov Random Fields**, Miguel Moctezuma Flores, Univ. Nacional Autónoma de México (Mexico); Fiorigi F. Parmiggiani, Istituto di Scienze dell'Atmosfera e del Clima (Italy); Ludwin Lopez Lopez, Univ. Nacional Autónoma de México (Mexico) [9240-10]

14:00: **Influence of satellite alerts on the efficiency of aircraft monitoring of maritime oil pollution in German waters**, Peer Helmke, Björn Baschek, Thomas Hunsänger, Susanne Kranz, Bundesanstalt für Gewässerkunde (Germany) [9240-11]

14:20: **Sea slicks classification by synthetic aperture radar**, Paolo Trivero, Walter Biamino, Maria Borasi, Marco Cavagnero, Lorenza Di Matteo, Univ. degli Studi del Piemonte Orientale Amedeo Avogadro (Italy); Davide Loreggia, INAF - Osservatorio Astronomico di Torino (Italy) [9240-12]

14:40: **On wave damping due to crude oil and oil derivatives film: theory and laboratory experiment**, Irina Sergievskaya, Stanislav A. Ermakov, Institute of Applied Physics (Russian Federation) [9240-13]

15:00: **Detecting biogenic pollution in Rybinsk Reservoir from satellite data and contact measurements**, Olga Y. Lavrova, Space Research Institute (Russian Federation); Victoria Shendrick, Dubna International Univ. of Nature, Society and Man (Russian Federation) [9240-14]

Coffee Break Wed 15:20 to 15:50

SESSION 4

Room: D204 Wed 15:50 to 17:50

Coastal and Inland Waters Remote Sensing

Session Chair: **George D. Emmitt**, Simpson Weather Associates, Inc. (United States)

15:50: **Investigation of coastal zone complex MBL circulations and their potential impact on energy transport**, George D. Emmitt, Simpson Weather Associates, Inc. (United States); Ralph Foster, Univ. of Washington (United States); Kevin S. Godwin, KSG Science (United States) [9240-15]

16:10: **Detection of scars by using sparse coding method**, Ender Oguslu, Turkish Air Force (Turkey); Sertan Erkanli, Turkish Military (Turkey) [9240-16]

16:30: **Relationship between spectral reflectance and chlorophyll-a concentration in the eutrophic Lake Togo-ike**, Yuji Sakuno, Hiroshima Univ. (Japan); Keisuke Hatakeyama, Yasushi Miyamoto, Akiko Hatsuda, Akihiro Mori, Takahiro Kuki, Tottori Prefecture (Japan) [9240-17]

16:50: **Monitoring and predicting eutrophication of Sri Lankan inland waters using ASTER satellite data**, Dahanayakage D. G. Dahanayaka, Hideyuki Tonooka, Ibaraki Univ. (Japan); Jayantha Wijeyaratne, Univ. of Kelaniya (Sri Lanka); Atsushi Minato, Satoru Ozawa, Ibaraki Univ. (Japan) [9240-18]

17:10: **Raman spectroscopy measurements of CO₂ dissolved in water and CO₂ bubbles for laser remote sensing in water**, Toshihiro Somekawa, Tomoki Takeuchi, Chihiro Yamanaka, Masayuki Fujita, Osaka Univ. (Japan) [9240-19]

17:30: **Shallow water surface gravity wave imaging, stereo sensing, spectra and their operational use in shallow water dredging operations and planning**, Charles R. Bostater Jr., Florida Institute of Technology (United States) [9240-20]

POSTERS—WEDNESDAY

Room: Elicium 1 Wed 17:40 to 19:15

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Retrieval of oceanic and atmospheric parameters with FY-3B microwave radiation imager measurements, Zhe Liu, Wenjun Zhang, Changgang Wu, Youtang Zheng, Institute of Aeronautical Meteorology (China) [9240-35]

Retrieval of total suspended particulate matter in highly turbid waters of Hangzhou Bay using polarizing spectra data, Liu Jia, Delu Pan, Tianyu Wang, Xianqiang He, Fang Gong, The Second Institute of Oceanography, SOA (China) [9240-37]

Influence of breaking waves on the airborne Lidar resolution, Alexander G. Luchinin, Institute of Applied Physics (Russian Federation) [9240-38]

A new method for extracting the ENSO-independent component from sea sensitive factors, Weijun Wen, Hongping Li, Haihua Chen, Ocean Univ. of China (China) [9240-39]

SMOS salinity retrieval by using support vector regression with multi-angular brightness temperatures, Dominik Rains, Roberto Sabia, Diego Fernández-Prieto, ESRIN (Italy); Mattia Marconcini, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Thomas Katagis, Aristotle Univ. of Thessaloniki (Greece) [9240-40]

Create the ensemble sea surface temperature using Bayesian model averaging, Kwangjin Kim, Pukyong National Univ. (Korea, Republic of) [9240-41]

Remote sensing and GIS for the modeling of persistent organic pollutant in the marine environment, Sofia Costanzini, Sergio Teggi, Alessandro Bigi, Grazia Ghermandi, Univ. degli Studi di Modena e Reggio Emilia (Italy) . [9240-42]

Using of marine radar stations for determination of a water surface and an atmosphere near-surface layer parameters, Nikolay Bogatov, Victor V. Bakhanov, Aleksei V. Ermoshkin, Vasily Kazakov, Olga N. Kemarskaya, Victor I. Titov, Yulia I. Troitskaya, Institute of Applied Physics (Russian Federation) [9240-43]

Comparisons of wind speed retrieval methods on C-band multi-polarization SAR measurements, Lin Ren, Jingsong Yang, Gang Zheng, Juan Wang, The Second Institute of Oceanography, SOA (China); Difeng Wang, Second Institute of Oceanography SOA (China) [9240-45]

Sea surface salinity variability in South-China Sea and implications for SMOS satellite measurements, Hongping Li, Haihua Chen, Changjun Li, Hong Zhao, Ocean Univ. of China (China) [9240-46]

Internal waves in the Black Sea: satellite observations and in-situ measurements, Olga Y. Lavrova, Marina I. Mityagina, Andrey N. Serebryany, Space Research Institute (Russian Federation) [9240-47]

Study on the pulse scattering from time-varying rough sea surface, Geng Zhang, Zhenshen Wu, Xidian Univ. (China) [9240-48]

Radar manifestations of ship wakes in algal bloom zones, Marina I. Mityagina, Olga Y. Lavrova, Space Research Institute (Russian Federation) [9240-49]

Are the trends in the surface chlorophyll opposite between the South China Sea and the Bay of Bengal?, Xiaoyan Chen, Delu Pan, Yan Bai, Xianqiang He, Tianyu Wang, The Second Institute of Oceanography, SOA (China) . . . [9240-50]

Analysis of the SAR hybrid-pol features sensitiveness for maritime targets detection, Rafael L. Paes, National Institute for Space Research (Brazil) [9240-51]

Three orthogonal visualization using full Lidar waveforms, Joong Yong Park, Vinod Ramnath, Viktor I. Feygels, Optech, Inc. (United States) [9240-52]

Multi-user information system for the investigation of processes in coastal zones on the base of joint analysis of satellite data, particularly hyperspectral data, Marina I. Mityagina, Olga Y. Lavrova, Ivan A. Uvarov, Space Research Institute (Russian Federation) [9240-53]

Investigation of near surface wind by optical images of wind-roughened water surface, Victor I. Titov, Institute of Applied Physics (Russian Federation) [9240-54]

Study of the selection of indicator parameters in marine water quality evaluation and the evaluation methodology, Ying Zhang, Delu Pan, Difeng Wang, The Second Institute of Oceanography, SOA (China) [9240-55]

Geospatial dynamics and hyperspectral data analysis for healthy detection of coral reef on the small islands, Spermonde Archipelago, Indonesia, Nurjannah Nurdin, Hasanuddin Univ. (Indonesia) [9240-56]

An adaptive PCA fusion method for remote sensing images, Qing Guo, An Li, Hong Zhang, Zhongkui Feng, Institute of Remote Sensing and Digital Earth (China) [9240-57]

Conceptual design of image acquisition and operation for next generation Geostationary Ocean Color Imager(GOCI-II), Ki-Beom Ahn, Seongick Cho, Eunsong Oh, Korea Institute of Ocean Science & Technology (Korea, Republic of) and Yonsei Univ. (Korea, Republic of); Young Je Park, Korea Institute of Ocean Science & Technology (Korea, Republic of) [9240-58]

9:40: Ship wake signatures in radar/optical images of the sea surface: observations and physical mechanisms, Stanislav A. Ermakov, Ivan Kapustin, Tatiana Lazareva, Institute of Applied Physics (Russian Federation) . . . [9240-24]

10:00: Assessment of the swell impact on HY-2 SCAT wind products, He Wang, National Ocean Technology Ctr. (China) and Ifremer (France); Jianhua Zhu, Xiaoqi Huang, Chuntao Chen, Yili Zhao, National Ocean Technology Ctr. (China) [9240-25]

Coffee Break Thu 10:20 to 10:50

SESSION 6

Room: D204 Thu 10:50 to 11:30

Radar Remote Sensing II

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

10:50: Deep bathymetry changes sensed by satellite altimeters around the coastal zone of Gavdos/Crete permanent satellite calibration facility, Stelios P. Mertikas, Technical Univ. of Crete (Greece); Antonis Daskalakis, Space Geomatica Ltd. (Greece); Ilias N. Tziavos, George S. Vergos, Aristotle Univ. of Thessaloniki (Greece); Vassilis Zervakis, Univ. of the Aegean (Greece) . [9240-27]

11:10: From ENVISAT RA-2 to CRYOSAT SIRAL: validation of altimeter products near the coast (the ALCOVA Project), Jesús Gómez-Enri, Pilar Villares, Begoña Tejedor, Alazne Abotiz, Irene M. Laiz, Josep Coca, Univ. de Cádiz (Spain); Stefano Vignudelli, Consiglio Nazionale delle Ricerche (Italy); Paolo Cipollini, Marcello Passaro, National Oceanography Ctr. (United Kingdom) [9240-28]

Lunch Break Thu 11:30 to 13:20

SESSION 7

Room: D204 Thu 13:20 to 15:20

Optical Remote Sensing

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

13:20: Design and validation of object recognition methodologies for underwater fluorescence Lidar applications, Stefania Matteoli, Laura Zotta, Marco Diani, Giovanni Corsini, Univ. di Pisa (Italy) [9240-30]

13:40: Retrieval of water optical properties using polarization of light: case I and II waters, Alexander Gilerson, Amir Ibrahim, Robert Foster, Carlos Carrizo, Ahmed El-Habashi, Samir Ahmed, The City College of New York (United States) [9240-31]

14:00: A feasibility study of a compact fluorescence lidar for oil spills detection from UAV, Lorenzo Palombi, David Lognoli, Istituto di Fisica Applicata Nello Carrara (Italy); Andrea Masini, Emilio Simeone, Flyby S.r.l (Italy); Valentina Raimondi, Istituto di Fisica Applicata Nello Carrara (Italy). . . . [9240-32]

14:20: Remote estimation of in water constituents in coastal waters using neural networks, Ioannis Ioannou, Alexander Gilerson, The City College of New York (United States); Michael E. Ondrusek, NOAA National Environmental Satellite, Data, and Information Service (United States); Robert Foster, Ahmed El-Habashi, Kaveh Bastani, Samir Ahmed, The City College of New York (United States) [9240-33]

14:40: Development of an unmanned aerial vehicle-based water quality monitoring system for inland water bodies, Anuradha Kar, Peter Gege, Thomas Schwarzmaier, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [9240-34]

15:00: Physical oceanographic characteristics of the Azores region in the North Atlantic Ocean as observed in the DIAPICNA cruise during July/August 2011, Shree Ram Prakya, Univ. dos Açores (Portugal); C. Loureiro, Research Center in Biodiversity and Genetic Resources/CIBIO (Portugal); Marcelino Santos, Institute of Marine and Fisheries Research/IMPA-IPIMAR (Portugal); Virginie Riou, Aix-Marseille Univ. (France); Frank Dehairs, Vrije Univ. Brussel (Belgium); Ana M. Martins, Univ. dos Açores (Portugal) [9240-59]

Thursday 25 September

SESSION 5

Room: D204 Thu 9:00 to 10:20

Radar Remote Sensing I

Session Chair: **Anis El YOUNCHA**, Royal Belgian Military Academy (Belgium)

9:00: Comparison of the spatial and radiometric resolution of ERS and Metop C-band radars, Anis El YOUNCHA, Xavier Neyt, Royal Belgian Military Academy (Belgium) [9240-21]

9:20: Analysis of internal waves around the Korean Peninsula using Radarsat-1 data, Dan-Bee Hong, Chan-Su Yang, Korea Institute of Ocean Science & Technology (Korea, Republic of) and Univ. of Science & Technology (Korea, Republic of); Kazuo Ouchi, Korea Institute of Ocean Science & Technology (Korea, Republic of); Tae-Ho Kim, Korea Institute of Ocean Science & Technology (Korea, Republic of) and Univ. of Science & Technology (Korea, Republic of) [9240-22]

CONFERENCE 9241 - ROOM: E102

Monday - Thursday 22-25 September 2014 • Proceedings of SPIE Vol. 9241

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**, Tokai Univ. (Japan)

Programme Committee: **Olivier Saint-Pe**, EADS Astrium (France); **Xiaoxiong J. Xiong**, NASA Goddard Space Flight Ctr. (United States)

Monday 22 September

SESSION 1

Room: E102 Mon 8:40 to 10:30

US Missions I

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

8:40: **The NASA Earth Science Flight Program (Invited Paper)**, Steven P. Neeck, Stephen M. Volz, NASA Headquarters (United States) [9241-1]

9:10: **Accomplishments of Aquarius: NASA's first global Sea Surface Salinity Mission; a review of the technical findings to date**, Amit Sen, Jet Propulsion Lab. (United States) [9241-2]

9:30: **Global Precipitation Measurement (GPM) launch, commissioning, and early operations**, Steven P. Neeck, Ramesh K. Kakar, NASA Headquarters (United States) [9241-3]

9:50: **OCO-2 mission operations planning and initial operations experiences**, Ralph R. Basilio, Harold Randy Pollock, Sarah L. Hunyadi, Jet Propulsion Lab. (United States) [9241-4]

10:10: **The Stratospheric Aerosol and Gas Experiment (SAGE III) on the International Space Station (ISS) Mission**, Michael S Cisewski, Joeseph Zawodny, Joseph Gasbarre, NASA Langley Research Center (United States); Richard Eckman, NASA Headquarters (United States) and NASA (United States); Nandkishore Topiwala, NASA Headquarters (United States); Otilia Rodriguez-Alvarez, NASA Goddard Space Flight Center (United States); Dianne L Cheek, Stephen R Hall, NASA Langley Research Center (United States) [9241-5]

Coffee Break Mon 10:30 to 11:00

SESSION 2

Room: E102 Mon 11:00 to 12:40

US Missions II

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

11:00: **ICESat-2: the next generation satellite for altimetric measurements of the Earth's surface**, Douglas D McLennan, NASA Goddard Space Flight Ctr (United States) [9241-6]

11:20: **CYGNSS: NASA Earth Venture tropical cyclone mission**, Christopher Ruf, University of Michigan (United States); Robert Atlas, NOAA/AOML (United States); Paul Chang, NOAA/NESDIS/StAR (United States); Maria Paula Clarizia, University of Michigan (United States); Zorana Jelenak, NOAA/NESDIS/StAR (United States); Sharan Majumdar, RSMAS/University of Miami (United States) [9241-7]

11:40: **Implementation of tropospheric emissions: monitoring of pollution (TEMPO)**, Kelly Chance, Xiong Liu, Raid M. Suleiman, Harvard-Smithsonian Ctr. for Astrophysics (United States); David E. Flittner, Jassim A. Al-Saadi, NASA Langley Research Ctr. (United States); Scott J. Janz, NASA Goddard Space Flight Ctr. (United States) [9241-8]

12:00: **Surface Water and Ocean Topography (SWOT) mission formulation**, Steven P. Neeck, Eric J. Lindstrom, NASA Headquarters (United States); Parag V. Vaze, Lee-Lueng Fu, Jet Propulsion Lab. (United States) [9241-9]

12:20: **Mission design for NI-SAR repeat-pass SAR interferometry**, Yuhsyen Shen, Paul A. Rosen, Sara J. Hatch, Theodore H. Sweetser, Scott J. Shaffer, Oscar Alvarez-Salazar, Peter Xaypraseuth, Jennifer M. Rocca, Jet Propulsion Lab. (United States) [9241-10]

Lunch Break Mon 12:20 to 13:50

SESSION 3

Room: E102 Mon 13:50 to 15:20

European Missions I

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

13:50: **Overview of ESA Earth observation missions (Invited Paper)**, Roland Meynart, European Space Research and Technology Ctr. (Netherlands) [9241-11]

14:20: **Meteosat third generation imager: simulation of the flexible combined imager instrument chain**, Dieter Just, EUMETSAT (Germany); Rebeca Gutiérrez López, HE Space Operations GmbH (Germany); Theo Steenberg, Theo Steenberg Consultancy (Germany); Fausto Roveda, EUMETSAT (Germany) [9241-12]

14:40: **The EarthCARE satellite payload**, Kotska Wallace, Tobias Wehr, Abelardo Perez-Albinana, Jerzy Lemanczyk, Arnaud Heliere, Alain Lefebvre, European Space Research and Technology Ctr. (Netherlands) [9241-13]

15:00: **The TROPOMI instrument is in final integration and heads for a bright future**, Jos Dingjan, Dutch Space BV (Netherlands); Johan de Vries, Dutch Space B.V. (Netherlands); Nick C. J. van der Valk, TNO (Netherlands); Ianjit Bhatti, David M. Woods, Tony Canas, Surrey Satellite Technology Ltd. (United Kingdom); Ilse Aben, Ruud W. M. Hoozeveld, SRON Netherlands Institute for Space Research (Netherlands); Quintus Kleipool, Pepijn Veefkind, Koninklijk Nederlands Meteorologisch Instituut (Netherlands) [9241-14]

Coffee Break Mon 15:20 to 15:50

SESSION 4

Room: E102 Mon 15:50 to 17:30

European Missions II

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

15:50: **The Copernicus Sentinel-5 mission for operational atmospheric monitoring: status and developments**, Jean-Loup Bézy, Bernd Sierk, European Space Research and Technology Ctr. (Netherlands); Jérôme C. Caron, RHEA (Netherlands) and European Space Research and Technology Ctr. (Netherlands); Didier D. Martin, Ben Veihelmann, Jörg Langen, European Space Research and Technology Ctr. (Netherlands) [9241-15]

16:10: **Sentinel-2 multispectral instrument pre-flight characterisation results and calibration/validation approach for the in-orbit commissioning phase**, Claudia Isola, Philippe Martimort, Valerie Fernandez, European Space Research and Technology Ctr. (Netherlands) [9241-16]

16:30: **TROPOLITE, on the path of atmospheric chemistry made simple**, Luca Maresi, European Space Research and Technology Ctr. (Netherlands); Wencke van der Meulen, Netherlands Space Office (Netherlands); Ramon J. Vink, European Space Research and Technology Ctr. (Netherlands) ... [9241-17]

16:50: **Study of a passive companion microsatellite to the SAOCOM-1B satellite of Argentina, for bistatic and interferometric SAR applications**, Christian Barbier, Dominique Derauw, Anne Orban, Univ. de Liège (Belgium); Malcolm W. J. Davidson, European Space Agency (Netherlands) and European Space Research and Technology Ctr. (Netherlands) [9241-18]

17:10: **ALTIUS: a spaceborne AOTF-based UV-VIS-NIR hyperspectral imager for atmospheric remote sensing**, Emmanuel Dekemper, Didier Fussen, Didier Pieroux, Jurgen Vanhamel, Belgian Institute for Space Aeronomy (Belgium); Vitaly B. Voloshinov, Lomonosov Moscow State Univ. (Russian Federation); Bert Van Opstal, Belgian Institute for Space Aeronomy (Belgium) [9241-19]

Tuesday 23 September

SESSION 5

Room: E102 Tue 8:30 to 10:20

Japanese Missions I

Session Chair: **Haruhisa Shimoda**, Tokai Univ. (Japan)

8:30: **Overview of Japanese Earth observation programs (Invited Paper)**, Haruhisa Shimoda, Tokai Univ. (Japan) [9241-20]

9:00: **ASTER TIR onboard calibration over fourteen years**, Fumihiro Sakuma, Masakuni Kikuchi, Kenji Tatsumi, Japan Space Systems (Japan); Hidehiko Ono, Fujitsu Ltd. (Japan) [9241-21]

9:20: **Current status of the Global Change Observation Mission 1st-Water SHIZUKU (GCOM-W1) and the Advanced Microwave Scanning Radiometer 2 (AMSR2)**, Takashi Maeda, Keiji Imaoka, Misako Kachi, Hiroyuki Tsutsui, Marehito Kasahara, Norimasa Ito, Taikan Oki, Haruhisa Shimoda, Japan Aerospace Exploration Agency (Japan) [9241-22]

9:40: **Validation activity for GCOM-C1/SGLI land standard products**, Keji Kajiwara, Yoshiaki Honda, Chiba Univ. (Japan); Yusaku Ono, Japan Aerospace Exploration Agency (Japan) [9241-23]

10:00: **GOSAT on-orbit status over 5-year nominal operation**, Kei Shiomi, Shuji Kawakami, Hiroshi Suto, Akihiko Kuze, Masakatsu Nakajima, Japan Aerospace Exploration Agency (Japan) [9241-24]

Coffee Break Tue 10:20 to 10:50

SESSION 6

Room: E102 Tue 10:50 to 12:30

Japanese Missions II

Session Chair: **Haruhisa Shimoda**, Tokai Univ. (Japan)

10:50: **The current status of GOSAT-2: mission and sensor system**, Masakatsu Nakajima, Hiroshi Suto, Kazuhiko Yotsumoto, Yoshiyuki Ishijima, Kazumasa Narita, Masashi Abe, Takeshi Hirabayashi, Japan Aerospace Exploration Agency (Japan) [9241-25]

11:10: **Orbital checkout result of the dual-frequency precipitation radar on the global precipitation measurement core spacecraft**, Kinji Furukawa, Masahiro Kojima, Takeshi Miura, Yasutoshi Hyakusoku, Hiroki Kai, Takayuki Ishikiri, Japan Aerospace Exploration Agency (Japan); Toshio Iguchi, Hiroshi Hanado, Katsuhiko Nakagawa, National Institute of Information and Communications Technology (Japan); Minoru Okumura, NEC TOSHIBA Space Systems Ltd. (Japan) [9241-26]

11:30: **ALOS-2 launch and early orbit operation result**, Yoshihisa Arikawa, Shinichi Suzuki, Japan Aerospace Exploration Agency (Japan) [9241-27]

11:50: **Recent status of the JAXA/EarthCARE algorithm development**, Maki Hirakata, Takuji Kubota, Riko Oki, JAXA (Japan); Hajime Okamoto, Kyushu University (Japan); Haruhisa Shimoda, Tokai University (Japan) [9241-28]

12:10: **Observation planning algorithm of a Japanese spaceborne sensor: Hyperspectral Imager Suite (HISUI)**, Kenta Ogawa, Kayo Nishiwaki, Rakuno Gakuen Univ. (Japan); Tsuneo Matsunaga, Satoru Yamamoto, National Institute for Environmental Studies (Japan); Osamu Kashimura, Tetsushi Tachikawa, Jun Tanii, Japan Space Systems (Japan) [9241-29]

Lunch/Exhibition Break Tue 12:30 to 13:40

SESSION 7

Room: E102 Tue 13:40 to 15:20

Focal Plane Assemblies

Session Chair: **Olivier Saint-Pe**, Airbus Defence and Space Satellites (France)

13:40: **CNES developments of key detection technologies to prepare next generation focal planes for high resolution Earth observation**, Alex Materne, Cedric Virmontois, Alain Bardoux, Thierry Gimenez, David Laubier, Jean-Marc Delvit, Jean-Marc Biffi, Ctr. National d'Études Spatiales (France) [9241-30]

14:00: **Space detector developments at SOFRADIR for sounding applications**, Anne Delannoy, Patricia Pidancier, SOFRADIR (France) [9241-31]

14:20: **Radiation-induced charge transfer inefficiency in charge-coupled devices: Sentinel-4 CCD pre-development as a case study**, Thibaut Prod'homme, J.-M. Belloir, H. Weber, Gregory Bazalgette Courreges-Lacoste, Roland Meynard, Yoanna-Reine Nowicki-Bringuiet, Jérôme C. Caron, European Space Research and Technology Ctr. (Netherlands); George J. Woffinden, e2v (Netherlands); B. Lord, R. Mackie, e2v (United States) [9241-32]

14:40: **Cryogenic and radiation hard ASIC design for large format NIR/SWIR detector array**, Peng Gao, Benoit Dupont, Bart M. Dierickx, Eric Mueller, Caeleste (Belgium); Geert Verbruggen, Stijn Gielis, Ramses Valvekens, Easics NV (Belgium) [9241-33]

15:00: **Focal plane design considerations for cartographic application**, Parul Singh, Indian Space Research Organisation (India) [9241-34]

Coffee Break Tue 15:20 to 16:00

PLENARY SESSION

Room: E102 Tue 16:05 to 17:40

Remote Sensing 2014

For details, please see special events section in the printed programme or visit <http://spie.org/remote-sensing-europe.xml>

Wednesday 24 September

SESSION 8

Room: E102 Wed 8:30 to 10:10

Calibration I

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

8:30: **Comparison of MODIS and PLEIADES Lunar observations**, Xiaoxiong Xiong, NASA Goddard Space Flight Ctr. (United States); Sophie Lachérade, Laurent Lebègue, Bertrand Fougne, Ctr. National d'Études Spatiales (France); Amit Angal, Science Systems and Applications, Inc. (United States); Zhipeng Wang, Sigma Space Corp. (United States) [9241-35]

8:50: **POLO: a unique dataset to derive the phase angle dependence of the Moon irradiance**, Sophie Lachérade, Ctr. National d'Études Spatiales (France); Ouahid Aznay, CS Systèmes d'information (France); Bertrand Fougne, Laurent Lebègue, Ctr. National d'Études Spatiales (France) [9241-36]

9:10: **Introduction to the Sentinel-2 radiometric calibration activities during commissioning phase**, Sophie Lachérade, Vincent Lonjou, Thierry Trémas, Julien Nosavan, Beatrice Petrucci, Ctr. National d'Études Spatiales (France); Philippe Martimort, Claudia Isola, European Space Research and Technology Ctr. (Netherlands) [9241-37]

9:30: **Cross-calibration of the RapidEye Multispectral Imager payloads using near simultaneous acquisitions of pseudo-invariant test sites**, Michael Thiele, Cody Anderson, Andreas Brunn, BlackBridge AG (Germany) [9241-38]

9:50: **Three-year operation of in-orbit radiometric calibration for geostationary ocean color imager**, Seongick Cho, Ki-Beom Ahn, Eunsong Oh, Young Je Park, Korea Institute of Ocean Science & Technology (Korea, Republic of) [9241-39]

Coffee Break Wed 10:10 to 10:40

SESSION 9

Room: E102 Wed 10:40 to 12:20

Calibration II

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

10:40: **Uncertainty effects of uniform source design and measurements**, Christopher N. Durell, Michael A. Bakshtab, Labsphere, Inc. (United States) [9241-40]

11:00: **Evaluating performances of vacuum dedicated blackbodies**, Catherine Barrat, HGH Systèmes Infrarouges (France) [9241-41]

11:20: **Ground testing and campaign intercomparisons with the NAST-I airborne FTS**, Allen M. Larar, Daniel K. Zhou, Xu Liu, NASA Langley Research Ctr. (United States); William L. Smith Sr., Univ. of Wisconsin-Madison (United States) [9241-42]

11:40: **Calibration and validation activities for DubaiSat-2 performance assessment**, Abdulla H. Bushehab, Khalid Al Suwaidi, Saeed H. Al-Mansoori, Hessa Al Matroushi, Meera Al Shamsi, Eman S. Al Tunajji, Emirates Institution for Advanced Science and Technology (United Arab Emirates) [9241-43]

12:00: **Prelaunch calibrations and on-orbit performance analysis of FY-2D/E SVISSR infrared channels**, Yong Zhang, National Satellite Meteorological Ctr. (China); Fuchun Chen, Shanghai Institute of Technical Physics (China); Xiuqing Hu, National Satellite Meteorological Ctr. (China) [9241-45]

Lunch/Exhibition Break Wed 12:20 to 13:50

SESSION 10

Room: E102 Wed 13:50 to 15:10

Missions and Sensing I

Session Chair: **Haruhisa Shimoda**, Tokai Univ. (Japan)

13:50: **Concepts for a geostationary-like polar missions**, Malcolm Macdonald, Pamela Anderson, Univ. of Strathclyde (United Kingdom); Laura Carrea, The Univ. of Reading (United Kingdom); Benjamin Dobke, Airbus Defence and Space (United Kingdom); Owen Embury, Christopher Merchant, The Univ. of Reading (United Kingdom); Paolo Bensi, European Space Research and Technology Ctr. (Netherlands) [9241-46]

14:10: **SkySat-1: very high-resolution imagery from a small satellite**, Kiran Murthy, Dirk Robinson, Michael Shearn, Byron D. Smiley, Alexandra H. Chau, Josh Levine, Skybox Imaging, Inc. (United States) [9241-47]

14:30: **DEIMOS-2: cost-effective, very-high resolution multispectral imagery**, Julio C. Lopez Bravo, Fabrizio Pironcini, Elecnor Deimos Imaging S.L. (Spain) [9241-48]

14:50: **THE DUBAISAT-2/DEIMOS-2 constellation: public-private cooperation between Emirates and Spain**, Julio C. Lopez Bravo, Fabrizio Pironcini, Elecnor Deimos Imaging S.L. (Spain) [9241-49]

Coffee Break Wed 15:10 to 15:40

CONFERENCE 9241 - ROOM: E102

SESSION 11

Room: E102 Wed 15:40 to 17:40

Missions and Sensing II

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

15:40: **A compact thermal infrared imaging radiometer with high spatial resolution and wide swath for a small satellite using a large format uncooled infrared focal plane array**, Kenji Tatsumi, Fumihiro Sakuma, Masakuni Kikuchi, Jun Tanii, Tono Kawanishi, Japan Space Systems (Japan); Shinichi Ueno, Hideki Kuga, Mitsubishi Electric Corp. (Japan). [9241-50]

16:00: **PanelSAR, an affordable small satellite miniSAR radar in support of infrastructure surveillance**, Pieter van Duijn, SSBV Aerospace & Technology Group (Netherlands) [9241-51]

16:20: **Design, simulation and test of silicon immersed gratings : key to compact spectrometers in the short-wave infrared**, Aaldert H. van Amerongen, Paul J. J. Tol, Tonny H. M. Coppens, Ruud Schuurhof, Phillip P. Laubert, Jos Ruijter, Ruud W. M. Hoogeveen, SRON Netherlands Institute for Space Research (Netherlands) [9241-52]

16:40: **Lightweight ZERODUR® mirror blanks: recent advances supporting faster, cheaper and better spaceborne optical telescope assemblies**, Tony B. Hull, The Univ. of New Mexico (United States); Thomas Westerhoff, SCHOTT AG (Germany) [9241-53]

17:00: **Monolithic diffraction grating elements for remote sensing applications**, Tobias Moeller, Peter Triebel, Torsten Diehl, Carl Zeiss Microscopy GmbH (Germany); Alexandre Gatto, Lars H. Erdmann, Alexander Pesch, Matthias Burkhardt, Alexander Kalies, Carl Zeiss Jena GmbH (Germany) [9241-54]

17:20: **Bandpass filter arrays patterned by photolithography for multispectral remote sensing**, Thomas E. Bauer, Optics Balzers Jena GmbH (Germany); Heidi Thome, Thomas Eisenhammer, Optics Balzers AG (Liechtenstein) [9241-55]

POSTERS—WEDNESDAY

Room: Elicium 1 Wed 17:40 to 19:15

Conference attendees are invited to attend the Remote Sensing poster session held on Wednesday 17:40 to 19:15. Posters will be on display after 10:00 Wednesday morning in the Conference Centre. Authors of poster papers will be present to answer questions concerning their papers during the Wednesday Poster Session. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x32234.xml> and under general information in the printed programme.

