



SPIE

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2012 Remote Sensing

Conference: 24–27 September 2012
www.spie.org/rs

2012 Security+ Defence

Conference: 24–27 September 2012
Exhibition: 25–26 September 2012
www.spie.org/sd

Location

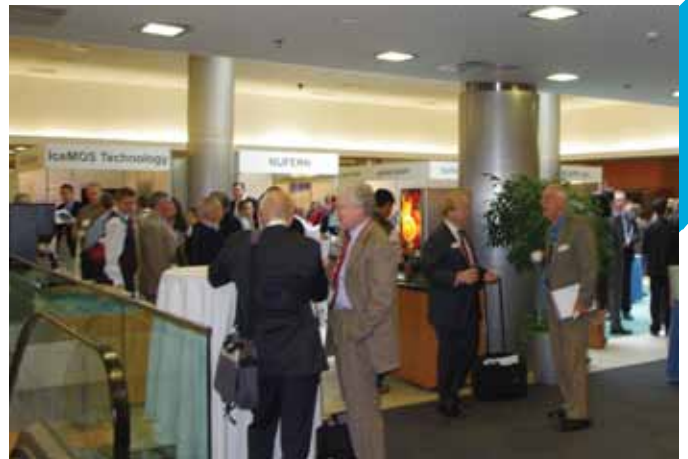
Edinburgh International
Conference Centre
Edinburgh,
United Kingdom

Remote Sensing Technologies

- Atmospheric Sensing
- Sensors, Systems, and Next-Generation Satellites
- Environmental Monitoring and Applications
- Earth Surface Sensing

Security + Defence Technologies

- Infrared Systems
- Optical Materials and Technologies
- Unmanned/Unattended Sensors
- Biological and Chemical Sensing
- Imaging and Display Technologies




SPIE Remote Sensing



SPIE Security+Defence



Karin Stein
Fraunhofer-IOSB Institute of Optronics,
System Technologies and Image
Exploitation, Germany
2012 Symposium Chair



David H. Titterton
Defence Science and Technology Lab.,
United Kingdom
2012 Symposium Chair



Charles R. Bostater
Marine-Environmental Optics Lab &
Remote Sensing Center, Florida
Institute of Technology, United States
2012 Symposium Co-Chair



Reinhard H. Ebert
Fraunhofer IOSB, Germany
2012 Symposium Co-Chair

Co-Sponsoring Organisations



Delivered with the support of Scottish Enterprise



Cooperating Organisations



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

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



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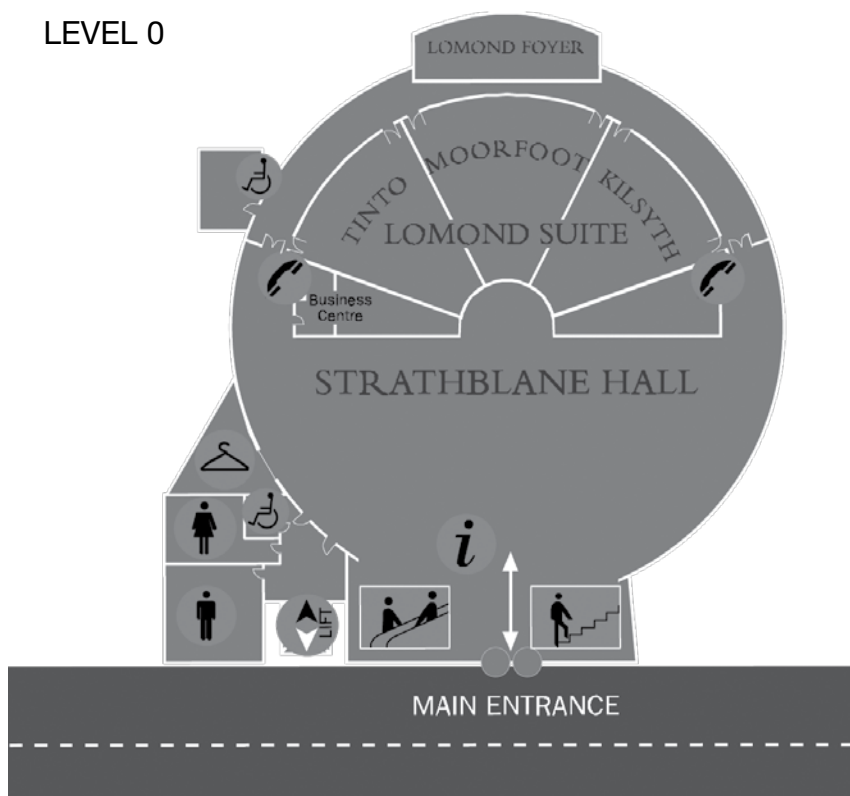
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Edinburgh International Conference Centre Map

LEVEL 0

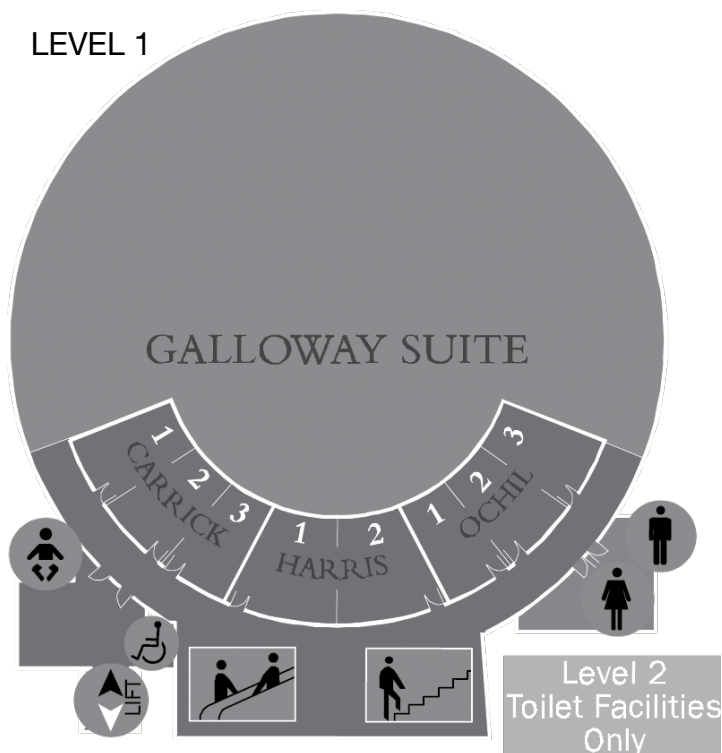


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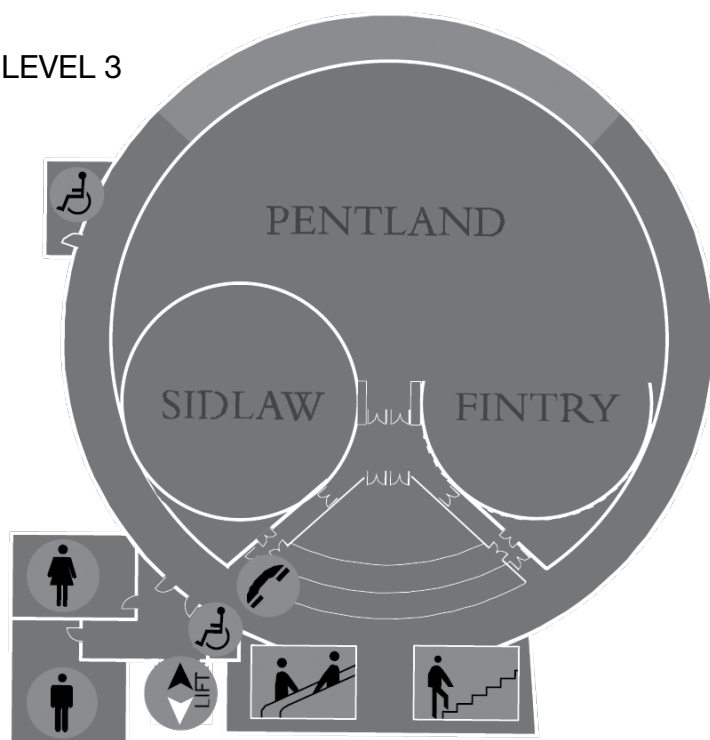
Level -1
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LEVEL 1



Level 2
Toilet Facilities Only

LEVEL 3



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Special Events			
Plenary Session		Welcome Reception	
		Poster Session	
		Meet the Buyer	
		Exhibition	

Special Events

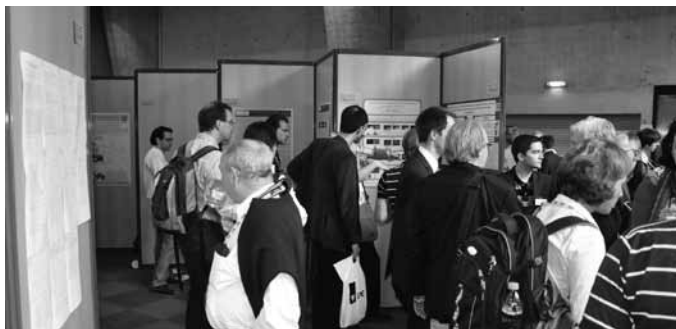


Welcome Reception

Strathblane Hall

Tuesday 25 September 18:30 to 20:30

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



Poster Session

Cromdale Hall

Wednesday 26 September 17:40 to 19:10

Poster presenters can begin to post their papers at 10.00 on Wednesday. Each poster presenter is provided a space 0.95 x 1.20m in which to display a summary of the paper. Poster presenters will stand by their posters from 17.40 to 19.10 to answer questions. 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. Posters must be removed at the end of the poster session since the poster boards will then be removed and the remaining posters discarded. SPIE assumes no responsibility for posters left up after the end of each poster session.



Meet the Buyer

Ochill 3 room

Tuesday and Wednesday, 25-26 September . . . 09:00 to 16:00

On the occasion of SPIE Security+Defence and SPIE Remote Sensing, Scottish Enterprise is offering attendees the opportunity to meet Scottish companies. The aerospace, defence, and marine (AD&M) industry sector is one of Scotland’s highest value sectors, directly employing nearly 40,000 staff. It is a dynamic and successful, high technology sector operating in a truly global market context.

The sector includes businesses specialising in the growing space, and security and resilience markets, and boasts the presence in Scotland of some of the world’s leading companies in e.g. Radar and Defence Systems, Satellites and Systems, Navigation-Systems, and others. Service providers in Design/Engineering, ICT, Testing as well as OEM Suppliers are in immediate proximity of the upcoming SPIE events, and not all of them may be at the exhibition. On 25th and 26th September, Scottish Enterprise therefore supports the Meet The Buyer events and we would like to invite you to register your interest via the registration form. You will then be sent a list of participating companies.

Monday 24 September | 16:00 to 17:45 | Pentland Hall

16.00 to 16.15

Welcome and Introduction



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

2012 Symposium Chair



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

2012 Symposium Co-Chair

16:15 to 17:00

Maximizing the use of EO products: how to leverage the potential of open geospatial service architectures



Thomas Usländer, Head of the Information Management and Production Control Department, Fraunhofer IOSB, Germany

The demand for the rapid provision of EO products with well-defined characteristics in terms of temporal, spatial, image-specific and thematic criteria is increasing. Examples are products to support near real-time damage assessment after a natural disaster event,

e.g. an earthquake. However, beyond the organizational and economic questions, there are technological and systemic barriers to enable a comfortable search, order, delivery or even combination of EO products. Most portals of space agencies and EO product providers require sophisticated satellite and product knowledge and, even worse, are all different and not interoperable.

This presentation will give an overview about the use cases and the architectural solutions that aim at an open and flexible EO mission infrastructure with application-oriented user interfaces and well-defined service interfaces based upon open standards. It presents corresponding international initiatives such as GEOSS (Global Earth Observation System of Systems) and HMA (Heterogeneous Missions Accessibility) and their associated infrastructure approaches. Furthermore, it highlights how such architectures are already successfully used in early warning systems for geo-hazards and research projects that investigate how EO products may be used to assess correlations between environmental situations and health impacts. Finally, the presentation mirrors these ideas with the vision of the Internet of Services and remaining challenges for future operational system-of-systems architectures.

Biography: Dr.-Ing. Thomas Usländer holds a degree in Computer Science from the University of Karlsruhe, Germany, and a PhD in Engineering of the Karlsruhe Institute of Technology (KIT), Germany. He is head of the department "Information Management and Production Control" and deputy speaker of the business unit "Energy, Water and Environment" at Fraunhofer IOSB. He was IOSB project leader in several international research projects and large environmental information system supply projects for German Environmental State Agencies. His research interests include the analysis and design of open geospatial service architectures where he has numerous publications. He is the representative of Fraunhofer in the architecture working group of the Open Geospatial Consortium (OGC). He was editor of the Reference Model for the ORCHESTRA Architecture (RM-OA) that has become OGC best practices document 07-097. He was an invited expert of the European Commission in the Consultation Workshop "Towards a Single Information Space in Europe for the Environment (SISE)" and the final workshop of "Connectivity between Environment and Health Information Systems (CE-HIS)". He got the Object Management Group (OMG) Application Award 2000 in the category "Best Application utilizing reusable components leveraged from of for use in other projects" and the best-paper award of the European conference "Towards eEnvironment" in Prague, 2009.

17:00 to 17:45

The use of polar orbiting and geostationary satellite data for geospatial analyses in fisheries, environmental monitoring, ship routing and management decision making



Mitchell Roffer, President Roffer's Ocean Fishing Forecasting Service, Inc., United States

The applications of new satellite visualization and data fusion products for 1) fisheries research with tuna, mackerel, squid, and marlin; 2) operational forecasting for fishing (commercial and recreational) and ship routing; and 3) mapping the oil - dispersant - water

mixtures in the Gulf of Mexico during the Deepwater Horizon oil spill (April - August, 2010) will be presented. This will include a review of the benefits and limitations of the spectral, spatial, temporal resolution and geographic coverage on the polar orbiting (e.g. NOAA series, MetOpA, Terra, Aqua, Envisat, Jason, Topex, ERS-2, etc.) and geostationary satellites (e.g. GOES) related to their utility in environmental monitoring and fisheries research, as well as, decision making in fisheries (operations and management), maritime transportation and safety (i.e. search and rescue), and oil spill response.

Due to the differing spatial and temporal resolution of satellite derived infrared (AVHRR and MODIS), visible (MODIS and MERIS), synthetic aperture radar and altimetry, as well as, the type of information required under a variety of weather conditions (clouds, wind, etc.), it is often necessary to merge different data. Examples of data fusion efforts over a variety of spatial (e.g. 75 m - 6 km) and temporal (1 hour - 10 day) resolutions and geographic coverages will be presented. These will include the validation data derived from In situ data collection (visual observations and drifting buoy tracks). The ability and utility to identify water masses by their signature physical characteristics of sea surface temperature and ocean color, as well as, the water masses' coherent Lagrangian structures using sequential image analysis will be demonstrated. This technique is especially valuable when working with cloud obstructed areas and where isothermal conditions exist, as well as for showing the motion of the currents. Examples from a wide variety of areas including the North Atlantic Ocean (including the Caribbean Sea and Gulf of Mexico), South Atlantic Ocean, and Pacific Indian Ocean will be shown.

Biography: Mitchell A. Roffer (Ph.D.) is founder and President of Roffer's Ocean Fishing Forecasting Service, Inc. (ROFFS™ - www.roffs.com), a scientific consulting company based in West Melbourne, Florida. He received his Ph.D. from the University of Miami's Rosenstiel School for Marine and Atmospheric Sciences in Biological Oceanography with an emphasis on satellite fisheries oceanography in 1987. Dr. Roffer has extensive experience in the use of satellite data, as well as, other oceanographic and meteorological data for producing applied operational and research products showing ocean currents and ocean frontal boundary dynamics. Roffer is best known for his research and operations related to tactical and strategic fisheries forecasts that are the result of the integration of satellite and other fisheries oceanographic data. He is intensively involved a broad range of projects from ship routing, oil and gas drilling operations, seismic and fish surveys, fisheries development, aquaculture, environmental monitoring, and applied scientific research.

Roffer remains active in both the scientific community and the fisheries resource management community locally, regionally, nationally and on an international basis. Roffer has a long history working on NASA research projects. He is currently the Principal Investigator in a four-year (\$1.7M) project funded by the National Aeronautics and Space Administration (NASA), "Management and Conservation of Atlantic Bluefin Tuna (*Thunnus thynnus*) and Other Highly Migratory Fish in the Gulf of Mexico Under IPCC Climate Change Scenarios: A Study Using Regional Climate and Habitat Models" (10-BIOCLIM10-14). He is a member (eight years) of NASA's internationally renowned Biodiversity & Ecological Forecasting Science Team. Dr. Roffer is an active participant in several regional and state Integrated Ocean Observing System (IOOS) associations and is currently serving as an Executive Board Member on the Southeast Coastal Ocean Observing System Regional Association (SECOORA), serves on the Products and Services Committee in Gulf of Mexico Coastal Ocean Observing System Regional Association (GCOOS), and is an Institutional Host of the Florida COOS Consortium.

Security+Defence Plenary Session

Monday 24 September | 08:45 to 10:45 | Pentland Hall

08:45 to 08:50

Welcome and Introduction



David H. Titterton, Defence Science and Technology Lab., United Kingdom

2012 Symposium Chair



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

2012 Symposium Co-Chair

08:50 to 09:10

Fellowship Award Ceremony

Welcome by Fergus Ewing MSP, Minister for Energy, Enterprise and Tourism The Scottish Parliament, United Kingdom

09:10 to 09:55

The promise of HEL weapons



Mark W. Neice, Director, High Energy Laser Joint Technology Office, United States

The High Energy Laser Joint Technology Office (HEL-JTO) was established in 2000 for the purpose of developing and executing a comprehensive investment strategy for HEL science and technology that would underpin weapons development. The JTO is currently sponsoring 90 programs across industry, academia, and government agencies with a budget of approximately \$70 million. The competitively awarded programs are chosen to advance the current state of the art in HEL technology and fill technology gaps, thus providing a broad capability that can be harvested in acquisition programs by the military services.

Electrically-driven lasers are attracting new science and technology funding because their magazine is limited only by the electrical prime power, and they are not encumbered by hazardous chemicals and chemical exhaust. The solid state laser has the special challenge that its waste heat is generated at fairly high energy density and rejected at relatively low temperature. The JTO, working with the Army SMDC and AF Research Laboratory (AFRL) recently completed the development and demonstration of a 100kW Joint High Power Solid State Laser (JHPSSL) project. The JHPSSL laser is currently being installed at the Solid State Laser Test Experiment site at HELSTF in New Mexico. Following the successful JHPSSL project, the JTO working with the Army SMDC and AFRL initiated the Robust Electric Laser Initiative (RELI) with a focus toward achieving size, weight and power (SWaP) limitations necessary to operate and field HEL technology on the battlefield.

The changing nature of the battlefield, particularly as it relates to the war on terrorism, provides strong motivation to assess HEL weaponry in the near term. Precision strikes measured in inches instead of meters, limited collateral damage, asymmetric threats, and rapid response to dynamic targets are all elements of warfare that are gaining in importance. The laser's ability to deliver modest energy to a precise spot from a safe distance is an ideal match to these requirements, if the right power levels, size, reliability, etc. can be attained. The JTO expects to play a key role in accelerating development of the capabilities underlying these next-generation weapons.

Biography: Mark Neice is the Director, High Energy Laser Joint Technology Office. He supervises the research and development of solid-state, free electron & gas laser devices, beam control technologies, lethality analysis, and the modeling & simulation tools that create military applications of laser energy for combat operations. He retired as a Colonel in the US Air Force in October 2004, after 25 years of active duty service. Previously, Col Neice was the Chief of the Laser Division, Directed Energy Directorate, AF Research Lab. Past positions include director of space test operations, Det 12, AFSPC, and director of systems engineering & test operations for the Airborne Laser Program Office. A command pilot, Col Neice has time in the 4950th Test Wing, and as initial cadre of the Joint Stars test team. He has over 6000 flying hours, mainly in the C-135 and B-707 variants, and is a member of the Acquisition career force, certified in program management, test & evaluation, and systems planning, research, development & engineering.

09:55 to 10:40

Routes to Autonomy



Bill Bardo, Univ. College London, United Kingdom; Technical Director (retired), GEC, United Kingdom

The talk draws on the work undertaken for seven years by the Systems Engineering for Autonomous Systems Defence Technology Centre and will cover a number of research topics including decision making, sensor data interpretation, information management, communication, navigation, and power management. The goal of designing learning, adaptive systems to work with humans poses interesting problems for architectures.

Biography: Following PhD and postdoctoral theoretical and experimental investigations of the quantum mechanical behaviour of masers and lasers **Bill Bardo** worked at the Royal Signals and Radar Establishment, Malvern for nine years before joining GEC where he was for nineteen years the Technical Director of the GEC-Marconi group of companies followed by a period at BAE Systems. His current activities include Technical Director of the Systems Engineering for Autonomous Systems Defence Technology Centre (SEAS DTC) and educational activities on behalf of the Royal Academy of Engineering. He is a Fellow of the Royal Academy of Engineering and recently President of the Institute of Measurement and Control [2009-2012]. In 2000 he received the Society Gold Medal of the Royal Aeronautical Society for contributions to systems engineering research. He is Visiting Professor in Systems Engineering at University College London and was a founder member and President of the UK Chapter of the International Council of Systems Engineering.

10:40 to 10:50

Round table discussion preview: counteracting a turbulent atmosphere

This debate is open to all symposium attendees, and will cover topics such as

- How much and when can technology improve imagery?
- What doesn't work?
- Will computer developments change conclusions?
- What happens close to the ground, at different heights, and is airborne surveillance different?

Coffee Break: 10:50 to 11:15

Registration

Registration Hours

Monday 24 September	07:30 to 17:30
Tuesday 25 September	07:45 to 17:30
Wednesday 26 September	08:00 to 17:30
Thursday 27 September	08:30 to 16:00

Exhibition Registration

Tuesday 25 September	10:00 to 17:00
Wednesday 26 September	10:00 to 16:00

Admission is included with conference registration. Or register online to attend only the exhibition; exhibition-only registration is complimentary.

Attendee Services

Cashier Services

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

- *Registration Payments* - If you are paying by cash or cheque as part of your onsite registration, wish to add a short course, workshop, or special event requiring payment, or have questions regarding your registration please see the onsite cashier at the Cashier station at the registration desk.
- *Receipts* - Preregistered attendees who did not receive a receipt prior to the meeting may obtain a new copy of their registration receipt onsite at the Cashier's desk.
- *Badge Corrections* - Attendees who need a correction to their badge information onsite may do so at the Cashier's desk. Please have your badge removed from the badge holder, marked with your changes, and ready to hand to the attendant upon approaching the counter.
- *Attendance Certificate* - Please leave your details at the registration desk and the certificate will be emailed to you after the event.

Online Services

Internet

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

Business Services

SPIE Publications

A selection of SPIE publications will be available at the registration desk for browsing and ordering.

Message Center

Messages for attendees can be left by calling the Edinburgh International Conference Centre and asking for the SPIE Europe Conference and Registration Desk. Messages will be taken during registration hours Monday - Thursday. It is the attendees responsibility to check the message boards on a daily basis.

Speaker Check In Desk

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

Policies

Audio, Video, Digital Recording Policy

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

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

Laser Pointer Safety Information/Policy

SPIE supplies tested and safety approved laser pointers for all conference meeting rooms, and for short course rooms if instructors request one. For safety reasons, SPIE requests that presenters use our provided laser pointers available in each meeting room.

If using your personal laser pointer:

- Please have it tested at your facility to make sure it has <5 mW power output. Laser pointers in Class II and IIIa (<5 mW) are eye safe if power output is correct - but don't automatically trust the labeling. Commercially available laser pointers, red or green (or any color), could be incorrectly labeled as to their wavelength and power output.
- We require that you to come to the Audiovisual Desk onsite and test you pointer on our power meter. If the pointer fails the safe power level you may not use the pointer at the conference. You will be required to sign a waiver releasing SPIE of any liability for use of potentially non-safe laser pointers.
- Use of a personal laser pointer at an SPIE event represents user's acceptance of liability for use of a non-SPIE supplied laser pointer device. Misuse of any laser pointer could lead to eye damage.

Underage Persons on Exhibition Floor Policy

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

Unauthorized Solicitation Policy

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

Unsecured Items Policy

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



Exhibition Guide

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

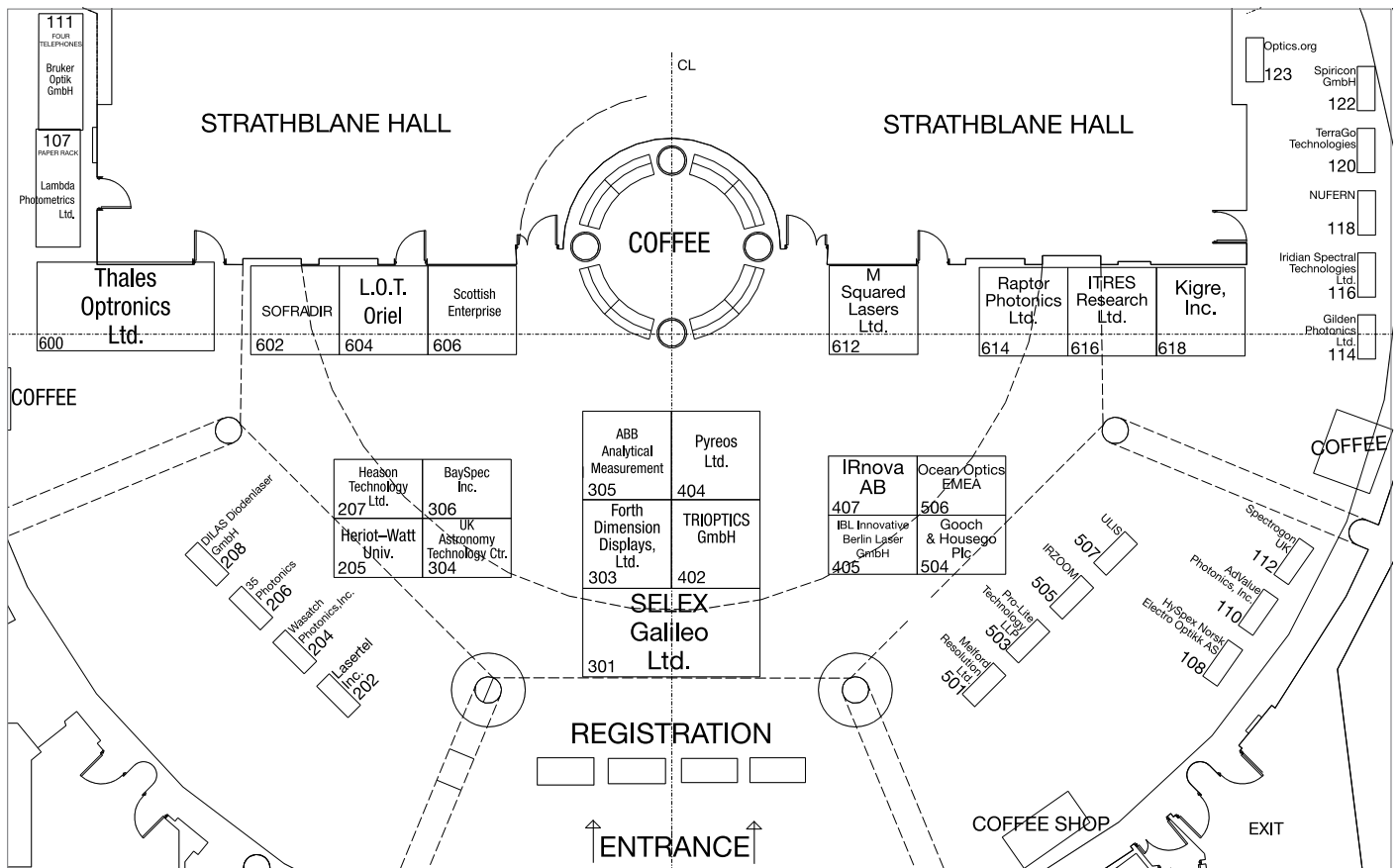
Exhibition Hours

Tuesday 25 September • 10.00 to 17.00

Wednesday 26 September • 10.00 to 16.00

Exhibitor List (Current as of 9/6/2012)

3S PHOTONICS S.A.S.	#206
ABB Analytical Measurement	#305
AdValue Photonics, Inc.	#110
BaySpec Inc.	#306
Bruker Optik GmbH	#111
Carl Hanser Verlag GmbH & Co. KG	#Lit 2
DILAS Diodenlaser GmbH	#208
Electro Optics Magazine	#Lit 1
Forth Dimension Displays, Ltd.	#303
Gilden Photonics Ltd.	#114
Gooch & Housego	#504
Heason Technology Ltd.	#207
Heriot-Watt Univ.	#205
HySpex, Norsk Elektro Optikk AS	#108
IBL Innovative Berlin Laser GmbH	#405
Imperx Inc.	#107
Iridian Spectral Technologies Ltd.	#116
IRnova AB	#407
IrZoom	#505
ITRES Research Ltd.	#616
Kigre, Inc.	#618
L.O.T. Oriel	#604
Lambda Photometrics, Ltd.	#107
Lasertel, Inc.	#202
M Squared Lasers Ltd.	#612
Melford Resolution Ltd.	#501
Nufern	#118
Ocean Optics EMEA	#506
optics.org	#123
Pro-Lite Technology Ltd	#503
Pyreos Ltd.	#404
Raptor Photonics Ltd.	#614
Scottish Enterprise	#606
SELEX Galileo	#301
SOFRADIR	#602
Spectrogon UK Ltd.	#112
Spiricon GmbH	#122
TerraGo Technologies	#120
Thales UK	#600
TRIOPTICS GmbH	#402
UK Astronomy Technology Centre	#304
ULIS	#507
Wasatch Photonics, Inc.	#204
Xenics	#604



3S PHOTONICS S.A.S.

#206

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33 296 04 2000; fax 33 296 04 2705
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Featured Product: Fiber lasers and amplifiers used in LIDAR applications such as temetry, ranging or scanning

3SP Group is an industry leading supplier of passive and active undersea and terrestrial optical components and modules. 3SP Group serves other high growth markets namely Industrial fiber laser, Sensor, Medical and Environmental markets. 3SP Group designs and manufactures high power fiber lasers and amplifiers at 1.0µm, 1.5µm and 2.0µm, pulsed or CW, with a lot of option such as PM, to cover telecom, industrial, scientific, medical and LIDAR applications. Contact: BRUNO LEFEVRE, Senior Director, Industrial, Security & Defence, blefevre@3spgroup.com

ABB Analytical Measurement

#305

SPIE Corporate Member

585 blvd Charest Est Ste 300, Québec, QC, G1K 9H4 Canada
418 877 2944; fax 418 877 2834
<http://www.abb.com/analytical>

Featured Product: Spectroradiometer, Hyperspectral Imager

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

AdValue Photonics, Inc.

#110

SPIE Corporate Member

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sales@bayspec.com; www.bayspec.com

Featured Product: Agility Raman Analyzer | out-of-lab flexibility without sacrificing performance. 532, 785, 1064

BaySpec, Inc., founded in 1999 with 100% manufacturing in the USA (San Jose, CA), is a vertically integrated spectral sensing company. The company designs, manufactures and markets advanced spectral engines, from OEM UV-VIS-NIR spectrometers to out-of-lab analyzers and Raman Bench-top and Microscope Instruments, for the biomedical, pharmaceuticals, chemical, food, semiconductor, homeland security, fiber sensing and the optical telecommunications industries. Over 35,000 units shipped worldwide. Contact: Eric Bergles, VP Sales & Marketing, sales@bayspec.com

Bruker Optik GmbH

#111

Rudolf-Plank-Str 27, Ettlingen, 76275 Germany
49 7243 504 2000; fax 49 7243 504 2050
info@brukeroptics.de; <http://www.brukeroptics.com>

Featured Product: HI 90 - Imaging Remote Sensing System

Bruker Optics, part of Bruker Corporation is the leading manufacturer and worldwide supplier of Fourier Transform Infrared, Near Infrared and Raman spectrometers for various industries and applications including Remote Sensing. The HI 90 represents a new high performance hyperspectral imaging system in Bruker's broad remote sensing product line, which also consists of the high-performance remote sensing spectrometer EM 27, the Scanning Infrared Gas Imaging System SIGIS 2 for homeland security.

PROMOTIONAL PARTNER

Carl Hanser Verlag GmbH & Co. KG

#Lit 2

Kolbergerstr 22, Muenchen, 81679 Germany
49 89 99830 0; fax 49 89 98480 9
info@hanser.de; <http://www.hanser.de>

DILAS Diodenlaser GmbH

#208

SPIE Corporate Member

Galileo Galilei-Str 10, Mainz-Hechtsheim, 55129 Germany
49 6131 9226 0; fax 49 6131 9226 257
sales@dilas.de; <http://www.dilas.de>

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

Electro Optics Magazine

#Lit 1

Purbeck Rd, Spectrum Bldg/Michael Young Ctr,
Cambridge, CB2 8PD United Kingdom
44 1223 211 170; fax 44 1223 211 107
sales.electro@europascience.com; <http://www.electrooptics.com>

Featured Product: Electro Optics is now available free worldwide as a digital edition

Electro Optics is the leading Europe-wide publication for the photonics industry, covering business, applications and technology. Supported by a regularly-updated website, www.electrooptics.com, and two monthly email newsletters, EONewline and EOProductline, it is the primary source of information for anyone looking to do business in photonics. Subscription is free to qualifying individuals. Subscribe now at www.electrooptics.com/subscribe. Contact: Warren Clark, Publishing Director, warren.clark@europascience.com; Jon Hunt, Advertising Sales Manager, jon.hunt@europascience.com

Forth Dimension Displays, Ltd.

#303

7 St Davids Dr, St Davids Business Park, Dalgety
Bay Dunfermline, KY11 9NB United Kingdom
44 1383 827 950; fax 44 1383 827 951
sales@forthdd.com; <http://www.forthdd.com>

Forth Dimension Displays is the World's leading high-resolution near-to-eye (NTE) microdisplay supplier. We provide a wide range of microdisplay solutions optimized for the best performance in demanding NTE applications. As the largest manufacturer of microdisplays for the U.S. military, Kopin's displays are inside thousands of deployed systems including night vision goggles, helmet-mounted displays, thermal weapon sights and other battlefield systems. Contact: David Vettese, Director of Sales EMEA, dvettese@forthdd.com; Jason Dingle, Director of Business Development, Jason_Dingle@kopin.com

Exhibitor Listings

Gilden Photonics Ltd. #114

9 South Ave, Unit 13 Telford Ct Clydebank Business Park, Glasgow, G81 2NR United Kingdom
44 141 952 9475; fax 44 141 952 9400
kevin.lynch@gildenphotonics.com; <http://www.gildenphotonics.com>

Gooch & Housego #504

SPIE Corporate Member
Dowlish Ford, Ilminster Somerset, TA19 0PF United Kingdom
44 1460 256440; fax 44 1460256441
sales@goochandhousego.com; www.goochandhousego.com
Gooch & Housego is a UK based world leader in its field, manufacturing advanced optical components & systems for laser / light / glass engineering applications in, aerospace & defence, telecommunications, semiconductors & microelectronics, and life sciences. Gooch & Housego specialise in custom build to print solutions and also have established COTS and military & space heritage for most of its varied product line capabilities.