The method of improving the spatial resolution of the matrix spectrometer, Yury Krot, Leonid V. Katkovsky, Boris Beliaev, Belarusian State Univ. (Belarus). [9241-72]

Features of design and development of the optical head of star tracker, Meirbek Moldabekov, National Space Agency of the Republic of Kazakhstan (Kazakhstan); Daulet Akhmedov, Suleimen Yelubayev, Institute of Space Technique and Technology (Kazakhstan); Vladimir Ten, Bakhytzhon Albazarov, Kazakhstan Garysh Sapary (Kazakhstan); Alexander Shamro, Kuanys Alipbayev, Timur Bopayev, Anna Sukhenko, Institute of Space Technique and Technology (Kazakhstan) [9241-74]

Plastic optical fiber level measurement sensor based on side holes, Jaehee Park, Keimyung Univ. (Korea, Republic of) [9241-75]

The effective area calibration precision analysis of grazing incidence soft X-ray optical system, Yongqiang Shi, Fuchang Zuo, Loulou Deng, Zhiwu Mei, Beijing Institute of Control Engineering (China). [9241-76]

structure design and optimization of an x-ray pulsar navigation instrument, Sheng L. Li, Loulou Deng, Beijing Institute of Control Engineering (China) [9241-77]

A relay imaging probe to check focus map of Earth-observing pushbroom imager, Ho-Lin Tsay, Instrument Technology Research Ctr. (Taiwan). . . [9241-78]

Theory, methods and principles of structural design of microwave radiometer multireceiver systems for aerospace remote sensing of land and ocean surface, Aleksander A. V. Filatov, Anton A. V. Ubaichin, Tomsk State Univ. of Control Systems and Radioelectronics (Russian Federation) . . [9241-80]

Thursday 25 September

SESSION 12

Room: E102 Thu 8:30 to 10:30

Missions and Sensing III

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

8:30: **A study of development trends and characteristics in military surveillance/reconnaissance and commercial satellites**, Haengbok Lee, Agency for Defense Development (Korea, Republic of) [9241-56]

8:50: **Short-wave infrared (SWIR) spectral imager based on Fabry-Perot interferometer for remote sensing**, Rami Mannila, Christer Holmlund, Harri J. Ojanen, Antti Näsilä, Heikki Saari, VTT Technical Research Ctr. of Finland (Finland). [9241-57]

9:10: **HyperCube: enabling hyperspectral imaging from nanosatellites**, Marco Esposito, cosine Research B.V. (Netherlands); Bavo Delauré, VITO NV (Belgium); Christina Aas, Science & Technology AS (Norway); Massimo Menenti, Technische Univ. Delft (Netherlands) [9241-58]

9:30: **Decoupling spatial and spectral resolutions in dispersive hyperspectral imagers**, Arsen R. Hajian, Scott A. Baker, Tornado Spectral Systems (Canada); Bradford B. Behr, Tornado Spectral Systems (United States); Yusuf Bismilla, Andrew T. Cenko, Brandon DesRoches, Jeffrey T. Meade, Jared Slaa, Tornado Spectral Systems (Canada) [9241-59]

9:50: **Emissivity spectra estimated with the MaxEnTES algorithm**, Alessandro Barducci, SOFASI SRL (Italy); Donatella Guzzi, Cinzia Lastrì, Vanni Nardino, Ivan Pippi, Valentina Raimondi, Istituto di Fisica Applicata Nello Carrara (Italy) [9241-60]

10:10: **Implementation of a hyperspectral image simulation tool and performance analysis of the impact of instrumental noise on vegetation fluorescence retrieval algorithms using the telluric O2-A and O2-B lines**, Alessandro Barducci, SOFASI SRL (Italy); Paola Di Ninni, Donatella Guzzi, Cinzia Lastrì, Vanni Nardino, Lorenzo Palombi, Ivan Pippi, Valentina Raimondi, Istituto di Fisica Applicata Nello Carrara (Italy) [9241-61]

Coffee Break Thu 10:30 to 11:00

SESSION 13

Room: E102 Thu 11:00 to 12:40

Missions and Sensing IV

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

11:00: **Collaboration pathways via new tools for operational global climate monitoring from space**, Douglas B. Helmuth, Lockheed Martin Corp. (United States) [9241-62]

11:20: **Knowledge-intensive global optimization of Earth observing system architectures: a weather-centric case study**, Daniel Selva, Cornell Univ. (United States) and Massachusetts Institute of Technology (United States); Morgan Dwyer, Massachusetts Institute of Technology (United States) [9241-63]

11:40: **Simulation testbeds for the assessment of space-based wind measuring systems**, George D. Emmitt, Sidney A. Wood Jr., Steven Greco, Simpson Weather Associates, Inc. (United States). [9241-64]

12:00: **Towards a spaceborne white-light Lidar instrument based on femtosecond filamentation**, Isabelle Dicaire, Leopold Summerer, European Space Research and Technology Ctr. (Netherlands) [9241-65]

12:20: **Image processing technologies for the Russian space satellite CANOPUS-V Nr.1**, Alexey Kuznetsov, Ryazan State Radio Engineering Univ. (Russian Federation); Victor Ereemeev, Ryazan State Radio Engineering University (Russian Federation); Vyacheslav Pobaruiev, Ryazan State Radio Engineering Univ. (Russian Federation); Vasily Poshekhonov, Ryazan State Radio Engineering University (Russian Federation); Oleg Nikonov, Viacheslav Ermakov, "VNIIEM Corporation" JSC (Russian Federation) [9241-66]

Lunch Break Thu 12:40 to 13:50

SESSION 14

Room: E102 Thu 13:50 to 15:30

Missions and Sensing V

Session Chair: **Haruhisa Shimoda**, Tokai Univ. (Japan)

13:50: **COSMO-SkyMed Second Generation planner**, Fabio Covello, Tiziana Scopa, Agenzia Spaziale Italiana (Italy); Stefano Serva, Ministro Della Difesa (Italy); Francesco Caltagirone, Giuseppe Francesco De Luca, Agenzia Spaziale Italiana (Italy); Alessandro Pacaccio, Telespazio S.p.A. (Italy); Mario Profili, Thales Alenia Space (Italy) [9241-67]

14:10: **The OPTIMA project: data simulation and correction procedures for PRISMA mission products**, Donatella Guzzi, Istituto di Fisica Applicata Nello Carrara (Italy); Alessandro Barducci, SOFASI SRL (Italy); Paola Di Ninni, Cinzia Lastri, Vanni Nardino, Ivan Pippi, Valentina Raimondi, Istituto di Fisica Applicata Nello Carrara (Italy) [9241-68]

14:30: **Pre- and post-launch end-to-end test simulation for dynamic response prediction of global Earth's albedo monitoring instrument**, Sehyun Seong, Sug-Whan Kim, Dongok Ryu, Yonsei Univ. (Korea, Republic of); Jinsuk Hong, Samsung Thales Co., Ltd. (Korea, Republic of); Mike Lockwood, The Univ. of Reading (United Kingdom) [9241-69]

14:50: **Design and test of a near-infrared tunable liquid crystal birefringent filter**, Zhi-Xue Shen, Da-Yong Zhang, Long Yan, Yongquan Luo, China Academy of Engineering Physics (China); Hai-Tao Liu, China Academy of Engineering Physics (China) [9241-70]

15:10: **A framework for multisource and multiscale remote sensing data normalization processing system**, Bo Zhong, Qinhuo Liu, Institute of Remote Sensing and Digital Earth (China) [9241-71]

CONFERENCE 9242A - ROOM: D203

Wednesday - Thursday 24-25 September 2014 • Proceedings of SPIE Vol. 9242

REMOTE SENSING OF CLOUDS AND THE ATMOSPHERE

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

Programme Committee: **Aldo Amodeo**, Istituto di Metodologie per l'Analisi Ambientale (Italy); **Christoph C. Borel**, Air Force Institute of Technology (United States); **Young Joon Kim**, Gwangju Institute of Science and Technology (Korea, Republic of); **Richard H. Picard**, ARCON Corp. (United States); **Michiel van Weele**, Koninklijk Nederlands Meteorologisch Instituut (Netherlands); **Konradin Weber**, Fachhochschule Düsseldorf (Germany)

Wednesday 24 September

SESSION 1

Room: D203 Wed 8:50 to 12:20

Radiative Transfer I

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

8:50: **Cloud pattern prediction from geostationary meteorological satellite images for solar energy forecasting**, Sylvain Cros, Nicolas Sébastien, Olivier Liandrat, Nicolas Schmutz, Reuniwatt (France) [9242-1]

9:10: **Active remote sensing observations for cirrus clouds profiling at subtropical and polar latitudes**, Carmen Córdoba-Jabonero, INTA Instituto Nacional de Técnica Aeroespacial (Spain); Eliane G. Larroza, Eduardo Landolfo, Walter M. Nakaema, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Emilio Cuevas, Agencia Estatal de Meteorología (AEMET) (Spain) and Ctr. de Investigaciones Atmosféricas de Izaña (Spain); Héctor Ochoa, Dirección Nacional del Antártico-Instituto Antártico Argentino (Argentina); Manuel Gil-Ojeda, INTA Instituto Nacional de Técnica Aeroespacial (Spain) [9242-2]

9:30: **Fast rendering of clouds from 3D radiative transfer computations**, Pierrick Bonafons, ALYOTECH France (France); Patrick Chervet, ONERA (France); Solène Amram, Goulven Monnier, ALYOTECH France (France); Claire Malherbe, ONERA (France); Arnaud Beche, Thales Optronique S.A.S. (France) [9242-3]

9:50: **Retrieval of area-averaged and spectrally resolved surface albedo from transmission data alone: computationally simple and fast approach**, Evgueni I. Kassianov, James Barnard, Connor Flynn, Laura Riihimäki, Pacific Northwest National Lab. (United States); Joseph J. Michalsky Jr., National Oceanic and Atmospheric Administration (United States); Gary Hodges, Cooperative Institute for Research in Environment Sciences (United States) [9242-4]

Coffee Break Wed 10:10 to 10:40

10:40: **Connecting ground-based in situ observations, ground-based remote sensing and satellite data within the Pan Eurasian Experiment (PEEX) program (Invited Paper)**, Tuukka Petäjä, Univ. of Helsinki (Finland); Gerrit de Leeuw, Hanna K. Lappalainen, Univ. of Helsinki (Finland) and Finnish Meteorological Institute (Finland); Dmitri Moiseev, Univ. of Helsinki (Finland); Ewan O'Connor, Finnish Meteorological Institute (Finland) and The Univ. of Reading (United Kingdom); Valery Bondur, Aerocosmos (Russian Federation); Nikolai Kasimov, Lomonosov Moscow State Univ. (Russian Federation); Vladimir Kotlyakov, Institute of Geography (Russian Federation); Huadong Guo, Jiahua Zhang, Institute of Remote Sensing and Digital Earth (China); Gennadii G. Matvienko, V.E. Zuev Institute of Atmospheric Optics SB RAS (Russian Federation); Alexander Baklanov, Danish Meteorological Institute (Denmark); Sergej Zilitinkevich, Finnish Meteorological Institute (Finland); Markku Kulmala, Univ. of Helsinki (Finland) [9242-5]

11:10: **Managing uncertainty in cloud and precipitation property retrievals with multiple synergistic remote sensors (Invited Paper)**, Gerald G. Mace, The Univ. of Utah (United States) [9242-6]

11:40: **Influence of broken cloud fields on reflectance retrievals**, Robert Sundberg, Steven C. Richtsmeier, Spectral Sciences, Inc. (United States) [9242-7]

12:00: **Multi-platform in-situ and remote sensing techniques to derive Saharan dust properties during AMISOC-TNF 2013**, Carmen Córdoba-Jabonero, INTA Instituto Nacional de Técnica Aeroespacial (Spain); Javier Andrey, INTA Instituto Nacional de Técnica Aeroespacial (Spain); Laura Gómez, María Parrondo, José Antonio Adame, Olga Puentedura, INTA Instituto Nacional de Técnica Aeroespacial (Spain); Emilio Cuevas, Agencia Estatal de Meteorología (AEMET) (Spain) and Ctr. de Investigaciones Atmosféricas de Izaña (Spain); Manuel Gil-Ojeda, INTA Instituto Nacional de Técnica Aeroespacial (Spain) [9242-8]

Lunch/Exhibition Break Wed 12:20 to 13:30

SESSION 2

Room: D203 Wed 13:30 to 14:30

Radiative Transfer II

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

13:30: **Combining satellite optical remote sensing and radiative transfer simulation of spherical and non-spherical atmospheric aerosols to increase the performances of downstream applications in the fields of renewable energy and healthcare**, Marco Morelli, Univ. degli Studi di Milano (Italy); Andrea Masini, Flyby S.r.l (Italy); Marco Alberto Carlo Potenza, Univ. degli Studi di Milano (Italy) [9242-9]

13:50: **Experimental work of aerosol retrieval for SGLI on board GCOM-C1**, Itaru Sano, Kinki Univ. (Japan); Sonoyo Mukai, The Kyoto College of Graduate Studies for Informatics (Japan); Makiko Nakata, Kinki Univ. (Japan); Brent N. Holben, NASA Goddard Space Flight Ctr. (United States); Oleg Dubovik, Univ. des Sciences et Technologies de Lille (France) and Ctr. National de la Recherche Scientifique (France); Alexander A. Kokhanovsky, EUMETSAT (Germany) [9242-10]

14:10: **Estimation of optical aerosol properties and bidirectional reflectance from PARASOL/POLDER data over land**, Takashi Kusaka, Kanazawa Institute of Technology (Japan) [9242-11]

SESSION 3

Room: D203 Wed 14:30 to 17:20

Atmospheric Profiling of Aerosol, Trace Gases, and Meteorological Parameters of RS I

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

14:30: **Spectral reference line data relevant to remote sensing applications: a review and outline of the EUMETRISPEC project**, Olav Werhahn, Jens Brunzendorf, Javis A. Nwabo, Andrea Pogány, Viktor Werwein, Anne Rausch, Anton Serdyukov, Volker Ebert, Physikalisch-Technische Bundesanstalt (Germany) [9242-12]

14:50: **Variability of Mediterranean aerosol properties at three regional background sites in the Western Mediterranean Basin**, Michaël Sicard, Univ. Politècnica de Catalunya (Spain); François Dulac, Lab. des Sciences du Climat et de l'Environnement (France); Marc Mallet, Lab. d'Aérodologie (France); Adolfo Comerón, Univ. Politècnica de Catalunya (Spain); Lucas Alados-Arboledas, Univ. de Granada (Spain); Patrick Augustin, Univ. du Littoral Côte d'Opale (Spain); Patrick Chazette, Lab. des Sciences du Climat et de l'Environnement (France); Jean-François Léon, Lab. d'Aérodologie (France); Francisco José Olmo-Reyes, Univ. de Granada (Spain); Jean-Baptiste Renard, Lab. de Physique et Chimie de l'Environnement et de l'Espace (France); Francisc Rocabadosch, Univ. Politècnica de Catalunya (Spain); Julien Totems, Lab. des Sciences du Climat et de l'Environnement (France) [9242-13]

15:10: **Retrieval of boundary layer height from lidar using an extended Kalman filter approach, classic methods, and backtrajectory cluster analysis**, Robert F Banks, Barcelona Supercomputing Center (Spain); Jordi Tiana-Alsina, Dept. of Signal Theor. and Commun. (TSC), Univ. Politec. de Catalunya (Spain); José María Baldasano, Barcelona Supercomputing Center (Spain); Francisc Rocabadosch, Dept. of Signal Theor. and Commun. (TSC), Univ. Politec. de Catalunya (Spain) [9242-15]

Coffee Break Wed 15:30 to 16:00

16:00: **Analysis of aerosol transport patterns from Northern Europe into the Arctic in spring 2013 using Raman Lidar data**, Anne Pfüller, Rigel Kivi, Finnish Meteorological Institute (Finland); Grzegorz Karasinski, Polish Academy of Sciences (Poland); Christoph Ritter, Alfred-Wegener-Institut für Polar- und Meeresforschung (Germany); Mika Komppula, Finnish Meteorological Institute (Finland) [9242-16]

16:20: An inter-comparison study between vertically resolved ceilometer data and aircraft measurements during a Sahara dust period in Germany: first results, Konradin Weber, Andreas Vogel, Christian Fischer, Martin Lange, Tobias Pohl, C. Böhlke, Fachhochschule Düsseldorf (Germany); F. Wagner, Ina Mattis, Harald Flentje, K. Sturm, J. Barth, Thorsten Steinkopff, Deutscher Wetterdienst (Germany) [9242-54]

16:40: Retrieving the microphysical characteristics of cirrus clouds from lidar data by depolarization and color ratios, Alexander Konoshonkin, Anatoli G. Borovoi, V.E. Zuev Institute of Atmospheric Optics (Russian Federation) and National Research Tomsk State Univ. (Russian Federation) [9242-17]

17:00: Monitoring particulate matters in urban areas in Malaysia using remote sensing and ground-based measurements, Kasturi D. Kanniah, Nurul Amalin Fatimah Kamarul Zaman, Hui Qi Lim, Mohd Nadzri Md Reba, Univ. Teknologi Malaysia (Malaysia) [9242-18]

POSTERS—WEDNESDAY

Room: Elicium 1 Wed 17:40 to 19:15

Conference attendees are invited to attend the Remote Sensing poster session held on Wednesday 17:40 to 19:15. Posters will be on display after 10:00 Wednesday morning in the Conference Centre. Authors of poster papers will be present to answer questions concerning their papers during the Wednesday Poster Session. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x32234.xml> and under general information in the printed programme.

Natural and anthropogenic particles over East Asia, Makiko Nakata, Kinki Univ. (Japan) [9242-38]

A neural network approach for monitoring of volcanic SO2 and plume height using hyperspectral measurements, Alessandro Piscini, Istituto Nazionale di Geofisica e Vulcanologia (Italy); Elisa Carboni, Univ. of Oxford (United Kingdom); Fabio Del Frate, Univ. degli Studi di Roma "Tor Vergata" (Italy); Roy Gordon Grainger, Univ. of Oxford (United Kingdom) [9242-39]

Volcanic emissions from AIRS observations: detection methods, case study, and statistical analysis, Lars Hoffmann, Sabine Griessbach, Catrin I. Meyer, Forschungszentrum Jülich GmbH (Germany) [9242-40]

Identifying volcanic endmembers in hyperspectral images using spectral unmixing, Alessandro Piscini, Istituto Nazionale di Geofisica e Vulcanologia (Italy); Elisa Carboni, Univ. of Oxford (United Kingdom); Fabio Del Frate, Univ. degli Studi di Roma "Tor Vergata" (Italy); Roy Gordon Grainger, Univ. of Oxford (United Kingdom) [9242-41]

Air pollutant retrieval in East Asia from space and ground, Sonoyo Mukai, The Kyoto College of Graduate Studies for Informatics (Japan); Masayoshi Yasumoto, Makiko Nakata, Kinki Univ. (Japan) [9242-42]

Analysis of microphysical processes in fog, Yunlong Li, Technische Univ. Delft (Netherlands); Peter Hoogeboom, TNO (Netherlands) and Technische Univ. Delft (Netherlands); Herman W. J. Russchenberg, Technische Univ. Delft (Netherlands); Henk Klein Baltink, Koninklijk Nederlands Meteorologisch Instituut (Netherlands) [9242-43]

Coastal PM2.5 mass inversion using MODIS AOD and AERONET AOD in Zhejiang Province, China, Fang Gong, Difeng Wang, Delu Pan, Tianyu Wang, The Second Institute of Oceanography, SOA (China) [9242-45]

Estimation of cloud height and speed using ground-based stereophotography: Methods, error analysis and first results, Maksim Andreev, Alexey Chulichkov, Lomonosov Moscow State Univ. (Russian Federation); Andrey Medvedev, Oleg V. Postlyakov, A.M. Obukhov Institute of Atmospheric Physics (Russian Federation) [9242-47]

SkyLandQuality software for extracting the sky and land quality from Meteosat Satellite second generation data using Cloud Analysis images. First results for two sites: Aklim, Morocco and Hoyo Verde, Canary Islands, Abdelouahed Abahamid, Univ. Cadi Ayyad (Morocco); Marc Sarazin, European Southern Observatory (Germany) [9242-48]

FY-3B microwave sensors data assimilation experiments in hybrid data assimilation system, Huang Jiang Ping, Yan Jun, Fangyou Zhang, Du HongLiang, Beijing Aviation Meteorological Institute (China) [9242-49]

Cloud detection of hyperspectral imagery based on Sparse Support Vector Machine, Lei Ma, Institute of Automation (China) and Beijing Institute of Remote Sensing Information (China); Ou Wu, Xinwei Jiang, Institute of Automation (China); Bitao Jiang, Institute of Remote Sensing and Digital Earth (China) [9242-50]

Absorption properties of atmospheric aerosol based on photoacoustic spectroscopy, Wenye Zhu, Qiang Liu, Yi Wu, Anhui Institute of Optics and Fine Mechanics (China) [9242-51]

Synergetic use of MODIS cloud parameters for detecting aerosol regions over the North China Plain, Huazhe Shang, Institute of Remote Sensing and Digital Earth (China) and Univ. of Chinese Academy of Sciences (China); Liangfu Chen, Jinhua Tao, Lin Su, Institute of Remote Sensing and Digital Earth (China); Songlin Jia, Institute of Remote Sensing and Digital Earth (China) and Univ. of Chinese Academy of Sciences (China) [9242-52]

FY-3B microwave sensors data assimilation experiments in Hybrid DA system, Jiang Ping Huang, Jun Yan, Zhang Fangyou, Du HongLiang, Beijing Aviation Meteorological Institute (China) [9242-53]

Thursday 25 September

SESSION 4

Room: D203 Thu 8:40 to 10:00

Atmospheric Profiling of Aerosol, Trace Gases, and Meteorological Parameters of RS II

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

8:40: Release 2 data products from the Ozone Mapping and Profiler Suite (OMPS) Limb Profiler, Philippe Q. Xu, SAIC (United States) and NASA Goddard Space Flight Ctr. (United States); Pawan K. Bhartia, Glen R. Jaross, NASA Goddard Space Flight Ctr. (United States); Matthew T. DeLand, Jack C. Larsen, Science Systems and Applications, Inc. (United States); Albert J. Fleig, PITA Analytic Sciences (United States); Daniel Kahn, Tong Zhu, Zhong Chen, Nick Gorkavyi, Science Systems and Applications, Inc. (United States); Jeremy Warner, SAIC (United States) and Science Systems and Applications, Inc. (United States); Michael Linda, Hong G. Chen, Mark Kowitz, Michael Haken, Peter Hall, Science Systems and Applications, Inc. (United States) [9242-19]

9:00: Validation of AIRS high-resolution stratospheric temperature retrievals, Catrin I. Meyer, Lars Hoffmann, Forschungszentrum Jülich GmbH (Germany) [9242-20]

9:20: Towards an integrated infrastructure for accurate H2O remote sensing validation, Bernhard Buchholz, Physikalisch-Technische Bundesanstalt (Germany) and Technische Univ. Darmstadt (Germany); Olav Werhahn, Physikalisch-Technische Bundesanstalt (Germany); Volker Ebert, Physikalisch-Technische Bundesanstalt (Germany) and Technische Univ. Darmstadt (Germany) [9242-21]

9:40: Influence of large and supersize droplets on propagation of Lidar radiation in cloud aerosol: numerical statistical simulation, Evgeniya G. Kablukova, Institute of Computational Mathematics and Mathematical Geophysics (Russian Federation); Boris A. Kargin, Institute of Computational Mathematics and Mathematical Geophysics (Russian Federation) and Novosibirsk State Univ. (Russian Federation); Andrei A. Lisenko, V.E. Zuev Institute of Atmospheric Optics (Russian Federation) [9242-22]

Coffee Break Thu 10:00 to 10:30

SESSION 5

Room: D203 Thu 10:30 to 12:30

Lidar, Radar and Passive Atmospheric Measurements I

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

10:30: Airborne midwave and longwave infrared hyperspectral imaging of gases, Marc-André Gagnon, Pierre Tremblay, Simon Savary, Marc Duval, Philippe Lagueux, Martin Chamberland, Telops (Canada) [9242-23]

10:50: Greenhouse Observations of the Stratosphere and Troposphere (GHOST): a novel shortwave infrared spectrometer developed for the Global Hawk unmanned aerial vehicle, Neil Humpage, Hartmut Boesch, Univ. of Leicester (United Kingdom); Paul I. Palmer, The Univ. of Edinburgh (United Kingdom); Phil M. Parr-Burman, Andrew J. A. Vick, Naidu N. Bezawada, Martin Black, Andrew J. Born, David Pearson, Jonathan Strachan, Martyn Wells, UK Astronomy Technology Ctr. (United Kingdom) [9242-24]

11:10: 3D acoustic atmospheric tomography, Kevin Rogers, Anthony Finn, Univ. of South Australia/Defence & Systems Institute (Australia) [9242-26]

11:30: Acoustic atmospheric tomography using multiple unmanned aerial vehicles, Anthony Finn, Kevin Rogers, Univ. of South Australia/Defence & Systems Institute (Australia); Joshua Meade, Univ. of South Australia/Defence & Systems Institute (Australia); Stephen Franklin, Univ. of South Australia/Defence & Systems Institute (Australia) [9242-25]

11:50: DOAS measurements of air pollutants including HCHO near road traffic, Klaus Schäfer, Karlsruher Institut für Technologie (Germany); Hong Ling, Institute of Atmospheric Physics (China); Christoph Münkel, Vaisala GmbH (Germany) [9242-27]

12:10: Measurements of formaldehyde total content using DOAS technique in Moscow Region: retrieval method and first results, Oleg V. Postlyakov, Alexander Borovski, Anatoly Dzhola, Alexander Elokho, Evgeny I. Grechko, A.M. Obukhov Institute of Atmospheric Physics (Russian Federation); Yugo Kanaya, Japan Agency for Marine-Earth Science and Technology (Japan) [9242-28]

Lunch Break Thu 12:30 to 13:40

CONFERENCE 9242A - ROOM: D203

SESSION 6

Room: D203 Thu 13:40 to 16:40

Lidar, Radar and Passive Atmospheric Measurements II

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

13:40: **Dimensionless parameters for Lidar performance characterization**, Adolfo Comerón, Univ. Politècnica de Catalunya (Spain); Ravil R. Agishev, Kazan National Research Technical Univ. (Russian Federation) [9242-29]

14:00: **Estimates of cumulative rainfall over a large area by weather radar**, Alessandro Mazza, Istituto di Biometeorologia (Italy) and LaMMA Consortium (Italy); Samantha Melani, Andrea Antonini, Istituto di Biometeorologia (Italy); Alberto Ortolani, Istituto di Biometeorologia (Italy) and LaMMA Consortium (Italy) [9242-30]

14:20: **Validation of atmospheric correction algorithm ATCOR**, Bringfried Pflug, Magdalena Main-Knorn, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [9242-31]

14:40: **Using Lunar observations to validate in-flight calibrations, pointing accuracy and detector alignment of CERES instruments**, Janet L. Daniels, George L. Smith, Science Systems and Applications, Inc. (United States); Kory Priestler, NASA Langley Research Ctr. (United States); Susan Thomas, Science Systems and Applications, Inc. (United States) [9242-32]

15:00: **Comparison of unfiltered radiances measured by CERES instruments aboard the NPP and Terra/Aqua satellites**, Zbigniew P. Szewczyk, Science Systems and Applications, Inc. (United States) [9242-33]

Coffee Break Thu 15:20 to 15:40

15:40: **Study of clear-air dynamic turbulence structure in troposphere using wind profile radar**, Ningquan Weng, Gang Sun, Caiyun Zhang, Xiaoqin Liu, Yi Wu, Anhui Institute of Optics and Fine Mechanics (China) [9242-34]

16:00: **Algorithms comparison for calculating downward longwave radiation by MODIS data under clear and cloudy skies**, Shanshan Yu, Xiaozhou Xin, Hailong Zhang, Institute of Remote Sensing and Digital Earth (China) . . [9242-36]

16:20: **Estimation of all-sky downward shortwave radiation from MTSAT-1R images and MODIS data**, Hailong Zhang, Li Li, Institute of Remote Sensing and Digital Earth (China) [9242-37]

OPTICS IN ATMOSPHERIC PROPAGATION AND ADAPTIVE SYSTEMS

Conference Chairs: **Karin Stein**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **John D. Gonglewski**, European Office of Aerospace Research and Development (United Kingdom)

Programme Committee: **Ivo Buske**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Sylvain Cheinet**, Institut Franco-Allemand de Recherches de Saint-Louis (France); **David C. Dayton**, Applied Technology Associates (United States); **Gregory C. Dente**, Air Force Research Lab. (United States); **Denis Dion Jr.**, Defence Research and Development Canada, Valcartier (Canada); **Stephen Hammel**, Space and Naval Warfare Systems Command (United States); **Vladimir P. Lukin**, V.E. Zuev Institute of Atmospheric Optics (Russian Federation); **Cheryl Matson**, Univ. of California, San Diego (United States); **Sergio R. Restaino**, U.S. Naval Research Lab. (United States); **Jim Riker**, Air Force Research Lab. (United States); **Marc J. F. Séchaud**, ONERA (France); **Alexander M. J. 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)

Monday 22 September

WELCOME AND INTRODUCTION

Room: E107 9:00 to 9:10

SESSION 10

Room: E107 Mon 9:10 to 10:30

Characterization of the Environment

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

9:10: **Characteristics of turbulence-driven atmospheric blur over coastal water**, Arie N. de Jong, TNO Defence, Security and Safety (Netherlands) [9242-60]

9:30: **Investigation of optical turbulence in the atmospheric surface using scintillometer measurements along a slant path and comparison to ultrasonic anemometer measurements**, Detlev Sprung, Erik Sucher, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Arshath Ramkilowan, Derek J. Griffith, Council for Scientific and Industrial Research (South Africa) [9242-61]

9:50: **Exploration of satellite-derived data products for atmospheric turbulence studies**, Derek J. Griffith, Arshath Ramkilowan, Ryno R. van Staden, Council for Scientific and Industrial Research (South Africa) [9242-62]

10:10: **Experimental verification of optical crosswind measurement systems**, Assaf Engel, Omer Porat, Joseph Shapira, Avraham Englander, Soreq Nuclear Research Ctr. (Israel) [9242-63]

Coffee Break Mon 10:30 to 11:00

SESSION 11

Room: E107 Mon 11:00 to 12:40

Propagation through Optical Turbulence

Session Chair: **John D. Gonglewski**, European Office of Aerospace Research and Development (United Kingdom)

11:00: **Experimental setup for investigation of laser beam propagation along horizontal urban path**, Rui N. Barros, Sarah Keary, Szymon Gladysz, Italo Toselli, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [9242-64]

11:20: **Position determination of a point source through turbulent atmosphere**, Ivo Buske, Leif Humbert, Andreas Walther, Wolfgang Riede, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [9242-65]

11:40: **Influence of each Zernike aberration on the propagation of laser beams through atmospheric turbulence**, Adrian Azarian, Szymon Gladysz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [9242-66]

12:00: **Remaining distortions, conditioned dimension of guide source**, Vladimir P. Lukin, V.E. Zuev Institute of Atmospheric Optics (Russian Federation) [9242-67]

12:20: **Modeling of laser beam propagation through turbulence**, Fedor V. Shugaev, Natalia A. Suhareva, Ludmila S. Shtemenko, Oksana A. Nikolaeva, Anatoly P. Sukhorukov, Tatiana I. Arsenyan, Lomonosov Moscow State Univ. (Russian Federation) [9242-68]

Lunch Break Mon 12:40 to 13:50

SESSION 12

Room: E107 Mon 13:50 to 15:10

Imaging through Turbulent Media

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

13:50: **Correction methods for underwater turbulence degraded imaging**, Andrey Kanaev, Weilin W. Hou, Sergio R. Restaino, Silvia C. Matt, U.S. Naval Research Lab. (United States) [9242-74]

14:10: **Scintillations in the imaging through turbulence**, Mikhail I. Charnotskii, National Oceanic and Atmospheric Administration (United States) [9242-75]

14:30: **Anisoplanatic imaging simulations on GPU with IMOTEP**, Goulven Monnier, F. R. Duval, Solène Amram, ALYOTECH France (France) [9242-76]

14:50: **Ship plume modeling in EOSTAR**, Miranda van Iersel, Marianne Degache, Alexander M van Eijk, TNO (Netherlands) [9242-77]

Coffee Break Mon 15:10 to 15:40

SESSION 13

Room: E107 Mon 15:40 to 16:40

Wavefront Sensing

Session Chair: **Ivo Buske**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)

15:40: **Characterization of the digital holographic wavefront sensor in an adaptive optics system**, Pablo Marin Palomo, Andreas Zepp, Szymon Gladysz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [9242-69]

16:00: **Dual-mode wavefront detection sensor based on liquid crystal microlens array**, Hui Li, Wuhan Institute of Technology (China); Kan Liu, Wuhan Institute of Physics and Mathematics (China); Fan Pan, Dunbo Cai, Yuntao Wu, Yanduo Zhang, Wuhan Institute of Technology (China) [9242-70]

16:20: **Simulation of SNS effect on the detecting precision of Hartman-Shack sensor**, Youkuan Li, Jianzhu Zhang, Feizhou Zhang, Institute of Applied Physics and Computational Mathematics (China) [9242-71]

SESSION 14

Room: E107 Mon 16:40 to 17:00

New Devices for Atmospheric Measurements

16:40: **Optically addressed and submillisecond response phase only liquid crystal spatial light modulator**, Xiangjie Zhao, Dayong Zhang, Yongquan Luo, Jiazhu Duan, China Academy of Engineering Physics (China) [9242-73]

CONFERENCE 9243 - ROOM: E108

Wednesday - Thursday 24-25 September 2014 • Proceedings of SPIE Vol. 9243

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 Bovenga**, Consiglio Nazionale delle Ricerche (Italy); **Fabio Covello**, 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); **Luca Pasolli**, EURAC research (Italy); **Luca Pulvirenti**, Univ. degli Studi di Roma La Sapienza (Italy); **Emanuele Santi**, Istituto di Fisica Applicata Nello Carrara (Italy); **Stefan Schneiderbauer**, EURAC research (Italy); **David Small**, Univ. of Zürich (Switzerland)

Wednesday 24 September

SESSION 1

Room: E108 Wed 8:40 to 10:00

SAR Processing

Session Chair: **Fabio Bovenga**, CNR ISSIA (Italy)

8:40: **Feasibility of COSMO-SkyMed constellation for radargrammetric DEM generation**, Domenico Conte, Politecnico di Bari (Italy); Alberto Refice, CNR ISSIA (Italy); Fabio Bovenga, Consiglio Nazionale delle Ricerche (Italy); Davide O. Nitti, Raffaele Nutricato, GAP S.r.l. (Italy); Maria Teresa Chiaradia, Politecnico di Bari (Italy). [9243-1]