Heason Technology Ltd. #207

Spring Copse Business Park, Motion Solutions Ctr, Slinfold West Sussex, RH13 0SZ United Kingdom
44 1403 755800; fax 44 1403 755810
sales@heason.com; <http://www.heason.com/>
With over 30 years of motion control experience, Heason Technology is a UK based world class supplier of Motion Control Products and Motorized System Solutions. Our broad range of standard products includes: Servo, stepper and piezo motors, precision ball and lead screws, zero backlash and planetary gearboxes, linear actuators, slides and rails, spherical roller joints, high precision linear and rotary stages through to electronic drives and motion controllers. With in-house design and assembly capabilities we offer a flexible, fast to market, solution based service ranging from sub-assemblies to full turn-key solutions for End Users and OEM's. Our key markets include Aerospace & Defence, Motor Sports, Printing, Micro-Machining, Semiconductor & Flat Panel, Life & Health Science, Photonics, Automotive, Research & Development, Manufacturing & Industrial Automations.

Heriot-Watt Univ. #205

Scott Russell Building, Edinburgh Scotland, EH14 4AS United Kingdom
44 131 451 3070; fax 44 131 451 3193
i.mcewan@hw.ac.uk; www.res.hw.ac.uk
Heriot-Watt University works with Industry to ensure our research is applicable to the real world. This research has applications in the defence sector in the areas of sensing, image and signal processing, robotics, laser processing and communications. With a commitment to ensuring intelligent knowledge transfer and comprehensive industry collaborations, our work with companies such as BAE Systems, Selex, QinetiQ and AWE ensures the UK remains at the forefront of defence technology research.

HySpex, Norsk Elektro Optikk AS #108

Solheimveien 62 A, Lørenskog, 1473 Norway
47 67974700; fax 47 67974900
hyspex@neo.no; <http://www.hyspex.no>
Featured Product: HySpex, hyperspectral cameras

HySpex are compact, high performance and versatile hyperspectral cameras for a multitude of applications, ranging from airborne to lab. and industrial use. Norsk Elektro Optikk AS (NEO) was established in 1985 as a privately owned research oriented company within the field of electro optics. NEO is the largest independent R&D organization in electro optics in Norway, and is an established manufacturer of advanced electro optical products for an international market. Contact: Hallvard Skjerpjng, Product Manager, HySpex, hallvard@neo.no

IBL Innovative Berlin Laser GmbH #405

Am Schlangengraben 16, Berlin, 13597 Germany
49 30 33774 0; fax 49 30 33774 477
contact@ib-laser.com; <http://www.ib-laser.com>

Imperx Inc. #107

SPIE Corporate Member
6421 Congress Ave Ste 204, Boca Raton, FL, 33487-2859 United States
561 989 0006; fax 561 989 0045
sales@imperx.com; <http://www.imperx.com>

Iridian Spectral Technologies Ltd. #116

SPIE Corporate Member
1200 Montreal Rd, M-50 Bldg, Ottawa, ON, K1A 0R6 Canada
613 741 4513 x266; fax 613 741 9986
inquiries@iridian.ca; <http://www.iridian.ca>
Iridian is the leader in optical filter solutions, providing more signal with less background. Covering wavelengths from the UV to LWIR, with sizes from <1mm to >300mm our reliable and durable dielectric filters, coatings (on glass or plastic), and beamsplitter cubes provide leading optical performance for:
-Sensing of environmental gases
-Spectroscopic id of biological components
-Night vision
-Hot/cold mirrors
-Secure free space optical communications
-Laser pointer protection glasses

IRnova AB #407

Electrum 236, Kista, 164 40 Sweden
46 8 793 66 00; fax 46 8 750 54 30
info@ir-nova.se; <http://www.ir-nova.se>
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 DDCAs (Detector Dewar Cooler Assembly); compact integral solutions for small size/weight applications, as well as long life split cooler DDCAs IRnova has a long track record with thousands of supplied detectors and well established manufacturing with high yield and capability.

COFFEE BREAK SPONSOR

IRZoom #505

120 Derry Rd, Hudson, NH, 03051 United States
603 889 2116; fax 603 889 2393
info@irzoom.com; www.IRZoom.com
We specialize in the design and manufacture of infrared zoom assemblies for our customers, who demand superior performance and reliability. Combining IRZoom catalog with our ability to offer tailored custom solutions makes us a natural partner for any optical challenge you may have. Now serving several customers around Europe, we invite you to visit us to explore our wide selection of MWIR, LWIR, SWIR and broadband zoom lenses that provide top performance and availability in a short lead time. Contact: Ziv Goren, Manager, Marketing oriented R&D, ziv.goren@irzoom-israel.com

ITRES Research Ltd. #616

3553 31 St NW Ste 110, Calgary, AB, T2L 2K7 Canada
403 250 9944; fax 403 250 9916
info@itres.com; <http://www.itres.com>

Kigre, Inc.**#618**

SPIE Corporate Member

100 Marshland Rd, Hilton Head Island, SC,
29926-2368 United States
843 681 5800; fax 843 681 4559
info@kigre.com; http://www.kigre.com

Kigre manufactures High Efficiency Side Pumped (HESP) Diode Pumped Solid State (DPSS) eye-safe lasers for use in laser surveillance, remote sensing, and chemical detection systems. The AO-1010 10Hz, 10mJ, 6ns, 1534nm laser is the latest example. These rugged, compact, conduction cooled lasers utilize athermal high-gain erbium glass gain materials that provide for reliable high power operation.

L.O.T. Oriel**#604**

1 Mole Business Park, Leatherhead Surrey, KT22 7BA
United Kingdom
44 1372 378822; fax 44 1372 375353
angela@lotoriel.c.uk; http://www.lot-oriel.co.uk

**Featured Product: Bobcat-320-Gated Uncooled InGaAs camera
Extremely short integration time for SWIR imaging- <80nsec**

LOT are a leading edge distributor of scientific instrumentation. We represent Xenics throughout UK and Europe. Xenics are the leading developer of innovative infrared detection cameras and solutions for a wide range of applications. Xenics advanced infrared cameras feature high quality and high performance in all major IR wavelength ranges for the most demanding research and military based applications. Contact: Shayz Ikram, Technical Director, shayz@lotoriel.co.uk

Lambda Photometrics, Ltd.**#107**

Batford Mill, Lambda House, Harpenden Herts, AL5
5BZ United Kingdom
44 1582 764334; fax 44 1582 712084
contact@lambdaphoto.co.uk; http://www.lambdaphoto.co.uk

Lambda Photometrics Ltd have 35 years experience of supplying systems and components to the defence industry. We can provide full sales and service support for our products from our base in Harpenden. We will be exhibiting our range of Electro-Optics Test & Simulation systems and Remote Sensing products from CI Systems along with our range of High Performance VIS & IR cameras and frame grabbers from Imperx.

Lasertel, Inc.**#202**

SPIE Corporate Member

7775 N Casa Grande Hwy, Tucson, AZ, 85743-9317
United States
1 877 844 1444; fax 1 520 744 5766
sales@lasertel.com; www.lasertel.com

Lasertel is a vertically-integrated high power semiconductor laser manufacturer. In-house epitaxy, wafer processing and packaging enables consistent delivery of a wide range of standard and customer-specific product solutions. Lasertel provides both edge emitting and vertical cavity surface emitting laser (VCSEL) diodes in single and array formats in multiple product configurations with peak wavelengths from 770nm to 1000nm, and peak powers from 200mW to several kW. Contact: Marie Grabe, Customer Service Rep, mgrabe@lasertel.com

M Squared Lasers Ltd.**#612**

1 Kelvin Campus, West of Scotland Science Park,
Glasgow, G20 0SP United Kingdom
44 141 945 0500; fax 44 141 945 0505
mail@m2lasers.com; http://www.m2lasers.com

M Squared Lasers, headquartered in Glasgow, has global reach across Europe, USA and Asia. M Squared Lasers' knowledge base spans the entire laser performance spectrum, from Continuous Wave to femtosecond systems, and from Deep Ultraviolet to terahertz wavelengths. M Squared is bringing world-leading laser technology to bear in "real-world" applications of lasers ranging from biomedical imaging and therapy, through frontier research, oil & gas sensing, advanced manufacturing to homeland security. Contact: David Armstrong, Marketing Director, mail@m2lasers.com

Melford Resolution Ltd.**#501**

Hall St, Thorpe House, Long Melford Suffolk, CO10
9HZ United Kingdom
44 1787 370190
jac@melres.co.uk; http://www.melres.co.uk

Featured Product: IT4 Imaging Through the 4 artefacts of sub-optimal surveillance (jitter, shimmer, contrast, noise)

Melford Resolution Ltd was started in 2002 as a specialist in low light level detection and imaging using Intensifiers and Electron Multiplication CCDs. An awareness of Lucky Imaging in astronomy and the ability to image with short integration times using EMCCDs led to development work being started to improve the quality of imagery through atmospheric turbulence for use in medium to long range surveillance in the Visible, SWIR and MWIR bands and to a close collaboration with Amber Optix Ltd. Contact: Tony Cochrane, Director, jac@melres.co.uk

Nufern**#118**

SPIE Corporate Member

7 Airport Park Rd, East Granby, CT, 06026-9523
United States
860 408 5000; fax 860 844 0210
info@nufern.com; http://www.nufern.com

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.

Ocean Optics EMEA**#506**

Geograaf 24, Duiven, 6921 EW Netherlands
31 26 319 0504; fax 31 26 319 0505
info@oceanoptics.eu; http://www.oceanoptics.eu

Featured Product: Spectrometer

Ocean Optics is the inventor of the world's first miniature spectrometer and a global leader in photonics for research, life sciences, quality assurance, education and OEM applications. Ocean Optics' extensive line of technologies includes spectrometers, chemical sensors, metrology instrumentation, optical fibres and thin films and optics. Recognized as an industry innovator, Ocean Optics has specified and delivered over 150,000 modular miniature spectrometers and systems throughout the world.

**optics.org****#123**

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

optics.org where the business of photonics meets the global photonics community! Excellent editorial quality, exclusive, must-read content makes optics.org essential for keeping up-to-date on news, market trends, new products, business analysis and financial updates. It also has a comprehensive buyers guide, international career centre and events info.

Exhibitor Listings

Pro-Lite Technology Ltd

#503

Innovation Centre, University Way, Cranfield, MK43
0BT United Kingdom
44 1234 436 110; fax 44 1234 436 111
info@pro-lite.co.uk; www.pro-lite.co.uk

Featured Product: Custom designed metal and diamond turned optics for defence, OEM and industrial applications

Pro-Lite Technology is a specialist photonics and light measurement company based in the UK. We supply custom designed metal and diamond turned optics for defence, OEM, industrial and instrumentation applications, lasers, laser modulators & Q-switches, crystals, detectors, laser safety equipment, laser power & energy meters, instruments for light measurement, instruments for measuring the optical properties of materials, opto-mechanics & motion control equipment and software tools. Contact: Steven Jones, Product Manager, steven.jones@pro-lite.co.uk; Ian Stansfield, Director, ian.stansfield@pro-lite.co.uk

Pyreos Ltd.

#404

W Mains Rd, Scottish Microelectronics Ctr The Kings
Bldgs, Edinburgh Scotland, EH9 3JF United Kingdom
44 131 650 7009; fax 44 131 650 7458
admin@pyreos.com; www.pyreos.com/

Featured Product: Low power, human body gesture sensor

Pyreos is a global supplier of infrared sensor products used in medical, industrial & consumer applications. Our unique MEMS thin film pyroelectric sensors enable innovation in security, surveillance, fire detection & building management. Our high performance IR sensor arrays & low power Gesture Sensor can detect & track the direction of the smallest human body movement at almost any speed, providing solutions for access control, queue management, people counting & motion tracking devices. Contact: Jeff Wright, CEO, jeff.wright@pyreos.com; Karolina Kolodziejczak, Sales & Finance, karolina@pyreos.com

Raptor Photonics Ltd.

#614

SPIE Corporate
Member

Willowbank Business Park, Larne, Northern Ireland,
BT40 2SF United Kingdom
02828270141

sales@raptorphotonics.com; www.raptorphotonics.com

Raptor Photonics Limited is a global leader and manufacturer of high performance, ultra low light digital & analogue cameras for the security, surveillance and defense markets. Raptor specializes in complete cameras and core engine solutions using CCD, EMCCD, Scientific CMOS and SWIR sensor technology. With a ISO 9001:2008 accreditation the company is headquartered in Larne, Northern Ireland.

Scottish Enterprise

#606

50 Waterloo St, Atrium Ct, Glasgow, G2 6HQ United
Kingdom
44 845 607 87 87

enquiries@scotent.co.uk; http://www.scottish-enterprise.com/

Featured Product: Scottish Enterprise provides a wide range of support mechanisms to help companies grow and develop.

Scottish Enterprise is Scotland's main economic development agency. Our role is to help identify and exploit the best opportunities for economic growth. We support ambitious Scottish companies to compete within the global marketplace and help build Scotland's globally competitive sectors. We also work with a range of partners in the public and private sectors to attract new investment to Scotland and to help create a world-class business environment. Contact: Ross White, Project Manager, ross.white@scotent.co.uk; Ian McMahon, Head of Aerospace, Defence & Marine, ian.mcmahon@scotent.co.uk

SELEX Galileo

#301

2 Crewe Road North, Crewe Toll, Edinburgh, EH5 2XS
United Kingdom

44 131 3322411; fax 44 131 3434011

sales.marketing@selexgalileo.com; http://www.selexgalileo.com

SELEX Galileo is a global leader in defence electronics and delivers mission critical systems for situational awareness, electronic warfare and surveillance. Across air, land and sea the company exploits its core skills in tactical ISTAR systems, sensors, defensive aids, tracking, targeting, navigation, command and control, and simulation. From design and development to through-life support we help our customers on their journey to mission success.

SOFRADIR

#602

43-47 rue Camille Pelletan, Chatenay-Malabry, 92290
France

33 1 41 13 45 30; fax 33 1 46 61 58 84

info@sofradir.com; http://www.sofradir.com/index.html

Sofradir is the No. 1 supplier in Europe for 2nd and 3rd generation IR MCT detectors and the No. 2 ranking worldwide. Sofradir and its subsidiaries, ULIS and Sofradir EC, employ 500 people. Sofradir's detectors have been integrated in battlefield proven equipments as well as in space observation missions. They include linear arrays and staring arrays, from ultracompact and low power Epsilon (384x288 15µm pitch) to JUPITER (1280x1024 15µm pitch). Contact: Marc Larive, Marketing Manager, marc.larive@sofradir.com

Spectrogon UK Ltd.

#112

Whitworth Rd, Glenrothes Fife, KY6 2TF United Kingdom
44 1592 770 000; fax 44 1592 770 040

sales.uk@spectrogon.com; http://www.spectrogon.com/

Featured Product: Interference filters, UV, VIS and IR Filters, optical coating, Holographic Diffraction Gratings.

Spectrogon is an independent manufacturer of optical components. Our two main product lines are Thin Film Optical Coatings and Holographic Diffraction Gratings. Our Thin Film Coating products line include a wide range of Optical Filters including BP, NB, BBP, LP, SP and Neutral Density Filters. We have a large stock of filters covering all the types listed above. Our range of Holographic Diffraction Gratings includes products designed for Pulse Compression, laser tuning and spectroscopy. Contact: Fred Ku-Mesu, Technical Sales, sales.uk@spectrogon.com

Spiricon GmbH

#122

An der Strusbek 60-62, Ahrensburg, 22926 Germany
49 41026671802; fax 49 41026671803

info@spiricon.com; www.spiricon.de

Spiricon GmbH provides laser beam profilers which cover the deep UV all the way to Thz wavelengths. Ultracal™, the renowned baseline correction algorithm has served manufacturing, medical, military and research industries worldwide for over 30 years.

TerraGo Technologies

#120

1600 Parkwood Cir Ste 300, Atlanta, GA, 30339
United States

44 678 3919700; fax 44 678 391 9701

info@terragotech.com; http://www.terragotech.com

TerraGo® Technologies is an innovative provider of widely adopted geospatial collaboration software solutions to produce, access, update and share geospatial information with anyone, anywhere.

Thales UK

#600

1 Linthouse Rd, Glasgow, G51 4BZ United Kingdom
44 41 440 4000; fax 44 41 440 4001
<http://www.thalesgroup.com/uk>

Thales is a defence, aerospace, security and transportation company, with 68,000 staff in 50 countries. Thales UK (8,000 staff) acts as prime contractor (eg Watchkeeper, FIST), systems integrator, technology and service provider. The Thales UK Optronics business is based in Scotland. It designs and manufactures world-class thermal imagers, laser rangefinders & designators, vehicle sighting systems, submarine periscopes & masts, and airborne reconnaissance systems, IRST and IR threat warning systems.



TRIOPTICS GmbH

#402

SPIE Corporate Member

Hafenstr 35-39, Wedel, 22880 Germany
49 4103 18006 0; fax 49 4103 180062 0
info@trioptics.com; <http://www.trioptics.com>

TRIOPTICS GmbH was established in 1992 in Wedel, Germany, as a manufacturer of optical test equipment. Since then, the company has focused on research and development of accurate and fully automated optical test instruments for industrial and scientific use. The development of innovative solutions in many fields of optical testing allowed TRIOPTICS to achieve a prominent presence on the international market. Our success is the result of the commitment and dedication of our employees.

UK Astronomy Technology Centre

#304

Blackford Hill, Edinburgh, EH9 3HJ United Kingdom
441316688100
info@atcinnovations.com; www.atcinnovations.com/

Featured Product: Compact, high-resolution IR spectrometer. Hyper-spectral systems for Earth Obs. Cubesat imagers.

The UK ATC is a UK government facility specialising in the design and construction of optical instrumentation. Working from the visible through to terahertz we produce imagers, spectrometers and hyper-spectral systems for Astronomy, Earth Observation and Security. We have a long track record of producing ground based, airborne and space based instruments, and of partnering with institutes and commercial organisations from around the globe. Contact: Andy Vick, Innovations Manager, Andy.Vick@stfc.ac.uk; Julian Dines, Head of Innovations, Julian.Dines@stfc.ac.uk

ULIS

#507

ZI des Iles Cordees, BP 27, Veurey Voroize, 38113 France
33 47 653 7470; fax 33 47 653 7480
ulis@ulis-ir.com; <http://www.ulis-ir.com>

Featured Product: ULIS specializes in the design and manufacture of high quality infrared imaging sensors.