9:00: **Advanced SAR simulator with multi-beam interferometric capabilities**, Antonio Reppucci, José Márquez, Victor Cazcarra, Giulio Ruffini, Starlab (Spain) [9243-2]

9:20: **Modeling atmospheric precipitation impact on synthetic aperture radar surface imagery at X and Ka bands**, Saverio Mori, Federica Polverari, Univ. degli Studi di Roma La Sapienza (Italy) and CETEMPS (Italy); Luca Pulvirenti, CIMA Research Foundation (Italy) and CETEMPS (Italy); Nazzareno Pierdicca, Univ. degli Studi di Roma La Sapienza (Italy); Frank Silvio Marzano, Univ. degli Studi di Roma La Sapienza (Italy) and CETEMPS (Italy) [9243-3]

9:40: **Intermittent Small Baseline Subset (ISBAS) monitoring of land covers unfavourable for conventional C-band InSAR: proof-of-concept for peatland environments in North Wales, UK**, Francesca Cigna, British Geological Survey (United Kingdom); Andrew Sowter, The Univ. of Nottingham (United Kingdom); Colm J. Jordan, Barry G. Rawlins, British Geological Survey (United Kingdom) [9243-4]

Coffee Break Wed 10:00 to 10:30

SESSION 2

Room: E108 Wed 10:30 to 11:50

SAR Application I

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

10:30: **Preparing a new data set for earthquake damage detection in SAR imagery: the Christchurch example II**, Horst Hammer, Silvia Kuny, Karsten Schulz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [9243-5]

10:50: **Detecting sparse earthquake damages in high density urban settlements by VHR SAR data**, Roberta Anniballe, Univ. degli Studi di Roma La Sapienza (Italy); Christian Bignami, Istituto Nazionale di Geofisica e Vulcanologia (Italy); Marco Chini, Ctr. de Recherche Public - Gabriel Lippmann (Luxembourg); Nazzareno Pierdicca, Univ. degli Studi di Roma La Sapienza (Italy); Salvatore Stramondo, Istituto Nazionale di Geofisica e Vulcanologia (Italy) [9243-6]

11:10: **Adaptive InSAR and surveying techniques combination for an improved characterisation of active landslides**, Javier Duro, David Albiol, Altamira Information (Spain) [9243-7]

11:30: **Study of the impact of ionosphere delay on the accuracy of SAR stereoscopic survey**, Yang Zhou, Qing Xu, Guowang Jin, Chaozhen Lan, Ling Zhao, Zhengzhou Institute of Surveying and Mapping (China) [9243-8]

Lunch/Exhibition Break Wed 11:50 to 14:10

SESSION JS1

Room: E108 Wed 14:10 to 15:10

SAR Data Analysis I: Joint Session

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

Conference 9244, Image and Signal Processing for Remote Sensing and Conference 9243, SAR Image Analysis, Modeling and Techniques Joint Session

14:10: **Target modelling for SAR image simulation**, Christopher J. Willis, BAE Systems (United Kingdom) [9243-10]

14:30: **Non-destructive wavelet-based despeckling in SAR images**, Yuri S. Bekhtin, Andrey A. Bryantsev, Damiao P. Malebo, Ryazan State Radio Engineering Univ. (Russian Federation); Alexey A. Lupachev, Moscow Power Engineering Institute (Russian Federation) [9243-11]

14:50: **Port surveillance by using co-occurrence matrix on multitemporal SAR images**, Na Li, Yang Liu, Songlin Liu, Fang Liu, Zengping Chen, National Univ. of Defense Technology (China) [9244-46]

Coffee Break Wed 15:10 to 15:40

SESSION JS2

Room: E108 Wed 15:40 to 17:20

SAR Data Analysis II: Joint Session

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

Conference 9244, Image and Signal Processing for Remote Sensing and Conference 9243, SAR Image Analysis, Modeling and Techniques Joint Session

15:40: **Topography estimation using SAR image polarimetry**, Ramin Sabry, Karim E. Mattar, Defence Research and Development Canada (Canada) [9244-48]

16:00: **Exploitation of a large COSMO-SkyMed interferometric dataset**, Raffaele Nutricato, Davide O. Nitti, GAP S.r.l. (Italy); Fabio Bovenga, Consiglio Nazionale delle Ricerche (Italy); Alberto Refice, CNR ISSIA (Italy); Maria Teresa Chiaradia, Politecnico di Bari (Italy) [9243-12]

16:20: **Benefits of blind speckle decorrelation for InSAR processing**, Luciano Alparone, Univ. degli Studi di Firenze (Italy) and Istituto di Fisica Applicata Nello Carrara (Italy); Fabrizio Argenti, Univ. degli Studi di Firenze (Italy); Gianfranco Fornaro, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy); Alessandro Lapini, Univ. degli Studi di Firenze (Italy); Diego Reale, Francescopaolo Sica, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy) [9243-13]

16:40: **A Bayesian network approach to perform SAR/InSAR data fusion in a flood detection problem**, Annarita D'Addabbo, Alberto Refice, CNR ISSIA (Italy); Guido Pasquariello, CNR-ISSIA (Italy) [9244-49]

17:00: **Inversion of three layers multiscale SPM model based on neural network technique for the retrieval of soil multi-scale roughness and moisture parameters**, Lilia Bennaceur FARAH, Ibtissem Hosni, Maroua Jaafari, ENIT (Tunisia); Imed Riadh Farah, ENSI (Tunisia); Mohamed Saber Naceur, ENIT (Tunisia) [9244-50]

POSTERS—WEDNESDAY

Room: Elicium 1 Wed 17:40 to 19:15

Conference attendees are invited to attend the Remote Sensing poster session held on Wednesday 17:40 to 19:15. Posters will be on display after 10:00 Wednesday morning in the Conference Centre. Authors of poster papers will be present to answer questions concerning their papers during the Wednesday Poster Session. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x32234.xml> and under general information in the printed programme.

Assessment of ground deformation at the Aquistore CO2 storage site in Saskatchewan (Canada) using satellite SAR interferometry, Magdalena Czarnogorska, Sergey V. Samsonov, Don White, Natural Resources Canada (Canada) [9243-20]

Preparing a new data set for earthquake damage detection in SAR imagery: the Christchurch example I, Silvia Kuny, Horst Hammer, Karsten Schulz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [9243-33]

Polarimetric SAR tomography in the X-band by continuous wave multibaseline SAR tracks in a convex optimization approach, Filippo Biondi, Ministero Della Difesa (Italy); Antonio Sarri, Luca Fiori, Kevin Dell'Omodarme, IDS - Ingegneria Dei Sistemi S.p.A. (Italy) [9243-34]

Experimental 3D SAR human target signature analysis, Brigitte Chan, Pascale Sévigny, David D. J. DiFilippo, Defence Research and Development Canada (Canada) [Paper 9243-35]

Feature of the displacement in applying the sub-pixel matching methodology to high-resolution TerraSAR-X images in the Great East Japan Earthquake 2011, Takashi Nonaka, Toshifumi Hiramatsu, PASCO Corp. (Japan) [9243-37]

Monitoring of surface deformation in open pit mine using DInSAR time-series: a case study in the N5W iron mine (Carajás, Brazil) using TerraSAR-X data, José C. Mura, Waldir R. Paradella, Instituto Nacional de Pesquisas Espaciais (Brazil); Fabio F. Gama, Athos R. Santos, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Mauricio Galo, Paulo Camargo, Univ. Estadual Paulista "Júlio de Mesquita Filho" (Brazil); Arnaldo Q. Silva, Univ. Federal do Pará (Brazil); Guilherme G. Silva, Instituto Nacional de Pesquisas Espaciais (Brazil) [9243-38]

Imaging of downward-looking linear array SAR using three-dimensional spatial smoothing MUSIC algorithm, Siqian Zhang, Gangyao Kuang, National Univ. of Defense Technology (China) [9243-39]

Ambiguities analysis in SAR tomography, Ziwei Wang, Chao Wang, Hong Zhang, Yixian Tang, Bo Zhang, Institute of Remote Sensing and Digital Earth (China) [9243-40]

Ship surveillance with Radarsat-2 ScansAR, Ziwei Wang, Hong Zhang, Chao Wang, Fan Wu, Institute of Remote Sensing and Digital Earth (China) [9243-41]

Deformation monitoring in the Metro Manila using ALOS/PALSAR, Tomonori Deguchi, Nittetsu Mining Consultants Co., Ltd. (Japan) [9243-42]

High resolution image formation method based on the realistic spaceborne SAR modeling and simulation, Sang Heun Shim, Agency for Defense Development (Korea, Republic of); KAIST (Korea, Republic of); Seyoung Kim, Agency for Defense Development (Korea, Republic of); Yong Man Ro, KAIST (Korea, Republic of) [9243-43]

The COSMO-SkyMed support to earthquake events, Patrizia Sacco, Maria Libera Battagliere, Maria Girolamo Daraio, Alessandro Coletta, Agenzia Spaziale Italiana (Italy) [9243-44]

MetaSensing's FastGBSAR: ground based radar for deformation monitoring, Sabine Roedelsperger, Adriano Meta, MetaSensing (Netherlands) [9243-45]

Prediction of Water Quality Parameters from SAR Images by Using Multivariate and Texture Analysis Models, Muntadher A. Shareef, Abdelmalek Toumi, Ali Khenchaf, ENSTA Bretagne (France) [9243-46]

Focusing of bistatic data, Mariantonietta Zonno, Pietro Bia, Politecnico di Bari (Italy); Giovanni Nico, Istituto per le Applicazioni del Calcolo "Mauro Picone" (Italy); Nicola Ricci, Politecnico di Bari (Italy); João Catalão Fernandes, Univ. de Lisboa (Portugal); Manlio Tesauro, Univ. degli Studi della Basilicata (Italy) [9243-47]

Intermittent SBAS (ISBAS) InSAR with COSMO-SkyMed X-band high resolution SAR data for landslide inventory mapping in Piana degli Albanesi (Italy), Francesca Cigna, British Geological Survey (United Kingdom); Alessandro Novellino, Univ. degli Studi di Napoli Federico II (Italy); Colm J. Jordan, British Geological Survey (United Kingdom); Andrew Sowter, The Univ. of Nottingham (United Kingdom); Domenico Calcaterra, Univ. degli Studi di Napoli Federico II (Italy); Massimo Ramondini, Univ. degli Studi di Napoli Federico II (United Kingdom) [9243-48]

Combined use of COSMO-SkyMed derived products and hydrodynamic models to produce physically-based maps of flood extent, Luca Pulvirenti, CIMA Research Foundation (Italy), Univ. degli Studi di Roma La Sapienza (Italy); Nazzareno Pierdicca, Univ. degli Studi di Roma La Sapienza (Italy); Giorgio Boni, Mattia Fiorni, Roberto Rudari, CIMA Research Foundation (Italy) [9243-49]

Thursday 25 September

SESSION 3

Room: E108 Thu 8:40 to 10:00

SAR Application in Hydrology

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

8:40: **Multitemporal soil moisture retrieval from radar data: preparation of SMAP data processing over Italy**, Fabio Fascetti, Nazzareno Pierdicca, Univ. degli Studi di Roma La Sapienza (Italy); Luca Pulvirenti, CIMA Research Foundation (Italy) and Univ. degli Studi di Roma La Sapienza (Italy) ... [9243-14]

9:00: **An overview of neural network applications for soil moisture retrieval from radar satellite sensors**, Simonetta Paloscia, Emanuele Santi, Simone Pettinato, Istituto di Fisica Applicata Nello Carrara (Italy) [9243-15]

9:20: **Estimation of surface soil moisture in alpine areas based on medium spatial resolution SAR time-series and upscaled in-situ measurements**, Felix Greffeneder, Claudia Notarnicola, Giovanni Cuzzo, Giacomo Bertoldi, Stefano Della Chiesa, Georg Niedrist, EURAC research (Italy); Jelena Stemenkovic, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Wolfgang Wagner, Technische Univ. Wien (Austria) [9243-16]

9:40: **Use of time series of SAR images in the estimation of wet snow cover in the Andes of Argentina and Chile**, Graciela Salinas Salmuni, Giovanna V. Argento, Comisión Nacional de Actividades Espaciales (Argentina) ... [9243-17]

Coffee Break Thu 10:00 to 10:30

SESSION 4

Room: E108 Thu 10:30 to 12:10

Interferometry and SAR Processing

Session Chair: **Fabio Bovenga**, CNR ISSIA (Italy)

10:30: **Corner reflectors and multi-temporal SAR interferometry for landslide monitoring**, Fabio Bovenga, Alberto Refice, Guido Pasquariello, CNR ISSIA (Italy); Davide O. Niitti, Raffaele Nutricato, GAP S.r.l. (Italy) [9243-18]

10:50: **Utilisation of the COSMO-SkyMed Constellation for coherent and incoherent monitoring**, Robert Siegmund, GAF AG (Germany); Mario Costantini, e-GEOS (Italy); Anna Schaertel, GAF AG (Germany); Luca Pietranera, e-GEOS (Italy) [9243-19]

11:10: **The PSIG chain: an approach to Persistent Scatterer Interferometry**, Núria Devanthery, Michele Crosetto, Oriol Monserrat, Maria Cuevas-González, Ctr. Tecnològic de Telecomunicacions de Catalunya (Spain); Bruno Crippa, Univ. degli Studi di Milano (Italy) [9243-36]

11:30: **Impact of focusing of ground-SAR data on the quality of interferometric SAR applications**, Mariantonietta Zonno, Luigi Mascolo, Pietro Guccione, Politecnico di Bari (Italy); Giovanni Nico, Istituto per le Applicazioni del Calcolo "Mauro Picone" (Italy); Andrea Di Pasquale, DIAN S.r.l. (Italy) [9243-21]

11:50: **An assessment of TanDEM-X GlobalDEM over rural and urban areas**, Fifamè N. Koudogbo, Javier Duro, Altamira Information (Spain); Roberto Rudari, CIMA Research Foundation (Italy); Andrew Eddy, Athena Global (France); Richard M. Lucas, The Univ. of New South Wales (Australia) [9243-22]

Lunch Break Thu 12:10 to 13:20

SESSION 5

Room: E108 Thu 13:20 to 14:20

SAR Application for Vegetation Monitoring

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

13:20: **Use of airborne polarimetric SAR, optical and elevation data for mapping and monitoring of salt marsh vegetation habitats**, Sybrand van Beijma, Airbus Defence and Space (United Kingdom); Alexis Comber, Univ. of Leicester (United Kingdom); Alistair Lamb, Airbus Defence and Space (United Kingdom) [9243-23]

13:40: **The monitoring of soil and vegetation parameters from COSMO-SkyMed data**, Simonetta Paloscia, Giacomo Fontanelli, Francesco Montomoli, Simone Pettinato, Emanuele Santi, Istituto di Fisica Applicata Nello Carrara (Italy) [9243-25]

14:00: **COSMO-SkyMed potentiality to identify crop-specific behavior and monitor phenological parameters**, Rocchina Guarini, Federica Segalini, Agenzia Spaziale Italiana (Italy); Giovanni Mastronardi, Politecnico di Bari (Italy); Claudia Notarnicola, EURAC research (Italy); Francesco Vuolo, Univ. für Bodenkultur Wien (Austria); Luigi Dini, Agenzia Spaziale Italiana (Italy) . [9243-26]

CONFERENCE 9243 - ROOM: E108

SESSION 6

Room: E108 Thu 14:20 to 16:20

SAR Application II

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

14:20: **A Bayesian algorithm to retrieve soil moisture from SAR data**, Matias Barber, Francisco M. Grings, Haydee Karszenbaum, Instituto de Astronomía y Física del Espacio (Argentina) [9243-27]

14:40: **Soil moisture estimation using synergy of optical, SAR, and topographic data with Gaussian process regression**, Jelena Stamenkovic, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Claudia Notarnicola, Nadine Spindler, Giovanni Cuzzo, Giacomo Bertoldi, Georg Niedrist, Stefano Della Chiesa, Felix Greifeneder, EURAC research (Italy); Devis Tuia, Univ. de Lausanne (Spain); Maurice Borgeaud, European Space Agency, ESRIN (Italy); Jean-Philippe Thiran, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [9243-28]

Coffee Break Thu 15:00 to 15:20

15:20: **Oil spill analysis by means of full polarimetric UAVSAR (L-band) and Radarsat-2 (C-band) products acquired during Deepwater Horizon Disaster**, Daniele Latini, Fabio Del Frate, Univ. degli Studi di Roma "Tor Vergata" (Italy); Cathleen E. Jones, Jet Propulsion Lab. (United States) [9243-29]

15:40: **Wake-based ship route estimation in high-resolution SAR images**, Maria Daniela Graziano, Giancarlo Rufino, Univ. degli Studi di Napoli Federico II (Italy); Marco D'Errico, Seconda Univ. degli Studi di Napoli (Italy) [9243-30]

16:00: **A comparative study of RADAR Ka-Band backscatter**, Daniele Mapelli, ARESYS s.r.l. (Italy); Nazzareno Pierdicca, Univ. degli Studi di Roma La Sapienza (Italy); Leila Guerriero, Univ. degli Studi di Roma "Tor Vergata" (Italy); Luca Pulvirenti, Univ. degli Studi di Roma La Sapienza (Italy); Paolo Ferrazzoli, Univ. degli Studi di Roma "Tor Vergata" (Italy); Eduardo Calleja, Starlab (Spain); Bjorn Rommen, European Space Research and Technology Ctr. (Netherlands); Davide Giudici, ARESYS s.r.l. (Italy); Andrea Monti Guarnieri, Politecnico di Milano (Italy) [9243-31]

CONFERENCE 9244 - ROOM: E103

Monday - Wednesday 22-24 September 2014 • Proceedings of SPIE Vol. 9244

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); **Francesca Bovolo**, Fondazione Bruno Kessler (Italy)

Programme Committee: **Selim Aksoy**, Bilkent Univ. (Turkey); **Luciano Alparone**, Univ. degli Studi di Firenze (Italy); **José M. Bioucas-Dias**, Univ. Técnica de Lisboa (Portugal); **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); **Melba M. Crawford**, Purdue Univ. (United States); **Fabio Dell'Acqua**, Univ. degli Studi di Pavia (Italy); **Begüm Demir**, Univ. degli Studi di Trento (Italy); **Peijun Du**, China Univ. of Mining and Technology (China); **Peijun Du**, Nanjing Univ. (China); **Giles M. Foody**, The Univ. of Nottingham (United Kingdom); **Andrea Garzelli**, Univ. degli Studi di Siena (Italy); **Jordi Inglada**, Ctr. d'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); **Josiane B. Zerubia**, INRIA Sophia Antipolis - Méditerranée (France)

Monday 22 September

SESSION 1

Room: E103 Mon 8:50 to 10:10

VHR Image Analysis and Fusion

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

8:50: **Full scale assessment of pansharpening methods and data products**, Bruno Aiuzzi, Istituto di Fisica Applicata Nello Carrara (Italy); Luciano Alparone, Univ. degli Studi di Firenze (Italy); Stefano Baronti, Roberto Carli, Istituto di Fisica Applicata Nello Carrara (Italy); Andrea Garzelli, Univ. degli Studi di Siena (Italy); Leonardo Santurri, Istituto di Fisica Applicata Nello Carrara (Italy) [9244-1]

9:10: **Methods and metrics for the assessment of Pan-sharpening algorithms**, Francesca Despini, Sergio Teggi, Univ. degli Studi di Modena e Reggio Emilia (Italy); Andrea Baraldi, Univ. of Maryland, College Park (United States) [9244-2]

9:30: **A method for generating high resolution satellite image time series**, Tao Guo, Hitachi, Ltd. (Japan) [9244-3]

9:50: **Spatial resolution enhancement of hyperspectral image based on the combination of spectral mixing model and observation model**, Yifan Zhang, Northwestern Polytechnical Univ. (China) [9244-5]

Coffee Break Mon 10:10 to 10:40

SESSION 2

Room: E103 Mon 10:40 to 12:20

Image Segmentation

Session Chair: **Andrea Garzelli**, Univ. degli Studi di Siena (Italy)

10:40: **Efficient hyperspectral image segmentation using geometric active contour formulation**, Fatema A. Albaloooshi, Paheding Sidike, Vijayan K. Asari, Univ. of Dayton (United States) [9244-6]

11:00: **A fuzzy segmentation tool for remote sensing data**, Ana C. Quintão Siravenha, Victor Brito, Evaldo G. Pelaes, Univ. Federal do Pará (Brazil). [9244-7]

11:20: **Automatic large-volume object region segmentation in Lidar point clouds**, Nina M. Varney, Vijayan K. Asari, Univ. of Dayton (United States)[9244-8]

11:40: **Edge-crease detection and surface reconstruction from point clouds using a second-order variational model**, Massimo Zanetti, Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy) [9244-9]

12:00: **Three-dimensional building roof boundary extraction using high-resolution aerial image and Lidar data**, Aluir P. Dal Poz, Antonio J. Fazan, UNESP (Brazil) [9244-10]

Lunch Break Mon 12:20 to 13:50

SESSION 3

Room: E103 Mon 13:50 to 15:10

Geometric Corrections and Co-registration

Session Chair: **Jon Atli Benediktsson**, Univ. of Iceland (Iceland)

13:50: **Sentinel 2: geometric calibration during commissioning phase**, Cecile Dechoz, Florie Languille, Thierry Tremas, Julien Nosavan, Beatrice Petrucci, Ctr. National d'Études Spatiales (France); Stéphane Massera, Roland Gachet, Institut Géographique National (France); Philippe Martimort, Claudia Isola, European Space Research and Technology Ctr. (Netherlands) [9244-11]

14:10: **Automatic registration of multispectral images through maximization of mutual information**, Pietro Guccione, Luigi Mascolo, Politecnico di Bari (Italy); Mario Tragni, Giuseppe Cifarelli, Planetek Italia S.r.l. (Italy) [9244-12]

14:30: **On resampling algorithms for the Meteosat Third Generation rectification: feasibility study for an operational implementation**, Rebecca Gutiérrez López, Dieter Just, EUMETSAT (Germany) [9244-13]

14:50: **Automatic outlier suppression for rigid coherent point drift algorithm**, Songlin Liu, Ruibin Tu, Zhaodong Niu, Na Li, Zengping Chen, National Univ. of Defense Technology (China) [9244-14]

Coffee Break Mon 15:10 to 15:40

SESSION 4

Room: E103 Mon 15:10 to 17:20

Calibration, Restoration, and Compression

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

15:40: **Atmospheric normalization via multi-image pseudo-invariant features**, Luigi Barazzetti, Marco Gianinnetto, Politecnico di Milano (Italy); Marco Scaioni, Tongji Univ. (Italy) [9244-16]

16:00: **Image structure restoration from sputnik with Multi-Matrix Scanners**, Alexey Kuznetsov, Ryazan State Radio Engineering Univ. (Russian Federation); Victor Eremeev, Ryazan State Radio Engineering University (Russian Federation); Gennady Miatov, Samara State Aerospace University (Russian Federation); Oleg Presnyakov, Ryazan State Radio Engineering Univ. (Russian Federation); Vasily Poshekhonov, Pavel Svetelkin, Ryazan State Radio Engineering University (Russian Federation) [9244-17]

16:20: **Hyperspectral imagery restoration based on multisource image fusion**, Lei Ma, Institute of Automation (China) and Institute of Remote Sensing and Digital Earth (China); Ou Wu, Xinwei Jiang, Institute of Automation (China); Bitao Jiang, Institute of Remote Sensing and Digital Earth (China) [9244-18]

16:40: **Prediction of optimal operation point existence and parameters in lossy compression of noisy images**, Vladimir V. Lukin, Alexander N. Zemliachenko, Sergey K. Abramov, National Aerospace Univ. (Ukraine); Benoit Vozel, Kacem Chehdi, Univ. de Rennes 1 (France) [9244-19]

17:00: **Analysis of infrared polarization properties of several typical artificial objects**, Yan Zhang, Jiantao Han, Jicheng Li, Weiping Yang, Ting Gong, National Univ. of Defense Technology (China) [9244-20]

CONFERENCE 9244 - ROOM: E103

Tuesday 23 September

SESSION 5

Room: E103 Tue 8:30 to 10:10

Feature Selection and Classification

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

8:30: **Feature selection of hyperspectral data by considering the integration of Genetic Algorithms and Particle Swarm Optimization**, Pedram Ghamisi, Jon Atli Benediktsson, Univ. of Iceland (Iceland) [9244-21]

8:50: **Classification of ocean surface slicks in hybrid-polarimetric SAR data**, Arnt B. Salberg, Siri Ø. Larsen, Norsk Regnesentral (Norway); Robert Jenssen, Univ. of Tromsø (Norway) [9244-22]

9:10: **Applying manifold learning to classification of closely spaced objects using time signatures**, Michele B. Lohr, Johns Hopkins Univ. Applied Physics Lab., LLC (United States) [9244-23]

9:30: **Dynamic classifier selection approaches for hyperspectral image classification**, Bharath Bhushan Damodaran, Rama Rao Nidamanuri, Indian Institute of Space Science and Technology (India) [9244-24]

9:50: **Unsupervised feature selection based on the maximum tangent discrimination of band vectors in prototype space for hyperspectral imagery**, Mohsen Ghamary Asl, Mohammad Reza Mobasher, K.N.Toosi Univ. of Technology (Iran, Islamic Republic of); Barat Mojaradi, Iran Univ. of Science and Technology (Iran, Islamic Republic of) [9244-25]

Coffee Break Tue 10:10 to 10:40

SESSION 6

Room: E103 Tue 10:40 to 12:20

Classification and Analysis of Urban Areas

Session Chair: **Jon Atli Benediktsson**, Univ. of Iceland (Iceland)

10:40: **Urban land-cover classification based on airborne hyperspectral data and field observation**, Fumio Yamazaki, Konomi Hara, Wen Liu, Chiba Univ. (Japan) [9244-26]

11:00: **Fusion of aerial images with mean shift-based upsampled elevation data for improved building block classification**, Sotirios Gyftakis, Technological Educational Institute of Athens (Greece) and National Ctr. for Scientific Research Demokritos (Greece); Theoharis Tsenoglou, Technological Educational Institute of Athens (Greece); Emmanuel Bratsolis, Technological Educational Institute of Athens (Greece) and National Univ. of Athens (Greece); Eleni Charou, National Ctr. for Scientific Research Demokritos (Greece); Nikolaos Vassilas, Technological Educational Institute of Athens (Greece) [9244-27]

11:20: **The extraction of buildings boundaries of the satellite imagery based on a new curvature estimation method**, Tahmineh Partovi, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [9244-28]

11:40: **Urban road extraction based on shadow removal and road clues detection from high resolution RGB aerial image**, Darlis Herumurti, Keiichi Uchimura, Gou Koutaki, Kumamoto Univ. (Japan); Takumi Uemura, Sojo Univ. (Japan) [9244-29]

12:00: **Very fast road database verification using textured 3D city models obtained from airborne imagery**, Dimitri Bulatov, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Marcel Ziems, Franz Rottensteiner, Leibniz Univ. Hannover (Germany); Melanie Pohl, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [9244-30]

Lunch/Exhibition Break Tue 12:20 to 13:50

SESSION 7

Room: E103 Tue 13:50 to 15:10

Analysis of Hyperspectral Data

Session Chair: **Nicola Acito**, Univ. di Pisa (Italy)

13:50: **Noise estimation for hyperspectral imagery using spectral unmixing and synthesis**, Can Demirkesen, TÜBİTAK UZAY (Turkey); Ugur M. Leloglu, Middle East Technical Univ. (Turkey) [9244-31]

14:10: **Visibility improvement of shadow regions using hyperspectral band integration**, Paheding Sidike, Yakov Diskin, Saibabu Arigela, Vijayan K. Asari, Univ. of Dayton (United States) [9244-32]

14:30: **Hyperspectral chemical agent standoff detection using sparse representation**, Asif Mehmood, Booz Allen Hamilton Inc. (United States) [9244-33]

14:50: **Subspace based non-parametric approach for hyperspectral anomaly detection in complex scenarios**, Stefania Matteoli, Nicola Acito, Marco Diani, Giovanni Corsini, Univ. di Pisa (Italy) [9244-34]

Coffee Break Tue 15:10 to 16:00

PLENARY SESSION

Room: E103 Tue 16:05 to 17:40

Remote Sensing 2014

For details, please see special events section in the printed programme or visit <http://spie.org/remote-sensing-europe.xml>

Wednesday 24 September

SESSION 8

Room: E103 Wed 8:30 to 10:10

Change Detection and Analysis of Multitemporal Images

Session Chair: **Francesca Bovolo**, Univ. degli Studi di Trento (Italy)

8:30: **Reducing false positives in change detection**, Corné van der Sande, Ben Gorte, Technische Univ. Delft (Netherlands) [9244-36]

8:50: **Hyperspectral anomalous change detection in the presence of non-stationary atmospheric/illumination conditions**, Nicola Acito, Accademia Navale di Livorno (Italy); Marco Diani, Alessandro Rossi, Univ. di Pisa (Italy); Sergio Ugo de Ceglie, Ctr. Interforze Studi per le Applicazioni Militari (Italy) [9244-37]

9:10: **A novel approach to change detection in very high resolution multisensor images**, Yady T. Solano Correa, Francesca Bovolo, Fondazione Bruno Kessler (Italy) and Univ. degli Studi di Trento (Italy); Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy) [9244-38]

9:30: **Cloud masking of multitemporal remote sensing images**, Luis Gómez-Chova, Julia Amorós-Lopez, Jordi Muñoz-Marí, Gustavo Camps-Valls, Univ. de València (Spain) [9244-39]

9:50: **An unsupervised approach based on Riemannian metric to change detection on multi-temporal SAR images**, Na Li, Fang Liu, Zengping Chen, National Univ. of Defense Technology (China) [9244-40]

Coffee Break Wed 10:10 to 10:40

SESSION 9

Room: E103 Wed 10:40 to 12:20

Estimation and Detection

Session Chair: **Luis Gómez-Chova**, Univ. de València (Spain)

10:40: **A transductive support vector regression method to estimate biophysical parameters from remotely sensed images**, Davide Castelletti, Begüm Demir, Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy) [9244-41]

11:00: **Automatic localization of backscattering events due to particulate in urban areas**, Michela Gelfusa, Andrea Malizia, Stefano Parracino, Maria Richetta, Univ. degli Studi di Roma "Tor Vergata" (Italy); Andrea Murari, Consorzio RFX-Association EURATOM-ENEA (Italy); Jesus Vega, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain); Pasquale Gaudio, Univ. degli Studi di Roma "Tor Vergata" (Italy) [9244-42]

11:20: **A procedure to detect impervious surfaces using satellite images and Lidar data**, Borja Rodríguez-Cuenca, Maria Alonso, Univ. de Alcalá (Spain); Antonio Arozarena-Villar, Emilio Domenech-Tofiño, Nuria Valcárcel-Sanz, Julián Delgado-Hernández, Juan José Peces-Morerá, Instituto Geográfico Nacional (Spain) [9244-43]

11:40: **A unified algorithm for ship detection on optical and SAR spaceborne images**, Guillaume Jubelin, Ali Khenchaf, ENSTA Bretagne (France) [9244-44]

12:00: **An improved algorithm for extracting atmospheric motion vectors in cloud-free region from FY-2E thermal infrared imagery**, Zhenhui Wang, Nanjing Univ. (China); Hang Zhao, Min Tang, Lu Yang, Yizhe Zhan, Qing Zhang, Nanjing Univ. of Information Science & Technology (China) [9244-45]

Lunch/Exhibition Break Wed 12:20 to 14:10

SESSION JS1

Room: E103 Wed 14:10 to 15:10

SAR Data Analysis I: Joint Session

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

Conference 9244, Image and Signal Processing for Remote Sensing and Conference 9243, SAR Image Analysis, Modeling and Techniques Joint Session

14:10: **Target modelling for SAR image simulation**, Christopher J. Willis, BAE Systems (United Kingdom) [9243-10]

14:30: **Non-destructive wavelet-based despeckling in SAR images**, Yuri S. Bekhtin, Andrey A. Bryantsev, Damiao P. Malebo, Ryazan State Radio Engineering Univ. (Russian Federation); Alexey A. Lupachev, Moscow Power Engineering Institute (Russian Federation) [9243-11]

14:50: **Port surveillance by using co-occurrence matrix on multitemporal SAR images**, Na Li, Yang Liu, Songlin Liu, Fang Liu, Zengping Chen, National Univ. of Defense Technology (China) [9244-46]

Coffee Break Wed 15:10 to 15:40

SESSION JS2

Room: E103 Wed 15:40 to 17:20

SAR Data Analysis II: Joint Session

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

Conference 9244, Image and Signal Processing for Remote Sensing and Conference 9243, SAR Image Analysis, Modeling and Techniques Joint Session

15:40: **Topography estimation using SAR image polarimetry**, Ramin Sabry, Karim E. Mattar, Defence Research and Development Canada (Canada) [9244-48]

16:00: **Exploitation of a large COSMO-SkyMed interferometric dataset**, Raffaele Nutricato, Davide O. Nitti, GAP S.r.l. (Italy); Fabio Bovenga, Consiglio Nazionale delle Ricerche (Italy); Alberto Refice, CNR ISSIA (Italy); Maria Teresa Chiaradia, Politecnico di Bari (Italy) [9243-12]

16:20: **Benefits of blind speckle decorrelation for InSAR processing**, Luciano Alparone, Univ. degli Studi di Firenze (Italy) and Istituto di Fisica Applicata Nello Carrara (Italy); Fabrizio Argenti, Univ. degli Studi di Firenze (Italy); Gianfranco Fornaro, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy); Alessandro Lapini, Univ. degli Studi di Firenze (Italy); Diego Reale, Francescopaolo Sica, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy) [9243-13]

16:40: **A Bayesian network approach to perform SAR/InSAR data fusion in a flood detection problem**, Annarita D'Addabbo, Alberto Refice, CNR ISSIA (Italy); Guido Pasquariello, CNR-ISSIA (Italy) [9244-49]

17:00: **Inversion of three layers multiscale SPM model based on neural network technique for the retrieval of soil multi-scale roughness and moisture parameters**, Lilia Bennaceur FARAH, Ibtissem Hosni, Maroua Jaafri, ENIT (Tunisia); Imed Riadh Farah, ENSI (Tunisia); Mohamed Saber Naceur, ENIT (Tunisia) [9244-50]

POSTERS—WEDNESDAY

Room: Elicium 1 Wed 17:40 to 19:15

Conference attendees are invited to attend the Remote Sensing poster session held on Wednesday 17:40 to 19:15. Posters will be on display after 10:00 Wednesday morning in the Conference Centre. Authors of poster papers will be present to answer questions concerning their papers during the Wednesday Poster Session. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x32234.xml> and under general information in the printed programme.