ULIS, a subsidiary of Sofradir, specializes in the design and manufacture of high quality infrared imaging sensors for thermography, security, automotive and military applications. It enables makers of consumer electronics and infrared equipment to produce low weight, low power consumption and cost-effective thermal cameras in large volume. ULIS is ranked #3 in the world for Infrared (IR) sensors delivered. The company achieves large-scale production due to its amorphous silicon technology, Contact: Patrick LABORDE, Sales area Manager, p.laborde@ulis-ir.com; Ludovic BRASSE, Sales area Manager, l.brasse@ulis-ir.com

Wasatch Photonics, Inc.

#204

SPIE Corporate Member

1305 North 1000 West, Suite 120, Logan, UT, 84321 United States
+1 435 752 4301

info@wasatchphotonics.com; www.wasatchphotonics.com

Xenics

#604

SPIE Corporate Member

Ambachtenlaan 44, Leuven, 3001 Belgium
32 16 38 9900; fax 32 16 38 9901
sales@xenics.com; <http://www.xenics.com/>

Xenics is the leading developer of innovative infrared detection solutions for a wide range of applications. Xenics designs, manufactures and sells infrared detectors and cameras. In addition, Xenics delivers custom products according to the agreed specification and planning. As a European vendor with a worldwide service and distributor network, Xenics is strategically placed to serve global markets with highly innovative products drawing on a strong science and technology background.

Product Categories

Astronomy

SOFRADIR
UK Astronomy Technology Centre

Basic Research, Science

3S PHOTONICS S.A.S.
Bruker Optik GmbH
Melford Resolution Ltd.
Pro-Lite Technology Ltd

Biomedical, Medical Imaging, Health Care

3S PHOTONICS S.A.S.
BaySpec Inc.
Gooch & Housego
HySpex, Norsk Elektro Optikk AS
L.O.T. Oriol
Ocean Optics EMEA
Pro-Lite Technology Ltd

Chemical and Biological Analysis

ABB Analytical Measurement
Bruker Optik GmbH
L.O.T. Oriol
Ocean Optics EMEA
Spectrogon UK Ltd.
UK Astronomy Technology Centre

Communications & Networking

3S PHOTONICS S.A.S.

Defense, Security, Law Enforcement

3S PHOTONICS S.A.S.
Bruker Optik GmbH
DILAS Diodenlaser GmbH
Gooch & Housego
HySpex, Norsk Elektro Optikk AS
IrZoom
L.O.T. Oriol
Melford Resolution Ltd.
Ocean Optics EMEA
Pro-Lite Technology Ltd

SOFRADIR
Spectrogon UK Ltd.
UK Astronomy Technology Centre
ULIS

Earth Sciences, Environmental Monitoring, Climate

Bruker Optik GmbH
HySpex, Norsk Elektro Optikk AS
Pro-Lite Technology Ltd
SOFRADIR
Spectrogon UK Ltd.
UK Astronomy Technology Centre

Education and Training

HySpex, Norsk Elektro Optikk AS
Ocean Optics EMEA

Industrial Sensing and Measurement

ABB Analytical Measurement
Bruker Optik GmbH
HySpex, Norsk Elektro Optikk AS
Spectrogon UK Ltd.
UK Astronomy Technology Centre

Laser Industry

3S PHOTONICS S.A.S.
DILAS Diodenlaser GmbH
Pro-Lite Technology Ltd

Machine Vision, Factory Automation

Spectrogon UK Ltd.

Optical Design and Engineering

Gooch & Housego

Optics Manufacturing

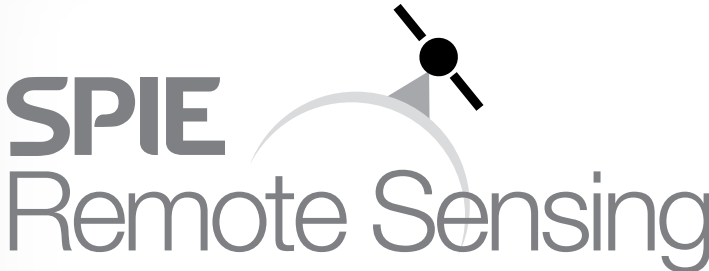
Gooch & Housego
IrZoom

Solar & Alternative Energy

L.O.T. Oriol
Ocean Optics EMEA

Structural and Infrastructure Sensing

BaySpec Inc.
Vehicle Sensing and Control
ULIS



SPIE Remote Sensing

Conference: 24–27 September 2012
Edinburgh International Conference Centre
Edinburgh, United Kingdom



Karin Stein
Fraunhofer-IOSB Institute of
Optronics, System Technologies
and Image Exploitation, Germany
2012 Symposium Chair



Charles R. Bostater
Marine-Environmental Optics Lab
& Remote Sensing Center, Florida
Institute of Technology, United
States)
2012 Symposium Co-Chair

Technical Conferences

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Technical Committee

Charles R. Bostater, Florida Institute of Technology (USA)
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Roland Meynart, European Space Research and Technology Ctr. (Netherlands)
Ulrich Michel, Univ. of Education Heidelberg (Germany)
Christopher M. U. Neale, Utah State Univ. (USA)

Steven P. Neeck, NASA Headquarters (USA)
Xavier Neyt, Royal Belgian Military Academy (Belgium)
Caroline Nichol, The Univ. of Edinburgh (United Kingdom)
Claudia Notarnicola, EURAC-Institute for Applied Remote Sensing (Italy)
Simonetta Paloscia, Istituto di Fisica Applicata Nello Carrara (Italy)
Gelsomina Pappalardo, Consiglio Nazionale delle Ricerche (Italy)
Richard H. Picard, ARCON Corp. (USA)
Nazzareno Pierdicca, Univ. degli Studi di Roma La Sapienza (Italy)
Antonio J. Plaza, Univ. de Extremadura (Spain)
Klaus Schäfer, Karlsruhe Institute of Technology (Germany)
Haruhisa Shimoda, Japan Aerospace Exploration Agency (Japan)
Upendra N. Singh, NASA Langley Research Ctr. (USA)
Karin Stein, Fraunhofer Institute of Optronics, System Technologies and Image Exploitation IOSB (Germany)

Remote Sensing for Agriculture, Ecosystems, and Hydrology

Conference Chairs: **Christopher M. U. Neale**, Utah State Univ. (USA); **Antonino Maltese**, Univ. degli Studi di Palermo (Italy); **Katja Richter**, Ludwig-Maximilians-Univ. München (Germany)

Programme Committee: **Guido D'Urso**, Univ. degli Studi di Napoli Federico II (Italy); **Goffredo La Loggia**, Univ. degli Studi di Palermo (Italy); **Francesco Vuolo**, Univ. für Bodenkultur Wien (Austria)

Monday 24 September

WELCOME AND INTRODUCTION

Room: Carrick 1&2 Mon 8:50 to 9:00

SESSION 1

Room: Carrick 1&2 Mon 9:00 to 10:00

Leaf Area Index

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

9:00: **Comparing results of a remote sensing driven interception-infiltration model for regional to global applications with ECMWF data**, Markus Tum, Erik Borg, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [8531-1]

9:20: **Comparison of leaf area index derived by statistical relationships and inverse radiation transport modeling using RapidEye data in the European alpine upland**, Sarah Asam, Julius-Maximilians-Univ. Würzburg (Germany); Doris Klein, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Stefan Dech, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) and Julius-Maximilians-Univ. Würzburg (Germany) [8531-2]

9:40: **Contribution of radar images for grassland management identification**, Pauline Dusseux, Xing Gong, Univ. Rennes 2 (France) and LIAMA (China); Thomas Corpetti, LIAMA (China); Laurence Hubert-Moy, Samuel Corgne, Univ. Rennes 2 (France) [8531-3]

Coffee Break Mon 10:00 to 10:30

SESSION 2

Room: Carrick 1&2 Mon 10:30 to 12:00

Hydrology

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

10:30: **Overview of USAID-World Bank-NASA collaboration to address water management issues in the MENA region** (*Invited Paper*), Shahid Habib, NASA Goddard Space Flight Ctr. (USA) [8531-4]

11:00: **Evaluating several satellite precipitation estimates and global ground-based dataset on Sicily (Italy)**, Francesco Lo Conti, Univ. degli Studi di Palermo (Italy); Kuo-Lin Hsu, University of California, Irvine (USA); Leonardo V. Noto, Univ. degli Studi di Palermo (Italy); Soroosh Sorooshian, University of California, Irvine (USA) [8531-5]

11:20: **Combined X- and L-band PSI analyses for assessment of land subsidence in Jakarta**, Fifamè N. Koudogbo, Javier Duro, Alain Arnaud, Altamira Information (Spain); Philippe Bally, ESA European Space Research Institute (Italy); Hasanuddin Z. Abidin, Institut Teknologi Bandung (Indonesia); Heri Andreas, Institute of Technology Bandung (Indonesia) [8531-94]

11:40: **Possibility of use of surface water resource in an arsenic contaminated region, Prubasthali I and II Block, Burdwan, West Bengal: a GIS approach**, Biplab Biswas, The Univ. of Burdwan (India) [8531-7]

Lunch Break Mon 12:00 to 13:20

SESSION 3

Room: Carrick 1&2 Mon 13:20 to 14:20

Water Bodies

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

13:20: **RapidEye water quality support service for the environmental agency in Brandenburg, Germany**, Sandra Reigber, RapidEye AG (Germany) [8531-8]

13:40: **Monitoring a river channel network at Salar de Uyuni using Landsat ETM+ images**, Seyed Enayat Hosseini Aria, Rick Donselaar, Roderik Lindenbergh, Roderik Koenders, Jiaguang Li, Anneleen Oyen, Technische Univ. Delft (Netherlands) [8531-9]

14:00: **An object-based method for mapping ephemeral river areas from WorldView-2 satellite data**, Benedetto Figorito, CNR-ISSIA (Italy); Eufemia Tarantino, Gabriella Balacco, Umberto Fratino, Politecnico di Bari (Italy) [8531-10]

SESSION 4

Room: Carrick 1&2 Mon 14:20 to 15:20

Thermal Remote Sensing

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

14:20: **Small-scale albedo-temperature relationship contrast with large-scale relations in Alaskan acidic tussock tundra**, Hella E. Ahrends, Univ. of Cologne (Germany); Steven Oberbauer, Florida International Univ. (USA); Werner Eugster, ETH Zürich (Switzerland) [8531-11]

14:40: **A sequential Bayesian procedure for integrating heterogeneous remotely sensed data for irrigation management**, Paolo Adesso, Roberto Conte, Maurizio Longo, Rocco Restaino, Gemine Vivone, Univ. degli Studi di Salerno (Italy) [8531-12]

15:00: **Frost monitoring of fruit tree with satellite data**, Jinlong Fan, Mingwei Zhang, China Meteorological Administration (China) [8531-13]

Coffee Break 15:20 to 16:00

Remote Sensing Plenary Session

Monday 24 September 16.00 to 17.45

For details, please see page 5

Tuesday 25 September

SESSION 5

Room: Carrick 1&2 Tue 9:00 to 10:00

Crop Monitoring I

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

9:00: **A comparison of two coupling methods for improving a sugarcane model's yield estimation**, Julien Morel, Jean-François Martiné, Agnès Bégué, Pierre Todoroff, CIRAD (France); Michel Petit, Institut de Recherche pour le Développement (France) [8531-14]

9:20: **Land cover change estimation for protected areas in Sub-Saharan Africa**, Zoltan Szantoi, Dario Simonetti, Andreas Brink, European Commission Joint Research Ctr. (Italy) [8531-16]

9:40: **Water productivity assessment by using MODIS images and agrometeorological data in the Petrolina municipality, Brazil**, Antônio Heriberto C. Teixeira, Embrapa Semiárido (Brazil); Morris Sherer-Warren, Agência Nacional de Águas (Brazil); Fernando B. T. Hernandez, Univ. Estadual Paulista (Brazil); Hélio L. Lopes, Univ. Federal do Vale do São Francisco (Brazil) [8531-17]

Coffee Break Tue 10:00 to 10:30

SESSION 6

Room: Carrick 1&2 Tue 10:30 to 12:00

Crop Monitoring II

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

10:30: **Hyperspectral imaging: do information content, land cover classification, sensitivity analysis and inverse modeling of spectral reflectance lead to the same set of optimal spectral bands? (Invited Paper)**, Massimo Menenti, A. Mousivand, Seyed Enayat Hosseini Aria, Ben Gorte, Technische Univ. Delft (Netherlands) [8531-18]

11:00: **Assessing irrigated cropland dynamics in central Asia between 2001 and 2010 based on MODIS time series**, Christopher Conrad, Fabian Loew, Moritz Rudloff, Gunther Schorcht, Julius-Maximilians-Univ. Würzburg (Germany) [8531-20]

11:20: **Caveats in calculating crop specific pixel purity for agricultural monitoring using MODIS time series**, Gregory Duveiller, European Commission Joint Research Ctr. (Italy) [8531-21]

11:40: **Plant optical properties for chlorophyll assessment**, Rumiana Kancheva, Georgi Georgiev, Denitsa Borisova, Space Research and Technology Institute (Bulgaria) [8531-22]

Lunch/Exhibition Break Tue 12:00 to 13:10

SESSION 7

Room: Carrick 1&2 Tue 13:10 to 16:20

Energy Balance

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

13:10: **Sources of uncertainty for eddy covariance measurements over heterogeneous surfaces in a semi-arid region: impact to remote sensing (Invited Paper)**, John H. Prueger, Agricultural Research Service (USA); Lawrence E. Hipps, Utah State Univ. (USA); Joe G. Alfieri, Agricultural Research Service (USA); Christopher M. U. Neale, Utah State Univ. (USA); William P. Kustas, U.S. Dept. of Agriculture (USA); Jerry L. Hatfield, Agricultural Research Service (USA) [8531-23]

13:40: **Basin-scale evapotranspiration assessment based on vegetation coefficients derived from thermal remote sensing**, Ana Andreu, Instituto de Investigación y Formación Agraria y Pesquera (Spain); Cristina Aguilar, Maria Jose Polo, Grupo de Dinámica Fluvial e Hidrología (Spain) and Instituto Interuniversitario de Investigación del Sistema Tierra en Andalucía (Spain); Elisabeth Carpintero, Grupo de Dinámica Fluvial e Hidrología (Spain); M. Patrocinio Gonzalez-Dugo, Instituto de Investigación y Formación Agraria y Pesquera (Spain) [8531-24]

14:00: **Evapotranspiration monitoring in a vineyard using satellite-based thermal remote sensing**, Maria Pat. González-Dugo, Instituto de Investigación y Formación Agraria y Pesquera (Spain); José González-Piqueras, Isidro Campos, Instituto de Desarrollo Regional de la Univ. de Castilla-La Mancha (Spain); Ana Andreu, Instituto de Investigación y Formación Agraria y Pesquera (Spain); Claudio Balbontín, Alfonso Calera, Instituto de Desarrollo Regional de la Univ. de Castilla-La Mancha (Spain) [8531-25]

14:20: **An integrated approach for high spatial resolution mapping of water and carbon fluxes using multi-sensor satellite data**, Carmelo Cammalleri, Martha C. Anderson, Agricultural Research Service (USA); Rasmus Houborg, European Commission Joint Research Ctr. (Italy); Feng Gao, William P. Kustas, Mitchell Schull, Agricultural Research Service (USA) [8531-26]

14:40: **Application of Landsat images for quantifying the energy balance under conditions of fast land use changes in the semi-arid region of Brazil**, Antônio Heriberto C. Teixeira, Embrapa Semiárido (Brazil); Fernando Braz T. Hernandez, Univ. Estadual Paulista (Brazil); Hélio L. Lopes, Univ. Federal do Vale do São Francisco (Brazil) [8531-27]

Coffee Break Tue 15:00 to 15:30

15:30: **Mapping evapotranspiration on vineyards: a comparison between Penman-Monteith and energy balance approaches for operational purposes (Invited Paper)**, Giuseppe Ciralo, Fulvio Capodici, Univ. degli Studi di Palermo (Italy); Guido D'Urso, Univ. degli Studi di Napoli Federico II (Italy); Goffredo La Loggia, Antonino Maltese, Univ. degli Studi di Palermo (Italy) [8531-28]

16:00: **Calibration of soil hydraulic parameter into a distributed hydrological model using satellite data of land surface temperature**, Chiara Corbari, Marco Mancini, Politecnico di Milano (Italy) [8531-29]

SESSION 8

Room: Carrick 1&2 Tue 16:20 to 17:20

Water Content

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

16:20: **Flood mapping of Yialias River catchment area in Cyprus using ALOS PALSAR radar images**, Dimitrios D Alexakis, Diofantos G Hadjimitsis, Athos Agapiou, Kyriacos Themistocleous, Cyprus Univ. of Technology (Cyprus); Adrianos Retalis, National Observatory of Athens (Greece); Silas Michaelides, Meteorological Service of Cyprus (Cyprus); Stelios Pashiardis, Filippos Tymvios, Cyprus Meteorological Service (Cyprus) [8531-30]

16:40: **Critical analysis of the thermal inertia approach to map soil water content under sparse vegetation and changeable sky conditions**, Antonino Maltese, Fulvio Capodici, Univ. degli Studi di Palermo (Italy); Chiara Corbari, Politecnico di Milano (Italy); Giuseppe Ciralo, Goffredo La Loggia, Univ. degli Studi di Palermo (Italy); José A. Sobrino, Univ. de València (Spain) [8531-31]

17:00: **From SAR-based flood mapping to water level data assimilation into hydraulic model**, Laura Giustarini, Patrick Matgen, Renaud Hostache, Jacques Dostert, Ctr. de Recherche Public - Gabriel Lippmann (Luxembourg) [8531-32]

Wednesday 26 September

SESSION 9

Room: Carrick 1&2 Wed 9:00 to 10:00

Vegetation

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

9:00: **Estimation of high density wetland biomass: combining regression model with vegetation index developed from Worldview-2 imagery**, Elhadi E. Adam, Onesimo Mutanga, Univ. of KwaZulu-Natal (South Africa) [8531-35]

9:20: **Changes in satellite-derived vegetation growth trend in China from 2002 to 2010**, Juan Gu, Lanzhou Univ. (China); Xin Li, Chunlin Huang, Cold and Arid Regions Environmental and Engineering Research Institute (China) [8531-37]

9:40: **Analysis of vegetation time-space dynamics and its effect factor in northwestern China**, Mingwei Zhang, Jinlong Fan, China Meteorological Administration (China); Hui Deng, Chinese Academy of Agricultural Sciences (China); Yanling Qiu, China Meteorological Administration (China) [8531-38]

Coffee Break Wed 10:00 to 10:30

SESSION 10

Room: Carrick 1&2 Wed 10:30 to 11:50

Snow

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

10:30: **Terrestrial photography as an alternative to satellite images to study snow cover evolution at hillslope scale**, Rafael Pimentel, Fluvial Dynamics and Hydrological Research Group. (Spain) and Interuniversity Institute for Research on the Earth System in Andalusia. University of Granada (Spain); Javier Herrero, Fluvial Dynamics and Hydrological Research Group (Spain) and Interuniversity Institute for the Research Earth System in Andalusia. University of Granada. (Spain); María José Polo, Fluvial Dynamics and Hydrological Research Group (Spain) and Interuniversity institute for Research on the Earth System in Andalusia. University of Cordoba (Spain) [8531-39]

10:50: **Estimation of snow-pack characteristics by means of polarimetric SAR data**, Antonio Reppucci, Xavier Banque, Starlab (Spain); Carlos Lopez-Martinez, Univ. Politec. de Catalunya (Spain); Yu Zhan, Alberto Alonso, Univ. Politec. de Catalunya (Spain) . . . [8531-40]

11:10: **Thermal remote sensing of snow cover to identify the extent of geothermal areas in Yellowstone National Park**, Christopher M. U. Neale, Saravanan Sivarajan, Ashish Masih, Utah State Univ. (USA); Cheryl Jaworowski, Henry Heasler, U.S. National Park Service (USA) [8531-41]

11:30: **Assimilation of MODIS snow cover fraction for improving snow variables estimation in west China**, Chunlin Huang, Cold and Arid Regions Environmental and Engineering Research Institute (China) [8531-42]

POSTERS—WEDNESDAY

Wed 17:40 to 19:10

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

An integrated information system for the acquisition, management and sharing of environmental data aimed to decision making,

Goffredo La Loggia, Elisa Arnone, Giuseppe Ciralo, Antonino Maltese, Leonardo Valerio Noto, Univ. degli Studi di Palermo (Italy); Umberto Pernice, TeRN - Technological District of the Basilicata (Italy) [8531-6]

Soil moisture retrieval by active/passive microwave remote sensing data, Shengli Wu, Lijuan Yang, CMA National Satellite Meteorological Ctr. (China) [8531-33]

The Leaf Area Index(LAI) monitoring and retrieval based on MODIS-NDVI, Hong-Wei Zhang, Key Lab. of Agrometeorological Safeguard and Applied Technique (China) and Xinxiang Meteorological Bureau (China); Huai-Liang Chen, Key Lab. of Agrometeorological Safeguard and Applied Technique (China); Guan-Hui Zhou, Xinxiang Meteorological Bureau (China) [8531-44]

Assessing the extent of conservation tillage across agricultural landscapes, Craig S. T. Daughtry, Peter C. Beeson, Sushil Milak, Bakhyt Akhmedov, Ali M. Sadeghi, E. Raymond Hunt Jr., Mark D. Tomer, Agricultural Research Service (USA) [8531-45]

Mixed pixel clumping index: definition, methodology, analysis and product generation, Qingmiao Ma, Jing Li, Institute of Remote Sensing Applications (China); Qiang Liu, Beijing Normal Univ. (China); Qinghuo Liu, Institute of Remote Sensing Applications (China) [8531-47]

Vegetation index retrieval by coupling optical and SAR images, Fulvio Capodici, Univ. degli Studi di Napoli Federico II (Italy); Giuseppe Ciralo, Univ. degli Studi di Palermo (Italy); Guido D'Urso, Antonino degli Studi di Napoli Federico II (Italy); Goffredo La Loggia, Antonino Maltese, Univ. degli Studi di Palermo (Italy) [8531-48]

A local post-retrieval tool for satellite precipitation estimates, Francesco Lo Conti, Antonia Incontrera, Leonardo V. Noto, Univ. degli Studi di Palermo (Italy) [8531-49]

NDVI sensitivity to the hydrological regime in semiarid mountainous environments, Pedro J. Gómez-Giráldez, Cristina Aguilar, María José Polo, Grupo de Dinámica Fluvial e Hidrología (Spain) [8531-50]

Monitoring of ice caps over Himalaya region using MODIS data, In-hwan Kim, Kyung-Soo Han, Kyoung-Jin Pi, Chang-Suk Lee, Min-Ji Lee, Pukyong National Univ. (Korea, Republic of) [8531-51]

Exploring vegetation photosynthetic light-use efficiency using hyperspectral data, Liangyun Liu, Quanjun Jiao, Dailiang Peng, Ctr. for Earth Observation and Digital Earth (China) [8531-52]

Spectrally-based quantification of plant heavy metal-induced stress, Rumiana Kancheva, Space Research and Technologies Institute (Bulgaria) and Bulgarian Academy of Sciences (Bulgaria); Georgi Georgiev, Space Research and Technologies Institute (Bulgaria); Denitsa Borisova, Institute for Space Research and Technologies (Bulgaria) [8531-53]

Testing automatic procedures to map rice area and detect phenological crop information exploiting time series analysis of remote sensed MODIS data, Giacinto Manfron, Alberto Crema, Mirco Boschetti, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy); Roberto Confalonieri, Univ. degli Studi di Milano (Italy) [8531-56]

Feasibility study and optimization of image tasking in the context of the European Union CAP CwRS, Blanka Vajsova, Pär Johan Åstrand, European Commission Joint Research Ctr. (Italy); Axel Oddone, e-GEOS S.p.A (Italy); George Ellis, European Space Imaging (EUSI) (Germany) [8531-57]

Crop classification at subfield level using RapidEye time series and graph theory algorithms, Gunther Schorcht, Fabian Löw, Sebastian Fritsch, Christopher Conrad, Julius-Maximilians-Univ. Würzburg (Germany) [8531-58]

Hyperspectral remote sensing applications for monitoring and stress detection in cultural plants: viral infections in tobacco plants, Dora D. Krezhova, Space Research and Technology Institute (Bulgaria); Nikolai M. Petrov, Svetla Maneva, Plant Protection Institute (Bulgaria) [8531-59]

Spatialization of instantaneous and daily mean net radiation and soil heat flux in the territory of Itaparica, northeast Brazil, Helio L. Lopes, Bernardo B da Silva, Univ. Federal de Pernambuco (Brazil); Antônio H. Teixeira, Embrapa Semiárido (Brazil); Luciano J. Accioly, Embrapa Solos / UEP Recife (Brazil) [8531-61]

Validation of AMSR-E soil moisture products in Xilinhot grassland, Shengli Wu, Jie Chen, CMA National Satellite Meteorological Ctr. (China) [8531-62]

Integration of drought monitoring with remote sensing into the global drought information system, Jinlong Fan, Mingwei Zhang, China Meteorological Administration (China) [8531-63]

- Estimation of cotton canopy water content by hyperspectral band combinations**, Qiuxiang Yi, Anming Bao, Qiang Wang, Xinjiang Institute of Ecology and Geography (China) [8531-64]
- Estimating canopy water content of wetland vegetation using hyperspectral and multispectral remote sensing data**, Yonghua Sun, Xiaojuan Li, Huili Gong, Capital Normal University (China); Ruiliang Pu, University of South Florida (USA) [8531-65]
- Soil moisture monitoring over a semiarid region using Envisat ASAR data**, Atef A Amriche, Ecole Nationale Supérieure Agronomique d'Alger (Algeria); Mokhtar Guerfi, Ecole Nationale Supérieure des Sciences de la Mer et de l'Aménagement du Littoral (Algeria) [8531-66]
- A re-examination of perpendicular drought indices over central and southwest Asia**, Alireza Shahabfar, Maximilian Reinwand, Christopher Conrad, Gunther Schorcht, Julius-Maximilians-Universität Würzburg (Germany) [8531-67]
- Wheat yield response to water deficit index using remote sensing**, Mohammed A. El-Shirbeny, Ayman F. Abou Hadid, Sayed M. Arafat, National Authority for Remote Sensing and Space Sciences (Egypt); Abd-Elghany M. El-Gindy, Ain Shams Univ. (Egypt) [8531-68]
- Remote sensing and mapping of vegetation community patches at Gudong Oil Field, China: a comparative use of SPOT 5 and ALOS data**, Qingsheng Liu, Dan Huang, Gaohuan Liu, Chong Huang, Institute of Geographic Sciences and Natural Resources Research, CAS (China) [8531-69]
- Analysis of regional vegetation changes with medium and high resolution imagery**, Javier Marcello, Francisco Eugenio, IOCAG - Univ. de Las Palmas de Gran Canaria (Spain); Anabella Medina, Univ. de Las Palmas de Gran Canaria (Spain) [8531-70]
- Climate changes and their impacts on Romanian mountain forests**, Maria A. Zoran, National Institute of Research and Development for Optoelectronics (Romania); Liviu-Florin Zoran, Polytechnical Univ. of Bucharest (Romania); Adrian I. Dida, Ministry of Agriculture and Rural Development (Romania); Mariana Rodica Dida, Univ. of Medicine and Pharmacy of Craiova (Romania) [8531-71]
- Laser-induced fluorescence monitoring of Chinese Longjing Tea**, Liang Mei, Zhejiang Univ. (China); Zuguang Guan, ALOMAR Observatory (Norway); Gabriel Somesfalean, Sune Svanberg, Lund Univ. (Sweden) [8531-72]
- Study of vegetation index selection and changing detection thresholds in land cover change detection assessment using change vector analysis**, Duy Ba Nguyen, Tran Thi H. Giang, Hanoi Univ. of Mining and Geology (Viet Nam); Tong Si Son, Space Technology Institute (Viet Nam) [8531-73]
- Mapping aquatic vegetation through remote sensing data: a comparison of different Vegetation Indices performances**, Paolo Villa, Istituto di Scienza e Tecnologie dell'Informazione "A.Faedo" (Italy) and Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy); Mariano Bresciani, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy); Federica Braga, Istituto di Scienze Marine (Italy); Rossano Bolpagni, Univ. degli Studi di Parma (Italy) [8531-74]
- Fuzzy logic for marine coastal zone land cover changes assessment**, Liviu-Florin V. I. Zoran, Polytechnical Univ. of Bucharest (Romania); Maria A. Zoran, National Institute of Research and Development for Optoelectronics (Romania) [8531-75]
- Planktothrix rubescens in freshwater reservoirs: remote sensing potentiality for mapping phycocyanin concentration**, Antonino Maltese, Fulvio Capodici, Giuseppe Ciruolo, Goffredo La Loggia, Univ. degli Studi di Palermo (Italy); Antonio Granata, Agenzia Regionale per la Protezione dell'Ambiente Siciliana (Italy) [8531-76]
- Investigation of the difference between thermal infrared canopy temperature and microwave effective canopy temperature over homogeneous corn canopy**, Jing Liu, Institute of Remote Sensing Applications (China) and Graduate School of Chinese Academy of Sciences (China); Qinhua Liu, Institute of Remote Sensing Applications (China); Hongzhang Ma, China Univ. of Petroleum (China); Le Yang, Institute of Remote Sensing Applications (China); Jingjing Peng, Institute of Remote Sensing Applications (China) and Graduate School of Chinese Academy of Sciences (China) [8531-77]
- Application of thermal infrared images in crop field studies of land-atmosphere interactions**, Hella E. Ahrends, Susanne Crewell, Univ. of Cologne (Germany); Anke Schickling, Uwe Rascher, Forschungszentrum Jülich GmbH (Germany) [8531-78]
- Thermal pollution assessment in nuclear power plant environment by satellite remote sensing data**, Maria A Zoran, Roxana S. Savastru, Dan M. Savastru, Sorin I. Miclos, Marina N. Tautan, Laurentiu V. Baschir, National Institute of Research and Development for Optoelectronics (Romania) [8531-79]
- Climatic driving forces in inter-annual variation of global FPAR**, Dailiang Peng, Liangyun Liu, Ctr. for Earth Observation and Digital Earth (China); Xiaohua Yang, Space Weather Center, Meteorological and Hydrographic Department (China); Bin Zhou, Hangzhou Normal Univ. (China) [8531-80]
- One method for HJ-1-A HSI and CCD data fusion**, Wencheng Xiong, Ministry of Environmental Protection (China) [8531-81]
- Evaluation of Heliosat-γ method of deriving solar irradiation from FY-2 images in China**, Mingwei Zhang, Jian Liu, Jinlong Fan, China Meteorological Administration (China); Hui Deng, Chinese Academy of Agricultural Sciences (China) [8531-82]
- The use of remotely sensed environmental data in the study of asthma disease**, Diogo Ayres-Sampaio, Ana C. Teodoro, Alberto Freitas, Neftali Sillero, Univ. do Porto (Portugal) [8531-83]
- Millimeter-wave and laser system for environmental monitoring**, Yaroslav V. Savenko, Fedir Repa, National Technical Univ. of Ukraine (Ukraine) [8531-84]
- Remote monitoring of road conditions during winter with NIR filter wheel system and a microwave radar**, Sumanth Kumar Pavuluri, Univ. of Glasgow (United Kingdom) and Heriot -Watt Univ. (United Kingdom); Alistair Gorman, Andy Harvey, Univ. of Glasgow (United Kingdom); Colin Irvine, Findlay Irvine Ltd. (United Kingdom) . [8531-85]
- Monitoring for "Agri-Environmental Measures Effectiveness", case study: Guadalquivir, Spain**, Hakki Emrah Erdogan, European Commission Joint Research Ctr. (Italy) [8531-86]
- Implementation of a General Linear Model using LiDAR derived explanatory variables: a case study in Scotland**, Silvia S. Flaherty, Univ. of Edinburgh (United Kingdom); Peter W. W. Lurz, Consultant (Germany); Genevieve Patenaude, Univ. of Edinburgh (United Kingdom) [8531-87]
- Using spectroscopy and satellite imagery to assess the total iron content of soils in the Judean Desert (Israel)**, Thomas Jarmer, University of Osnabrück (Germany) [8531-88]
- A validation of the GLASS albedo product with tower-based pyranometer measurements and Landsat-TM images**, Lizhao Wang, Beijing Normal Univ. (China) and State Key Lab. of Remote Sensing Science (China); Qiang Liu, State Key Lab. of Remote Sensing Science (China) and Beijing Normal Univ. (China) and Institute of Remote Sensing Applications (China) [8531-89]
- Mapping salinity stress in sugarcane fields with hyperspectral satellite imagery**, Saeid Hamzeh, Shahid Chamran Univ. of Ahvaz (Iran, Islamic Republic of); Abd Ali Naseri, Shahid Chamran University of Ahvaz (Iran, Islamic Republic of); Seyed Kazem Alavi Panah, University of Tehran (Iran, Islamic Republic of); Barat Mojaradi, Iran Univ. of Science and Technology (Iran, Islamic Republic of); Harm Bartholomeus, Martin Herold, Wageningen University (Netherlands) [8531-91]
- Using hyperspectral remote sensing data for the assessment of topsoil organic carbon from agricultural soils**, Bastian Siegmann, Thomas Jarmer, Univ. Osnabrück (Germany); Thomas Selige, Technische Univ. München (Germany); Holger Lilienthal, Nicole Richter, Julius Kühn-Institut (Germany); Bernhard Höfle, Ruprecht-Karls-Universität Heidelberg (Germany) [8531-92]
- Integration of optical and SAR remotely sensed data for monitoring wildfires in Mediterranean forests (stand-by oral presentation)**, Ramin Azar, Politecnico di Milano (Italy) and Istituto per il Rilevamento Elettromagnetico dell'Ambiente (France); Daniela Stroppiana, Mirco Boschetti, Antonio Pepe, Luca Paglia, Riccardo Lanari, Pietro Alessandro Brivio, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy) [8531-93]
- Assessment of soil degradation in the northern part of the Nile Delta, Egypt using remote sensing and GIS techniques**, Alaa H. El Nahry, National Authority for Remote Sensing and Space Sciences (Egypt) [8531-95]

Remote Sensing of the Ocean, Sea Ice, Coastal Waters, and Large Water Regions 2012

Conference Chairs: **Charles R. Bostater Jr.**, Florida Institute of Technology (USA); **Stelios P. Mertikas**, Technical Univ. of Crete (Greece); **Xavier Neyt**, Royal Belgian Military Academy (Belgium); **Caroline Nichol**, The Univ. of Edinburgh (United Kingdom); **Dave C. Cowley**, RCAHMS (United Kingdom); **Jean-Paul Bruyant**, ONERA (France)

Programme Committee: **Karine Caillault**, ONERA (France); **Eurico J. D'Sa**, Louisiana State Univ. (USA); **Alex Gilerson**, The City College of New York (USA); **Ana M. Martins**, Univ. dos Açores (Portugal); **Miguel Velez-Reyes**, Univ. de Puerto Rico Mayagüez (USA)

Wednesday 26 September

WELCOME AND INTRODUCTION

Room: Ochill 1&2 Wed 8:25 to 8:30

SESSION 1

Room: Ochill 1&2 Wed 8:30 to 10:00

Airborne Remote Sensing I

Session Chairs: **Jean-Paul Bruyant**, ONERA (France); **Caroline Nichol**, The Univ. of Edinburgh (United Kingdom)

8:30: **SYSIPHE: the new-generation airborne remote sensing system** (*Invited Paper*), Laurent Rousset-Rouviere, Christophe Coudrain, Sophie Fabre, Nicolas Guérineau, Jean-Paul Bruyant, ONERA (France); Ivar Baarstad, Trond Løke, Andrei Fridman, Soeren Blaaberg, Norsk Elektro Optikk AS (Norway) [8532-1]