The usefulness of wavelet-based features as global descriptors of VHR satellite images, Krystian Pyka, Wojciech Drzewiecki, Katarzyna K. Bernat, AGH Univ. of Science and Technology (Poland); Anna Wawrzaszek, Michal Krupi ski, Space Research Ctr. (Poland) [9244-4]

A ground control points sampling design method based on smallest singular value, Pu Wang, Wei An, Xing Pu Deng, Jing Guo, Jun Li, National Univ. of Defense Technology (China) [9244-15]

Small target detection based on three-dimensional principal component analysis in hyperspectral imagery, Xing Zhang, Gongjian Wen, National Univ. of Defense Technology (China) [9244-35]

Methods of combining multiple sparse classifiers: application to target recognition in SAR images, Gang Dong, Gangyao Kuang, National Univ. of Defense Technology (China) [9244-47]

Estimating urban surface component from Landsat-5 TM data using spectral index model and sub-pixel model, Qingni Huang, China Meteorological Administration (China) [9244-51]

Two-stage subpixel impervious surface coverage estimation: comparing classification and regression trees and artificial neural networks, Katarzyna K. Bernat, Wojciech Drzewiecki, AGH Univ. of Science and Technology (Poland) [9244-52]

3D reconstruction of Vesta from sequence images of DAWN based on multiview dense matching algorithm, Chaozhen Lan, Zhengzhou Institute of Surveying and Mapping (China); Qin Xi, Beijing Institute of Technology (China); Pingyuan Cui, Harbin Institute of Technology (China) [9244-53]

Precise geometric correction of LANDSAT-8 images based on Kalman filter, Shanshan Li, Shaofeng Guo, An Li, Institute of Remote Sensing and Digital Earth (China) [9244-54]

Detection and imaging of the moving target using frequency space-time adaptive processing and Fractional Fourier Transform, Jian Wu, Yongmei Jiang, Gangyao Kuang, National Univ. of Defense Technology (China) [9244-55]

A fast 3D image simulation algorithm of moving target with scanning laser radar, Jicheng Li, Zhiguang Shi, Xiao Chen, Yan Zhang, National Univ. of Defense Technology (China) [9244-56]

Compressive sensing imaging through a drywall barrier at sub-THz and THz frequencies in transmission and reflection modes, Taylan Takan, Firat Idikut, Vedat A. Özkan, Ihsan Ozan Yildirim, Middle East Technical Univ. (Turkey); Asaf B. Sahin, Yildirim Beyazit Univ. (Turkey); Hakan Altan, Middle East Technical Univ. (Turkey) [9244-57]

Spatial sampling considerations of the CERES instrument, George L. Smith, Natividad Manalo-Smith, Science Systems and Applications, Inc. (United States); Kory J. Priestley, NASA Langley Research Ctr. (United States) [9244-58]

Analysis of discriminants for experimental 3D SAR imagery of human targets, Brigitte Chan, Pascale Sévigny, David D. J. DiFilippo, Defence Research and Development Canada (Canada) [9244-59]

Infrared radiation scene generation of stars and planets in celestial background, Feng Guo, Yaohui Hong, Xiaoqian Xu, BeiHang Univ. (China) [9244-60]

Sub-surface based fusion experiments using ETM-8 and ERS-1 data for geological exploration, Ayman H. Nasr, Mohamed R. Metwalli, National Authority for Remote Sensing and Space Sciences (Egypt) [9244-61]

Intermediate grouping on remotely sensed data using Gestalt algebra, Eckart Michaelsen, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [9244-62]

Building recognition based on big template in FLIR images, Jiangwei Zhang, Zhaodong Niu, Songlin Liu, Fang Liu, Zengping Chen, National Univ. of Defense Technology (China) [9244-63]

Real-time moving ground target detection algorithm based on Gaussian mixture model, Weiping Yang, Zhilong Zhang, Zhiguang Shi, Jicheng Li, National Univ. of Defense Technology (China) [9244-64]

Reducing the complexity of the CCSDS standard for image compression decreasing the DWT filter order, Leandro H. Ito, Marcelo S. Pinho, ITA (Brazil) [9244-65]

Band selection of hyperspectral images using a classifier ensemble based on GA-SVM, Aida Omani, Mahdi Hasanlou, Mohammad Reza Saradjian, Univ. of Tehran (Iran, Islamic Republic of) [9244-67]

Pansharpening of multispectral images using filtering in Fourier domain, Alper Akoguz, Istanbul Technical Univ. (Turkey); Burak Kurt, ASELSAN Inc. (Turkey); Sedef K. Pinar, Istanbul Technical Univ. (Turkey) [9244-68]

Performance evaluation of supervised change detection tool on DubaiSat-2 multispectral and pansharpened images, Hessa Almatroushi, Emirates Institution for Advanced Science and Technology (United Arab Emirates) [9244-70]

Fusing MODIS and HJ-1 CCD with improved STARFM algorithm to generate high spatial and temporal resolution dataset, Bo Chen, Institute of Remote Sensing and Digital Earth (China); Hongyue Du, China Siwei Surveying and Mapping Technology Corp. (China), Beijing Research Institute of Uranium Geology (China) [9244-71]

Detecting changes on coastal primary sand dunes using multi-temporal Landsat imagery, Gil R. Goncalves, Univ. de Coimbra (Portugal), INESC Coimbra (); Nino Duro, www.bluecover.pt (Portugal); Ercilia Sousa, Luis Pinto, Isabel Figueiredo, Univ. de Coimbra (Portugal) [9244-72]

Geometric superresolution by using a two-dimensional orthogonal encoding mask, Yangyang Liu, Lv Qunbo, Academy of Opto-Electronics (China) [9244-74]

Spectrally consistent haze removal in multispectral data, Aliaksei Makarau, Rudolf G. Richter, Rupert M. Mueller, Peter Reinartz, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [9244-75]

Quantitative method of total petroleum hydrocarbon for crude oil in soil: comparison between remote sensing reflectance data and different organic laboratory techniques. Case study, Kirkuk- Iraq, Layth Y. Sahib, Technische Univ. Darmstadt (Germany) [9244-76]

CONFERENCE 9245 - ROOM: E107

Tuesday - Thursday 23-25 September 2014 • Proceedings of SPIE Vol. 9245

EARTH RESOURCES AND ENVIRONMENTAL REMOTE SENSING/GIS APPLICATIONS

Conference Chairs: **Ulrich Michel**, Pädagogische Hochschule Heidelberg (Germany); **Karsten Schulz**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)

Conference Co-Chairs: **Manfred Ehlers**, Univ. Osnabrück (Germany); **Konstantinos G. Nikolakopoulos**, Univ. of Patras (Greece); **Daniel L. Civco**, Univ. of Connecticut (United States)

Programme Committee: **Thomas Blaschke**, Univ. Salzburg (Austria); **Tilman U. Bucher**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Dimitri Bulatov**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (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**, Istituto di Metodologie per l'Analisi Ambientale (Italy); **Marguerite M. Madden**, The Univ. of Georgia (United States); **Derya Maktav**, Istanbul Technical Univ. (Turkey); **Matthias S. Moeller**, Beuth Univ. of Applied Sciences Berlin (Germany); **Pablo H. Rosso**, BlackBridge AG (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 Stænz**, Univ. of Lethbridge (Canada); **Josef Strobl**, Univ. Salzburg (Austria); **Kerstin Voss**, Univ. of Education Heidelberg (Germany); **Christiane H. Weber**, Univ. of Strasbourg/Faculty of Georaphy (France)

Tuesday 23 September

SESSION 1

Room: E107 Tue 9:30 to 10:30

Infrastructures and Urban Areas I

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

9:30: **Change Analysis at Stuttgart Airport using TerraSAR-X Imagery**, Markus Boldt, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Antje Thiele, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) and Karlsruher Institut für Technologie (Germany); Erich Cadario, Fraunhofer-IOSB (Germany); Karsten Schulz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Stefan Hinz, Karlsruher Institut für Technologie (Germany) . . [9245-1]

9:50: **SAR/multispectral image fusion for the detection of environmental hazards with a GIS**, Cesario Vincenzo Angelino, Luca Cicala, Ctr. Italiano Ricerche Aerospaziali (Italy) [9245-2]

10:10: **Assessment of urban growth using satellite-derived imperviousness index: a case study from the United Arab Emirates**, Salem Issa, United Arab Emirates Univ. (United Arab Emirates) [9245-3]

Coffee Break Tue 10:30 to 11:00

SESSION 2

Room: E107 Tue 11:00 to 12:00

Infrastructures and Urban Areas II

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

11:00: **Simulating urban land cover changes at sub-pixel level in a coastal city**, Xiaofeng Zhao, Lei Deng, Institute of Urban Environment (China); Huihui Feng, Nanjing Institute of Geography and Limnology (China). [9245-4]

11:20: **Monitoring of heat island in Shenzhen, China: using remotely sensed and ground measurements**, Wei-Min Wang, Lijun Yang, Hong Liang, Shenzhen Environmental Monitoring Ctr. (China); Lei Li, Meteorological Bureau of Shenzhen Municipality (China) [9245-5]

11:40: **Does escape of ULF of EM radiation from solar spectrograph characterize of stress drop or the outbreak any seismic event?**, Umesh P. Verma, Madhurendra Nath Sinha, Patna Science College (India). [9245-6]

Lunch/Exhibition Break Tue 12:00 to 13:30

SESSION 3

Room: E107 Tue 13:30 to 15:30

Hazard Mitigation Geologic Applications I

Session Chair: **Andre C. Kalia**, Bundesanstalt für Geowissenschaften und Rohstoffe (Germany)

13:30: **Preparation of a national Copernicus-service for detection and monitoring of land subsidence and mass movements in the context of remote sensing assisted hazard mitigation**, Andre C. Kalia, Bundesanstalt für Geowissenschaften und Rohstoffe (Germany); Michaela Frei, Thomas Lege, Bundesanstalt für Geowissenschaften und Rohstoffe (Germany) [9245-7]

13:50: **Landslide monitoring using airphotos time series and GIS**, Konstantinos G. Nikolakopoulos, Katerina Kavoura, Nikolaos Sabatakakis, Univ. of Patras (Greece) [9245-8]

14:10: **Open quarry monitoring using gap-filled LANDSAT 7 ETM SLC-OFF imagery**, Ilias Raptis, Konstantinos G. Nikolakopoulos, Univ. of Patras (Greece) [9245-9]

14:30: **Analysis of spectrometric optical data from different devices**, Denitsa Borisova, Doyno Petkov, Space Research and Technology Institute (Bulgaria) [9245-10]

14:50: **Time series satellite and ground-based data for detecting earthquake anomalies**, Maria A. Zoran, Roxana S. Savastru, Dan M. Savastru, National Institute of Research and Development for Optoelectronics (Romania). [9245-11]

15:10: **Application of ASTER and ETM-8 images data in lithological mapping of Precambrian basement rocks in Eastern Desert of Egypt**, Mohamed Fouad Sadek, Safaa M. Hassan, Safwat S. Gabr, National Authority for Remote Sensing and Space Sciences (Egypt) [9245-12]

Coffee Break Tue 15:30 to 16:00

PLENARY SESSION

Room: E107 Tue 16:05 to 17:40

Remote Sensing 2014

For details, please see special events section in the printed programme or visit <http://spie.org/remote-sensing-europe.xml>

Wednesday 24 September

SESSION 4

Room: E107 Wed 8:50 to 10:10

Hazard Mitigation Geologic Applications II

Session Chair: **Konstantinos G. Nikolakopoulos**, Univ. of Patras (Greece)

8:50: **Fusion of declassified airphotos and Landsat MSS data for old landslides detection**, Konstantinos G. Nikolakopoulos, Katerina Kavoura, Nikolaos Sabatakakis, Univ. of Patras (Greece); Aristides Vaiopoulos, National Technical Univ. of Athens (Greece) [9245-13]

9:10: **Attribute-based processing of lineament data: an example from Cesar-Rancheria and neighbor provinces in Colombia**, Carlos M. Baquero, Corporacion Geologica ARES (Colombia); Camilo Montes, Univ. de los Andes (Colombia); German A. Bayona, Corporacion Geologica ARES (Colombia) [9245-14]

9:30: **ASTER images classification using support vector machine and a particle swarm optimization, Eastern Desert, Egypt**, Safaa M. Sayed, National Authority for Remote Sensing and Space Sciences (Egypt) [9245-15]

9:50: **Application of remote sensing and GIS for identification landslide hazard zone in a small part of lesser Himalayan region**, Supriti Das Pramanik, National Institute of Technology, Durgapur (India) [9245-16]

Coffee Break Wed 10:10 to 10:40

SESSION 5

Room: E107 Wed 10:40 to 12:00

Sensors and Platforms I

Session Chair: **Konstantinos G. Nikolakopoulos**, Univ. of Patras (Greece)

10:40: **Diffuser properties and according performance in BSDF and spectral features in remote sensing applications**, Bilgehan Gür, Hedser van Brug, Man Xu, Elizabeth Vela, TNO Science and Industry (Netherlands) [9245-17]

11:00: **A reliable methodology for monitoring unstable slopes: the multi-platform and multi-sensor approach**, Cristina Castagnetti, Eleonora Bertacchini, Alessandro Corsini, Riccardo Rivola, Univ. degli Studi di Modena e Reggio Emilia (Italy) [9245-18]

11:20: **A fluorescence Lidar combining spectral, lifetime and imaging capabilities for the remote sensing of cultural heritage assets**, Valentina Raimondi, David Lognoli, Lorenzo Palombi, Istituto di Fisica Applicata Nello Carrara (Italy) [9245-19]

11:40: **Preliminary results from most recent SAR airborne campaigns by meta-sensing**, Alex Coccia, MetaSensing (Netherlands) [9245-20]

Lunch/Exhibition Break Wed 12:00 to 13:40

SESSION 6

Room: E107 Wed 13:40 to 15:00

Sensors and Platforms II

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

13:40: **Robust discrimination of permanent scatterers using Cameron Decomposition**, Georgios Kouroupis, Univ. of Patras (Greece); Panagiotis Elias, National Observatory of Athens (Greece); Vassilis Anastassopoulos, Univ. of Patras (Greece) [9245-21]

14:00: **Use of advanced SAR monitoring techniques for the assessment of the behaviour of old embankment dams**, Luigi Mascolo, Politecnico di Bari (Italy); Giovanni Nico, Istituto per le Applicazioni del Calcolo "Mauro Picone" (Italy); Andrea Di Pasquale, DIAN s.r.l. (Italy); Alfredo Pitullo, Consorzio per Lla Bonifica della Capitanata (Italy) [9245-22]

14:20: **A methodology for luminance map retrieval using airborne hyperspectral data**, Luca Pipia, Ramon Alamús, Anna Tardà, Fernando Pérez, Vicenç Palà, Jordi Corbera, Institut Cartogràfic i Geològic de Catalunya (Spain) [9245-23]

14:40: **Airborne hyperspectral imaging in the visible-to-mid wave infrared spectral range by fusing three spectral sensors**, Dainis Jakovels, Jevgenijs Filipovs, Gatis Erins, Juris Taskovs, Institute for Environmental Solutions (Latvia) [9245-24]

Coffee Break Wed 15:00 to 15:30

SESSION 7

Room: E107 Wed 15:30 to 17:10

Environmental Monitoring Concepts I

Session Chair: **Maurice Schönert**, BlackBridge AG (Germany)

15:30: **Derivation of Tasseled Cap Coefficients for RapidEye data**, Maurice Schönert, Horst Weichelt, Erik Zillmann, BlackBridge AG (Germany); Carsten Jürgens, Ruhr-Univ. Bochum (Germany) [9245-25]

15:50: **Monitoring deforestation trend and future outlooks of the aboveground forest carbon stocks in Central Sumatra using ALOS-PALSAR mosaic data**, Rajesh B. Thapa, Manabu Watanabe, Takeshi Motohka, Masanobu Shimada, Japan Aerospace Exploration Agency (Japan) [9245-26]

16:10: **Methodology to define and analyze environmental protection areas for water capitation in cities on Paraíba Do Sul River Basin**, Jussara de Oliveira Ortiz, Sergio Rosim, Instituto Nacional de Pesquisas Espaciais (Brazil); Manoel Jimenez Ortiz, Geopixel (Brazil); João R. de Freitas Oliveira, Rodolfo Moraes, Instituto Nacional de Pesquisas Espaciais (Brazil); Fernando Regis Siqueira, ICMBIO (Brazil) [9245-27]

16:30: **Land cover disturbance due to tourism in Jeseniky mountain region: a remote sensing and GIS based approach**, Mukesh S. Boori, Palacky Univ. Olomouc (Czech Republic) [9245-28]

16:50: **Retrieval and verification of fire radiative power using the Korean Geostationary Meteorological Satellite**, Dae Sun Kim, Pukyong National Univ. (Korea, Republic of) [9245-38]

POSTERS—WEDNESDAY

Room: Elicium 1 Wed 17:40 to 19:15

Conference attendees are invited to attend the Remote Sensing poster session held on Wednesday 17:40 to 19:15. Posters will be on display after 10:00 Wednesday morning in the Conference Centre. Authors of poster papers will be present to answer questions concerning their papers during the Wednesday Poster Session. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x32234.xml> and under general information in the printed programme.

Mesoscale observational analysis of a strong squall line in its genesis and development over the Song-Nen plain of NE China, Meiying Yuan, China Meteorological Administration (China) [9245-46]

Remote sensing technology and geographic information system (GIS) in order to identify the relationship between the natural setting (environment) and the spread of disease, Kamel K. Sheikho, King Abdulaziz City for Science and Technology (Saudi Arabia) [9245-47]

Desertification modelling and assessment using remote sensing and GIS, Kamel K. Sheikho, King Abdulaziz City for Science and Technology (Saudi Arabia) [9245-48]

Producing large scale GIS ready base map and ground truth from GE images, Ahmed R. Ibrahim, NASS (Egypt) [9245-49]

Using MODIS time series for studying vegetation trends in the desiccated seabed of the Aral Sea, Fabian Löw, Julius-Maximilians-Univ. Würzburg (Germany); Rene Colditz, La Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (Mexico); Galina Stulina, Victor Dukhovny, Scientific-Information Ctr. of the Interstate Commission for Water Coordination in Central Asia (Uzbekistan) [9245-50]

Exploration of the OBIA methods available in SPRING non-commercial software to UAV data processing, Ana C. Teodoro, Ricardo Araújo, Ctr. de Investigação em Ciências Geo-Espaciais (Portugal) [9245-51]

Geologic exploration using new high-spatial resolution Mapping Satellite-1 remote sensing data in arid region, China, Xiaoqing Han, Beijing Research Institute of Uranium Geology (China) [9245-52]

Analysis of urbanization and climate change impacts on the urban thermal environment based on MODIS satellite data, Maria A. Zoran, Roxana S. Savastru, Dan M. Savastru, National Institute of Research and Development for Optoelectronics (Romania) [9245-53]

Evaluation of remote sensing data potential in the geological exploration of Freixeda area, Mirandela, Portugal: a preliminary study, Alexandre Lima, Ana C. Teodoro, José Casimiro, Ctr. de Investigação em Ciências Geo-Espaciais (Portugal) [9245-54]

Monitoring land use/cover changes on the Romanian Black Sea Coast, Liviu-Florin V. Zoran, Univ. Politehnica de Bucharest (Romania); Adrian I. Dida, Transilvania Univ. of Brasov (Romania); Maria A. Zoran, National Institute of Research and Development for Optoelectronics (Romania) [9245-55]

Results of the application of persistent scatterers interferometry for surface displacements monitoring in the Azul open pit manganese mine, Carajás province, Amazon region, using TerraSAR-X data, Carolina A. Pinto, Waldir R. Paradella, Instituto Nacional de Pesquisas Espaciais (Brazil); Fabio F. Gama, Instituto de Pesquisas Energéticas e Nucleares (Brazil); José C. Mura, Instituto Nacional de Pesquisas Espaciais (Brazil); Athos R. Santos, Guilherme G. Silva, Instituto de Pesquisas Energéticas e Nucleares (Brazil) [9245-57]

Algorithms for lineaments detection in processing of multispectral images, Denitsa Borisova, Georgi Jeleu, Valentin Atanassov, Space Research and Technology Institute (Bulgaria); Petia Koprinkova-Hristova, Kiril Alexiev, Institute of Information and Communication Technologies (Bulgaria) [9245-58]

Prioritization criteria of objective indexes for disaster management by satellite image processing, Mohammadreza Poursaber, Yasuo Ariki, Kobe Univ. (Japan); Mohammad Safi, Shahid Beheshti Univ. (Iran, Islamic Republic of) [9245-59]

Using SRTM, land use and time of concentration define critical distance for studying diffuse source pollution, Lilia M. Oliveira, Univ. Federal de Minas Gerais (Brazil); Philippe Maillard, Univ. Federal de Minas Gerais (Brazil) [9245-60]

Effects of band selection on endmember extraction for forestry applications, Vassilia Karathanassi, Charoula Andreou, Vassilis Andronis, Polychronis Kolokoussis, National Technical Univ. of Athens (Greece) [9245-61]

A framework for air quality monitoring based on free public data and open source tools, Hristo Nikolov, Denitsa Borisova, Space Research and Technology Institute (Bulgaria) [9245-62]

Bore-sight calibration of the profile laser scanner using a large size exterior calibration field, Bronislav Koska, Tomás Kremen, Martin Stroner, Czech Technical Univ. in Prague (Czech Republic) [9245-63]

The application of remote sensing for climate change adaptation in Sahel region, Taisser H. H. Deafalla, Elmar Csaplovics, Mustafa M. El-Abbas, Technische Univ. Dresden (Germany) [9245-64]

CONFERENCE 9245 - ROOM: E107

Improvement the quality of vector data issued from the vectorization of remote sensing images, Bouhadjar Meguenni, Ctr. National des Techniques Spatiales (Algeria) [9245-65]

Anthropogenic ground deformation observed in Alberta's oil sands by RADARSAT-2 DInSAR, Sergey V. Samsonov, Magdalena Czarnogorska, Natural Resources Canada (Canada) [9245-66]

CARS: technique for geological exploration of hydrocarbons deposits, Aleksandr Grishkanich, Victor Bespalov, Sergey Kascheev, Valentin Elizarov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Aleksandr Il'inskiy, All-Russia Petroleum Research Exploration Institute (Russian Federation); Evgenij Makarov, Aleksandr Zhevlakov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) [9245-67]

Graph-assisted landscape monitoring and pattern analysis, Alan Kwok Lun Cheung, The Univ. of Auckland (New Zealand); David O'Sullivan, Univ. of California, Berkeley (United States); Gary J. Brierley, The Univ. of Auckland (New Zealand) [9245-68]

Thursday 25 September

SESSION 8

Room: E107 Thu 9:00 to 10:00

Processing Methodologies I

Session Chair: **Kyle Pipkins**, Technische Univ. Berlin (Germany)

9:00: **A comparison of feature selection methods for multitemporal tree species classification**, Kyle Pipkins, Michael Förster, Birgit Kleinschmit, Anne Clasen, Tobias Schmidt, Technische Univ. Berlin (Germany) [9245-29]

9:20: **Multispectral land use classification using support vector machine**, Worku Zewdie Gebrehiwot, Elmar Csaplovics, Technische Univ. Dresden (Germany) [9245-30]

9:40: **Integration of a marked point process and template matching for the identification of individual tree crowns in an urban and a wooded savanna environment in Brazil**, Marília Gomes, Univ. Federal de Minas Gerais (Brazil); Philippe Maillard, Univ. Federal de Minas Gerais (Brazil) [9245-31]

Coffee Break Thu 10:00 to 10:30

SESSION 9

Room: E107 Thu 10:30 to 12:10

Processing Methodologies II

Session Chair: **Pablo H. Rosso**, RapidEye AG (Germany)

10:30: **Scale issue and hierarchical GEOBIA for mapping land use/land cover**, Mustafa M. El Abbas, Technische Univ Dresden (Germany); Elmar Csaplovics, Technische Univ. Dresden (Germany) [9245-32]

10:50: **Mapping tree species in a boreal forest area using RapidEye and Lidar data**, Nadia Rochdi, Xiaohui Yang, Karl Staenz, Alberta Terrestrial Imaging Ctr. (Canada); Shane Patterson, Alberta Sustainable Resource Development (Canada); Brett Purdy, Alberta Innovates - Technology Futures (Canada) [9245-33]

11:10: **Tracking sugarcane expansion in the Sao Paulo region through Landsat and Envisat/ERS time-series**, Lorenzo Iannini, Alijafar Mousivand, Ramses Molijn, Ramon Hanssen, Technische Univ. Delft (Netherlands) [9245-34]

11:30: **Deriving phenological metrics from NDVI through an open source tool developed in QGIS**, Lia Duarte, Ana C. Teodoro, Hernâni Gonçalves, Ctr. de Investigação em Ciências Geo-Espaciais (Portugal) [9245-35]

11:50: **Automatic reconstruction of 3D urban landscape by computing connected regions and their average altitude from LIDAR point cloud image**, Yoshiyuki Kawata, Kohei Koizumi, Kanazawa Institute of Technology (Japan) [9245-36]

Lunch Break Thu 12:10 to 13:40

SESSION 10

Room: E107 Thu 13:40 to 15:00

Environmental Monitoring Concepts II

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

13:40: **Web service tools in the era of forest fire management and elimination**, Dimitris Poursanidis, Giorgos Kochilakis, Nektarios Chrysoulakis, Foundation for Research and Technology-Hellas (Greece); Vasiliki Varela, Algosystems S.A. (Greece); Vassiliki Kotroni, National Observatory of Athens (Greece); Giorgos Eftychidis, Algosystems S.A. (Greece); Kostas Lagouvardos, National Observatory of Athens (Greece) [9245-37]

14:00: **A study on wildfires using satellite data over the Korean Peninsula**, Goo Kim, Yang Won Lee, Pukyong National Univ. (Korea, Republic of) [9245-39]

14:20: **Remotely Piloted Aircraft Systems (RPAS) for high resolution topography and monitoring: civil protection purposes on hydrogeological contexts**, Eleonora Bertacchini, Cristina Castagnetti, Alessandro Corsini, Univ. degli Studi di Modena e Reggio Emilia (Italy) [9245-40]

14:40: **Multipurpose use possibility of Zagros forest areas using GIS, RS and AHP**, Naser Ahmadi Sani, Sasan Babaie Kafaky, Asadollah Mataji, Islamic Azad Univ. (Iran, Islamic Republic of); Timo Pukkala, Univ. of Eastern Finland (Fiji) [9245-41]

Coffee Break Thu 15:00 to 15:20

SESSION 11

Room: E107 Thu 15:20 to 16:20

Environmental Monitoring Concepts III

Session Chair: **Denitsa Borisova**, Space Research and Technology Institute (Bulgaria)

15:20: **Adaptation of classification methods for identification of small to moderate scale marine oil spill events using medium resolution remote sensing data**, Haifa Ben Romdhane, Prashanth Marpu, Michele Lazzarini, Hosni Ghedira, Marouane Temimi, Masdar Institute of Science & Technology (United Arab Emirates) [9245-42]

15:40: **Prediction of Interdecadal variation in climate over NE China with countermeasures**, Nanping Xu, Meteorological Bureau of Heilongjiang (China) [9245-43]

16:00: **Use of Landsat data to create a time-series of sand dune fields maps in Abu Dhabi, United Arab Emirates**, Nazmi Saleous, Salem Issa, Rami Saeed, United Arab Emirates Univ. (United Arab Emirates) [9245-44]

LIDAR TECHNOLOGIES, TECHNIQUES, AND MEASUREMENTS FOR ATMOSPHERIC REMOTE SENSING

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

Programme Committee: **Arnoud Apituley**, Rijksinstituut voor Volksgezondheid en Milieu (Netherlands); **Errico Armandillo**, European Space Research and Technology Ctr. (Netherlands); **Andreas Behrendt**, Univ. Hohenheim (Germany); **Gerhard Ehret**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Barry M. Gross**, The City College of New York (United States); **Animesh Jha**, Univ. of Leeds (United Kingdom); **Philippe L. Keckhut**, LATMOS (France); **George J. Komar**, NASA Headquarters (United States); **Eduardo Landulfo**, Instituto de Pesquisas Energéticas e Nucleares (Brazil); **Kohei Mizutani**, National Institute of Information and Communications Technology (Japan); **Doina Nicoleta Nicolae**, National Institute of Research and 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); **Ulla Wandinger**, Leibniz Institut für Troposphärenforschung (Germany); **Jirong Yu**, NASA Langley Research Ctr. (United States)

Monday 22 September

SESSION 1

Room: E104 Mon 8:30 to 10:20

IPDA/DIAL Instruments: Carbon Dioxide Measurements

Session Chairs: **Upendra N. Singh**, NASA Langley Research Ctr. (United States); **Syed Ismail**, NASA Langley Research Ctr. (United States)

8:30: **Airborne 2-micron double-pulsed integrated path differential absorption lidar for column CO₂ measurement** (*Invited Paper*), Upendra N. Singh, Jirong Yu, Mulugeta Petros, NASA Langley Research Ctr. (United States); Tamer F. Refaat, Old Dominion Univ. (United States); Karl D. Reithmaier, Science Systems and Applications, Inc. (United States) [9246-1]

9:00: **Mobile DIAL system for multipurpose measurements of CO₂ concentration using 1.6µm direct detection technique**, Chikao Nagasawa, Yasukuni Shibata, Makoto Abo, Tokyo Metropolitan Univ. (Japan) [9246-2]

9:20: **High repetition rate Ho:YLF laser for space-borne lidar applications**, Jirong Yu, NASA Langley Research Ctr. (United States); Yingxin Bai, Teh-hwa Wong, Science Systems and Applications, Inc. (United States); Mulugeta Petros, Upendra N. Singh, NASA Langley Research Ctr. (United States) [9246-3]

9:40: **Satellite assisted aerosol correlation in a sequestered CO₂ leakage controlled site**, Eduardo Landulfo, Fábio J. da Silva Lopes, Walter M. Nakaema, Instituto de Pesquisas Energéticas e Nucleares (Brazil); José A. G. de Medeiros, UNICID (Brazil); Andrea Moreira, Petróleo Brasileiro S.A. (Brazil) and Univ. Federal do Estado do Rio de Janeiro (Brazil) [9246-4]

10:00: **Laser energy monitor for double-pulsed 2-micron IPDA lidar application**, Tamer F. Refaat, NASA Langley Research Ctr. (United States) and Old Dominion Univ. (United States); Mulugeta Petros, Ruben Remus, Jirong Yu, Upendra N. Singh, NASA Langley Research Ctr. (United States) [9246-19]

Coffee Break Mon 10:20 to 10:50

SESSION 2

Room: E104 Mon 10:50 to 11:40

Differential Absorption Lidar: Water Vapor and Ozone Measurements

Session Chairs: **Jirong Yu**, NASA Langley Research Ctr. (United States); **Eduardo Landulfo**, Instituto de Pesquisas Energéticas e Nucleares (Brazil)

10:50: **A new technique for the retrieval of near-surface water vapor using DIAL measurements and its validation** (*Invited Paper*), Syed Ismail, NASA Langley Research Ctr. (United States); Susan Kooi, Science Systems and Applications, Inc. (United States); Richard Ferrare, David Winker, Johnathan W. Hair, Amin Nehrir, Chris Hostetler, NASA Langley Research Ctr. (United States) [9246-5]

11:20: **A compact mobile ozone Lidar for atmospheric ozone and aerosol profiling**, Russell J. De Young, NASA Langley Research Ctr. (United States); William Carrion, Coherent Applications, Inc. (United States); Denis Pliutau, Science Systems and Applications, Inc. (United States) [9246-7]

SESSION 3

Room: E104 Mon 11:40 to 12:30

Doppler Lidar: Wind Measurements

Session Chairs: **Kevin B. Strawbridge**, Environment Canada (Canada); **Simone Lolli**, NASA Goddard Space Flight Ctr. (United States)

11:40: **Advanced airborne Doppler Wind Lidar signal processing for observations in complex terrain** (*Invited Paper*), George D. Emmitt, Simpson Weather Associates, Inc. (United States); Kevin S. Godwin, KSG Science (United States); Steven Greco, Chris O'Handley, Simpson Weather Associates, Inc. (United States) [9246-8]

12:10: **2-micron Coherent Doppler Lidar instrument advancements for tropospheric wind measurement**, Mulugeta Petros, NASA Langley Research Ctr. (United States) [9246-9]

Lunch Break Mon 12:30 to 13:40

SESSION 4

Room: E104 Mon 13:40 to 17:00

Backscatter and Raman Lidar: Aerosols and Clouds Measurements

Session Chairs: **George D. Emmitt**, Simpson Weather Associates, Inc. (United States); **Mulugeta Petros**, NASA Langley Research Ctr. (United States)

13:40: **A synopsis of CALIPSO polar stratospheric cloud observations from 2006-2014** (*Invited Paper*), Michael C. Pitts, NASA Langley Research Ctr. (United States) [9246-10]

14:10: **High Spectral Resolution Lidar and MPLNET Micro Pulse Lidar aerosol optical property retrieval intercomparison during the 2012 7-SEAS field campaign at Singapore**, Simone Lolli, Ellsworth J. Welton, NASA Goddard Space Flight Ctr. (United States); James Campbell, U.S. Naval Research Lab. (United States); Edwin Eloranta, Univ. of Wisconsin-Madison (United States); Brent N. Holben, NASA Goddard Space Flight Ctr. (United States); Boom Ning Chew, Santo Salinas, National Univ. of Singapore (Singapore) [9246-11]

14:30: **Comparison between Haar and Mexican Hat function to obtain the height of atmospheric boundary layer**, Eduardo Landulfo, Gregori de Arruda Moreira, Fábio J. da Silva Lopes, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Juan Luis Guerrero-Rascado, Instituto Interuniversitario de Investigación del Sistema Tierra en Andalucía (Spain) and Univ. de Granada (Spain); María José Granados-Muñoz, Instituto Interuniversitario de Investigación del Sistema Tierra en Andalucía (Spain); Riad Bourayou, Instituto de Pesquisas Energéticas e Nucleares (Brazil) [9246-12]

14:50: **New Lidar facility at Lindenberg Meteorological Observatory, Germany**, Jens Reichardt, Robert Begbie, Veronika Wolf, Andrew Reigert, Deutscher Wetterdienst (Germany); Ulla Wandinger, Ronny Engelmann, Leibniz Institut für Troposphärenforschung (Germany); Bernhard Hilber, Loritus GmbH (Germany) [9246-13]

Coffee Break Mon 15:10 to 15:40

15:40: **LED mini-lidar as minimum setup**, Tatsuo Shiina, Chiba Univ. (Japan) [9246-14]

CONFERENCE 9246 - ROOM: E104

16:00: **Evaluation of the hygroscopic behavior of aerosols over Sao Paulo: one-day case study**, Patricia F. Rodrigues, Eduardo Landulfo, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Fabio J. Lopes, Instituto de Pesquisas Energéticas e Nucleares (Brazil) and Univ. de São Paulo (Brazil); Renata F. de Costa, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Andrés Bedoya, Univ. Nacional de Colombia Sede Medellín (Colombia); María José Granados-Muñoz, Instituto Interuniversitario de Investigación del Sistema Tierra en Andalucía (IISTA-CEAMA) (Spain); Juan Luis Guerrero-Rascado, Instituto Interuniversitario de Investigación del Sistema Tierra en Andalucía (Spain) and Univ. de Granada (Spain) [9246-15]

16:20: **Lidar measurements of tropospheric aerosol and water vapour profiles during the winter season campaigns over the metropolitan area of São Paulo, Brazil**, Fabio J. Lopes, Univ. de São Paulo (Brazil); Gregori de Arruda Moreira, Patricia F. Rodrigues, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Juan Luis Guerrero-Rascado, Instituto Interuniversitario de Investigación del Sistema Tierra en Andalucía (Spain), Univ. de Granada (Spain); María de Fatima Andrade, Univ. de São Paulo (Brazil); Eduardo Landulfo, Instituto de Pesquisas Energéticas e Nucleares (Brazil) [9246-16]

16:40: **MPLNET lidar data assimilation in the ECMWF MACC-II Aerosol system: first preliminary results**, Simone Lolli, Ellsworth J. Welton, NASA Goddard Space Flight Ctr. (United States); Angela Benedetti, Luke Jones, Martin Suttie, European Ctr. for Medium-Range Weather Forecasts (United Kingdom) [9246-17]

CLOSING REMARKS

Room: E104 17:20 to 17:25

Wednesday 24 September

POSTERS—WEDNESDAY

Room: Elicium 1 Wed 17:40 to 19:15

Conference attendees are invited to attend the Remote Sensing poster session held on Wednesday 17:40 to 19:15. Posters will be on display after 10:00

Wednesday morning in the Conference Centre. Authors of poster papers will be present to answer questions concerning their papers during the Wednesday Poster Session. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x32234.xml> and under general information in the printed programme.

Error propagation of exterior orientation elements study on space-borne laser altimeter ground positioning, Chunyu Yue, Beijing Institute of Space Mechanics and Electricity (China); Hongyan He, China Academy of Space Technology (China); Yunfei Bao, Kun Xing, Nan Zhou, Beijing Institute of Space Mechanics and Electricity (China) [9246-20]

Synergy between ground-based remote sensing systems in microphysical analysis of cirrus clouds, Veronika Wolf, Jens Reichardt, Ulrich Görsdorf, Andrew Reigert, Ronny Leinweber, Volker Lehmann, Deutscher Wetterdienst (Germany) [9246-21]

Use of Lidar technology in forest fuel structure measurements for development of dynamic fuel hazard models, Yang Chen, Xuan Zhu, Nigel Tapper, Musa Kilinc, Sarah Harris, Monash Univ. (Australia) [9246-22]

Characterization of smoke particle properties from multiwavelength Raman lidar measurements, Anastasiia S. Suvorina, Igor A. Veselovskii, Physics Instrumentation Ctr. (Russian Federation); David N. Whiteman, NASA Goddard Space Flight Ctr. (United States); Mikhail Y. Korenskii, Physics Instrumentation Ctr. (Russian Federation); Daniel Pérez-Ramírez, NASA Goddard Space Flight Ctr. (United States) [9246-23]

Instrumental correction of the uneven PMT aging effect on the calibration constant of a water vapor Raman Lidar, Valentin B. Simeonov, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Shlomo Fastig, Soreq Nuclear Research Ctr. (Israel) and Ecole Polytechnique Fédérale de Lausanne (Switzerland); Alexander Haefele, Bertrand Calpini, MeteoSwiss (Switzerland) [9246-24]

Towards an instrumental harmonization in the framework of LALINET: dataset of technical specifications, Juan Luis Guerrero-Rascado, Instituto de Pesquisas Energéticas e Nucleares (Brazil) and Ctr. Andaluz de Medio Ambiente (Spain) and Univ. de Granada (Spain); Eduardo Landulfo, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Juan Carlos Antuña, Ctr. Meteorológico de Camagüey (Cuba); Henrique M. J. Barbosa, Univ. de São Paulo (Brazil); Boris Barja, Ctr. Meteorológico de Camagüey (Cuba) and Univ. de São Paulo (Brazil); Álvaro E. Bastidas, Andrés E. Bedoya, Univ. Nacional de Colombia Sede Medellín (Colombia); Renata F. da Costa, Instituto de Pesquisas Energéticas e Nucleares (Brazil); René Estevan, Ctr. Meteorológico de Camagüey (Cuba); Ricardo N. Forno, Univ. Nacional Mayor de San Marcos (Bolivia); Diego A. Gouveia, Univ. de São Paulo (Brazil); Cristófer Jiménez, Univ. de Concepción (Chile); Eliane G. Larroza, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Fábio J. da Silva Lopes, Instituto de Pesquisas Energéticas e Nucleares (Brazil) and Univ. de São Paulo (Brazil); Elena Montilla-Rosero, Univ. de Concepción (Chile) and Univ. de Concepción (Chile); Gregori de Arruda Moreira, Walter M. Nakaema, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Daniel Nisperuza, Univ. Nacional de Colombia Sede Medellín (Colombia); Lidia A. Otero, Sebastián Papandrea, Ezequiel Pawelko, Eduardo J. Quel, Pablo Ristori, Instituto de Investigaciones Científicas y Técnicas para la Defensa (Argentina); Patricia F. Rodrigues, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Jacobo Salvador, Instituto de Investigaciones Científicas y Técnicas para la Defensa (Argentina); María Fernanda Sánchez, Univ. Nacional Mayor de San Marcos (Bolivia); Antonieta Silva, Univ. de Concepción (Chile) [9246-25]

Application of the adaptive segmentation smoothing method in the atmospheric detection by a space-based Lidar, Yuzhao Wang, Beijing Institute of Space Mechanics and Electricity (China) [9246-26]

Tropospheric Raman Lidar measurements of the vertical aerosol backscattering with range-dependent Lidar ratio in Penang Island, Malaysia, during the dry season, Wan Shen Hee, Wei Ying Khor, Fuyi Tan, Hwee San Lim, Mohamad Zubir Mat Jaffri, Univ. Sains Malaysia (Malaysia); Simone Lolli, NASA Goddard Space Flight Ctr. (United States) [9246-27]

Fiber optic humidity sensor based on Fabry-Perot interferometer, Zhi Zhuang, Yi Zhang, Yongjian Mao, China Academy of Engineering Physics (China); MingHong Yang, Wuhan Univ. of Technology (China) and Key Lab. of Fiber Optic Sensing Technology and Information Processing, Ministry of Education (China) [9246-28]

An inspection approach for airborne Lidar data filtering and qualification, Ming-Ko Chung, Ting-Wei Kuo, Che-Hao Chang, National Taipei Univ. of Technology (Taiwan) [9246-29]

A multiwavelength Lidar system based on an erbium-doped fiber MOPA-system, Alfred Kurtz, Albert Töws, Fachhochschule Köln (Germany) [9246-30]

Development of a laser for differential absorption Lidar measurement of atmospheric carbon dioxide, James W. Jack, Iain Robinson, John B. Moncrieff, The Univ. of Edinburgh (United Kingdom) [9246-31]

Development of PM2.5 density distribution visualization system using ground-level sensor network and Mie lidar, Hiroshi Okumura, Taiga Akaho, Yu Kojiro, Saga Univ. (Japan); Osamu Uchino, National Institute for Environmental Studies (Japan) and Meteorological Research Institute (Japan); Isamu Morino, Tatsuya Yokota, National Institute for Environmental Studies (Japan); Tomohiro Nagai, Tetsu Sakai, Takashi Maki, Akihiro Yamazaki, Meteorological Research Institute (Japan); Kohei Arai, Saga Univ. (Japan) [9246-32]

Raman Lidar characterization using a reference lamp, Eduardo Landulfo, Fábio J. da Silva Lopes, Renata F. da Costa, Patricia Ferrini Rodrigues, Instituto de Pesquisas Energéticas e Nucleares (Brazil) [9246-33]

CONFERENCE 9247 - ROOM: D202

Monday - Tuesday 22-23 September 2014 • Proceedings of SPIE Vol. 9247

HIGH-PERFORMANCE COMPUTING IN REMOTE SENSING

Conference Chairs: **Bormin Huang**, Univ. of Wisconsin-Madison (United States); **Sebastian López**, Univ. de Las Palmas de Gran Canaria (Spain); **Zhensen Wu**, Xidian Univ. (China)

Programme Committee: **Saeed H. Al-Mansoori**, Emirates Institution for Advanced Science and Technology (United Arab Emirates); **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**, GeoMetWatch Corp. (United States); **Qian Du**, Mississippi State Univ. (United States); **Mitch Goldberg**, National Environmental Satellite, Data, and Information Service (United States); **Carlos Gonzalez**, Univ. Complutense de Madrid (Spain); **Lixin Guo**, Xidian Univ. (China); **HungLung Allen Huang**, Univ. of Wisconsin-Madison (United States); **Tung-Ju Hsieh**, National Taipei Univ. of Technology (Taiwan); **Dieter Just**, European Organisation for the Exploitation of Meteorological Satellites (Germany); **Tsengdar J. Lee**, NASA Headquarters (United States); **Francesco Leporati**, Univ. degli Studi di Pavia (Italy); **Prashanth Reddy Marpu**, Masdar Institute of Science & Technology (United Arab Emirates); **Jarno Mielikainen**, Univ. of Wisconsin-Madison (United States); **J. Montgomery**, Georgetown Univ. (United States); **Jose M. Nascimento**, Instituto de Telecomunicações (Portugal); **Abel Paz**, Univ. de Extremadura (Spain); **Antonio J. Plaza**, Univ. de Extremadura (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); **Yuliya Tarabalka**, INRIA Sophia Antipolis - Méditerranée (France); **Carole Thiebaud**, Ctr. National d'Études Spatiales (France); **Tanya Vladimirova**, Univ. of Leicester (United Kingdom); **Shih-Chieh Wei**, Tamkang Univ. (Taiwan); **Jiayi Wu**, Xidian Univ. (China); **Ye Zhang**, Harbin Institute of Technology (China)

Monday 22 September

SESSION 1

Room: D202 Mon 8:30 to 10:10

High-Performance Computing in Remote Sensing I

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

8:30: **GPU implementation of random projection-based dimensionality reduction for hyperspectral imagery**, Xiaochao Li, Xiamen University (China); Qian Du, Mississippi State Univ (United States) [9247-1]

8:50: **FPGA-based architecture for hyperspectral end-member extraction**, Jose M. Nascimento, Instituto de Telecomunicações (Portugal); João Rosário, Mário Véstias, Instituto Superior de Engenharia de Lisboa (Portugal) ... [9247-2]

9:10: **Intel Many Integrated Core (MIC) architecture optimization strategies for a memory-bound Weather and Research Forecasting (WRF) Goddard microphysics scheme**, Jarno Mielikainen, Bormin Huang, Allen Huang, Univ. of Wisconsin-Madison (United States) [9247-3]

9:30: **FPGA implementation of the hyperspectral Lossy Compression for Exomars (LCE) algorithm**, José F. López, Aday García, Lucana S. Falcon, Univ. de Las Palmas de Gran Canaria (Spain) and Institute for Applied Microelectronics (Spain); Sebastián López, Univ. de Las Palmas de Gran Canaria (Spain) and Institute for Applied Microelectronics (Spain); Gustavo M. Callico, Univ. de Las Palmas de Gran Canaria (Spain) and Institute for Applied Microelectronics (Spain); Roberto Sarmiento, Univ. de Las Palmas de Gran Canaria (Spain) and Institute for Applied Microelectronics (Spain) [9247-4]

9:50: **EM scattering from a 2D target above a 1D sea surface using GPU-based FDTD**, Lixin Guo, Chungang Jia, Pangju Yang, Xidian Univ. (China) [9247-5]

Coffee Break Mon 10:10 to 10:40

SESSION 2

Room: D202 Mon 10:40 to 12:20

High-Performance Computing in Remote Sensing II

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

10:40: **Hybrid DWT-DCT based digital image watermarking for copyright protection of DubaiSat-2 images**, Saeed H. Al-Mansoori, Emirates Institution for Advanced Science and Technology (United Arab Emirates); Alavi Kunhu, Khalifa Univ. of Science, Technology and Research (United Arab Emirates) [9247-6]

11:00: **Building high-performance system for processing a daily large volume of Chinese satellite imagery**, Huawu Deng, PCI Geomatics (Canada); Shicun Huang, Qi Wang, Zhiqiang Pan, China Ctr. for Resource Satellite Data and Applications (China); Yubin Xin, PCI Geomatics (Canada) [9247-7]

11:20: **Implementation of the 5-layer thermal diffusion scheme in weather research and Forecasting model with Intel many integrated core (MIC) architecture**, Melin Huang, Bormin Huang, Allen Huang, Univ. of Wisconsin-Madison (United States) [9247-8]

11:40: **A composite algorithm for variable size object tracking for high performance FPGA-based on-board vision systems**, Valeriy V. Strotov, Boris A. Alpatov, Ryazan State Radio Engineering Univ. (Russian Federation) . [9247-9]

12:00: **Parallel motion JPEG2000 decoding running on multicore CPUs and CUDA-enabled GPUs**, Changhe Song, Yunsong Li, Jiaojiao Li, Xidian Univ. (China) [9247-10]

Lunch Break Mon 12:20 to 13:50

SESSION 3

Room: D202 Mon 13:50 to 15:10

High-Performance Computing in Remote Sensing III

Session Chair: **Zhensen Wu**, Xidian Univ. (China)

13:50: **Initial results on computational performance of Intel Many Integrated Core (MIC) architecture: implementation of the Weather and Research Forecasting (WRF) Purdue-Lin microphysics scheme**, Jarno Mielikainen, Bormin Huang, Allen Huang, Univ. of Wisconsin-Madison (United States) [9247-11]

14:10: **GPU efficient SAR image denoising using summed area tables**, Caner Ozcan, Karabuk Univ. (Turkey); Baha Sen, Yildirim Beyazit Univ. (Turkey); Fatih Nar, SDT A.S. (Turkey) [9247-12]

14:30: **Acceleration of the Partitioned Predictive Vector Quantization Lossless Compression Method with Intel MIC**, Shih-Chieh Wei, Tamkang Univ. (Taiwan); Bormin Huang, University of Wisconsin-Madison (United States) [9247-14]

14:50: **Fast motion detection in coded video streams for a large-scale remote video sensor system**, Yong-Sung Kim, Gyu-Hee Park, Seung-Hwan Kim, Hyung-Joon Cho, SK Telecom (Korea, Republic of) [9247-15]

Coffee Break Mon 15:10 to 15:40

SESSION 4

Room: D202 Mon 15:40 to 17:40

High-Performance Computing in Remote Sensing IV

Session Chair: **Qian Du**, Mississippi State Univ. (United States)

15:40: **GPU-accelerated computation of beam scattering from sea surface**, Xiang Su, Xiaoxiao Zhang, Zhensen Wu, Xidian Univ. (China) [9247-16]

16:00: **A novel highly-parallel algorithm for linearly unmixing hyperspectral images**, Raul Guerra, Sebastian López, Gustavo M. Callico, José F. López, Roberto Sarmiento, Univ. de Las Palmas de Gran Canaria (Spain) ... [9247-17]

16:20: **The backscattering characteristics and accelerated arithmetic for complex rough target in THz and laser bands**, Yuan Mou, Zhensen Wu, Xing Guo, School of Physics and Optoelectronic Engineering, Xidian University (China) [9247-18]

CONFERENCE 9247 - ROOM: D202

16:40: **Application of Intel many integrated core (MIC) architecture to the Yonsei University planetary boundary layer scheme in Weather Research and Forecasting model**, Melin Huang, Bormin Huang, Allen Huang, Univ. of Wisconsin-Madison (United States) [9247-19]

17:00: **Efficient parallel implementation of polarimetric synthetic aperture radar data processing**, Sergio Sanchez Martinez, Prashanth Reddy Marpu, Masdar Institute of Science & Technology (United Arab Emirates); Antonio J. Plaza Miguel, Univ. de Extremadura (Spain) [9247-20]

17:20: **GPU-accelerated the geometric modeling of the ocean surface based on ocean wave spectrums**, Zhan Song, Jiayi Wu, Wenze Li, Longxiang Ling-Hu, Xiang Su, Zhensen Wu, Xidian Univ. (China) [9247-21]

Tuesday 23 September

SESSION 5

Room: D202 Tue 10:00 to 12:00

High-Performance Computing in Remote Sensing V

Session Chair: **Saeed H. Al-Mansoori**, Emirates Institution for Advanced Science and Technology (United Arab Emirates)

10:00: **Optimizing an advanced research weather research and forecast (WRF-ARW) dynamics subroutine for Intel MIC**, Jarno Mielikainen, Bormin Huang, Allen Huang, Univ. of Wisconsin-Madison (United States). [9247-22]

10:20: **On the use of reconfigurable hardware for the estimation of the number of end-members in hyperspectral images**, Carlos Gonzalez, Univ. Complutense de Madrid (Spain); Sebastian López, Roberto Sarmiento, Univ. de Las Palmas de Gran Canaria (Spain); Daniel Mozos, Univ. Complutense de Madrid (Spain) [9247-23]

10:40: **GPU-accelerated calculation of scattering characteristics of satellite in the visible spectrum**, YunHua Cao, Zhensen Wu, Lu Bai, Xing Guo, School of Physics and Optoelectronic Engineering, Xidian University (China) [9247-24]

11:00: **GPU-based rectification of high-resolution remote sensing stereo images**, Niko Lukac, Borut Zalik, Univ. of Maribor (Slovenia) [9247-25]

11:20: **Minimum access division-free structure for GPU accelerated parallel FDTD**, Bing Bai, Bing Wei, Yi Niu, Xidian Univ. (China) [9247-26]

11:40: **GPU acceleration of incenter-based nearest feature space approach to hyperspectral image classification**, Yang-Lang Chang, Chao-Hsien Tang, Tung-Ju Hsieh, National Taipei Univ of Technology (Taiwan); Lena Chang, National Taiwan Ocean University (Taiwan); Bormin Huang, University of Wisconsin-Madison (United States) [9247-27]

PLENARY SESSION

Room: D202 Tue 16:05 to 17:40

Remote Sensing 2014

For details, please see special events section in the printed programme or visit <http://spie.org/remote-sensing-europe.xml>

Wednesday 24 September

POSTERS—WEDNESDAY

Room: Elicium 1 Wed 17:40 to 19:15

Conference attendees are invited to attend the Remote Sensing poster session held on Wednesday 17:40 to 19:15. Posters will be on display after 10:00 Wednesday morning in the Conference Centre. Authors of poster papers will be present to answer questions concerning their papers during the Wednesday Poster Session. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x32234.xml> and under general information in the printed programme.

Salient region detection in remote sensing images based on frequency and color characteristics, Libao Zhang, Xuwei Li, Beijing Normal Univ. (China) [9247-28]

A fine-grained parallel model of edge-directed interpolation for remote sensing image, Wenze Li, Jiayi Wu, Zhan Song, Xidian Univ. (China); Xiang Su, Xidian Univ. (China) [9247-29]

Detection and recognition of deep seismic weak reflection signal, Xie Kai, Yangtze Univ. (China) [9247-30]

Scattering of targets over layered half-space using a semi-analytic method in conjunction with FDTD algorithm, Bing Wei, Xidian Univ. (China) . [9247-31]

Estimating refractivity of lower troposphere from weather radar clutter, Hongguang Wang, China Research Institute of Radiowave Propagation (China); Zhensen Wu, Xidian University (China); Shifeng Kang, Zhenwei Zhao, China Research Institute of Radiowave Propagation (China) [9247-32]

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(Netherlands)

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CONFERENCE 9248 - ROOM: E103

Wednesday - Thursday 24-25 September 2014 • Proceedings of SPIE Vol. 9248

UNMANNED/UNATTENDED SENSORS AND SENSOR NETWORKS

Conference Chairs: **Edward M. Carapezza**, General Atomics (United States); **Panos G. Datskos**, Oak Ridge National Lab. (United States); **Christos Tsamis**, National Ctr. for Scientific Research Demokritos (Greece)

Programme Committee: **Mehdi F. 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**, Consultant (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); **Tariq Manzur**, Naval Undersea Warfare Ctr. (United States); **George C. McNamara**, Naval Undersea Warfare Ctr. (United States); **Nino Srouf**, U.S. Army Research Lab. (United States); **Huub A.J.M. van Hoof**, TNO Defence, Security and Safety (Netherlands); **Andre Samberg**, Sec-Control Finland Ltd. (Finland)

Wednesday 24 September

WELCOME AND INTRODUCTION

Room: E103 13:00 to 13:10

SESSION 1

Room: E103 Wed 13:10 to 13:50

Unmanned/Unattended Sensors

Session Chairs: **Panos G. Datskos**, Oak Ridge National Lab. (United States); **Christos Tsamis**, National Ctr. for Scientific Research Demokritos (Greece)

13:10: **Energy harvesting for autonomous sensors (Keynote Presentation)**, Christos Tsamis, National Ctr. for Scientific Research Demokritos (Greece) [9248-1]

SESSION 2

Room: E103 Wed 13:50 to 15:10

Sensors & Technology I

Session Chairs: **Panos G. Datskos**, Oak Ridge National Lab. (United States); **Christos Tsamis**, National Ctr. for Scientific Research Demokritos (Greece)

13:50: **Piezoelectric nanogenerators on flexible substrates for self-powered systems and sensors (Invited Paper)**, Eleni Makarona, National Ctr. for Scientific Research Demokritos (Greece) [9248-2]

14:10: **Nonlinear mechanical resonators for ultra-sensitive mass detection**, Panos G Datskos, Nickloay Lavrik, Oak Ridge National Lab (United States) [9248-3]

14:30: **Superhydrophobic coatings for ammunition corrosion protection**, Slobodan Rajic, Panos Datskos, Scott Hunter, Oak Ridge National Lab (United States) [9248-4]

14:50: **Spray-on superhydrophobic coatings with high mechanical durability for anti-corrosion and anti-soiling applications**, Daniel Schaeffer, Georgios Polyzos, David Barton Smith, Scott Hunter, Oak Ridge National Lab (United States) [9248-5]

Coffee Break Wed 15:10 to 15:40

SESSION 3

Room: E103 Wed 15:40 to 17:10

Sensors and Technology II

Session Chairs: **Panos G. Datskos**, Oak Ridge National Lab. (United States); **Christos Tsamis**, National Ctr. for Scientific Research Demokritos (Greece)

15:40: **Sense and avoid radar for micro-/nano robots (Invited Paper)**, Pavlo A Molchanov, Olha Asmolova, AETHER Inc (United States) [9248-7]

16:10: **Submicron metamaterial structures using drawn composite fibers**, Daniel A Schaeffer, Panos Datskos, Oak Ridge National Lab (United States) [9248-8]

16:30: **Photonic crystal fiber long period grating sensor for ammonia detection in structural health monitoring**, Shijie Zheng, Harbin Institute of Technology (China) and Harbin Institute of Technology (China); Jinping Ou, Harbin Institute of Technology (China) [9248-9]

16:50: **Bi-material resonant infrared thermal detector and array**, Xia Zhang, Communication Univ. of China (China); Dacheng Zhang, Peking Univ. (China) [9248-10]

SESSION 4

Room: E103 Wed 17:10 to 17:50

Sensors, Algorithms, and Systems I

17:10: **Simple fiber optic sensor for applications in security systems**, Marek Zyczkowski, Mateusz Karol, Piotr Markowski, Marta Napierala, Military Univ. of Technology (Poland) [9248-13]

17:30: **Improvement of optical and acoustical technologies for the protection: project IMOTEP. Network of heterogeneous sensor types for the protection of camps or mobile troupes**, Sébastien Hengy, Martin Laurenzis, Institut Franco-Allemand de Recherches de Saint-Louis (France); Veronique Zimpfer, Armin Schneider, ISL (France) and Inst Franco-Allemand de Recherches de Saint-Louis (France) [9248-14]

POSTERS—WEDNESDAY

Room: Elicium 1 Wed 17:40 to 19:15

Conference attendees are invited to attend the Remote Sensing poster session held on Wednesday 17:40 to 19:15. Posters will be on display after 10:00 Wednesday morning in the Conference Centre. Authors of poster papers will be present to answer questions concerning their papers during the Wednesday Poster Session. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x32234.xml> and under general information in the printed programme.

Analysis on polarization aberration of the coherent laser communication optical system, Yuan Hu, Changchun Univ. of Science and Technology (China) and Beijing Institute of Technology (China); Dewen Cheng, Beijing Institute of Technology (China); Lun Jiang, Changchun Univ. of Science and Technology (China) [9248-27]

Coastal sensors for monitoring impacts of significant events on marine life, Aldo Bargnesi, Naval Undersea Warfare Ctr. (United States); Edward M. Carapezza, EMC, Inc. (United States) [9248-29]

Thursday 25 September

SESSION 5

Room: E103 Thu 8:30 to 10:20

Sensors, Algorithms, and Systems II

Session Chairs: **Panos G. Datskos**, Oak Ridge National Lab. (United States); **Edward M. Carapezza**, EMC, Inc. (United States)

8:30: **Encounter detection to improve navigation in a group of unattended vehicles (Invited Paper)**, Marcel G. A. Ruizenaar, TNO Defence, Security and Safety (Netherlands) [9248-33]

9:00: **Inference of vessel intent and behaviour for maritime security operations**, Arthur Smith, TNO Defence, Security and Safety (Netherlands) [9248-6]

9:20: **Range measurements to improve navigation in a group of unattended vehicles**, A. P. M. Maas, Danny J. Maat, TNO Defence, Security and Safety (Netherlands) [9248-31]

9:40: **Towards a distributed implementation of the PHD-filter**, Joris Sijs, Leon J. H. M. Kester, TNO Defence, Security and Safety (Netherlands) [9248-30]

10:00: **Event protection with disruption tolerant aerial networking with multicopters**, Maurits de Graaf, Thales Nederland (Netherlands); Julio de Oliveira Filho, TNO (Netherlands) [9248-32]

Coffee Break Thu 10:20 to 10:40

SESSION 6

Room: E103 Thu 10:40 to 13:00

Sensors, Algorithms, and Systems III

Session Chairs: **Panos G. Datskos**, Oak Ridge National Lab. (United States); **Edward M. Carapezza**

- 10:40: **All-digital radar architecture**, Pavlo A. Molchanov, Compass Systems Inc. (United States) [9248-11]
- 11:00: **Independent motion detection with a rival penalized adaptive particle filter**, Stefan Becker, Wolfgang Hübner, Michael Arens, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [9248-12]
- 11:20: **PADF electromagnetic source localization using extremum seeking control**, Huthaifa A. Al Issa, Univ. of Dayton (United States), Jerash Univ. (Jordan); Raúl Ordóñez, Univ. of Dayton (United States) [9248-15]
- 11:40: **Coordinating UAV information for executing national security-oriented collaboration**, Anthony W. Isenor, Defence Research and Development Canada, Atlantic (Canada); Yannick Allard, OODA Technologies Inc. (Canada); Anna-Liesa S. Lapinski, Defence Research and Development Canada, Atlantic (Canada); Hugues Demers, Dan Radulescu, OODA Technologies Inc. (Canada) [9248-16]
- 12:00: **Implementing the distributed consensus-based estimation of environmental variables in unattended wireless sensor networks**, Rodrigo Contreras, Silvia E. Restrepo, Jorge E. Pezoa Nunez, Univ. de Concepción (Chile) [9248-17]
- 12:20: **Detection of people in military and security context imagery**, Thomas M. Shannon, Ben Wiltshire, Emmet H. Spier, 2d3 Sensing (United Kingdom) [9248-18]
- 12:40: **Adaptive Multi-sensor Biomimetics for Unsupervised Submarine Hunt: AMBUSH**, Stephane Blouin, A. Aghdam, M. Rabbat, E. Kranakis, Defence Research and Development Canada, Atlantic (Canada) [9248-34]
- Lunch Break Thu 13:00 to 14:00

SESSION 7

Room: E103 Thu 14:00 to 17:10

Free-Space Optical Communication

Session Chairs: **Henry J. White**, BAE Systems (United Kingdom); **Leslie Laycock**, BAE Systems (United Kingdom)

- 14:00: **Dazzle project: UAV to ground communication system using a laser and a modulated retro-reflector (Invited Paper)**, Yoann P. Thueux, Airbus Group (United Kingdom) [9248-19]
- 14:30: **Channel modelling for free-space optical Inter-HAP links using adaptive ARQ transmission**, Swaminathan Parthasarathy, Dirk Giggenbach, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Andreas Kirstädter, Univ. Stuttgart (Germany) [9248-20]
- 14:50: **Demonstration of high-rate laser communications from fast airborne platform: flight campaign and results**, Florian Moll, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Wolfgang Mitzkus, Airbus Defence and Space (Germany); Joachim Horwath, ViaLight Communications GmbH (Germany); Amita Shrestha, Martin Brechtelsbauer, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Luis Martin, Alberto Lozano, Dionisio Diaz, ViaLight Communications GmbH (Germany) [9248-21]
- 15:10: **Novel non-mechanical fine tracking module for retroreflective free space optics**, Crisanto Quintana, Ariel Gomez Diaz, Grahame E. Faulkner, Univ. of Oxford (United Kingdom); Gavin R. Erry, Yoann P. Thueux, Airbus Defence and Space (United Kingdom); Dominic C. O'Brien, Univ. of Oxford (United Kingdom) [9248-22]
- Coffee Break Thu 15:30 to 15:50
- 15:50: **Assessment of laser tracking and data transfer for underwater optical communications**, Henry J. White, BAE Systems (United Kingdom) [9248-23]
- 16:10: **Indoor artificial atmospheric beamlet as a test-bed for adaptive optics**, Vladimir Yu. Venediktov, St. Petersburg Univ. (Russian Federation); D. I. Dimitriev, NII OEP (Russian Federation); Alina Gorelaya, Saint Petersburg Electrotechnical Univ. "LETI" (Russian Federation) [9248-24]
- 16:30: **Modulation techniques used in earth to satellite and inter-satellite free space optical links**, Pooja Gopal, Virander K. Jain, Subrat Kar, Indian Institute of Technology Delhi (India) [9248-25]
- 16:50: **Lower bound on number of telescopes in an optical array receiver for deep space optical communication**, Ali J. Hashmi, National Univ. of Science and Technology (Pakistan); Ali A. Eftekhar, Ali Adibi, Georgia Institute of Technology (United States); Farid Amoozegar, Jet Propulsion Lab. (United States) [9248-26]