9:00: **On the use of SAR interferometry to aid navigation of UAV**, Davide O. Nitti, GAP S.r.l. (Italy); Fabio Bovenga, Research National Council of Italy (Italy); Alberto Morea, Univ. degli Studi di Bari (Italy); Fabio M. Rana, Consiglio Nazionale delle Ricerche (Italy); Luciano Guerriero, GAP S.r.l. (Italy); Mario Greco, Gianpaolo Pinelli, IDS Ingegneria Dei Sistemi (Italy) [8532-9]

9:20: **CARVE-FTS Observations of Arctic CO₂, CH₄, and CO: overview of the instrument**, Fabien Dupont, François Tanguay, Gaetan P. Perron, Manyuan Li, ABB Analytical Measurement (Canada); Charles E. Miller, Steven J. Dinardo, Jet Propulsion Lab. (USA) [8532-3]

9:40: **Development of advanced miniaturized Dyson imaging spectrometer for Mars rover and small aircrafts**, Shen-En Qian, Michael Maszkiewicz, Allan Hollinger, Canadian Space Agency (Canada); Eric Martin, Canada Space Agency (Canada); Jean-Pierre Ardouin, Alexander Jouan, Defence Research and Development Canada, Valcartier (Canada) [8532-4]

Coffee Break Wed 10:00 to 10:30

SESSION 2

Room: Ochill 1&2 Wed 10:30 to 12:20

Airborne Remote Sensing II

Session Chairs: **Dave C. Cowley**, RCAHMS (United Kingdom); **Caroline Nichol**, The Univ. of Edinburgh (United Kingdom)

10:30: **In with the new, out with the old? Auto-extraction for remote sensing archaeology** (*Invited Paper*), Dave C. Cowley, RCAHMS (United Kingdom) [8532-5]

11:00: **Change detection of trees in urban areas using multi-temporal airborne lidar point clouds**, Wen Xiao, Faculty of Geo-Information Science and Earth Observation (ITC), University of Twente (Netherlands) and IGN, MATIS; Université Paris-Est (France); Sudan Xu, Sander Oude Elberink, George Vosselman, Faculty of Geo-Information Science and Earth Observation (ITC), University of Twente (Netherlands) [8532-6]

11:20: **Airborne remote sensing in littoral zones for subsurface feature detection**, Charles R. Bostater Jr., Jr., Florida Institute of Technology (USA) [8532-7]

11:40: **Architecture and methods for UAV-based heterogeneous sensor network applications**, Pedro Antonio, TEKEVER EMEA (Portugal); Davide Caputo, Alessandro Gandelli, Francesco Grimaccia, Marco Mussetta, Politecnico di Milano (Italy) [8532-8]

12:00: **Remote sensing spectrometric system for emergency response onboard of unmanned helicopter**, Doyno Petkov, Hristo Nikolov, Denitsa Borisova, Space Research and Technology Institute (Bulgaria) [8532-2]

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

SESSION 3

Room: Ochill 1&2 Wed 13:40 to 15:00

Hyperspectral Remote Sensing

Session Chairs: **Edel O'Connor**, Dublin City Univ. (Ireland); **Charles R. Bostater, Jr.**, Florida Institute of Technology (USA)

13:40: **Examination of coastal and inland water quality characteristics based on spectral signature analyses**, Christiana Papoutsas, Diofantos G. Hadjimitsis, Cyprus Univ. of Technology (Cyprus) [8532-10]

14:00: **Raman spectral analysis for remote measurement of water temperature**, Christopher P. Artlett, Helen M. Pask, Macquarie Univ. (Australia) [8532-11]

14:20: **Hyperspectral derivatives analysis for intertidal habitat mapping**, Natascha M. Oppelt, Florian Schulze, Christian-Albrechts-Universität zu Kiel (Germany); Inka Bartsch, Alfred-Wegener-Institut für Polar- und Meeresforschung (Germany) [8532-12]

14:40: **Resolution enhancement optimizations for data fusion of multiple satellite and airborne sensor data of the water surface**, Charles R. Bostater Jr., Florida Institute of Technology (USA) [8532-14]

Coffee Break Wed 15:00 to 15:30

SESSION 4

Room: Ochill 1&2 Wed 15:30 to 17:30

Remote Sensing Systems for Ocean Water

15:30: **Investigation Into the Use of Satellite Remote Sensing Data Products as Part of a Multi-Modal Marine Environmental Monitoring Network**, Edel O'Connor, Alan F. Smeaton, Noel E. O'Connor, Fiona Regan, Dublin City Univ. (Ireland) [8532-15]

15:50: **Mapping Arctic sea ice by fusing MODIS and AMSR-E data**, Yi Luo, Environment Canada (Canada) [8532-16]

16:10: **Accuracy assessment of water column correction based on bio-physical parameters for case 2 waters**, Tina Geisler, Natascha M. Oppelt, Christian-Albrechts-Universität zu Kiel (Germany); Thomas Heege, EOMAP GmbH & Co. KG (Germany) [8532-17]

16:30: **Algal fluorescence in coastal waters: impact and potential for retrieval from measurements of the underwater degree of polarization**, Samir Ahmed, Alberto Tonnizzo, Amir Ibrahim, Alex Gilerson, Barry M. Gross, Fred Moshary, The City College of New York (USA) [8532-18]

16:50: **Development of optical remote sensing technique for monitoring of water basins**, Victor I Titov, Victor Bakhanov, Stanislav Ermakov, Ivan Kapustin, Alexander Luchinin, Irina Sergievskaja, Emma Zuikova, Institute of Applied Physics (Russian Federation) .. [8532-19]

17:10: **Data fusion of significant wave height from HY-2A and other satellite altimeters**, Jingsong Yang, The Second Institute of Oceanography, SOA (China) [8532-20]

POSTERS—WEDNESDAY
Wed 17:40 to 19:10

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

Bifurcation and application advantages of generalized logistic equations on time scales, Wen Hu, Nanjing Changjiang Electronics Group Co., Ltd. (China); Yong Li, Nanjing Univ. of Aeronautics and Astronautics (China) [8532-29]

Estimating Qinghai Lake area with BP neural network based on genetic algorithm, Chengfeng Luo, You Haoyan, Chinese Academy of Surveying and Mapping (China); Liu Hui, Qinghai Geomatics Center (China); Liu Zhengjun, Chinese Academy of Surveying and Mapping (China) [8532-30]

The numerical analysis method of depolarizer for broadband imaging spectrometer, Fang Chen, Ming Li, Pengmei Xu, Beijing Institute of Space Mechanics and Electricity (China) [8532-31]

Vertical profiles of beam attenuation coefficients in East China Sea, Qiong Liu, The Second Institute of Oceanography, SOA (China) and Wuhan University (China); Delu Pan, Yan Bai, Xuan Zhang, Lin Zhang, Qiankun Zhu, The Second Institute of Oceanography, SOA (China) [8532-32]

Assessment of suspended particulate matter concentration retrieved by Aqua-MODIS and SeaWiFS in the East China Sea, Qianfang Cui, Nanjing Univ. of Science & Technology (China); Delu Pan, Yan Bai, Xianqiang He, Jianyu Chen, The Second Institute of Oceanography, SOA (China) [8532-33]

A method for retrieving the directional ocean wave spectra from synthetic aperture radar image, Lin Ren, Jingsong Yang, Peng Chen, The Second Institute of Oceanography, SOA (China) . [8532-34]

Speckle noise reduction in SAR images ship detection, Ji Yuan, Bin Wu, Yuan Yuan, Qingqing Huang, Jingbo Chen, Institute of Remote Sensing Applications (China) [8532-35]

Remote sensing and buoy based effect analysis of typhoon on hypoxia off the Changjiang (Yangtze) Estuary, Jianyu Chen, Xiaobo Ni, Zhihua Mao, Yifan Wang, Lijin Liang, Fang Gong, The Second Institute of Oceanography, SOA (China) [8532-36]

Radar backscattering from breaking water waves: wave tank study, Stanislav A. Ermakov, Ivan Kapustin, Irina Sergievskaya, Institute of Applied Physics (Russian Federation) [8532-37]

The analysis of bloom areas drifted to the northwest caused by three hurricanes in the East China Sea, Dongyang Fu, Delu Pan, The Second Institute of Oceanography, SOA (China) [8532-38]

Seasonal and interannual variability of sea surface wind over the China seas and its adjacent ocean from QuikSCAT and ASCAT data during 2000-2011, Xiaoyan Chen, The Second Institute of Oceanography, SOA (China) and Zhejiang Univ. (China); Delu Pan, Xianqiang He, Yan Bai, Yifan Wang, Qiankun Zhu, The Second Institute of Oceanography, SOA (China) [8532-39]

Detecting the red tide based on remote sensing data in optically complex East China Sea, Xiaohui Xu, South China Sea Institute of Oceanology, Chinese Academy of Science (China) and The Second Institute of Oceanography, SOA (China) and University of Chinese Academy of Sciences (China); Delu Pan, Zhihua Mao, Bangyi Tao, Qiong Liu, The Second Institute of Oceanography, SOA (China) [8532-40]

Satellite study of the influence of coastal upwelling on a red tide in the Zhejiang Coastal Waters, Xiulin Lou, Aiqin Shi, Qingmei Xiao, Peng Chen, Lin Ren, The Second Institute of Oceanography, SOA (China) [8532-41]

Study on the temporal-spatial change of aerosol on the yellow sea using MODIS products, Hongchun Peng, Huaihai Institute of Technology (China) [8532-42]

Study on aerosol changes in the Yellow Sea based on MODIS products, Hongchun Peng, Haiying Li, Huaihai Institute of Technology (China); Chunlin Huang, Cold and Arid Regions Environmental and Engineering Research Institute, (China); Hao Gao, Huaihai Institute of Technology (China) [8532-43]

Surface wind speed retrieval from SAR imagery and its contribution to typhoon track forecasting in west Pacific Ocean, Hui Shen, Institute of Oceanology (China) [8532-45]

Arabian Sea cyclone: structure analysis using satellite data, Lubna Rafiq, Pakistan Space and Upper Atmosphere Research Commission (Pakistan) [8532-46]

Acquisition of airborne imagery in support of Deepwater Horizon oil spill recovery assessments, Charles R. Bostater Jr. Jr., Heather Frystacky, Florian A. Levoux, Florida Institute of Technology (USA); Frank E. Muller-Karger, Univ. of South Florida (USA) [8532-47]

Coastal Zone Mapping and Imaging Lidar (CZMIL): First Flights and System Validation, Viktor I Feygels, Joong Yong Park, Jennifer Aitken, Minsu Kim, Andy Payment, Vinod Ramnath, Optech, Inc. (USA) [8532-48]

Contrast based band selection for optimized weathered oil detection in hyperspectral images, Florian A. Levoux, Charles R. Bostater Jr. Jr., Florida Institute of Technology (USA); Xavier Neyt, Royal Belgian Military Academy (Belgium) [8532-50]

Thursday 27 September

SESSION 5

Room: Ochill 1&2 Thu 8:40 to 10:00

Radar Remote Sensing of Water Surfaces

Session Chairs: **Xavier Neyt**, Royal Belgian Military Academy (Belgium); **Stelios P. Mertikas**, Technical Univ. of Crete (Greece)

8:40: **Investigation of fine spatial structure of currents and submesoscale eddies based on satellite radar data and concurrent acoustic measurements**, Olga Y. Lavrova, Space Research Institute (Russian Federation); Andrey N. Serebryany, Space Research Institute (Russian Federation) and Andreev Acoustics Institute (Russian Federation); Tatiana Yu Bocharova, Marina I. Mityagina, Space Research Institute (Russian Federation) . . [8532-21]

9:00: **Remote sensing of oil films on the water surface using radar**, Stanislav A. Ermakov, Institute of Applied Physics (Russian Federation); Jose da Silva, Univ. do Porto (Portugal); Ivan Kapustin, Irina Sergievskaya, Institute of Applied Physics (Russian Federation) [8532-22]

9:20: **Study on wind wave variability by inhomogeneous currents in the closed seas**, Victor V. Bakhanov, Nikolai A. Bogatov, Aleksei V. Ermoshkin, Institute of Applied Physics (Russian Federation); Andrei Ivanov, P.P. Shirshov Institute of Oceanology of RAS (Russian Federation); Olga N. Kemarskaya, Victor I. Titov, Institute of Applied Physics (Russian Federation) [8532-23]

9:40: **A method for cross-comparison of scatterometer data using natural distributed targets: application to ERS-1 and ERS-2 data during the tandem mission**, Anis El Younda, Xavier Neyt, Royal Belgian Military Academy (Belgium) [8532-24]

Coffee Break Thu 10:00 to 10:30

SESSION 6

Room: Ochill 1&2 Thu 10:30 to 12:10

Optical Remote Sensing of Water Surfaces

Session Chairs: **Alexander G. Luchinin**,
Institute of Applied Physics (Russian Federation);
Sam Ahmed, The City College of New York (USA)

10:30: **Oil films detection on the sea surface using an optical remote sensing method**, Irina Sergievskaya, Stanislav A. Ermakov, Institute of Applied Physics (Russian Federation) [8532-25]

10:50: **Direct problems of aerospace optical remote sensing of the ocean: Monte Carlo modeling**, Boris A. Kargin, Arseny B. Kargin, Sergei M. Prigarin, Institute of Computational Mathematics and Mathematical Geophysics (Russian Federation) [8532-26]

11:10: **Complex modulation of airborne lidar light pulse: the effects of rough sea surface and multiple scattering**, Alexander G Luchinin, Institute of Applied Physics (Russian Federation) . . [8532-27]

11:30: **Spatial structure of the sea level seasonal cycle within the Gulf of Cadiz**, Irene M. Laiz, Begoña Tejedor, Jesús Gómez-Enri, Alazne Aboitiz, Pilar Villares, Univ. de Cádiz (Spain) [8532-28]

11:50: **Coupling ocean models and satellite derived optical fields to estimate LIDAR penetration and detection performance**, Sergio deRada, Sherwin Ladner, Robert A. Arnone, U.S. Naval Research Lab. (USA) [8532-49]

ADJOURN

Room: Ochill 1&2 Thu 12:10

Sensors, Systems, and Next-Generation Satellites

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

Programme Committee: **Olivier Saint-Pé**, EADS Astrium (France); **Xiaoxiong Xiong**, NASA Goddard Space Flight Ctr. (USA)

Monday 24 September

WELCOME AND INTRODUCTION

Room: Kylsyth Mon 9:00 to 9:10

SESSION 1

Room: Kylsyth Mon 9:10 to 10:00

European Missions

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

9:10: **Status of ESA Science Earth Observation missions: The Explorers** (*Invited Paper*), Roland Meynart, European Space Research and Technology Ctr. (Netherlands) [8533-1]

9:40: **Status of ESA Application Earth Observation missions: meteorology and GMES**, Roland Meynart, European Space Research and Technology Ctr. (Netherlands) [8533-2]

Coffee Break Mon 10:00 to 10:30

SESSION 2

Room: Kylsyth Mon 10:30 to 12:00

Japanese Missions

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

10:30: **Japanese Earth observation programs** (*Invited Paper*), Haruhisa Shimoda, Tokai Univ. (Japan) [8533-3]

11:00: **Onboard calibration of the ASTER instrument over twelve years**, Fumihiro Sakuma, Masakuni Kikuchi, Japan Resources Observation System and Space Utilization Organization (Japan); Hitomi Inada, NEC TOSHIBA Space Systems, Ltd. (Japan); Shigeki Akagi, Mitsubishi Electric Corp. (Japan); Hidehiko Ono, Fujitsu Ltd. (Japan) [8533-4]

11:20: **The current status of GOSAT and the concept of GOSAT-2**, Masakatsu Nakajima, Akihiko Kuze, Hiroshi Suto, Japan Aerospace Exploration Agency (Japan) [8533-5]

11:40: **Status of AMSR2 on GCOM-W1**, Marehito Kasahara, Keiji Imaoka, Misako Kachi, Japan Aerospace Exploration Agency (Japan); Hideyuki Fujii, The University of Tokyo (Japan); Kazuhiro Naoki, Takashi Maeda, Norimasa Ito, Keizo Nakagawa, Japan Aerospace Exploration Agency (Japan); Taikan Oki, The Univ. of Tokyo (Japan) [8533-6]

Lunch Break Mon 12:00 to 13:20

SESSION 3

Room: Kylsyth Mon 13:20 to 15:30

Japanese Missions II

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

13:20: **LAND VALIDATION for GCOM-C1/SGLI using UVA** (*Invited Paper*), Yoshiaki Honda, Chiba Univ. (Japan) [8533-7]

13:50: **Status of proto-flight model of the dual-frequency precipitation radar for the global precipitation measurement**, Takeshi Miura, Masahiro Kojima, Kinji Furukawa, Yasutoshi Hyakusoku, Takayuki Ishikiri, Hiroki Kai, Japan Aerospace Exploration Agency (Japan); Toshio Iguchi, Hiroshi Hanado, Katsuhiro Nakagawa, National Institute of Information and Communications Technology (Japan) [8533-8]

14:10: **ALOS-2 development status and draft acquisition strategy**, Shinichi Suzuki, Yukihiko Kankaku, Yuji Osawa, Japan Aerospace Exploration Agency (Japan) [8533-9]

14:30: **A conceptual design of PRISM-2 for Advanced Land Observing Satellite-3(ALOS-3)**, Hiroko Imai, Haruyoshi Katayama, Masakazu Sagisaka, Yasushi Hatooka, Shinichi Suzuki, Yuji Osawa, Masuo Takahashi, Takeo Tadono, Japan Aerospace Exploration Agency (Japan) [8533-10]

14:50: **Effect of temperature on onboard calibration reference material for spectral response functions retrieval of the hyperspectral sensor of HISUI-SWIR spectral case**, Kenji Tatsumi, Jun Tanii, Hisashi Harada, Toneo Kawanishi, Fumihiro Sakuma, Japan Space Systems (Japan); Hitomi Inada, Takahiro Kawashima, NEC TOSHIBA Space Systems, Ltd. (Japan); Akira Iwasaki, The Univ. of Tokyo (Japan) [8533-11]