CONFERENCE 9249 - ROOM: E105-106

Tuesday - Wednesday 23-24 September 2014 • Proceedings of SPIE Vol. 9249

ELECTRO-OPTICAL AND INFRARED SYSTEMS: TECHNOLOGY AND APPLICATIONS

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

Programme Committee: **Christopher C. Alexay**, StingRay Optics, LLC (United States); **Jan Yngve Andersson**, Acreo Swedish ICT AB (Sweden); **Gisele Bennett**, Georgia Institute of Technology (United States); **Piet Bijl**, TNO Defence, Security and Safety (Netherlands); **Rainer Breiter**, AIM INFRAROT-MODULE GmbH (Germany); **Gordon A. Cain**, Vision4ce Ltd. (United Kingdom); **David J. Clarke**, Placing Value Co.,Ltd (Thailand); **Gérard Destefanis**, Commissariat à l'Énergie Atomique (France); **Judith Dijk**, TNO Defence, Security and Safety (Netherlands); **Jean-Claude L. Fontanella**, Thales Optronique S.A.S. (France); **Natan S. Kopeika**, Ben-Gurion Univ. of the Negev (Israel); **Robert A. Lamb**, SELEX Galileo Ltd. (United Kingdom); **Stephen T. Lee**, Thales Optronics Ltd. (United Kingdom); **José Manuel López-Alonso**, Univ. Complutense de Madrid (Spain); **John F. Parsons**, Thales UK 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); **Philip J. Soan**, Defence Science and Technology Lab. (United Kingdom)

Tuesday 23 September

SESSION 1

Room: E105-106 Tue 8:30 to 10:10

Electro-Optical Systems and Applications

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

8:30: **Method for increased detection range in IR warning systems**, Eyal Arad, Paula I. Roit, Rafael Advanced Defense Systems Ltd. (Israel) [9249-1]

8:50: **Simultaneous image stabilization and motor control in semi-stationary video applications**, Ann-Kristin Grossefinger, Wolfgang Hübner, Michael Arens, David Münch, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [9249-2]

9:10: **Modeling transient thermal behavior of shutterless microbolometer-based infrared cameras**, Alexander Tempelhahn, Helmut Budzier, Volker Krause, Gerald Gerlach, Technische Univ. Dresden (Germany) [9249-3]

9:30: **Nondestructive testing of CFRP with small arms impacts by IR thermography methods**, Waldemar Swiderski, Military Institute of Armament Technology (Poland); Marek Szudrowicz, Military Institute of Armoured and Automotive Technology (Poland) [9249-4]

9:50: **Optical fibre techniques for use within tamper indicating enclosures designed for arms control verification purposes**, Thomas C. Dyer, Alexander W. J. Thompson, Paul Wynn, Helen White, AWE plc (United Kingdom) .. [9249-5]

Coffee Break Tue 10:10 to 10:40

SESSION 2

Room: E105-106 Tue 10:40 to 12:00

Systems Components and Testing

Session Chairs: **Bernd Eberle**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Christopher C. Alexay**, StingRay Optics, LLC (United States); **Robert A. Lamb**, SELEX Galileo Ltd. (United Kingdom)

10:40: **Passive athermalization of doublets in 8-13 micron waveband**, Norbert Schuster, Umicore Electro-Optic Materials (Belgium) [9249-6]

11:00: **Protection performance evaluation regarding imaging sensors hardened against laser dazzling**, Gunnar Ritt, Michael Körber, Bernd Eberle, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Daniel Forster, Wehrtechnische Dienststelle für Waffen und Munition (Germany) [9249-7]

11:20: **Evaluation of super-resolution imager with binary fractal test target**, Stephane Landeau, Délégation Générale pour l'Armement (France) [9249-8]

11:40: **Optical design of the medium-sized solar simulator**, Hongsong Li, Beijing Institute of Spacecraft Environment Engineering (China) [9249-9]

Lunch/Exhibition Break Tue 12:00 to 13:20

SESSION 3

Room: E105-106 Tue 13:20 to 15:00

Simulation and Modelling

Session Chairs: **Gisele Bennett**, Georgia Institute of Technology (United States); **Gordon A. Cain**, Vision4ce Ltd. (United Kingdom); **Philip J. Soan**, Defence Science and Technology Lab. (United Kingdom)

13:20: **Software thermal imager simulator**, Loic Le Noc, Michel Doucet, Ovidiu Pancrati, Denis G. Dufour, Benoit Debaque, Simon Turbide, Francois Berthiaume, Louis Saint-Laurent, Linda E. Marchese, Martin Bolduc, Alain Bergeron, INO (Canada) [9249-10]

13:40: **A target detection model predicting field observer performance in maritime scenes**, Joanne B. Culpepper, Vivienne C. Wheaton, Defence Science and Technology Organisation (Australia) [9249-11]

14:00: **Exact expressions for thermal contrast detected with thermal and quantum detectors**, Sean M. Stewart, Nazarbayev Univ. (Kazakhstan); R. Barry Johnson, Alabama A&M Univ. (United States) [9249-12]

14:20: **Performance optimization for space-based sensors: simulation and modelling at Fraunhofer IOSB**, Caroline Schweitzer, Norbert Wendelstein, Karin U. Stein, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [9249-13]

14:40: **Contrast analysis of space-based Earth observation infrared system**, Xiaoyu He, Xiaojian Xu, BeiHang Univ. (China) [9249-14]

Coffee Break Tue 15:00 to 15:30

SESSION 4

Room: E105-106 Tue 15:30 to 16:30

Active Imaging and Target Designation

Session Chairs: **Stephen T. Lee**, Thales Optronics Ltd. (United Kingdom); **José Manuel López-Alonso**, Univ. Complutense de Madrid (Spain)

15:30: **Low-light CMOS imaging for SWAPC active imaging systems**, Gareth H. Powell, e2v semiconductors SAS (France) [9249-15]

15:50: **Novel eye-safe line scanning 3D laser-radar**, Bernd Eberle, Tobias Kern, Marcus Hammer, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Ullrich Schwanke, Heinrich Nowak, Airbus Defence and Space (Germany) [9249-16]

16:10: **Passively-athermal, compact, STANAG-compatible laser target designator**, Stephen T. Lee, Andrew Borthwick, Ian McRae, William Alexander, Thales Optronics Ltd. (United Kingdom) [9249-18]

SESSION 5

Room: E105-106 Tue 16:30 to 17:30

Image Processing

Session Chairs: **Jean-Claude L. Fontanella**, Thales Optronique S.A.S. (France); **John F. Parsons**, Thales UK Ltd. (United Kingdom)

16:30: **A new incremental principal component analysis with a forgetting factor for background estimation**, Takashi Toriu, Osaka City Univ. (Japan); Thi Thi Zin, Univ. of Miyazaki (Japan); Hiromitsu Hama, Osaka City Univ. (Japan) [9249-19]

16:50: **An embedded face-classification system for infrared images on an FPGA**, Miguel E. Figueroa, Javier E. Soto, Univ. de Concepción (Chile) [9249-20]

17:10: **A texture-based architecture for face detection in IR images on an FPGA**, Marcelo G. Vergara, Alexander Wolf, Miguel E. Figueroa, Univ. de Concepción (Chile) [9249-21]

Wednesday 24 September

SESSION 6

Room: E105-106 Wed 8:30 to 11:50

Electro-Optical Technology in the Netherlands

Session Chairs: **Piet Bijl**, TNO Defence, Security and Safety (Netherlands); **Judith Dijk**, TNO Defence, Security and Safety (Netherlands)

8:30: **Research topics on EO systems for maritime platforms (Keynote Presentation)**, Judith Dijk, Piet Bijl, TNO Defence, Security and Safety (Netherlands) [9249-22]

9:00: **Ship recognition for improved persistent tracking with descriptor localization and compact representations**, Sebastiaan P. van den Broek, Henri Bouma, Richard J. M. den Hollander, Henry E. T. Veerman, Koen W. Benoist, Piet B. W. Schwing, TNO Defence, Security and Safety (Netherlands) [9249-23]

9:20: **Turbulence mitigation methods and their evaluation**, Adam W. M. van Eekeren, Judith Dijk, Klamer Schutte, Piet B. W. Schwing, TNO Defence, Security and Safety (Netherlands) [9249-24]

9:40: **NVG-the-Day: towards realistic night-vision training**, Maarten A. Hogervorst, Frank L. Kooi, Piet Bijl, TNO Defence, Security and Safety (Netherlands) [9249-25]

Coffee Break Wed 10:00 to 10:30

10:30: **Efficient contrast enhancement through log-power histogram modification**, Tirui Wu, Ford Motor Research & Engineering (China); Alexander Toet, TNO Defence, Security and Safety (Netherlands) [9249-26]

10:50: **Towards a validated synthetic human observer model for range modelling and objective sensor performance testing**, Piet Bijl, Maarten A. Hogervorst, Frank L. Kooi, TNO Defence, Security and Safety (Netherlands) [9249-27]

11:10: **Detection and tracking of humans from an airborne platform**, Adam W. M. van Eekeren, Judith Dijk, Gertjan J. Burghouts, Richard J. M. den Hollander, TNO Defence, Security and Safety (Netherlands) [9249-28]

11:30: **Actionable intelligence from an airborne platform: automated recognition of human activities**, Gertjan J. Burghouts, Judith Dijk, Adam W. M. van Eekeren, Richard J. M. den Hollander, TNO Defence, Security and Safety (Netherlands) [9249-29]

Lunch/Exhibition Break Wed 11:50 to 13:00

SESSION 7

Room: E105-106 Wed 13:00 to 14:00

Spectral Systems

Session Chairs: **Gérard Destefanis**, Commissariat à l'Énergie Atomique (France); **Rainer Breiter**, AIM INFRAROT-MODULE GmbH (Germany)

13:00: **Time-resolved thermal infrared multispectral imaging of gases and minerals**, Marc-André Gagnon, Telops (Canada); Karl-Alexandre Jahjah, Telops (Canada); Frédéric Marcotte, Pierre Tremblay, Philippe Lagueux, Vincent Farley, Telops (Canada) [9249-30]

13:20: **SYSIPHE system: a state of the art airborne hyperspectral imaging system. First results of the first airborne campaign**, Laurent Rousset-Rouviere, Christophe Coudrain, Sophie Fabre, ONERA (France); Soren Blaaberg, Trond Løke, Andrei Fridman, Ivar Baarstad, Norsk Elektro Optikk AS (Norway); Torbjorn Skauli, Norwegian Defence Research Establishment (Norway); Isabelle Moccoeur, Délégation Générale pour l'Armement (France) [9249-31]

13:40: **A next generation VNIR-SWIR hyperspectral camera system: HySpex ODIN-1024**, Trond Løke, Soren Blaaberg, Ivar Baarstad, Andrei Fridman, Pesal Koirala, Norsk Elektro Optikk AS (Norway) [9249-32]

SESSION 8

Room: E105-106 Wed 14:00 to 16:50

Detectors

Session Chairs: **Jan Yngve Andersson**, Acreo Swedish ICT AB (Sweden); **Reinhard Ebert**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **David A. Huckridge**

14:00: **CMOS-TDI detector technology for reconnaissance application**, Andreas Eckardt, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Ralf Reulke, Humboldt-Universität zu Berlin (Germany) and Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Melanie Jung, Fraunhofer-Institut für Mikroelektronische Schaltungen und Systeme (Gibraltar); Karsten Sengebusch, Eureka Messtechnik GmbH (Germany) [9249-34]

14:20: **Optimization of InGaAs/InAlAs APDs for SWIR detection with demand for high gain and low breakdown voltage**, Philipp Kleinow, Frank Rutz, Rolf Aidam, Wolfgang Bronner, Lutz Kirste, Martin Walther, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) [9249-35]

14:40: **InGaAs focal plane array developments and perspectives**, Anne Rouvie, Jérôme Coussement, Odile Huet, Jean-Patrick Truffer, Maxime Pozzi, El Houcine Oubensaid, Sébastien Hamard, Patrick Maillart, Eric M. Costard, SOFRADIR (France) [9249-36]

Coffee Break Wed 15:00 to 15:30

15:30: **Barrier photodetectors for the short and mid-wave infrared**, Andrew R. J. Marshall, Adam P. Craig, Lancaster Univ. (United Kingdom); Manish Jain, Amethyst Research Inc. (United Kingdom); Gary W. Wicks, Amethyst Research Inc. (United States); Terry Golding, Amethyst Research Inc. (United Kingdom) [9249-37]

15:50: **New SOFRADIR 10µm pixel pitch infrared products**, Xavier Lefoul, Nicolas Péré-Laperne, Laurent Rubaldo, Augéy Thibault, SOFRADIR (France); Olivier Gravrand, MINATEC (France); Sylvette Bisotto, Commissariat à l'Énergie Atomique (France); Eric Mazaleyrat, Marie-Lise Bourqui, SOFRADIR (France) [9249-38]

16:10: **Pyroelectric performances of relaxor-based ferroelectric single crystals and infrared detectors**, Wenning Di, Shanghai Institute of Ceramics (China) [9249-39]

16:30: **The pressure response of the frame rate in the optical readout infrared FPA imaging system**, Xiaomeng Li, Yuejin Zhao, Xiaohua Liu, Ming Liu, Xiaomei Yu, Hong Wu, Cuiling Li, Liquan Dong, Yun Feng, Beijing Institute of Technology (China) [9249-40]

POSTERS—WEDNESDAY

Room: Elicium 1 Wed 17:40 to 19:15

Conference attendees are invited to attend the Remote Sensing poster session held on Wednesday 17:40 to 19:15. Posters will be on display after 10:00 Wednesday morning in the Conference Centre. Authors of poster papers will be present to answer questions concerning their papers during the Wednesday Poster Session. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x32234.xml> and under general information in the printed programme.

Explosion-proof fiber optic fire detector: design and mathematical description, Vasily Kazakov, Oleg Moskaletz, St. Petersburg State Univ. of Aerospace Instrumentation (Russian Federation) [9249-42]

Optical encryption with spatially-incoherent illumination using two LC SLMs for information input and encryption key dynamic generation, Vitaly V. Krasnov, Alyona P. Bondareva, Pavel A. Cheremkhin, National Research Nuclear Univ. MEPhI (Russian Federation); Nikolay N. Evtikhiev, National Research Nuclear Univ. MEPhI (Russian Federation); Vladislav G. Rodin, Sergey N. Starikov, National Research Nuclear Univ. MEPhI (Russian Federation) [9249-43]

Fabrication of chalcogenide-glass lens module for thermal security camera, Du Hwan Cha, Yeon Hwang, Jeong-Ho Kim, Dong-Sik Kim, Hye-Jeong Kim, Korea Photonics Technology Institute (Korea, Republic of) [9249-44]

A novel clutter removal method based on semi-supervised regression for infrared small target detection, Kun Bai, Yuehuan Wang, Huazhong Univ. of Science and Technology (China) [9249-45]

A regional density distribution based wide dynamic range algorithm for infrared camera systems, Gyu-Hee Park, Yong-Sung Kim, Sanghoon Shin, Shichang Joung, SK Telecom (Korea, Republic of) [9249-46]

CONFERENCE 9249 - ROOM: E105-106

Fault location and mechanism analysis on the CES problem, Zhijun Tu, Beijing Institute of Control Engineering (China) [9249-47]

Infrared target detection in large field of view using visual attention, Gang Sun, Weihua Wang, Songlin Liu, Zengping Chen, National Univ. of Defense Technology (China) [9249-48]

Improvement of quality of optical reconstruction of digital Fourier holograms displayed on phase-only SLM by its digital preprocessing, Pavel A. Cheremkhin, National Research Nuclear Univ. MEPhI (Russian Federation); Nikolay N. Evtikhiev, National Research Nuclear Univ. MEPhI (Russian Federation); Sergey N. Starikov, Vitaly V. Krasnov, Liudmila A. Porshneva, Vladislav G. Rodin, National Research Nuclear Univ. MEPhI (Russian Federation) [9249-49]

Numerical simulation of aero-optical effects by laminar flow field surrounding the supersonic flying missile, Sehyun Seong, Yonsei Univ. (Korea, Republic of) and Spheredyne Co., Ltd. (Korea, Republic of); Sangmin Kim, Sug-Whan Kim, Yonsei Univ. (Korea, Republic of); Dongok Ryu, Yonsei Univ. (Korea, Republic of) and Spheredyne Co., Ltd. (Korea, Republic of); Ho-Gyun Kang, LIG Nex1 Co., Ltd. (Korea, Republic of) [9249-50]

Analysis on the effect of hypersonic vehicle's optical window on infrared thermal imaging system, Ling-Qin Kong, Ming Liu, Liquan Dong, Yuejin Zhao, Beijing Institute of Technology (China); Li Zhang, Shanghai Institute of Electro-Mechanical Engineering (China); Yanhong Li, Shanghai Electro-Mechanical Engineering Institute (China); Yi Tian, Shanghai Institute of Electro-Mechanical Engineering (China) [9249-51]

Analytical model of avalanche heterophotodiode with separate regions of absorption and multiplication, Viacheslav A. Kholodnov, Institute of Radio Engineering and Electronics (Russian Federation); Mikhail S. Nikitin, JSC "Shvabe-Photodevice" (Russian Federation); Igor D. Burlakov, Orion Research-and-Production Association (Russian Federation) [9249-52]

CONFERENCE 9250A - ROOM: D203

Monday - Tuesday 22-23 September 2014 • Proceedings of SPIE Vol. 9250

ELECTRO-OPTICAL REMOTE SENSING

Conference Chairs: **Gary Kamerman**, FastMetrix, Inc. (United States); **Ove Steinvall**, Swedish Defence Research Agency (Sweden)

Programme Committee: **Robert J. Grasso**, Northrop Grumman Electronic Systems (United States); **Laurent Hespel**; **Dennis K. Killinger**, Univ. of South Florida (United States); **Martin Laurenzis**, Institut Franco-Allemand de Recherches de Saint-Louis (France); **Peter Lutzmann**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Kenneth J McEwan**, Consultant (United Kingdom); **Vasyl Molebny**, National Taras Shevchenko Univ. of Kyiv (Ukraine); **Philip St. John Russell**, Max-Planck-Institut für die Physik des Lichts (Germany); **Peter N. Randall**, QinetiQ Ltd. (United Kingdom); **Philippe Réfrégier**, Institut Fresnel (France); **Monte D. Turner**, Air Force Research Lab. (United States); **María J. Yzuel**, Univ. Autònoma de Barcelona (Spain)

Monday 22 September

SESSION 1

Room: D203 Mon 8:30 to 10:20

New Devices and Technology

Session Chair: **Gary Kamerman**, FastMetrix, Inc. (United States)

8:30: **Time-resolved SPAD and SiPM imaging** (*Invited Paper*), Edoardo Charbon, Technische Univ. Delft (Netherlands) [9250-1]

9:00: **Statistical analysis of dark count rate in geiger-mode avalanche photodiode focal plane arrays**, Mark A. Itzler, Uppili Krishnamachari, Mark Entwistle, Xudong Jiang, Mark Owens, Krystyna Slomkowski, Princeton Lightwave, Inc. (United States) [9250-2]

9:20: **Design and performance analysis of multilayer nested grazing incidence optics**, Fuchang Zuo, Loulou Deng, Zhiwu Mei, Liansheng Li, Zhengxin Lv, Beijing Institute of Control Engineering (China) [9250-3]

9:40: **Image reconstruction and optimization using a Terahertz scanned imaging system**, Ihsan Ozan Yildirim, Firat Idikut, Vedat A. Özkan, Taylan Takan, Hakan Altan, Middle East Technical Univ. (Turkey); Behzat Sahin, Yildirim Beyazit Univ. (Turkey) [9250-4]

10:00: **Non-contact measurement of an object's angular position by means of laser goniometer**, Yuri V. Filatov, Saint Petersburg Electrotechnical Univ. "LETI" (Russian Federation); Maksim S Nikolaev, Saint Petersburg Electrotechnical Univ. Chapter (Russian Federation) [9250-5]

Coffee Break Mon 10:20 to 10:50

SESSION 2

Room: D203 Mon 10:50 to 12:30

Lidar/Ladar Sensing I

Session Chair: **Martin Laurenzis**, Institut Franco-Allemand de Recherches de Saint-Louis (France)

10:50: **Long-range 3D single-photon imaging lidar system**, Agata M. Pawlikowska, Selex ES (United Kingdom) and Heriot-Watt Univ. (United Kingdom); Roger M. Pilkington, Karen J. Gordon, Philip A. Hiskett, Selex ES (United Kingdom); Gerald S. Buller, Heriot-Watt Univ. (United Kingdom); Robert A. Lamb, Selex ES (United Kingdom) [9250-6]

11:10: **Lidar on small UAV for 3D mapping**, H. Michael Tulldahl, Håkan Larsson, Swedish Defence Research Agency (Sweden) [9250-7]

11:30: **Passive and active EO sensing close to the sea surface**, Ove Steinvall, Rolf Persson, Folke Berglund, Frank Gustafsson, Johan Öhgren, Swedish Defence Research Agency (Sweden) [9250-8]

11:50: **Synthetic aperture Ladar concept for infrastructure monitoring** (*Invited Paper*), Simon Turbide, Linda Marchese, Marc Terroux, Alain Bergeron, INO (Canada) [9250-9]

12:10: **Range resolution improvement of phase coded lidar system utilizing detector characteristics for short codes acquirement**, Long Wu, China Electronics Technology Group Corp. (China); Tian-yuan Qiao, Harbin Institute of Technology (China); Jun Zhang, Tongyu Communication Inc. (China); Yong Zhang, Yuan Zhao, Harbin Institute of Technology (China) [9250-10]

Lunch Break Mon 12:30 to 13:40

SESSION 3

Room: D203 Mon 13:40 to 15:30

Lidar/Ladar Sensing II

Session Chair: **Robert J. Grasso**, Northrop Grumman Electronic Systems (United States)

13:40: **3DLASEM: simulation of three-dimensional flash Lidar for ocean imaging** (*Invited Paper*), Michael J. DeWeert, BAE Systems (United States) [9250-11]

14:10: **Underwater laser imaging experiments in the Baltic Sea**, Martin Laurenzis, Frank Christnacher, Institut Franco-Allemand de Recherches de Saint-Louis (France); Thomas K. Scholz, Forschungsanstalt der Bundeswehr für Wassershall und Geophysik (Germany); Nicolas Metzger, Stéphane Schertzer, Institut Franco-Allemand de Recherches de Saint-Louis (France); Emmanuel Bacher, ISL (France) [9250-14]

14:30: **Processing of airborne lidar bathymetry data for detailed sea floor mapping**, H. Michael Tulldahl, Swedish Defence Research Agency (Sweden) [9250-13]

14:50: **3D laser gated viewing from a moving submarine platform**, Frank Christnacher, Martin Laurenzis, David Monnin, Gwenaël Schmitt, Nicolas Metzger, Stéphane Schertzer, Institut Franco-Allemand de Recherches de Saint-Louis (France); Thomas Scholz, Forschungsanstalt der Bundeswehr für Wassershall und Geophysik (Germany) [9250-12]

15:10: **Low-cost commodity depth sensor comparison and accuracy analysis**, Timo Breuer, Christoph Bodensteiner, Michael Arens, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) ... [9250-15]

Coffee Break Mon 15:30 to 16:00

PLENARY SESSION

Room: D203 Mon 16:05 to 17:50

Security + Defence 2014

For details, please see special events section in the printed programme or visit <http://spie.org/security-defence-europe.xml>

Tuesday 23 September

SESSION 4

Room: D203 Tue 9:00 to 10:20

Lidar/Ladar Sensing III

Session Chair: **Ove Steinvall**, Swedish Defence Research Agency (Sweden)

9:00: **New fiber laser for lidar developments in disaster management** (*Invited Paper*), Claudine Besson, Béatrice Augere, Guillaume Canat, Nicolas Cezard, Agnes Dolfi-Bouteyre, Alexandre Dobroc, Mathieu Duhant, Didier Fleury, Didier Goular, Laurent Lombard, Christophe Planchat, William Renard, Matthieu Valla, ONERA (France) [9250-16]

9:30: **Automatic change detection using mobile laser scanning** (*Invited Paper*), Marcus Hebel, Marcus Hammer, Marvin Gordon, Michael Arens, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [9250-17]

10:00: **Investigation of frame-to-frame back projection and feature selection algorithms for non line of sight laser gated viewing**, Martin Laurenzis, Institut Franco-Allemand de Recherches de Saint-Louis (France); Andreas Velten, Univ. of Wisconsin-Madison (United States) and Morgridge Institute for Research (United States) [9250-18]

Coffee Break Tue 10:20 to 10:50

CONFERENCE 9250A - ROOM: D203

SESSION 5

Room: D203 Tue 10:50 to 12:40

Passive Sensing and Processing I

Session Chair: **Kenneth J. McEwan**, Defence Science and Technology Lab. (United Kingdom)

10:50: **Detection of people in military and security context imagery** (*Invited Paper*), Thomas M. Shannon, Ben Wiltshire, Emmet H. Spier, 2d3 Sensing (United Kingdom). [9250-19]

11:20: **Image quality of optical remote sensing data**, Ralf Reulke, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) and Humboldt-Univ. zu Berlin (Germany) [9250-20]

11:40: **Obtaining spectral information of infrared scenarios using hyperspectral cameras and cameras equipped with spinning filter wheels**, Eirik Glimsdal, Erik Brendhagen, Jan Brede Thomassen, Arthur D. van Rheenen, Lars T. Heen, Norwegian Defence Research Establishment (Norway) [9250-21]

12:00: **Performance evaluation of image-based location recognition approaches based on large-scale UAV imagery**, Nikolas Hesse, Christoph Bodensteiner, Michael Arens, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany). [9250-22]

12:20: **Geometric calibration of multi-sensor image fusion system with thermal infrared and low-light camera**, Dragana Peric, Vojislav Lukic, Milana Spanovic, Radmila Sekulic, Jelena Kocic, VLATACOM d.o.o. (Serbia) . [9250-23]

Lunch/Exhibition Break Tue 12:40 to 13:50

SESSION 6

Room: D203 Tue 13:50 to 14:50

Passive Sensing and Processing II

Session Chair: **Gary Kamerman**, FastMetrix, Inc. (United States)

13:50: **Mobile device geo-localization and object visualization in sensor networks**, Simon Lemaire, Christoph Bodensteiner, Michael Arens, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) . . . [9250-24]

14:10: **Blurred image recognition based on multi-features fusion**, Mengyu Zhu, Zhiguo Cao, Huazhong Univ. of Science and Technology (China) . [9250-25]

14:30: **Salient region detection in remote sensing images based on integer wavelet transform and color opponent mechanism**, Libao Zhang, Jue Zhang, Beijing Normal Univ. (China) [9250-26]

Wednesday 24 September

POSTERS—WEDNESDAY

Room: Elicium 1 Wed 17:40 to 19:15

Conference attendees are invited to attend the Remote Sensing poster session held on Wednesday 17:40 to 19:15. Posters will be on display after 10:00 Wednesday morning in the Conference Centre. Authors of poster papers will be present to answer questions concerning their papers during the Wednesday Poster Session. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x32234.xml> and under general information in the printed programme.

Fixed ground target localization between heterogenous images based on structure pyramid and linear programming techniques, Zhiwen Fang, Zhiguo Cao, Yueming Qin, Wei Li, Huazhong Univ. of Science and Technology (China) [9250-27]

A new technique for the cultivation of the chick embryo in vitro, Mao Ning, Beihang Univ. (China) [9250-29]

Remote screening and direct control of the bacterial infection of gardens, Nickolaj F. Starodub, Kateryna Shavanova, Roman V. Sonko, National Univ. of Life and Environmental Sciences of Ukraine (Ukraine) [9250-28]

MILITARY APPLICATIONS IN HYPERSPECTRAL IMAGING AND HIGH SPATIAL RESOLUTION SENSING

Conference Chairs: **Gary J. Bishop**, BAE Systems (United Kingdom); **Ainsley Killey**, BAE Systems (United Kingdom); **John D. Gonglewski**, European Office of Aerospace Research and Development (United Kingdom)

Programme Committee: **David C. Dayton**, Applied Technology Associates (United States); **Detlev M. Even**, NovaSol (United States); **Andrey V. Kanaev**, U.S. Naval Research Lab. (United States); **Michael M. Myers**, Air Force Research Lab. (United States); **Jorge E. Pezoa Nunez**, Univ. de Concepción (Chile); **Michael F. Reiley**, HNU Photonics (United States); **Stanley R. Rotman**, Ben-Gurion Univ. of the Negev (Israel)

Monday 22 September

SESSION 6

Room: D204 Mon 9:00 to 10:20

Military Applications in Hyperspectral Imaging and High Spatial Resolution Sensing I

Session Chair: **Gary J. Bishop**, BAE Systems (United Kingdom)

9:00: **Hyperspectral data collection for the assessment of target detection algorithms: the Viareggio 2013 trial**, Alessandro Rossi, Univ. di Pisa (Italy); Nicola Acito, Accademia navale di Livorno (Italy); Marco Diani, Giovanni Corsini, Univ. di Pisa (Italy); Sergio Ugo de Ceglie, Ctr. Interforze Studi per le Applicazioni Militari (Italy); Leandro Chiarantini, Aldo Riccobono, SELEX ES S.p.A. (Italy) [9250-31]

9:20: **Combining spectral matching and anomalous change detection for target rediscovery in hyperspectral images**, Alessandro Rossi, Univ. di Pisa (Italy); Nicola Acito, Accademia navale di Livorno (Italy); Marco Diani, Giovanni Corsini, Univ. di Pisa (Italy) [9250-32]

9:40: **Sun-glint false alarm mitigation in a maritime scenario**, Alessandro Rossi, Univ. di Pisa (Italy); Aldo Riccobono, SELEX ES S.p.A. (Italy); Stefano Landini, SELEX ES (Italy) [9250-33]

10:00: **Turbulence reduction algorithm in hyperspectral images using four-port imaging spectroradiometer**, Florent M. Prel, Stéphane M. Lantagne, Louis M. Moreau, Claude B. Roy, Richard L. Lachance, ABB Analytical Measurement (Canada) [9250-34]

Coffee Break Mon 10:20 to 10:50

SESSION 7

Room: D204 Mon 10:50 to 11:50

Military Applications in Hyperspectral Imaging and High Spatial Resolution Sensing II

Session Chair: **Ainsley Killey**, BAE Systems (United Kingdom)

10:50: **Extraction of incident irradiance from LWIR hyperspectral imagery**, Pierre Lahaie, Defence Research and Development Canada, Valcartier (Canada) [9250-35]

11:10: **Detection of concealed objects by a multispectral and hyperspectral signatures analysis**, Philippe Lagueux, Telops (Canada); Mariusz Kastek, Marcin Kowalski, Henryk Polakowski, Military Univ. of Technology (Poland); Marc-André Gagnon, Telops (Canada) [9250-37]

11:30: **Non-linear sampling for efficient implementation of the projection-slice synthetic discriminant function filter**, Vahid R. Riasati, Raytheon Space & Airborne Systems (United States) [9250-38]

Lunch Break Mon 11:50 to 13:30

SESSION 8

Room: D204 Mon 13:30 to 14:30

Military Applications in Hyperspectral Imaging and High Spatial Resolution Sensing III

Session Chair: **John D. Gonglewski**, European Office of Aerospace Research and Development (United Kingdom)

13:30: **Automatic representation of urban terrain models for simulations on the example of VBS2**, Dimitri Bulatov, Gisela Häufel, Peter Solbrig, Peter Wernerus, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [9250-39]

13:50: **Underwater monitoring experiment using hyperspectral sensor, Lidar and high-resolution satellite imagery**, Chan-Su Yang, Korea Institute of Ocean Science & Technology (Korea, Republic of); Sun-Hws Kim, Korea Maritime Univ. (Korea, Republic of); Kazuo Ouchi, Korea Institute of Ocean Science & Technology (Korea, Republic of) [9250-40]

14:10: **Wideband radar imaging for space debris based on direct IF sampling signals**, Yang Liu, Zengping Chen, Na Li, Shiyong Xu, National Univ. of Defense Technology (China) [9250-41]

PLENARY SESSION

Room: D204 Mon 16:05 to 17:50

Security + Defence 2014

For details, please see special events section in the printed programme or visit <http://spie.org/security-defence-europe.xml>

CONFERENCE 9251A - ROOM: D204

Wednesday - Thursday 24-25 September 2014 • Proceedings of SPIE Vol. 9251

TECHNOLOGIES FOR OPTICAL COUNTERMEASURES

Conference Chairs: **David H. Titterton**, UK Defence Academy (United Kingdom); **Mark A. Richardson**, Cranfield Univ. (United Kingdom); **Robert J. Grasso**, Northrop Grumman Electronic Systems (United States)

Programme Committee: **Zahir Daya**, Defence Research and Development Canada, Atlantic (Canada); **Brian Butters**, Meon Technology Ltd. (United Kingdom); **Marc Eichhorn**, Institut Franco-Allemand de Recherches de Saint-Louis (France); **Ian F. Elder**, SELEX Galileo Ltd. (United Kingdom); **David B. James**, Cranfield Univ. (United Kingdom); **Helena Jelinková**, Czech Technical Univ. in Prague (Czech Republic); **Gerald C. Manke II**, Naval Surface Warfare Ctr. Crane Div. (United States); **Stephen P. McGeoch**, Thales Optronics Ltd. (United Kingdom); **Espen Lippert**, Norwegian Defence Research Establishment (Norway); **Eric D Park**, Q-Peak, Inc. (United States); **Ric H. Schleijsen**, TNO Defence, Security and Safety (Netherlands); **Piet B. W. Schwing**, TNO Defence, Security and Safety (Netherlands); **Dirk Peter Seiffer**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Ove Steinvall**, Swedish Defence Research Agency (Sweden); **Hans Dieter Tholl**, Diehl BGT Defence GmbH & Co. KG (Germany); **Maria S. Willers**, Denel Dynamics (South Africa); **Cornelius Willers**, Council for Scientific and Industrial Research (South Africa)

Wednesday 24 September

OPENING REMARKS

Room: D201 9:00 to 9:10

David H. Titterton, UK Defence Academy (United Kingdom); **Mark A. Richardson**, Cranfield Univ. (United Kingdom); **Robert J. Grasso**, Northrop Grumman Electronic Systems (United States)

SESSION 1

Room: D201 Wed 9:10 to 10:30

Keynote Session

Session Chair: **Robert J. Grasso**, Northrop Grumman Electronic Systems (United States)

9:10: **High-power laser research** (*Keynote Presentation*), Don Seeley, U.S. Army Space and Missile Defense Command (United States); Lawrence E. Grimes, Air Force Research Lab. (United States). [9251-1]

9:50: **Requirements for laser countermeasures against imaging seekers** (*Keynote Presentation*), William D. Caplan, NIRCM (Netherlands) [9251-2]

Coffee Break Wed 10:30 to 11:00

SESSION 2

Room: D201 Wed 11:00 to 12:30

DIRCM Systems

Session Chair: **Hans-Dieter Tholl**, Diehl BGT Defence GmbH & Co. KG (Germany)

11:00: **Future DIRCM system-concepts** (*Invited Paper*), Helge Bürsing, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [9251-3]

11:30: **The next generation in aircraft protection against advanced MANPADS** (*Invited Paper*), Stuart N. Chapman, Selex ES (United Kingdom) [9251-4]

12:00: **ELBIT MUSIC system** (*Invited Paper*), [9251-5]

Lunch/Exhibition Break Wed 12:30 to 13:40

SESSION 3

Room: D201 Wed 13:40 to 14:00

Aircraft Protection

Session Chair: **David H. Titterton**, UK Defence Academy (United Kingdom)

13:40: **Ultraviolet signature collection of airborne platforms and decoy flare countermeasures**, Leon Smith, Mark A. Richardson, Cranfield Univ. (United Kingdom); Richard Ayling, Chemring Countermeasures Ltd. (United Kingdom) [9251-6]

SESSION 4

Room: D201 Wed 14:00 to 15:10

Lasers and Sources for Countermeasures

Session Chair: **David H. Titterton**, UK Defence Academy (United Kingdom)

14:00: **Lasers in electronic warfare** (*Invited Paper*), Gerald C. Manke II, Naval Surface Warfare Ctr. Crane Div. (United States) [9251-7]

14:30: **Incoherent aperture beam combining of quantum cascade lasers**, Katrin Dahl, Michael Raab, Hans Dieter Tholl, Diehl BGT Defence GmbH & Co. KG (Germany) [9251-9]

14:50: **High-power mid-infrared continuous-wave optical parametric oscillator pumped by fiber lasers**, Xiaojun Xu, Xiao Li, Lei Liu, Yaping Shang, National Univ. of Defense Technology (China) [9251-12]

Coffee Break Wed 15:10 to 15:40

PANEL DISCUSSION

Room: D201 15:40 to 17:10

Attaining Damage and Destroy Countermeasures

Session Chairs: **Robert J. Grasso**, Northrop Grumman Electronic Systems (United States); **David H. Titterton**, UK Defence Academy (United Kingdom)

As threats become more sophisticated and countermeasure tolerant new means are required to effect defeat. Please join us for an engaging discussion that will cover such topic areas as:

What CM technology is relevant. How does that atmosphere impact/limit effectiveness. Is directed energy the only solution and what other approaches might be just as effective. What SWaP concerns exist. What has been proven effective.

This open discussion is an opportunity for conference attendees to compare, contrast, and debate what approaches might work and further discuss the advances in technology that might have to be made and the impacts of threat and environment that might limit these approaches.

Please join us and share your experience, knowledge, and insight. And have some fun as well.

Thursday 25 September

SESSION 5

Room: D201 Thu 9:00 to 10:00

Fibre Lasers

Session Chair: Ric H. M. A. Schleijsen, TNO Defence, Security and Safety (Netherlands)

9:00: **All fiber-based ultra-short chirped pulse amplification laser operating at 2µm wavelengths based on thulium-doped germanate active fibers** (*Invited Paper*), Arturo Chavez-Pirson, NP Photonics, Inc. (United States) [9251-10]

9:30: **2 µm and mid-IR fiber-laser-based sources for OCM** (*Invited Paper*), Christelle Kieleck, Antoine Berrou, Christian Kneis, Brenda M. Donelan, Marc Eichhorn, Institut Franco-Allemand de Recherches de Saint-Louis (France) [9251-11]

Coffee Break Thu 10:00 to 10:30

SESSION 6

Room: D201 Thu 10:30 to 11:40

MIR Lasers

Session Chair: Ian F. Elder, SELEX Galileo Ltd. (United Kingdom)

10:30: **Laser source with high pulse energy at 3-5 µm and 8-12 µm based on nonlinear conversion in ZnGeP₂** (*Invited Paper*), Espen Lippert, Helge Fonnum, Magnus W. Haakestad, Norwegian Defence Research Establishment (Norway) [9251-13]

11:00: **Efficiency-enhanced mid-wave infrared beam generation at 3.8 µm with a seeded optical parametric generator**, Ziya G. Figen, TÜBİTAK BILGEM İLTAREN (Turkey) [9251-15]

11:20: **Temperature-stable lithium niobate electro-optic Q-switch for improved cold performance**, Dieter H. Jundt, Gooch & Housego, Palo Alto (United States) [9251-16]

Lunch Break Thu 11:40 to 12:50

SESSION 7

Room: D201 Thu 12:50 to 14:40

Laser Effects

Session Chair: Ove Steinvall, Swedish Defence Research Agency (Sweden)

12:50: **Optical countermeasures against human operators** (*Invited Paper*), Alexander Toet, TNO Defence, Security and Safety (Netherlands) [9251-17]

13:20: **Modeling of the over-exposed pixel area of CCD cameras caused by laser dazzling**, Koen W. Benoist, TNO Defence, Security and Safety (Netherlands); Ric H. M. A. Schleijsen, TNO (Netherlands) [9251-18]

13:40: **Towards the implementation of a spectral data base for the detection of biological warfare agents**, Mariachiara Carestia, Roberto Pizzoferrato, Orlando Cenciarelli, Fabrizio D'Amico, Andrea Malizia, Michela Gelfusa, David Scarpellini, Pasquale Gaudio, Univ. degli Studi di Roma "Tor Vergata" (Italy) [9251-19]

14:00: **Further comparison of MODTRAN@5 to measured data in the UV band**, Leon Smith, Mark A. Richardson, Cranfield Univ. (United Kingdom); Richard Ayling, Chemring Countermeasures Ltd. (United Kingdom) ... [9251-20]

SESSION 8

Room: D201 Thu 14:20 to 15:40

Modelling and Simulation

Session Chair: Mark A. Richardson, Cranfield Univ. (United Kingdom)

14:20: **ELT-572(v)2 DIRCM: simulation, system design and DT&E process to protect ItAF Platforms against ManPADS** (*Invited Paper*), Luigi Ideo, Giorgio Mazzi, Andrea Usai, Valter Bonori, Elettronica S.p.A. (Italy); Fabio Togna, Giancarlo Borriello, Aeronautica Militare Italiana (Italy); Antonio Tafuto, Elettronica S.p.A. (Italy); Mirko Cresti, Intecs S.p.A (Italy); Emiliano Dente, Skytechnology (Italy) [9251-21]

14:50: **Aircraft vulnerability analysis by modelling and simulation** (*Invited Paper*), Cornelius Willers, Council for Scientific and Industrial Research (South Africa) [9251-14]

15:20: **Modelling a man-portable air-defence (MANPAD) system with a rosette scan two-colour infrared (IR) and ultraviolet (UV) seeker**, Devinder Kumar, Leon Smith, Mark A. Richardson, Cranfield Univ. (United Kingdom); Richard Ayling, Nick Barlow, Chemring Countermeasures Ltd. (United Kingdom) [9251-22]

CONFERENCE 9251B - ROOM: E105-106

Monday 22 September 2014 • Proceedings of SPIE Vol. 9251

HIGH-POWER LASERS 2014: TECHNOLOGY AND SYSTEMS

Conference Chairs: **Willy L. Bohn**, BohnLaser Consult (Germany); **Harro Ackermann**, High Energy Laser Joint Technology Office (United States)

Monday 22 September

SESSION 10

Room: E105-106 Mon 8:50 to 10:10

Lasers and Laser Architectures for Power Scaling

Session Chair: **Willy L. Bohn**, BohnLaser Consult (Germany)

8:50: **The mobile and stationary laser weapon demonstrators of Rheinmetall Waffe Munition** (*Invited Paper*), Klaus Ludewigt, Thomas Riesbeck, Thomas Baumgärtel, Jürgen Schmitz, Alexander Graf, Markus Jung, Rheinmetall Waffe Munition GmbH (Germany) [9251-30]

9:20: **Ultrashort pulsed laser technology development program** (*Invited Paper*), Gerald C. Manke II, Naval Surface Warfare Ctr. Crane Div. (United States) [9251-31]

9:50: **Broadband hybrid IR laser system emitting within 2.5-16.5 micron**, Andrey A. Ionin, Igor Kinyaevskii, Yuri M. Klimachev, Andrey A. Kotkov, P.N. Lebedev Physical Institute (Russian Federation) [9251-33]

Coffee Break Mon 10:10 to 10:40

SESSION 11

Room: E105-106 Mon 10:40 to 12:00

Novel Design in Fiber Lasers

Session Chair: **Jens Limpert**, Friedrich-Schiller-Univ. Jena (Germany)

10:40: **Coherent combination as performance scaling concept of ultrafast lasers** (*Invited Paper*), Jens Limpert, Tino Eidam, Arno Klenke, Marco Kienel, Sven Breitkopf, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) [9251-34]

11:10: **Single-mode single-frequency high peak power all-fiber MOPA at 1550 nm** (*Invited Paper*), Leonid V. Kotov, Fiber Optics Research Ctr. (Russian Federation) and Moscow Institute of Physics and Technology (Russian Federation); Mikhail E. Likhachev, Mikhail M. Bubnov, Vladimir M. Paramonov, Fiber Optics Research Ctr. (Russian Federation); Mikhail I. Belovolov, A. M. Prokhorov General Physics Institute (Russian Federation); Denis S. Lipatov, Institute of Chemistry of High-Purity Substances of the Russian Academy of Sciences (Russian Federation) and Lobachevsky State Univ. of Nizhni Novgorod (Russian Federation); Aleksei N. Guryanov, Institute of Chemistry of High-Purity Substances of the Russian Academy of Sciences (Russian Federation) [9251-35]

11:40: **Q-switched fiber laser with topological insulator Bi₂Se₃ film**, Jinrong Tian, Yanrong Song, Zhenhua Yu, Zhiyuan Dou, Kexuan Li, Beijing Univ. of Technology (China) [9251-36]

Lunch Break Mon 12:00 to 13:20

SESSION 12

Room: E105-106 Mon 13:20 to 15:30

DPAL and IR Gas Lasers

Session Chair: **Salman Rosenwaks**, Ben-Gurion Univ. of the Negev (Israel)

13:20: **CFD DPAL modeling for various schemes of flow configurations** (*Invited Paper*), Karol Waichman, Boris D. Barmashenko, Salman Rosenwaks, Ben-Gurion Univ. of the Negev (Israel) [9251-37]

13:50: **Comparison of semi-analytical to CFD model calculations and to experimental results of subsonic flowing-gas and static DPALs**, Boris D. Barmashenko, Salman Rosenwaks, Karol Waichman, Ben-Gurion Univ. of the Negev (Israel) [9251-38]

14:10: **Theoretical studies of the feasibility of supersonic DPALs**, Salman Rosenwaks, Boris D. Barmashenko, Karol Waichman, Ben-Gurion Univ. of the Negev (Israel) [9251-39]

14:30: **New concepts of realizing chemical oxygen lasers**, Kiwamu Takehisa, O2 Laser Laboratory (Japan) [9251-40]

14:50: **Study of potassium DPAL operation in pulsed and CW mode**, Boris V. Zhdanov, Matthew Rotondaro, Michael K. Schaffer, Randall J. Knize, U.S. Air Force Academy (United States) [9251-43]

15:10: **DPAL research in Changsha**, Hongyan Wang, Xiaojun Xu, Zining Yang, Weihong Hua, National Univ. of Defense Technology (China) [9251-41]

Coffee Break Mon 15:30 to 16:00

PLENARY SESSION

Room: E105-106 Mon 16:05 to 17:50

Security + Defence 2014

For details, please see special events section in the printed programme or visit <http://spie.org/security-defence-europe.xml>

Wednesday 24 September

POSTERS—WEDNESDAY

Room: Elicium 1 Wed 17:40 to 19:15

Conference attendees are invited to attend the Remote Sensing poster session held on Wednesday 17:40 to 19:15. Posters will be on display after 10:00 Wednesday morning in the Conference Centre. Authors of poster papers will be present to answer questions concerning their papers during the Wednesday Poster Session. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x32234.xml> and under general information in the printed programme.

Middle spatial frequency measurement in high-power laser system, Xiaofeng Wang, Nanjing Univ. of Science and Technology (China) and Univ. of Rochester (United States) [9251-42]

CONFERENCE 9252 - ROOM: D202

Wednesday - Thursday 24-25 September 2014 • Proceedings of SPIE Vol. 9252

MILLIMETRE WAVE AND TERAHERTZ SENSORS AND TECHNOLOGY

Conference Chairs: **Neil Anthony Salmon**, MMW Sensors Ltd. (United Kingdom); **Eddie L. Jacobs**, The Univ. of Memphis (United States)

Programme Committee: **Amir Abramovich III**, Ariel Univ. (Israel); **Sherif Sayed Ahmed**, Rohde & Schwarz GmbH & Co. KG (Germany); **Nicholas J. Bowring**, Manchester Metropolitan Univ. (United Kingdom); **Stephan Dill**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Markus Peichl**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Douglas T. Petkie**, Wright State Univ. (United States); **Christopher A. Schuetz**, Phase Sensitive Innovations, Inc. (United States); **Vyacheslav A. Trofimov**, Lomonosov Moscow State Univ. (Russian Federation); **Vincent P. Wallace**, The Univ. of Western Australia (Australia)

Wednesday 24 September

SESSION 1

Room: D202 Wed 9:00 to 12:10

Systems

Session Chair: **Neil Anthony Salmon**, MMW Sensors Ltd. (United Kingdom)

9:00: **Millimeter wave radar system on a rotating platform for combined search and track functionality with SAR imaging** (*Invited Paper*), Uwe Aulenbacher, Klaus Rech, Johannes Sedlmeier, Ingenieurbüro für Sensorik und Signalverarbeitung (Germany); Hans S. Pratisto, Peter Wellig, Armasuisse (Switzerland) [9252-1]

9:30: **Ultrawide band microwave 3D imaging footwear scanner**, Nacer Ddine Rezgui, David A. Andrews, Nicholas J. Bowring, David J. Leonard, Matthew J. Southgate, Manchester Metropolitan Univ. (United Kingdom) [9252-2]

9:50: **Simulation and experimentation in three dimensional near-field aperture synthesis imaging**, Neil A. Salmon, MMW Sensors Ltd. (United Kingdom) and Manchester Metropolitan Univ. (United Kingdom) [9252-3]

Coffee Break Wed 10:10 to 10:40

10:40: **Multistatic short range imaging with multipath signals** (*Invited Paper*), Frank Gumbmann, Sherif S. Ahmed, Rohde & Schwarz GmbH & Co. KG (Germany) [9252-5]

11:10: **Millimeter waves sensors based very inexpensive plasma LED lamps comprehensive video rate real time imaging in three-dimensional space**, Assaf Levanon, Yitzhak Yitzhaky, Natan S. Kopeika, Daniel Rozban, Ben-Gurion Univ. of the Negev (Israel); Amir Abramovich, Ariel Univ. (Israel) [9252-4]

11:30: **Design and first-season operation of ACTPol, a millimeter wavelength, polarization sensitive receiver for the Atacama Cosmology Telescope**, Benjamin L. Schmitt, Univ. of Pennsylvania (United States); ACTPol Collaboration, Princeton Univ. (United States) [9252-6]

11:50: **A circular-shaped time-delay line inspired by CRLH TL unit cell for UWB operation**, Jun Zhang, TongYu Communication Inc (China); S. W. Cheung, The Univ. of Hong Kong (Hong Kong, China); Qi Zhu, University of Science and Technology of China (China); Long Wu, Nanjing Univ. (China); Yong Zhang, Harbin Institute of Technology (China) [9252-7]

Lunch/Exhibition Break Wed 12:10 to 13:40

SESSION 2

Room: D202 Wed 13:40 to 15:10

Phenomenology and Signatures

Session Chair: **Eddie L. Jacobs**, The Univ. of Memphis (United States)

13:40: **Characterization of plasma treated surfaces for food safety by Terahertz spectroscopy** (*Invited Paper*), Katerina Sulovska, Marian Lehocky, Tomas Bata Univ. of Zlin (Czech Republic) [9252-8]

14:10: **Distinguishing of different kinds of gunpowder using various methods based on Terahertz radiation**, Tomás Gavenda, Vojtech Kresalek, Tomas Bata Univ. of Zlin (Czech Republic) [9252-9]

14:30: **The development of a fully polarimetric radar for the detection of concealed weapons**, Dean R. O'Reilly, Nicholas J. Bowring, David A. Andrews, Nacer Ddine Rezgui, Stuart W. Harmer, Manchester Metropolitan Univ. (United Kingdom) [9252-10]

14:50: **Waveform diversity in mmw and terahertz sensing applications**, Douglas T. Petkie, Ivan R. Medvedev, Wright State Univ. (United States) [9252-12]

Coffee Break Wed 15:10 to 15:40

SESSION 3

Room: D202 Wed 15:40 to 17:30

Devices and Subsystems

Session Chair: **Neil Anthony Salmon**, MMW Sensors Ltd. (United Kingdom)

15:40: **Josephson junction as the receiving and measuring element in panoramic receiver: frequency meter in Terahertz band** (*Invited Paper*), Alexander Denisov, State Research Ctr. of Superconductive Radioelectronics (Ukraine); Alexander Gudkov, State Scientific Research Institute of Physical Problems (Russian Federation); Jing Hui Qiu, Harbin Institute of Technology (China) [9252-13]

16:10: **Design of switched-line phase shifters with constant phase shift using CRLH TL**, Jun Zhang, TongYu Communication Inc. (China); S. W. Cheung, The Univ. of Hong Kong (Hong Kong, China); Qi Zhu, University of Science and Technology of China (China); Long Wu, Nanjing Univ. (China); Yong Zhang, Harbin Institute of Technology (China) [9252-14]

16:30: **Silicon optics for focusing of Novosibirsk free electron laser radiation in a given two-dimensional domain**, Vladimir S. Pavelyev, Samara State Aerospace Univ. (Russian Federation) and Image Processing Systems Institute (Russian Federation); Andrey N. Agafonov, Boris O. Volodkin, Samara State Aerospace Univ. (Russian Federation); Sergey G. Volotovskiy, Image Processing Systems Institute (Russian Federation); Andrey K. Kaveev, Tydex (Russian Federation); Boris A. Knyazev, Budker Institute of Nuclear Physics (Russian Federation) and Novosibirsk State Univ. (Russian Federation); Grigoriy I. Kropotov, Tydex (Russian Federation); Konstantin N. Tukmakov, Samara State Aerospace Univ. (Russian Federation); Ekaterina V. Tsygankova, Dmitry I. Tsypishka, Tydex (Russian Federation); Yulia Y. Choporova, Budker Institute of Nuclear Physics (Russian Federation) and Novosibirsk State Univ. (Russian Federation) [9252-15]

16:50: **Binary DOE with enhanced focal depth to focus terahertz Novosibirsk free electron laser radiation**, Vladimir S. Pavelyev, Samara State Aerospace Univ. (Russian Federation) and Image Processing Systems Institute (Russian Federation); Boris O. Volodkin, Konstantin N. Tukmakov, Andrey N. Agafonov, Denis G. Kachalov, Samara State Aerospace Univ. (Russian Federation); Boris A. Knyazev, Yulia Y. Choporova, Budker Institute of Nuclear Physics (Russian Federation) and Novosibirsk State Univ. (Russian Federation); Andrey K. Kaveev, Grigoriy I. Kropotov, Dmitry I. Tsypishka, Tydex (Russian Federation) . . . [9252-16]

17:10: **Broadband and polarization-insensitive Terahertz absorber**, XiaoFei Zang, Cheng Shi, YiMing Zhu, Univ. of Shanghai for Science and Technology (China) [9252-17]

POSTERS—WEDNESDAY

Room: Elicium 1 Wed 17:40 to 19:15

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A method of 3D reconstruction via ISAR sequences based on scattering centers association for space rigid object, Gang Li, Jiangwei Zou, Shiyou Xu, Biao Tian, Zengping Chen, National Univ. of Defense Technology (China) [9252-23]

IF digitization receiver of wideband digital array radar test-bed, Weixing Li, Yue Zhang, Jianzhi Lin, Zengping Chen, National Univ. of Defense Technology (China) [9252-24]

MTRC compensation in high-resolution ISAR imaging via improved polar format algorithm, Yang Liu, National Univ. of Defense Technology (China); Na Li, Shiyou Xu, Zengping Chen, National Univ. of Defense Technology (China); Hao Li, 94754 Troops of PLA (China) [9252-25]

CONFERENCE 9252 - ROOM: D202

Frequency invariant beamforming under bandpass sampling based on convex optimization, Lijie Fan, Qingkai Hou, Yue Zhang, Zengping Chen, National Univ. of Defense Technology (China) [9252-26]

Terahertz superconducting hot electron bolometric mixers: predicted performance and technological issues for Y-Ba-Cu-O devices, Romain G. Ladret, Alain J. Kreisler, Ecole Supérieure d'Electricité (France); Annick F. Dégardin, UPMC Sorbonne Univ. (France) [9252-27]

Investigations on time stability of passive THz imaging, Marcin Kowalski, Norbert Palka, Marek Zyczkowski, Mieczysław Szustakowski, Military Univ. of Technology (Poland) [9252-28]

Sparse ISAR imaging using 2D compressed sensing, Qingkai Hou, Lijie Fan, National Univ. of Defense Technology (China); Zengping Chen, National Univ. of Defense Technology (Chile) [9252-29]

A novel image registration method for InSAR imaging system, Biao Tian, Na Li, National Univ. of Defense Technology (China); Yang Liu, Da Tang, National Univ. of Defense Technology (China); Shiyong Xu, Zengping Chen, National Univ. of Defense Technology (China) [9252-30]

Thursday 25 September

SESSION 4

Room: D202 Thu 8:30 to 10:20

Image and Signal Processing

Session Chairs: **Vyacheslav A. Trofimov**, Lomonosov Moscow State Univ. (Russian Federation); **Eddie L. Jacobs**, The Univ. of Memphis (United States)

8:30: **Investigation of the CLEAN deconvolution method for use with Late Time Response analysis of multiple objects** (*Invited Paper*), Simon J. Hutchinson, Manchester Metropolitan Univ. (United Kingdom); Christopher T. Taylor, The Univ. of Manchester (United Kingdom); David A. Andrews, Michael J. Fernando, Nicholas J. Bowring, Manchester Metropolitan Univ. (United Kingdom) [9252-18]

9:00: **An investigation into the use of CLEAN to improve the image fidelity of a novel radiation mapper**, Matthew J. Southgate, Manchester Metropolitan Univ. (United Kingdom); Christopher T. Taylor, The Univ. of Manchester (United Kingdom); Simon J. Hutchinson, Nicholas J. Bowring, Manchester Metropolitan Univ. (United Kingdom) [9252-19]

9:20: **Design and verification of half-pixel for linear multipixel THz imaging systems**, Yogesh Karandikar, Herbert Zirath, Yu Yan, Vessen Vassilev, Chalmers Univ. of Technology (Sweden) [9252-20]

9:40: **New opportunities for quality enhancing of images captured by passive THz camera**, Vyacheslav A. Trofimov, Vladislav V. Trofimov, Igor E. Kuchik, Lomonosov Moscow State Univ. (Russian Federation) [9252-21]

10:00: **Detection algorithm of big bandwidth chirp signals based on STFT**, Jinzhen Wang, Juhong Wu, Shaoying Su, Zengping Chen, National Univ. of Defense Technology (China) [9252-22]

CONFERENCE 9253A - ROOM: E108

Monday - Tuesday 22-23 September 2014 • Proceedings of SPIE Vol. 9253

OPTICS AND PHOTONICS FOR COUNTERTERRORISM, CRIME FIGHTING AND DEFENCE

Conference Chairs: **Douglas Burgess**, Burgess Consulting (United Kingdom); **Gari Owen**, Annwyn Solutions (United Kingdom); **Harbinder Rana**, Defence Science and Technology Lab. (United Kingdom)

Programme Committee: **Benedicte Bascle**, Thales Optronique S.A.S. (France); **Richard R. Botten**, Ministry of Defence (United Kingdom); **Henri Bouma**, TNO Defence, Security and Safety (Netherlands); **Felicity Carlyle**, Univ. of Strathclyde (United Kingdom); **Deeph Chana**, Imperial College (United Kingdom); **David J. Clarke**, Placing Value Co.,Ltd (Thailand); **Giovanni Cocca**, SELEX Galileo SpA (Italy); **Howard J. Cummins**, Her Majesty's Government Communications Ctr. (United Kingdom); **Brian E. Foulger**, Ministry of Defence (United Kingdom); **Gillian F. Marshall**, QinetiQ Ltd. (United Kingdom); **Niamh Nic Daeid**, Univ. of Strathclyde (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 Stokes**, Cobalt Light Systems (United Kingdom); **Miranda van Iersel**, TNO Defence, Security and Safety (Netherlands); **Mauro G. Varasi**, Finmeccanica (Italy); **Yitzhak Yitzhaky**, Ben-Gurion Univ. of the Negev (Israel); **Peter W. Yuen**, Cranfield Univ. (United Kingdom)

Monday 22 September

WELCOME AND INTRODUCTION

Room: E108 9:00 to 9:10

Doug, Burgess, Burgess Consulting (United Kingdom)

SESSION 1

Room: E108 Mon 9:10 to 12:40

Materials, Weapons, Contraband and Counterfeits: Detection and Identification I

Session Chair: **Gari Owen**, Annwyn Solutions (United Kingdom)

9:10: **A picosecond laser FAIMS analyzer for detecting ultralow quantities of explosives**, Alexander A. Chistyakov, Gennadii E. Kotkovskii, Alexey V. Sychev, Ivan P Odulo, National Research Nuclear University "Moscow Engineering Physics Institute" (Russian Federation); Artem S. Bogdanov, Anatoly N. Perederii, Moscow State Institute of Radiotechnics, Electronics and Automation (Russian Federation); Eugene M. Spitsyn, Alexander V. Shestakov, POLYUS Research and Development Institute (Russian Federation) [9253-1]

9:30: **Eye-safe UV Raman spectroscopy for proximal detection of explosives and their precursors in fingerprints concentration**, Salvatore Almaviva, Antonio Palucci, Roberto Chirico, Marcello Nuvoli, ENEA (Italy); Frank Schnürer, Wenka Schweikert, Fraunhofer-Institut für Chemische Technologie (Germany); Francesco S. Romolo, Univ. de Lausanne (Switzerland) [9253-2]

9:50: **Infrared reflectance spectra: effects of particle size, provenance and preparation**, Timothy J. Johnson, Tanya L. Myers, Yin-Fong Su, Carolyn S. Brauer, Thomas A. Blake, Pacific Northwest National Lab. (United States); Brenda M. Forland, Red Rocks Community College (United States) [9253-3]

10:10: **Real-time criteria based on spectral dynamics of medium response for the detection and identification of substance using THz signal**, Vyacheslav A. Trofimov, Svetlana A. Varentsova, Lomonosov Moscow State Univ. (Russian Federation) [9253-4]

Coffee Break Mon 10:30 to 11:00

11:00: **Handheld detector using NIR for bottled liquid explosives**, Hideo Itozaki, Hideo Sato-Akaba, Osaka Univ. (Japan) [9253-5]

11:20: **Detection of hidden objects using a real-time 3D millimeter-wave imaging system**, Daniel Rozban, Ariel Univ. (Israel) and Ben-Gurion Univ. of the Negev (Israel); Assaf Levanon III, Yitzhak Yitzhaky, Ben-Gurion Univ. of the Negev (Israel); Amir Abramovich, Ariel Univ. (Israel); Natan S. Kopeika, Ben-Gurion Univ. of the Negev (Israel) [9253-6]

11:40: **Hyperspectral analysis of blood stains at the crime scene**, Gerda J. Edelman, Netherlands Forensic Institute (Netherlands); Maurice C. Aalders, Academisch Medisch Ctr. (Netherlands) [9253-7]

12:00: **Possibility of the detection and identification of substance at long distance at using broad THz pulse**, Vyacheslav A. Trofimov, Lomonosov Moscow State Univ. (Russian Federation); Svetlana A. Varentsova, Lomonosov Moscow State Univ. (Russian Federation); Vladislav V. Trofimov, Lomonosov Moscow State Univ. (Russian Federation) [9253-8]

12:20: **Towards a "fingerprint" of paper network; separating forgeries from genuine by the properties of fibre structure**, Jouni J. Takalo, Univ. of Jyväskylä (Finland); Jouni A. Sampo, Lappeenranta Univ. of Technology (Finland); Jussi Timonen, Univ. of Jyväskylä (Finland); Maarja Rantala, Samuli Siltanen, Matti Lassas, Univ. of Helsinki (Finland) [9253-9]

Lunch Break Mon 12:40 to 14:00

SESSION 2

Room: E108 Mon 14:00 to 15:00

Materials, Weapons, Contraband and Counterfeits: Detection and Identification II

Session Chair: **Gari Owen**, Annwyn Solutions (United Kingdom)

14:00: **Stand-off detection and classification of CBRNe using a Lidar system based on a high power femtosecond laser**, Jun Izawa, IHI Corp. (Japan); Takeshi Yokozawa, INC Engineering (Japan); Takao Kurata, Akihiro Yoshida, Yasushi Mastunaga, IHI Corp. (Japan); Toshihiro Somekawa, Institute for Laser Technology (Japan); Shuzo Eto, Central Research Institute of Electric Power Industry (Japan); Naohiro Manago, Chiba Univ. (Japan); Hideyuki Horisawa, Shigeru Yamaguchi, Tokai Univ. (Japan); Takashi Fujii, Central Research Institute of Electric Power Industry (Japan); Hiroaki Kuze, Chiba Univ. (Japan) [9253-10]

14:20: **Multi-channel thermal infrared communications using engineered blackbody radiation for security applications**, Fangjing Hu, Imperial College London (United Kingdom); Xiaoxin Liang, Imperial College London (United Kingdom) and Institute of Microelectronics (China); Stepan Lucyszyn, Imperial College London (United Kingdom) [9253-11]

14:40: **Complex of the new generation of the instrumental analytical approaches to prevent bioterrorism dangerous**, Nickolaj F. Starodub, Kateryna Shavanova, National Univ. of Life and Environmental Sciences of Ukraine (Ukraine); Andrii Karpiuk, National Univ of Life and Environmental Sciences (Ukraine) [9253-12]

Coffee Break Mon 15:00 to 16:00

PLENARY SESSION

Room: E108 Mon 16:05 to 17:50

Security + Defence 2014

For details, please see special events section in the printed programme or visit <http://spie.org/security-defence-europe.xml>

Tuesday 23 September

OPENING REMARKS

Room: E108 9:15 to 9:20

Doug, Burgess, Burgess Consulting (United Kingdom)

SESSION 3

Room: E108 Tue 9:20 to 12:10

Identifying Threats Posed by People I: Are We Getting Better?

Session Chair: **Harbinder Rana**, Defence Science and Technology Lab. (United Kingdom)

9:20: **Track-based event recognition in a realistic crowded environment**, Jasper R. van Huis, Henri Bouma, TNO (Netherlands); Jan Baan, Technisch Fysische Dienst-TNO (Netherlands); Gertjan J. Burghouts, TNO Defence, Security and Safety (Netherlands); Pieter T. Eendebak, TNO (Netherlands); Richard J. M. den Hollander, Judith Dijk, TNO Defence, Security and Safety (Netherlands); Jeroen H. C. van Rest, TNO (Netherlands) [9253-13]

CONFERENCE 9253A - ROOM: E108

9:40: **Automatic detection of suspicious behavior of pickpockets with track-based features in a shopping mall**, Henri Bouma, TNO (Netherlands); Jan Baan, Technisch Physische Dienst-TNO (Netherlands); Gertjan J. Burghouts, TNO Defence, Security and Safety (Netherlands); Pieter T. Eendebak, Jasper R. van Huis, TNO (Netherlands); Judith Dijk, TNO Defence, Security and Safety (Netherlands); Jeroen H. C. van Rest, TNO (Netherlands) [9253-14]

10:00: **Some observations on computer lip-reading: moving from the dream to the reality**, Helen Bear, Univ. of East Anglia (United Kingdom); Gari Owen, Annwyn Solutions (United Kingdom); Richard Harvey, Barry-John Theobald, Univ. of East Anglia (United Kingdom) [9253-15]

Coffee Break Tue 10:20 to 10:50

10:50: **Finding suspects in multiple cameras for improved railway protection**, Jan-Willem Marck, Henri Bouma, TNO (Netherlands); Jan Baan, Technisch Physische Dienst-TNO (Netherlands); Julio de Oliveira Filho, Mark van den Brink, TNO (Netherlands). [9253-16]

11:10: **A photogrammetric approach for real-time 3D localization and tracking of pedestrians in monocular infrared imagery**, Mikolaj E. Kundegorski, Toby P. Breckon, Durham Univ. (United Kingdom). [9253-17]

11:30: **Advantages of fused night vision in complex urban environment**, Alistair Brown, Thermoteknix Systems Ltd. (United Kingdom) [9253-18]

11:50: **Generalized Hough Transform-based time invariant action recognition with 3D pose information**, David Muench, Wolfgang Huebner, Michael Arens, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [9253-19]

Lunch/Exhibition Break Tue 12:10 to 13:40

SESSION 4

Room: E108 Tue 13:40 to 14:40

Identifying Threats Posed by People II: Are We Getting Better?