15:10: **EarthCARE/CPR design and verification status**, Kazuyuki Okada, Toshiyoshi Kimura, Hiroataka Nakatsuka, Yoshihiro Seki, Gaku Kadosaki, Jun Yamaguchi, Japan Aerospace Exploration Agency (Japan); Nobuhiro Takahashi, Yuichi Ohno, Hiroaki Horie, Kenji Sato, National Institute of Information and Communications Technology (Japan) [8533-12]

Coffee Break 15:30 to 16:00

Tuesday 25 September

SESSION 4

Room: Kylsyth Tue 8:40 to 10:30

US Missions

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

8:40: **NASA Earth Science Flight Program** (*Invited Paper*), Steven P. Neeck, Stephen M. Volz, NASA Headquarters (USA) [8533-13]

9:10: **Global Precipitation Measurement (GPM) L-18**, Steven P. Neeck, Ramesh K. Kakar, NASA Headquarters (USA); Ardeshir A. Azarbarzin, Arthur Y. Hou, NASA Goddard Space Flight Ctr. (USA) [8533-14]

9:30: **Surface Water and Ocean Topography (SWOT) Mission**, Steven P. Neeck, Eric J. Lindstrom, NASA Headquarters (USA); Parag V. Vaze, Lee-Lueng Fu, Jet Propulsion Lab. (USA) [8533-15]

9:50: **JPSS instrument transition to NASA and development status**, Chris W. Brann, NASA Goddard Space Flight Ctr. (USA) [8533-16]

10:10: **Build status of VIIRS, the Visible Imager Radiometer Suite on the Joint Polar Orbiting Satellite System (JPSS)**, Phillip A. Driggers, Bastion Technologies, Inc. (USA) [8533-17]

Coffee Break Tue 10:30 to 11:00

SESSION 5

Room: Kylsyth Tue 11:00 to 12:00

Missions and Sensing I

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

11:00: **Accomplishments from 9.5 years of AMSR-E observations**, Elena S Lobl, The Univ. of Alabama in Huntsville (USA) [8533-18]

11:20: **Simulation of the performance and image quality characteristics of the Landsat OLI and TIRS sensors using DIRSIG**, John R. Schott, Aaron Gerace, Rochester Institute of Technology (USA); Matthew Montanaro, Sigma Space Corp. (USA) [8533-19]

11:40: **Innovative multi-angle imaging spectrometer and analysis approach to remotely quantify ecosystem-atmosphere carbon and water exchange**, Forrest G. Hall, NASA Goddard Space Flight Ctr. (USA); Thomas Hilker, Oregon State Univ. (USA); Compton J. Tucker, James C. Smith, Catherine T. Marx, NASA Goddard Space Flight Ctr. (USA) [8533-20]

Lunch/Exhibition Break Tue 12:00 to 13:10

SESSION 6

Room: Kylsyth Tue 13:10 to 15:10

Missions and Sensing II

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

13:10: **Technology development for the meteorological multispectral imager of the Canadian Polar Communications and Weather Mission**, Louis M. Moreau, Jacques Giroux, Francois Tanguay, Frederic Girard, Patrick Dubois, ABB Analytical Measurement (Canada) [8533-22]

13:30: **PCW/PHEOS-WCA: Quasi-geostationary Arctic measurements for weather, climate and air quality from highly eccentric orbits**, Richard L Lachance, ABB Analytical Measurement (Canada); Jack C. McConnell, Tom McElroy, York Univ. (Canada); Norm O'Neill, Univ. de Sherbrooke (Canada); Ray Nassar, Environment Canada (Canada); Henry Buijs, ABB Analytical Measurement (Canada); Peyman Rahnama, COM DEV International Ltd. (Canada); Kaley Walker, Univ. of Toronto (Canada); Randall Martin, Dalhousie Univ. (Canada); Chris Sioris, York Univ. (Canada); Louis Garand, Alexander Trichtchenko, Environment Canada (Canada); Martin Bergeron, Canadian Space Agency (Canada) [8533-21]

13:50: **Novel pole-sitter mission concepts for continuous polar remote sensing**, Matteo Ceriotti, Jeannette Heiligers, Colin R. McInnes, Univ. of Strathclyde (United Kingdom) [8533-23]

14:10: **A novel design concept for space-based polar remote sensing**, Malcolm Macdonald, Pamela Anderson, Univ. of Strathclyde (United Kingdom); Carl Warren, EADS Astrium Ltd. (United Kingdom) [8533-24]

14:30: **Invitation to a Forum - Architecting operational 'Next Generation' earth monitoring satellites based on best modeling, existing sensor capabilities, with constellation efficiencies to secure trusted datasets for the next 20 years**, Douglas B Helmuth, Lockheed Martin Corp. (USA) [8533-25]

14:50: **Design tradeoffs for a high-resolution, wide-field, pushbroom camera for a small-sat Earth observation mission**, Denis P. Naughton, Sierra Imaging Systems (Australia) and Selex Galileo S.p.A. (Italy); Demetrio Labate, Selex Galileo S.p.A (Italy) [8533-26]

Coffee Break Tue 15:10 to 15:40

SESSION 7

Room: Kylsyth Tue 15:40 to 18:00

Mission and Sensing III

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

15:40: **PERSIST: prototype Earth observing system using image slicer mirrors**, David Lee, UK Astronomy Technology Ctr. (United Kingdom); James M. Barlow, The Univ. of Edinburgh (United Kingdom); Andy Vick, Peter Hastings, David Atkinson, Sandi Wilson, Martin Black, UK Astronomy Technology Ctr. (United Kingdom); Paul Palmer, The Univ. of Edinburgh (United Kingdom) [8533-27]

16:00: **Science capability of the NOAA/NESDIS/STAR Algorithm and Data Products (ADP) Program: Suomi-NPP Satellite**, Laurie A. Rokke, National Oceanic and Atmospheric Administration (USA) [8533-28]

16:20: **Development plan of next generation geostationary ocean color imager**, Seongick Cho, Korea Ocean Research & Development Institute (Korea, Republic of); Ki-Beom Ahn, Yonsei Univ. (Korea, Republic of); Eunsong Oh, Yu-Hwan Ahn, Youngje Park, Joo-Hyung Ryu, Korea Ocean Research & Development Institute (Korea, Republic of) [8533-29]

16:40: **DubaiSat-2 mission overview**, Ali AlSuwaidi, Emirates Institution for Advanced Science and Technology (United Arab Emirates) [8533-30]

17:00: **Research of the multispectral camera of ZY-3 satellite**, Bin Fan, Xiaohong Zhang, Weijun Cai, Ying Huang, Wenchun Jiao, Beijing Institute of Space Mechanics and Electricity (China) [8533-31]

17:20: **An effective unloading opto-structure design of multispectral camera on ZY-3**, Cai Weijun, Fan Bin, Fengqin Zhang, Qinglin Li, Wei Xin, Beijing Institute of Space Mechanics and Electricity (China) [8533-32]

17:40: **Enhancing the temperature sensitivity of Bragg gratings using different sensor heads**, Parne Saidi Reddy, National Institute of Technology, Goa (India); R. L. N. Sai Prasad, National Institute of Technology, Warangal (India); G. R. C. Reddy, National Institute of Technology, Goa (India) [8533-33]

Wednesday 26 September

SESSION 8

Room: Kylsyth Wed 13:10 to 15:00

Focal Plane Assemblies

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

13:10: **CMOS smart sensor developed for lightning detection from GEO orbit (Invited Paper)**, Michel Bréart de Boisanger, Sai prasad Guiry, Franck Larnaudie, Olivier Saint-Pé, Michel Tulet, EADS Astrium (France); Sébastien Rolando, Vincent Goiffon, Franck Corbiere, Pierre Magnan, Institut Supérieur de l'Aéronautique et de l'Espace (France); Bruno Leone, European Space Research and Technology Ctr. (Netherlands) [8533-34]

13:40: **InGaAs sensors inVGA format at 15 µm pitch for space applications**, Anne Rouvie, Jean Decobert, Eric Costard, Mauricio Pires, Jean-Luc Reverchon, Alcatel-Thales III-V Lab. (France); Bogdan Arion, Yang Ni, Vincent Noguier, New Imaging Technologies SAS (France) [8533-35]

14:00: **New Sofradir VISIR-SWIR large format detector for next generation space missions**, Bruno Fièque, Bertrand Terrier, Philippe Churier, Nicolas Jamin, Patricia Pidancier, Laurent Baud, SOFRADIR (France) [8533-36]

14:20: **Overview of p-on-n HgCdTe IRFPAs at DEFIR**, Laurent R. Mollard, Guillaume Bourgeois, Olivier Gravrand, Nicolas Baier, Gérard Destéfanis, CEA-LETI (France); Alexandre Kerlain, Alain Manissadjian, SOFRADIR (France) [8533-37]

14:40: **Very long wave HgCdTe p-on-n FPAs for space applications**, Nicolas Baier, Laurent Mollard, Olivier Gravrand, Gérard Destéfanis, Guillaume Bourgeois, Jean-Paul Zanatta, CEA-LETI (France); Philippe Churier, SOFRADIR (France); Laurie Tauziède, Alain Bardoux, Ctr. National d'Études Spatiales (France) . . . [8533-38]

Coffee Break Wed 15:00 to 15:30

SESSION 9

Room: Kylsyth Wed 15:30 to 17:40

Calibration I

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

15:30: **Overview of Aqua MODIS 10-year on-orbit calibration and performance (Invited Paper)**, Xiaoxiong Xiong, NASA Goddard Space Flight Ctr. (USA); Brian Wenny, Sigma Space Corp. (USA); William Barnes, Univ. of Maryland, Baltimore County (USA) [8533-39]

16:00: **Evaluation of Terra and Aqua MODIS thermal emissive band calibration consistency**, Brian Wenny, Sigma Space Corp. (USA); Xiaoxiong Xiong, NASA Goddard Space Flight Ctr. (USA); Sriharsha Madhavan, Science Systems and Applications, Inc. (USA) . . [8533-40]

16:20: **Comparison of MODIS and VIIRS onboard Blackbody performance**, Xiaoxiong Xiong, Jim Butler, NASA Goddard Space Flight Ctr. (USA) [8533-41]

16:40: **Modeling the detector gain of the Suomi NPP VIIRS reflective solar bands**, Ning Lei, Sigma Space Corp. (USA); Jack Xiong, NASA Goddard Space Flight Ctr. (USA); Zhipeng Wang, Sigma Space Corp. (USA); Bruce Guenther, Stellar Solutions (USA); James Gleason, NASA Goddard Space Flight Ctr. (USA) [8533-42]

17:00: **First results from the Cross-track infrared sounder (CRIS) on NPP**, Vladimir V. Zavyalov, Mark P. Esplin, Mark Greenman, Deron Scott, Brandon Graham, Charles Mayor, Lee D. Phillips, Utah State Univ. Research Foundation (USA); Yong Han, National Oceanic and Atmospheric Administration (USA) [8533-43]

17:20: **Calibration of VIIRS F1 sensor fire detection band using Lunar observations**, Jeff McIntire, Boryana Efremova, Sigma Space Corp. (USA); Xiaoxiong Xiong, NASA Goddard Space Flight Ctr. (USA) [8533-44]

POSTERS—WEDNESDAY
Wed 17:40 to 19:10

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

Evaluation of a new sensor design technique for satellite navigation, George Dekoulis, Frederick Univ. (Cyprus) [8533-53]

Supercontinuum-source-based system for pre-launch calibration of the hyperspectral sensor, Yu Yamaguchi, Yoshiro Yamada, Juntoro Ishii, National Metrology Institute of Japan (Japan) . . [8533-54]

Research and design of measuring methods for parameters of infrared focal plane array, Xu Lina, Beijing Institute of Space Mechanics and Electricity (China) [8533-55]

MODIS TEB calibration approaches in collection 6, Brian Wenny, Aisheng Wu, Sigma Space Corp. (USA); Xiaoxiong Xiong, NASA Goddard Space Flight Ctr. (USA); Sriharsha Madhavan, Science Systems and Applications, Inc. (USA); Zhipeng Wang, Na Chen, Yonghong Li, Kwo-fu Chiang, Sigma Space Corp. (USA) . . . [8533-57]

In-orbit quantitative evaluation methods research of infrared focal plane array detector performance, Yanhua Zhao, Beijing Institute of Space Mechanics and Electricity (China) [8533-58]

Research on breadboard spectrometer for measuring 1.61µm CO₂ band, Wei Peng, Shanghai Institute of Technical Physics (China); Shixiang Wu, Vision Engineering Ltd (China); Yuxuan Liu, Lei Ding, Xianghua Wang, Shanghai Institute of Technical Physics (China) [8533-59]

A method of FPGA implementation FTS phase correction based on CORDIC algorithm, Jiaqing Liu, Laboratory of Infrared Detection and Imaging, CAS (China) and Shanghai Institute of Technical Physics (China); Lei Ding, Laboratory of Infrared Detection and Imaging, CAS (China) and Shanghai Institute of Technical Physics (China) . [8533-60]

Preliminary study of the stereo geolocation accuracy of ZY-3 satellite, Li-ping Zhao, Satellite Surveying and Mapping Application Ctr. (China) and School of Resource and Environmental Science, Wuhan University (China); Xin-ming Tang, Xing-ke Fu, Yu-xing Li, Xian-hui Dou, Satellite Surveying and Mapping Application Ctr. (China) [8533-61]

Stray light analysis of nearby slot source using integrated ray tracing technique, Eunsong Oh, Korea Ocean Research & Development Institute (Korea, Republic of) and Yonsei Univ. (Korea, Republic of); Jinsuk Hong, Samsung Thales Co., Ltd. (Korea, Republic of); Sug-Whan Kim, Yonsei Univ. (Korea, Republic of); Seongick Cho, Korea Ocean Research & Development Institute (Korea, Republic of) and Yonsei Univ. (Korea, Republic of); Joo-Hyung Ryu, Korea Ocean Research & Development Institute (Korea, Republic of) [8533-62]

COMS normal operation for Earth observation mission, Young-Min Cho, Korea Aerospace Research Institute (Korea, Republic of) [8533-63]

Novel high sensitivity sensor design based on cascaded long-period fiber gratings, Zhengtian Gu, Univ. of Shanghai for Science and Technology (China) [8533-64]

The Radiance Standard RASTA of DLR's calibration facility for airborne imaging spectrometers, Thomas Schwarzmaier, Peter Gege, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [8533-65]

Rigorous geometrical modeling of ALSAT-2A Algerian satellite, Issam Boukerch, Mohammed Hadeid, Redouane Mahmoudi, Bachir Takarli, Kamel Hasni, Ctr. National des Techniques Spatiales (Algeria) [8533-66]

One-year operation of in-orbit radiometric calibration for geostationary ocean color imager, Seongick Cho, Eunsong Oh, Sun-Ju Lee, Yu-Hwan Ahn, Youngje Park, Joo-Hyung Ryu, Korea Ocean Research & Development Institute (Korea, Republic of) [8533-67]

Pre-launch spatial response calibration of the Landsat Data Continuity Mission thermal infrared sensor, Brian Wenny, Sigma Space Corp. (USA); Kurt Thome, Dennis Reuter, NASA Goddard Space Flight Ctr. (USA); Taeyoung Choi, Matthew Montanaro, Sigma Space Corp. (USA); Zelalem Tesfaye, Johns Hopkins Bayview Medical Ctr. (USA) [8533-68]

Study on modeling and simulation techniques based on the whole imaging chain of optical remote sensing, Ningjuan Ruan, Haibo Zhao, Xuxia Zhuang, Chunxiao Xu, Beijing Institute of Space Mechanics and Electricity (China) [8533-69]

Test results of adaptive optics system with deformable mirror for remote sensing telescope, Norihide Miyamura, The Univ. of Tokyo (Japan) [8533-70]

Development of a large-size gold coated integrating sphere, Masatomo Harada, Fumihiko Sakuma, Yasuji Yamamoto, Yasuhiro Nakajima, Haruyoshi Katayama, Japan Aerospace Exploration Agency (Japan) [8533-71]

ALSAT-2A power subsystem behavior during launch, early operation and in-orbit test, Nacera Larbi, Mehdi Attaba, Centre des Techniques Spatiales (Algeria); Eric Beaufume, EADS Astrium (France) [8533-72]

A 1550-nm time-of-flight laser ranging system based on 1.5-GHz sine-wave gated InGaAs/InP APD, Min Ren, Guang Wu, Yan Liang, Weibin Kong, Heping Zeng, East China Normal Univ. (China) [8533-73]

A Laser Ranging System Operating at 1036 nm with Geiger-mode Silicon Avalanche Photodiode, Guang Wu, Min Ren, Yan Liang, Zhiyuan Wang, Haifeng Pan, Heping Zeng, East China Normal Univ. (China) [8533-74]

The Hyperspectral Infrared Imager (HyspIRI) and supporting projects (stand-by oral presentation), Simon J. Hook, Elizabeth M. Middleton, Robert O. Green, Jet Propulsion Lab. (USA) [8533-75]

Infrared focal plane detector modules for space applications at AIM, Dominique Hübner, Kai-Uwe Gassmann, Markus Haiml, Luis-Dieter Haas, Stefan Hanna, Andreas Weber, Johann Ziegler, Hans-Peter Nothaft, Richard Thöt, Wolfgang Fick, AIM INFRAROT-MODULE GmbH (Germany) [8533-76]

Thursday 27 September

SESSION 10

Room: Kylsyth Thu 9:00 to 10:00

Calibration II

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

9:00: **The impact of time scales to calibration and validation for the CERES Earth radiation budget decadal record**, Kory J. Priestley, NASA Langley Research Ctr. (USA); G. Lou Smith, National Institute of Aerospace (USA); Audra Bullock, NASA Langley Research Ctr. (USA); Susan Thomas, Science Systems and Applications, Inc. (USA) [8533-45]