Session Chair: **Harbinder Rana**, Defence Science and Technology Lab. (United Kingdom)

13:40: **Sensor for real-time determining the polarization state distribution in the object images**, Barbara N. Kilosanidze, George Kakauridze, Institute of Cybernetics (Georgia); Yuri Mshvenieradze, Georgian Technical Univ. (Georgia) [9253-20]

14:00: **Fusion of optical flow based motion pattern analysis and silhouette classification for person tracking and detection**, Johan W. H. Tangelder, Ed Lebert, VicarVision (Netherlands); Gertjan J. Burghouts, TNO Intelligent Imaging (Netherlands); Kasper van Zon, Marten J. den Uyl, VicarVision (Netherlands). [9253-21]

14:20: **Distinguishing suspicious actions in long-distance surveillance**, Guy Hebe, Eli Chen, Yitzhak Yitzhaky, Ben-Gurion Univ. of the Negev (Israel) [9253-23]

PANEL DISCUSSION

Room: E108 14:40 to 15:40

Detecting More Threats: More Pixels, More Cameras, Both; or Better Image Processing and Analytics

Moderator: **Doug, Burgess**, Burgess Consulting (United Kingdom)

Everyone in a street, a railway station or a crowded airport departure lounge is a potential criminal or terrorist. Whilst police and security forces have successfully neutralised many threats, our protectors need to be constantly vigilant if they are to keep on top of evolving threats. Technology will help them identify threats, but which technology mix will help the most?

Whoever you are - a technology researcher, supplier or user for example - come along to this informal discussion: share your viewpoint with us and help create a vision for the future for imaging sensors and image processing technologies that best support our law enforcement agencies.

CONFERENCE 9253B - ROOM: FORUM

Monday - Tuesday 22-23 September 2014 • Proceedings of SPIE Vol. 9253

OPTICAL MATERIALS AND BIOMATERIALS IN SECURITY AND DEFENCE SYSTEMS TECHNOLOGY

Conference Chairs: **Roberto Zamboni**, Istituto per la Sintesi Organica e la Fotoreattività (Italy); **François Kajzar**, Univ. Politehnica of Bucharest (Romania); **Attila A. Szep**, Air Force Research Lab. (United States)

Programme Committee: **Chantal Andraud**, Ecole Normale Supérieure de Lyon (France); **André-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 Feneyrou**, Thales Research & Technology (France); **Barrett Flake**, European Office of Aerospace Research and Development (United Kingdom); **Marina Saphiannikova 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**, Wrocław Univ. of Technology (Poland); **Jaroslav Mysliwiec**, Wrocław Univ. of Technology (Poland); **Robert L. Nelson**, Air Force Research Lab (United States); **Fahima Ouchen**, Air Force Research Lab. (United States); **Ulrich Pietsch**, Univ. Siegen (Germany); **Ileana Rau**, Univ. Politehnica of Bucharest (Romania); **Niyazi Serdar Sariciftci**, Johannes Kepler Univ. Linz (Austria); **Renato Seiber**, Univ. degli Studi di Modena e Reggio Emilia (Italy); **Kenneth D. Singer**, Case Western Reserve Univ. (United States)

Monday 22 September

SESSION 5

Room: Forum Mon 8:30 to 10:20

Biopolymers

Session Chair: **Roberto Zamboni**, Istituto per la Sintesi Organica e la Fotoreattività (Italy)

8:30: **Biopolymeric lasers** (*Keynote Presentation*), Jaroslav Mysliwiec, Lech Sznitko, Konrad Cyprych, Adam Szukalski, Andrzej Miniewicz, Grzegorz Pawlik, Antoni C. Mitus, Wrocław Univ. of Technology (Poland); François Kajzar, Ileana Rau, Univ. Politehnica of Bucharest (Romania) [9253-30]

9:05: **Linear and NLO properties of DNA-CTMA-SBE complexes** (*Invited Paper*), Ana-Maria Manea, Ileana Rau, François Kajzar, Univ. Politehnica of Bucharest (Romania) [9253-31]

9:30: **Protein-based artificial receptive field** (*Invited Paper*), Yoshiko Okada-Shudo, The Univ. of Electro-Communications (Japan) [9253-32]

9:55: **Design and development of variable data security holograms on photopolymer and biomaterials** (*Invited Paper*), Sheeja M. K., Sree Chitra Thirunal College of Engineering (India) [9253-33]

Coffee Break Mon 10:20 to 10:45

SESSION 6

Room: Forum Mon 10:45 to 12:20

Sensing I

Session Chair: **William R. Heineman**, Univ. of Cincinnati (United States)

10:45: **Optical biosensor system for the quick and reliable detection of virus infections: VIROSENS** (*Invited Paper*), Guenther Proll, Florian Proll, Biometrics GmbH (Germany); Pranav Patel, Matthias Niedrig, Robert Koch-Institut (Germany) [9253-34]

11:10: **Photo-assisted chemical sensors** (*Invited Paper*), Corrado Di Natale, Yuvaraj Yuvaraj Sivalingam, Gabriele Magna, Roberto Paolesse, University of Rome Tor Vergata (Italy) [9253-35]

11:35: **Rapid and label-free screening and identification of anthrax simulants by surface enhanced Raman spectroscopy**, Antonia Lai, Salvatore Almaviva, Valeria Spizzichino, Stefano Lecci, Antonio Palucci, ENEA (Italy); Lorella Addari, ENEA (Italy); Domenico Luciani, Sandro Mengali, Consorzio CREO (Italy); Christophe A. Marquette, Institut de Chimie et Biochimie Moléculaires et Supramoléculaires (France); Ophélie Berthuy, Institut de Chimie et Biochimie Moléculaires et Supramoléculaires (France); Bartłomiej Jankiewicz, IOM Univ. (Poland); Luigi Pierno, SELEX ES S.p.A. (Italy) [9253-36]

11:55: **Devices for in-situ and proximal detection of biohazards, food contaminants and explosive compounds: results from national and international security projects** (*Invited Paper*), Antonio Palucci, ENEA (Italy) [9253-48]

Lunch Break Mon 12:20 to 13:20

SESSION 7

Room: Forum Mon 13:20 to 15:25

Materials and Applications I

Session Chair: **Jaroslav Mysliwiec**, Wrocław Univ. of Technology (Poland)

13:20: **NLO properties of formyl-methoxy derivatives of [2.2]paracyclophane containing the donor group in different positions** (*Invited Paper*), Lada N. Puntus, Institute of Radio Engineering and Electronics (Russian Federation) and A.N. Nesmeyanov Institute of Organoelement Compounds (Russian Federation); Kyrill Y. Suponitsky, Dmitrii Y. Antonov, A.N. Nesmeyanov Institute of Organoelement Compounds (Russian Federation); Irina Pekareva, Kotel'nikov Institute of Radio Engineering and Electronics (Russian Federation); Konstantin A. Lyssenko, A.N. Nesmeyanov Institute of Organoelement Compounds (Russian Federation); François Kajzar, Institut des Sciences et Technologies Moléculaires d'Angers (France) [9253-38]

13:45: **Pyrazoline derivatives for random laser operation** (*Invited Paper*), Lech Sznitko, Adam Szukalski, Konrad Cyprych, Andrzej Miniewicz, Wrocław Univ. of Technology (Poland); Jaroslav Mysliwiec, Wrocław Univ. of Technology (Poland) [9253-39]

14:10: **A review of materials for spectral design coatings in signature management applications** (*Invited Paper*), Kent E. Andersson, The Swedish National Defence College (Sweden); Christina Åkerlind, Swedish Defence Research Agency (Sweden) [9253-40]

14:35: **Analysis of key properties of materials for optical power limiting and the influence of nonlinear scattering** (*Invited Paper*), Michael Körber, Adrian Azarian, Bastian Schwarz, Bernd Eberle, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [9253-41]

15:00: **Chalcogenide glass with good thermal stability for the application of molded infrared lens** (*Invited Paper*), Ju Hyeon Choi, Young Jun Park, Du Hwan Cha, Jeong Ho Kim, Hye-Jeong Kim, Korea Photonics Technology Institute (Korea, Republic of) [9253-42]

Coffee Break Mon 15:25 to 16:00

PLENARY SESSION

Room: Forum Mon 16:05 to 17:50

Security + Defence 2014

For details, please see special events section in the printed programme or visit <http://spie.org/security-defence-europe.xml>

CONFERENCE 9253B - ROOM: FORUM

Tuesday 23 September

SESSION 8

Room: Forum Tue 9:00 to 10:35

Sensing II

Session Chair: **Guenther Proll**, Eberhard Karls Univ. Tübingen (Germany)

9:00: **Spectroelectrochemical sensors: new polymer films for improved sensitivity** (*Keynote Presentation*), William R. Heineman, Laura K. Morris, Carl J. Seliskar, Univ. of Cincinnati (United States); Samuel A. Bryan, Pacific Northwest National Lab. (United States). [9253-43]

9:35: **Trends and challenges for the detection of HME threats** (*Keynote Presentation*), Augustus Way Fountain III, U.S. Army Edgewood Chemical Biological Ctr. (United States). [9253-44]

10:10: **Novel electrode systems for amperometric sensing: the case of titanium**. (*Invited Paper*), Fabio Terzi, Laura Pigani, Chiara Zanardi, Barbara Zanfagnini, Stefano Ruggeri, Giulio Maccaferri, Renato Seeber, Univ. degli Studi di Modena e Reggio Emilia (Italy) [9253-37]

Coffee Break Tue 10:35 to 11:00

SESSION 9

Room: Forum Tue 11:00 to 12:15

Sensing III

Session Chair: **Fabio Terzi**, Univ. degli Studi di Modena e Reggio Emilia (Italy)

11:00: **Rapid, simple and low cost point of sampling detection of explosives and other analytes of interest** (*Invited Paper*), Adrian Guckian, Ocean Optics EMEA (United Kingdom) [9253-46]

11:25: **Optimisation and production of a molecular-imprinted-polymer for the electrochemical determination of triacetone triperoxide (TATP)** (*Invited Paper*), S. K. Mamo, Jose Gonzalez-Rodriguez, Univ. of Lincoln (United Kingdom) [9253-47]

11:50: **News on electrochemical sensors** (*Invited Paper*), Luca Pini, Metrohm Autolab (Netherlands) [9253-45]

Lunch/Exhibition Break Tue 12:15 to 13:30

SESSION 10

PLEASE NOTE ROOM CHANGE

Room: D201 Tue 13:30 to 15:05

Materials and Applications II

Session Chair: **François Kajzar**, Univ. Politehnica of Bucharest (Romania)

13:30: **Preparation and characterization of novel nanosized hybrid materials and their nonlinear optical properties** (*Invited Paper*), Stefanie Dengler, Cordula Hege, Bernd Eberle, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany). [9253-49]

13:55: **Growth and study of nonlinear optical materials for frequency conversion devices with applications in defence and security** (*Invited Paper*), Vladimir Tassev, Michael Snure, Shivashankar R. Vangala, Martin M. Kimani, Matthew Mann, Rita D. Peterson, Air Force Research Lab. (United States); Peter G. Schunemann, BAE Systems (United States) [9253-50]

14:20: **Improvement of photophysical properties of emissive molecules in DNA matrix** (*Invited Paper*), Norihisa Kobayashi, Wataru Watanabe, Kazuki Nakamura, Chiba Univ. (Japan). [9253-51]

14:45: **The versatile electronic structure of polymethine dyes**, Simon Pascal, Cyrille Monnereau, Olivier Maury, Chantal Andraud, Ecole Normale Supérieure de Lyon (France) [9253-52]

Coffee Break Tue 15:05 to 15:35

PANEL DISCUSSION

Room: D201 Tue 15:35 to 17:35

The Need for a Step Forward in Sensing. Electrochemical and Optical Sensing: Competition, Complementarity, Hyphenation, Applications

Moderators: **Bob Lieberman**, **Renato Seeber**, **Roberto Zamboni**

Panelists:

C. Di Natale, Univ. of Rome Tor Vergata (Italy); **H. Emons**, JRC European Commission (Belgium); **A. W. Fountain III**, Edgewood Chemical Biological Center (United States); **A. Guckian**, Ocean Optics EMEA (United Kingdom); **W.R. Heineman**, Univ. of Cincinnati (United States); **Luca Pini**, Metrohm Autolab (Netherlands) and Dropsens (Spain); **Günther Proll**, Univ. of Tübingen and Biometrics (Germany); **Fabio Terzi**, Univ. of Modena and Reggio Emilia & Delprosens (Italy)

Sensing systems have become a strategic pillar of our countries, playing fundamental role in citizens' health and well-being, in societal and environmental security, in infrastructures and services safety and even in political stability. The PD discussion will focus on the chemical sensors, aiming at evidencing complementarity and hyphenation of different sensing transductions. The aim is to include all possible issues of sensing, from the development of any components of a sensing system, to the definition of standard materials and methodologies. Problems involving specific fields will be also faced. Academia, public institutions and companies are involved. Starting from scientific/technical issues, the discussion will evolve to explore the reliability to establish a network suitable to give answer to requirements that come from EU and US.

CONFERENCE 9254A - ROOM: D201

Monday - Tuesday 22-23 September 2014 • Proceedings of SPIE Vol. 9254

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: **Jan Bouda**, Masaryk Univ. (Czech Republic); **Robert W. Boyd**, Univ. of Ottawa (Canada); **Gerald S. Buller**, Heriot-Watt Univ. (United Kingdom); **Ryan Camacho**, Sandia National Labs (United States); **John D. Gonglewski**, European Office of Aerospace Research and Development (United Kingdom); **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); **Vadim V. Makarov**, Norwegian Univ. of Science and Technology (Norway); **Ronald E. Meyers**, U.S. Army Research Lab. (United States); **Jane E. Nordholt**, Los Alamos National Lab. (United States); **Miles J. Padgett**, Univ. of Glasgow (United Kingdom); **Momtchil Peev**, Austrian Research Ctrs. GmbH - ARC (Austria); **Renato Renner**, ETH Zürich (Switzerland); **Andrew J. Shields**, Toshiba Research Europe Ltd. (United Kingdom); **Rupert Ursin**, Austrian Academy of Sciences (Austria)

Monday 22 September

SESSION 1

Room: D201 Mon 8:30 to 10:00

Satellite Quantum Communication

Session Chair: **Ryan Camacho**, Sandia National Labs (United States)

8:30: **Progress towards implementation of the QEYSSAT quantum communication satellite** (*Keynote Presentation*), Thomas D. Jennewein, Brendon L. Higgins, Eric Choi, Univ. of Waterloo (Canada) [9254-1]

9:10: **Quantum communication to the inside of the International Space Station** (*Invited Paper*), Rupert Ursin, Austrian Academy of Sciences (Austria) [9254-2]

9:40: **Adaptive spatial filtering for daytime satellite quantum key distribution**, Mark T Gruneisen, Air Force Research Lab (United States); Brett A Sickmiller, Michael B Flanagan, Leidos (United States); James P Black, Kurt E Stoltenberg, The Boeing Company (United States) [9254-3]

Coffee Break Mon 10:00 to 10:30

SESSION 2

Room: D201 Mon 10:30 to 12:50

Photon Sources, Transceivers, and Repeaters for Quantum Information Systems

Session Chair: **Miloslav Dusek**, Palacky Univ. (Czech Republic)

10:30: **Room-temperature single photon sources based on nanocrystals in photonic/plasmonic nanostructures** (*Invited Paper*), Svetlana G. Lukishova, Justin Winkler, Univ. of Rochester (United States); Luke J. Bissell, Air Force Research Lab. (United States); Dilyana Mihaylova, Andreas C. Liapis, Univ. of Rochester (United States); Zhimin Shi, Univ. of South Florida (United States); David Goldberg, Vinod M. Menon, Queens College (United States); Robert W. Boyd, Univ. of Rochester (United States) and Univ. of Ottawa (Canada); Guanying Chen, Paras N. Prasad, Univ. at Buffalo (United States) [9254-4]

11:00: **Chipscale transceivers for quantum communications** (*Invited Paper*), Ryan M. Camacho, Sandia National Labs. (United States) [9254-5]

11:30: **Advanced single photon sources using cavity-coupled colour centres in diamond** (*Invited Paper*), Jason Smith, Univ. of Oxford (United Kingdom) [9254-6]

12:00: **An experimental demonstration of a simple quantum repeater for use with quantum information systems**, Ross J. Donaldson, Robert J. Collins, Heriot-Watt Univ. (United Kingdom); Electra Eleftheriadou, Univ. of Strathclyde (United Kingdom); Stephen M. Barnett, Univ. of Glasgow (United Kingdom); John Jeffers, Univ. of Strathclyde (United Kingdom); Gerald S. Buller, Heriot-Watt Univ. (United Kingdom) [9254-7]

12:20: **Single photon detection and generation with nanowires** (*Invited Paper*), Valery Zwiller, Technische Univ. Delft (Netherlands) [9254-22]

Lunch Break Mon 12:50 to 13:50

SESSION 3

Room: D201 Mon 13:50 to 15:40

Implementation of Quantum Key Distribution and other Quantum Protocols

Session Chair: **Jan Bouda**, Masaryk Univ. (Czech Republic)

13:50: **Towards high data-rate quantum cryptography over water** (*Invited Paper*), Bradley G. Christensen, Univ. of Illinois at Urbana-Champaign (United States); Daniel J. Gauthier, Duke Univ. (United States); Alexander D. Hill, Daniel R. Kumor, Kevin T. McCusker, Paul G. Kwiat, Univ. of Illinois at Urbana-Champaign (United States) [9254-8]

14:20: **Implementing linear quantum hyper-dense coding**, Trent M. Graham, Paul Kwiat, Univ. of Illinois at Urbana-Champaign (United States) [9254-9]

14:40: **Efficient quantum key distribution based on pulse-position modulation**, Yequn Zhang, Ivan B. Djordjevic, Mark A. Neifeld, The Univ. of Arizona (United States) [9254-10]

15:00: **An in-fiber experimental approach to photonic quantum digital signatures that does not require quantum memory**, Robert J. Collins, Ross J. Donaldson, Heriot-Watt Univ. (United Kingdom); Vedran Dunjko, Heriot-Watt Univ. (United Kingdom) and Univ. of Edinburgh (United Kingdom) and Ruder Boskovic Institute (Croatia); Petros Wallden, Patrick J. Clarke, Erika Andersson, Heriot-Watt Univ. (United Kingdom); John Jeffers, Univ. of Strathclyde (United Kingdom); Gerald S. Buller, Heriot-Watt Univ. (United Kingdom) [9254-11]

Coffee Break Mon 15:10 to 16:00

15:20: **Quantum-secure authentication of a physical key**, Sebastianus A. Goorden, Marcel Horstmann, Allard P. Mosk, Univ. Twente (Netherlands); Boris Skoric, Technische Univ. Eindhoven (Netherlands); Pepijn W. H. Pinkse, Univ. Twente (Netherlands) [9254-12]

PLENARY SESSION

Room: D201 Mon 16:05 to 17:50

Security + Defence 2014

For details, please see special events section in the printed programme or visit <http://spie.org/security-defence-europe.xml>

Tuesday 23 September

SESSION 4

Room: D201 Tue 9:00 to 10:20

Continuous Variables Approaches to Quantum Key Distribution

Session Chair: **Rupert Ursin**, Austrian Academy of Sciences (Austria)

9:00: **Enhancement of continuous variable QKD via post-selection** (*Invited Paper*), Timothy C. Ralph, The Univ. of Queensland (Australia) [9254-13]

9:30: **Distributing secret keys using quantum continuous variables** (*Invited Paper*), Eleni Diamanti, Télécom ParisTech (France) [9254-14]

10:00: **Towards multimode continuous-variable quantum key distribution**, Vladyslav C. Usenko, Laszlo Ruppert, Radim Filip, Palacky Univ. Olomouc (Czech Republic) [9254-15]

Coffee Break Tue 10:20 to 10:50

SESSION 5

Room: D201 Tue 10:50 to 12:10

Quantum Computation and Quantum Information Theory

Session Chair: **Timothy Ralph**, The Univ. of Queensland (Australia)

10:50: **Programming nontrivial algorithms in the measurement-based quantum computation model**, Paul M. Alsing, Michael L. Fanto, Air Force Research Lab. (United States); A. Matthew Smith, Oak Ridge National Lab. (United States); Christopher C. Tison, Air Force Research Lab. (United States) and Florida Atlantic Univ. (United States); Gordon E. Lott, Air Force Research Lab. (United States) [9254-16]

11:10: **An approach towards blind quantum computation with continuous variable cluster states**, Michael L. Fanto, Air Force Research Lab. (United States); Christopher C. Tison, Air Force Research Lab. (United States) and Florida Atlantic Univ. (United States); Paul M. Alsing, Gordon E. Lott, Joseph M. Osman, Air Force Research Lab. (United States) [9254-17]

11:30: **Device-independent randomness extraction for arbitrarily weak min-entropy**, Jan Bouda, Faculty of Informatics, Masaryk University (Czech Republic) [9254-18]

11:50: **Misinterpretation of statistical distance in security of quantum key distribution shown by simulation**, Takehisa Iwakoshi, Osamu Hirota, Tamagawa Univ. (Japan) [9254-19]

CONFERENCE 9254A - ROOM: D201

Wednesday 24 September

POSTERS—WEDNESDAY

Room: D201 Wed 17:40 to 19:15

Conference attendees are invited to attend the Remote Sensing poster session held on Wednesday 17:40 to 19:15. Posters will be on display after 10:00 Wednesday morning in the Conference Centre. Authors of poster papers will be present to answer questions concerning their papers during the Wednesday Poster Session. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x32234.xml> and under general information in the printed programme.

Preventing side-channel leakage in continuous-variable quantum key distribution, Ivan D. Derkach, Vladyslav C. Usenko, Radim Filip, Palacky Univ. Olomouc (Czech Republic) [9254-20]

Special properties of single-photon optical fiber sensor for security needs, Marek Zyczkowski, Mieczysław Szustakowski, Mateusz Karol, Piotr Markowski, Marta Napierala, Military Univ. of Technology (Poland) [9254-21]

CONFERENCE 9254B - ROOM: D204

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EMERGING TECHNOLOGIES

Conference Chairs: **Keith L. Lewis**, Sciovis Ltd. (United Kingdom); **Richard C. Hollins**, Defence Science and Technology Lab. (United Kingdom); **Thomas J. Merlet**, Thales Optronique S.A.S. (France); **Alexander Toet**, TNO Defence, Security and Safety (Netherlands)

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Tuesday 23 September

SESSION 6

Room: D204 Tue 9:00 to 12:40

Sensor Technologies and ISR

Session Chairs: **Keith L. Lewis**, Sciovis Ltd. (United Kingdom); **Richard C. Hollins**, Defence Science and Technology Lab. (United Kingdom)

9:00: **Plasmonic and metamaterial technologies for imaging (Keynote Presentation)**, David R. Cumming, James Grant, Iain J. H. McCrindle, Univ. of Glasgow (United Kingdom) [9254-30]

9:40: **High operating temperature SWIR HgCdTe APDs for remote sensing**, Johan Rothman, CEA-LETI (France); Kevin Foubert, CEA-LETI (France); Gilles Lasfargues, Commissariat à l'Énergie Atomique (France); Igor Zayer, European Space Agency ESA/ESTEC (Germany); Zoran Sodnik, European Space Agency ESA/ESTEC (Netherlands); Martin Mosberger, Johannes Widmer, RUAG Space AG (Switzerland) [9254-31]

10:00: **Demonstration of an InAsBi photodiode operating in the MWIR**, Ian C. Sandall, Faebian Bastiman, Ben White, Robert Richards, Chee Hing Tan, John P. David, The Univ. of Sheffield (United Kingdom) [9254-32]

Coffee Break Tue 10:20 to 10:40

10:40: **Emerging technologies are enabling a real-time world model (Keynote Presentation)**, Thomas J. Karr, Defense Advanced Research Projects Agency (United States) [9254-33]

11:20: **Photonically-enabled Ka-band radar and infrared sensor subscale testbed**, Michele B. Lohr, Raymond M. Sova, Kevin B. Funk, Marc B. Airola, Michael L. Dennis, Richard E. Pavek, Jennifer S. Hollenbeck, Sean K. Garrison, Steven J. Conard, David H. Terry, Johns Hopkins Univ. Applied Physics Lab., LLC (United States) ... [9254-34]

11:40: **Photonics and bioinspiration (Keynote Presentation)**, Keith L. Lewis, Sciovis Ltd. (United Kingdom) [9254-36]

12:20: **Artificial human vision camera**, Jean-François Goudou, Simona Maggio, Michael Fagno, Thales Security Systems S.A.S. (France) [9254-37]

Lunch/Exhibition Break Tue 12:40 to 14:00

SESSION 7

Room: D204 Tue 14:00 to 16:50

Photonic Systems and their Application

Session Chairs: **Alexander Toet**, TNO Defence, Security and Safety (Netherlands); **Keith L. Lewis**, Sciovis Ltd. (United Kingdom)

14:00: **Progress and opportunities in active electro-optical sensing (Keynote Presentation)**, Gary Kamerman, FastMetrix, Inc. (United States) [9254-38]

14:40: **Atmospheric energy harvesting: use of Doppler Wind Lidars on UAVs to extend mission endurance and enable quiet operations**, George D. Emmitt, Steven Greco, Sidney A. Wood, Simpson Weather Associates, Inc. (United States); Mark Costello, Earthly Dynamics, LLC (United States) [9254-39]

15:00: **Active photonic sensor communication cable for field application of optical data and power transmission**, Eike Suthau, Ralf Rieske, LUMILOOP (Germany); Thomas Zerna, Technische Univ. Dresden (Germany) [9254-40]

Coffee Break Tue 15:20 to 15:50

15:50: **Laser driven X-ray sources for penetrating imaging**, David Neely, Rutherford Appleton Lab. (United Kingdom); Robert M. Deas, Defence Science and Technology Lab. (United Kingdom) [9254-41]

16:10: **AlGaIn laser diode technology for defence, security & sensing applications**, Stephen P. Najda, TopGaN Ltd. (Poland); Piotr Perlin, Tadek Suski, Lucja Marona, Michal Bockowski, Institute of High Pressure Physics (Poland); Mariusz Leszczynski, Institute of High Pressure Physics (Poland); Przemek Wisniewski, Robert Czernecki, Institute of High Pressure Physics (Poland); Robert Kucharski, Ammono Sp. z o.o. (Poland); Grzegorz Targowski, Institute of High Pressure Physics (Poland); Scott Watson, A. E. Kelly, Univ. of Glasgow (United Kingdom) [9254-42]

16:30: **Monolithic CMOS-MEMS integration for high-g accelerometers**, Vinayak Narasimhan, Holden K. H. Li, Chuan Seng Tan, Nanyang Technological Univ. (Singapore) [9254-43]

POSTERS—WEDNESDAY

Room: Elicium 1 Wed 17:40 to 19:15

Conference attendees are invited to attend the Remote Sensing poster session held on Wednesday 17:40 to 19:15. Posters will be on display after 10:00 Wednesday morning in the Conference Centre. Authors of poster papers will be present to answer questions concerning their papers during the Wednesday Poster Session. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x32234.xml> and under general information in the printed programme.

Digital orthogonal receiver for wideband radar based on compressed sensing, Qingkai Hou, Shaoying Su, Zengping Chen, National Univ. of Defense Technology (China) [9254-35]

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Entrance E, Forum Lounge

Sunday 21 September	16:00 to 18:00
Monday 22 September	7:30 to 17:00
Tuesday 23 September	8:00 to 17:00
Wednesday 24 September	8:30 to 17:00
Thursday 25 September	8:30 to 16:00

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Poster Session

Wednesday 24 September 17:40 to 19:15

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

Poster presenters may begin posting their poster papers starting at 10:00 hrs on Wednesday in the Conference Area Hallway. Each poster presenter is provided a space 0.95 x 1.20m in which to display a summary of the paper. Poster authors are requested to attend the official poster session and should be at their papers on Wednesday from 17:40 to 19:15 hrs to answer questions from attendees. Poster presenters who have not set up by 17:40 on Wednesday will be considered a "no show" and their manuscript will not be published. SPIE assumes no responsibility for posters left up after 19:15 pm on Wednesday. Any papers left on the boards at that time will be considered unwanted and will be discarded.

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Level -1, Elicium

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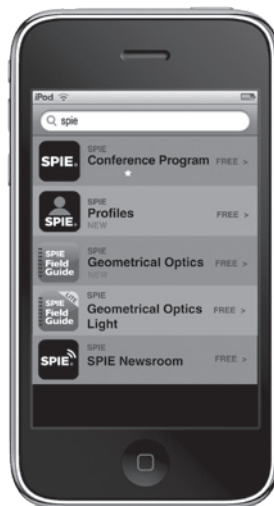


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Shuttles and Public Transportation

There are any number of buses and trains connecting Schiphol to Amsterdam and the national and international train network. The quickest connection into the city is by using the high speed connection Frya from Schiphol station which is situated directly below the airport. At the time of publication, tickets are EU 13.50. For more detail, please visit www.spie.org/frya*. There is also the Schiphol Hotel Shuttle which services a number of hotels in Amsterdam and can be pre-booked at www.spie.org/shuttle*.

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Amsterdam.

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September 22-25, 2014
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Conferences, courses, and poster sessions: For copyright reasons, recordings of any kind are prohibited without prior written consent of the presenter or instructor. Attendees may not capture or use the materials presented in any meeting/course room, or in course notes on display without written permission. Consent forms for material presented in meeting rooms are available at Speaker Check-In. Individuals not complying with this policy will be asked to leave a given session and/or asked to surrender their recording media.

Exhibition Hall: For security and courtesy reasons, recordings of any kind are prohibited unless one has explicit permission from on-site company representatives. Individuals not complying with this policy will be asked to surrender their recording media and to leave the exhibition hall.

Your registration signifies your agreement to be photographed or videotaped by SPIE in the course of normal business. Such photos and video may be used in SPIE marketing materials or other SPIE promotional items.

Laser Pointer Safety Information/Policy

SPIE supplies tested and safety-approved laser pointers for all conference meeting rooms. For safety reasons, SPIE requests that presenters use provided laser pointers.

Use of a personal laser pointer represents user's acceptance of liability for use of a non-SPIE-supplied laser pointer. If you choose to use your own laser pointer, it must be tested to ensure <5 mW power output. Laser pointers in Class II and IIIa (<5 mW) are eye safe if power output is correct, but output must be verified because manufacturer labeling may not match actual output. Come to Speaker Check-In and test your laser pointer on our power meter. You are required to sign a waiver releasing SPIE of any liability for use of potentially non-safe, personal laser pointers. Misuse of any laser pointer can lead to eye damage.

Access to Technical and Networking Events

Persons under the age of 18 including babies, carried or in strollers, and toddlers are not allowed in technical or networking events. Anyone 18 or older must register as an attendee. All technical and networking events require a valid conference badge for admission.

Underage Persons on Exhibition Floor Policy

For safety and insurance reasons:

- No persons under the age of 18 will be allowed in the exhibition area during move-in and move-out.
- Children 14 and older, accompanied by an adult, will be allowed in the exhibition area during open exhibition hours only
- All children younger than 14, including babies in strollers and toddlers, are not allowed in the exhibition area at any time.

Unauthorized Solicitation Policy

Unauthorized solicitation in the Exhibition Hall is prohibited. Any non-exhibiting manufacturer or supplier observed to be distributing information or soliciting business in the aisles, or in another company's booth, will be asked to leave immediately.

Unsecured Items Policy

Personal belongings should not be left unattended in meeting rooms or public areas. Unattended items are subject to removal by security. SPIE is not responsible for items left unattended.

Wireless Internet Service Policy

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

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

Mobile Phones and Related Devices Policy

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

Smoking

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

Hold Harmless

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

Event Cancellation

If for some unforeseen reason SPIE should have to cancel the event, registration fees processed will be refunded to registrants. Registrants will be responsible for cancellation of travel arrangements or housing reservations and the applicable fees.

Confidential Reporting of Unethical or Inappropriate Behavior

SPIE is an organization with strong values of responsibility and integrity. Our Ethics Statement and Code of Professional Conduct contain general guidelines for conducting business with the highest standards of ethics. SPIE has established a confidential reporting system for staff & other stakeholders to raise concerns about possible unethical or inappropriate behavior within our community. Complaints may be filed by phone or through the website, and, if preferred, may be made anonymously. The web address is www.SPIE.ethicspoint.com and the toll free hotline number is 1-888-818-6898.

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