9:20: **Comparing radiances from ScaRaB-3 and CERES scanning radiometers**, George L. Smith, Z. Peter Szewczyk, Science Systems and Applications, Inc. (USA); Kory J. Priestley, NASA Langley Research Ctr. (USA) [8533-46]

9:40: **Development of dedicated target tracking capability for the CERES instruments through flight software: enhancing radiometric validation and on-orbit calibration**, Kelly K. Teague, Science Systems and Applications, Inc. (USA) [8533-47]

Coffee Break Thu 10:00 to 10:30

SESSION 11

Room: Kylsyth Thu 10:30 to 11:50

Calibration III

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

10:30: **In-orbit calibration strategy for Sentinel-1**, Paul Snoeij, Ignacio Navas-Traver, Dirk Geudtner, Allan Østergaard, Bjorn Rommen, Michael Brown, Ramon Torres, European Space Research and Technology Ctr. (Netherlands); Marco Schwerdt, Björn Döring, Manfred Zink, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [8533-48]

10:50: **Robust in-flight multi-angular calibration for the PROBA-V mission**, Stefan Livens, Sindy Sterckx, Stefan Adriaensen, VITO NV (Belgium) [8533-49]

11:10: **Characterisation methods for the hyperspectral sensor HySpex at DLR's calibration home base**, Andreas Baumgartner, Peter Gege, Claas Köhler, Karim Lenhard, Thomas Schwarzmaier, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) and Remote Sensing Technology Institute (IMF) (Germany) [8533-50]

11:30: **Laboratory test simulation for non-flat response calibration of global Earth albedo monitor**, 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) [8533-51]

Remote Sensing of Clouds and the Atmosphere

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

Programme Committee: **Aldo Amodeo**, Istituto di Metodologie per l'Analisi Ambientale (Italy); **Christoph C. Borel-Donohue**, Air Force Institute of Technology (USA); **Young-Jin Kim**, KAIST (Korea, Republic of); **Christopher J. Mertens**, NASA Langley Research Ctr. (USA); **Didier F. Rault**, NASA Langley Research Ctr. (USA); **Nicolaos I. Sifakis**, National Observatory of Athens (Greece); **Konradin Weber**, Fachhochschule Düsseldorf (Germany); **Michiel van Weele**, Koninklijk Nederlands Meteorologisch Instituut (Netherlands)

Monday 24 September

WELCOME AND INTRODUCTION

Room: Harris 2 Mon 8:40 to 9:00

SESSION 1

Room: Harris 2 Mon 9:00 to 11:50

Lidar, Radar and Passive Atmospheric Measurements

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

9:00: **Preliminary results of a Lidar-Dial integrated system for the automatic detection of atmospheric pollutants**, Pasquale Gaudio, Michela Gelfusa, Maria Richetta, Univ. degli Studi di Roma Tor Vergata (Italy) [8534-1]

9:20: **Ozone vertical profile measurements with the Ozone Mapper Profiler Suite (OMPS) Limb Profiler**, Didier F. Rault, NASA Langley Research Ctr. (USA) [8534-2]

9:40: **Preliminary validation of CERES instruments aboard the NPP and TERRA/AQUA satellites**, Zbigniew P. Szewczyk, Science Systems and Applications, Inc. (USA) [8534-3]

Coffee Break Mon 10:00 to 10:30

10:30: **Construction of NOAA/NESDIS/STAR AMSU-A-only atmospheric temperature thematic climate data records**, Wenhui Wang, Cheng-Zhi Zou, National Oceanic and Atmospheric Administration (USA) [8534-4]

10:50: **Snowfall retrieval by the combination of CloudSat-CPR and AQUA/AMSR-E data: a preliminary study**, Nari Kim, YangWon Lee, YoungSeup Kim, Pukyong National Univ. (Korea, Republic of) [8534-5]

11:10: **Preliminary results of the PreViBOSS project: description of the fog life cycle by ground-based and satellite observation**, Thierry G. Elias, Dominique Jolivet, Hygeos (France); Jean-Charles Dupont, Martial Haefelin, Ecole Polytechnique (France); Frédéric Burnet, Météo-France CNRM (France) [8534-6]

11:30: **Multi-year satellite and surface observations of AOD in support of Two-Column Aerosol Project (TCAP) field campaign**, Evgueni I. Kassianov, Duli Chand, Larry K. Berg, Jerome Fast, Jason Tomlinson, Pacific Northwest National Lab. (USA); Richard Ferrare, Chris Hostetler, John Hair, NASA Langley Research Center (USA) [8534-7]

Lunch Break Mon 11:50 to 13:20

SESSION 2

Room: Harris 2 Mon 13:20 to 15:20

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

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

13:20: **Results from long-term detection of mixing layer height: different ceilometer sites and comparison with Radio-Acoustic Sounding System**, Klaus Schäfer, Stefan Emeis, Carsten Jahn, Karlsruher Institut für Technologie (Germany); Christoph Munkel, Vaisala GmbH (Germany) [8534-8]

13:40: **Detection of mixing layer height by ceilometer and air pollution in urban area**, Klaus Schäfer, Stefan Emeis, Carsten Jahn, Karlsruher Institut für Technologie (Germany); Patrick Wagner, Univ. Duisburg-Essen (Germany); Christoph Muenkel, Vaisala GmbH (Germany) [8534-9]

14:00: **Assessing the relations between spectral sensitivity and integrated water vapor for NDSA processing applied to a radio link between two LEO satellites**, Luca Facheris, Fabrizio Cuccoli, Univ. degli Studi di Firenze (Italy); Susanne Schweitzer, Karl-Franzens- Univ. Graz (Austria) [8534-10]

14:20: **The development of air quality indices through image-retrieved AOT and PM10 measurements in Limassol Cyprus**, Kyriacos Themistocleous, Diofantos G. Hadjimitsis, Cyprus Univ. of Technology (Cyprus); Adrianos Retalis, National Observatory of Athens (Greece); Nektarios Chrysoulakis, Foundation for Research and Technology (Greece) [8534-11]

14:40: **Local distribution of PM2.5 concentration over Osaka based on space and ground measurements**, Itaru Sano, Sonoyo Mukai, Makiko Nakata, Kinki Univ. (Japan); Nobuo Sugimoto, National Institute for Environmental Studies (Japan); Brent N. Holben, NASA Goddard Space Flight Ctr. (USA) [8534-12]

15:00: **Remote sensing of BVOC isoprene retrieval based on ambient concentrations and ecosystem type**, Man Sing C. Wong, Janet E. Nichol, The Hong Kong Polytechnic Univ. (Hong Kong, China); Latifur Sarker, Univ. of Teknologi Malaysia (Malaysia) [8534-13]

Coffee Break 15:20 to 16:00

Remote Sensing Plenary Session

Monday 24 September 16.00 to 17.45

For details, please see page 5

Tuesday 25 September

SESSION 3

Room: Harris 2 Tue 9:00 to 11:30

Radiative Transfer I

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

9:00: **Cloud detection and characterization using topological data analysis**, Chona S. Guiang, Robert Y. Levine, Spectral Sciences, Inc. (USA) [8534-14]

9:20: **Fast Monte Carlo-assisted simulation of cloudy Earth backgrounds**, Steven Adler-Golden, Steven Richtsmeier, Alexander Berk, James W. Duff, Spectral Sciences, Inc. (USA) [8534-15]

9:40: **Numeric modeling in non-stationary problems of laser sensing of scattering media: new effective Monte Carlo code**, Boris A. Kargin, Yevgeniya Kablukova, Institute of Computational Mathematics and Mathematical Geophysics (Russian Federation) [8534-16]

Coffee Break Tue 10:00 to 10:30

10:30: **Infrared measurements throughout polar night using two AERIs in the Arctic**, Zen H. Mariani, Kim Strong, Mareile A. Wolff, Univ. of Toronto (Canada); Penny Rowe, Von P. Walden, Univ. of Idaho (USA); Pierre F. Fogal, Univ. of Toronto (Canada); Thomas J. Duck, Glen Lesins, Dalhousie Univ. (Canada); David S. Turner, Environment Canada (Canada); Christopher J. Cox, Univ. of Idaho (USA); Edwin W. Eloranta, Univ. of Wisconsin-Madison (USA); Jim R. Drummond, Dalhousie Univ. (Canada); Claude B. Roy, Richard L. Lachance, ABB Analytical Measurement (Canada); David D. Turner, National Oceanic and Atmospheric Administration (USA); David R. Hudak, Environment Canada (Canada); Iosif A. Lindenmaier, Univ. of Toronto (Canada) [8534-18]

10:50: **Estimation of aerosol properties from airborne hyperspectral data: a new technique designed for industrial plume characterization**, Adrien Deschamps, Rodolphe Marion, Commissariat à l'Énergie Atomique (France); Pierre-Yves Foucher, Xavier Briottet, ONERA (France) [8534-19]

11:10: **Aerosol properties from multi-spectral and multi-angular aircraft 4STAR observations: Expected advantages and challenges**, Evgueni I. Kassianov, Connor Flynn, Pacific Northwest National Lab. (USA); Jens Redemann, Bay Area Environmental Research Institute (USA); Beat Schmid, Pacific Northwest National Lab. (USA); Philip B. Russell, NASA Ames Research Ctr. (USA); Alexander Sinyuk, NASA Goddard Space Flight Ctr. (USA) .. [8534-20]

SESSION 4

Room: Harris 2 Tue 11:30 to 12:50

Radiative Transfer II

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

11:30: **The comparison of the darkest pixel and empirical line atmospheric correction methods to retrieve aerosol optical thickness using the radiative transfer equations**, Kyriacos Themistocleous, Diofantos G. Hadjimitsis, Cyprus Univ. of Technology (Cyprus); Adrianos Retalis, National Observatory of Athens (Greece); Nektarios Chrysoulakis, Foundation for Research and Technology-Hellas (Greece) [8534-21]

11:50: **The use of volcanic beach sand as a pseudo-invariant target for atmospheric correction using Landsat images**, Kyriacos Themistocleous, Diofantos G. Hadjimitsis, Cyprus Univ. of Technology (Cyprus); Adrianos Retalis, National Observatory of Athens (Cyprus); Nektarios Chrysoulakis, Foundation for Research and Technology-Hellas (Greece) [8534-22]

12:10: **Remote sensing of chemical gas cloud emission by passive infrared scanning imaging system**, Liang Xu, Minguang Gao, Jianguo Liu, Yang Jiao, Mingchun Feng, JingJing Tong, Sheng Li, Anhui Institute of Optics and Fine Mechanics (China) [8534-23]

12:30: **Mapping of Methane from Scanning Imaging Absorption Spectrometer for Atmospheric Cartography (SCIAMACHY)**, Mohd Zubir M Jafri, Hwee San Lim, Kok Chooi Tan, Univ. Sains Malaysia (Malaysia) [8534-24]

ADJOURN

Room: Harris 2 Tue 12:50

Wednesday 26 September

POSTERS—WEDNESDAY

Wed 17:40 to 19:10

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

Atmospheric correction models for high resolution WorldView-2 multispectral imagery: A case study in Canary Islands, Spain., Javier Martín Abasolo, Anabella Medina, Francisco Eugenio González, Javier Marcello Ruiz, Univ. de Las Palmas de Gran Canaria (Spain); Juan Antonio Bermejo, Fundación Observatorio Ambiental de Granadilla (Spain); Manuel Arbelo, Univ. de la Laguna (Spain) [8534-17]

Study of the topside electron density profiles obtained by COSMIC satellites and ionosondes over Europe during a four-year period, Haris Haralambous, George Dekoulis, Frederick Univ. (Cyprus) [8534-26]

Magnetospheric substorm measurements using PRIAMOS and NASA's THEMIS cluster satellites, George Dekoulis, Haris Haralambous, Frederick Univ. (Cyprus) [8534-27]

A feasibility study of cloud screening with neural networks with Aura/OMI data, Giulia Saponaro, Pekka Kolmonen, Gerrit de Leeuw, Johanna Tamminen, Finnish Meteorological Institute (Finland) [8534-28]

Individual particle analysis in suburban Osaka, Makiko Nakata, Itaru Sano, Sonoyo Mukai, Kinki Univ. (Japan) [8534-29]

Algorithms for radiative transfer simulations of aerosol retrieval, Sonoyo Mukai, Itaru Sano, Makiko Nakata, Kinki Univ. (Japan) [8534-30]

Lidar Technologies, Techniques, and Measurements for Atmospheric Remote Sensing

Conference Chairs: **Upendra N. Singh**, NASA Langley Research Ctr. (USA); **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); **Alain M. Dabas**, Meteo-France CNRM (France); **Gerhard Ehret**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Barry M. Gross**, The City College of New York (USA); **Animesh Jha**, Univ. of Leeds (United Kingdom); **Philippe L. Keckhut**, Service d'aéronomie (France); **George J. Komar**, NASA Goddard Space Flight Ctr. (USA); **Eduardo Landulfo**, Instituto de Pesquisas Energéticas e Nucleares (Brazil); **Doina Nicoleta Nicolae**, National Institute of Research & Development for Optoelectronics (Romania); **Alexandros D. Papayannis**, National Technical Univ. of Athens (Greece); **Vincenzo Rizi**, Univ. degli Studi dell'Aquila (Italy); **Stephen P. Sandford**, NASA Langley Research Ctr. (USA); **Laurent Sauvage**, Leosphere France (France); **Ulla Wandinger**, Leibniz Institut für Troposphärenforschung (Germany); **Jirong Yu**, NASA Langley Research Ctr. (USA)

Wednesday 26 September

POSTERS—WEDNESDAY

Room: Cromdale Hall Wed 17:40 to 19:10

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

Studies on the crystallisation behaviour of erbium doped phosphate glasses, Nupur Prasad, Billy D. Richards, Univ. of Leeds (United Kingdom); Malcolm Glendenning, Martyn Marshall, Paul Sharp, Glass Technology Services (United Kingdom); Animesh Jha, Univ. of Leeds (United Kingdom) [8534-47]

High-power infrared fiber frequency comb, Wenxue Li, Ming Yan, Kangwen Yang, Xuling Shen, Heping Zeng, Jian Zhao, East China Normal Univ. (China) [8534-53]

Generation of phase-stabilized high-power fiber comb for long distance ranging, Wenxue Li, Ming Yan, Kangwen Yang, Xuling Shen, Heping Zeng, East China Normal Univ. (China) [8534-54]

An unsupervised classification for full-waveform LiDAR point data using IHSL transform and the FCM algorithm, Jinhu Wang, Chuanrong Li, The Academy of Opto-Electronics (China) . . . [8534-56]

Remote Sensing Plenary Session

Monday 24 September 16.00 to 17.45

For details, please see page 5

Thursday 27 September

WELCOME AND INTRODUCTION

Room: Sidlaw Thu 8:55 to 9:00

SESSION 5

Room: Sidlaw Thu 9:00 to 10:10

Differential Absorption Lidar

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

9:00: **Pulsed 2-micron direct detection Integrated Path Differential Absorption (IPDA) Lidar for CO₂ column measurement** (*Invited Paper*), Upendra N. Singh, Jirong Yu, Mulugeta Petros, NASA Langley Research Ctr. (USA) [8534-40]

9:30: **High energy optical parametric sources for multi-wavelength DIAL: a generic approach**, Jessica Barrientos Barria, Jean-Baptiste Dherbecourt, Myriam Raybaut, Antoine Godard, Jean-Michel Melkonian, Michel Lefebvre, ONERA (France) [8534-41]

9:50: **A flexible eye-safe lidar instrument for elastic-backscatter and DIAL**, Iain Robinson, James W. Jack, Cameron F. Rae, John Moncrieff, The Univ. of Edinburgh (United Kingdom) [8534-42]

Coffee Break Thu 10:10 to 10:40

SESSION 6

Room: Sidlaw Thu 10:40 to 12:30

Novel Laser Sources for Lidar Applications

Session Chairs: **Eduardo Landulfo**, Instituto de Pesquisas Energéticas e Nucleares (Brazil); **Gary W. Kamerman**, FastMetrix, Inc. (USA)

10:40: **Diode-pumped Alexandrite laser: a bright prospect for future space Lidar missions** (*Invited Paper*), Michael J. Damzen, Imperial College London (United Kingdom) and Midaz Lasers Ltd. (United Kingdom); Ara Minassian, Midaz Lasers Ltd. (United Kingdom) [8534-43]

11:10: **The Titan laser family: high pulse energy, high repetition rate and excellent beam quality for Lidar applications**, Martin D. Ostermeyer, Artur Napiwotzki, Karsten Schmidt, Frank Massmann, IBL Innovative Berlin Laser GmbH (Germany) [8534-44]

11:30: **Broadband spectroscopic lidar for SWIR/MWIR detection of gaseous pollutants in air**, Simon Lambert-Girard, Nicolas Hô, Bruno Bourliaguet, INO (Canada); Michel Piché, Univ. Laval (Canada); François Babin, INO (Canada) [8534-45]

11:50: **Mid-infrared emission from Dy³⁺ doped tellurite bulk glass and waveguides**, Billy D. Richards, Toney Teddy-Fernandez, Animesh Jha, Univ. of Leeds (United Kingdom); David J. Binks, The Univ. of Manchester (United Kingdom) [8534-46]

12:10: **First attempt to monitor atmospheric glyoxal using differential absorption lidar**, Liang Mei, Lund Univ. (Sweden); Alexandros D. Papayannis, National Technical Univ. of Athens (Greece) [8534-57]

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

SESSION 7**Room: Sidlaw** **Thu 13:40 to 15:30****Lidar Measurements**Session Chairs: **Brian M. Walsh**, NASA Langley Research Ctr. (USA);
Billy D. Richards, Univ. of Leeds (United Kingdom)**13:40: Measurement of tropospheric aerosol in São Paulo area using a new upgraded Raman LIDAR system** (*Invited Paper*), Fabio J. da Silva Lopes, Eduardo Landulfo, Walter M. Nakaema, Instituto de Pesquisas Energéticas e Nucleares (Brazil) [8534-48]**14:10: The effective use of Doppler LiDAR in wind power applications**, Peter J. M. Clive, SgurrEnergy Ltd. (United Kingdom) [8534-49]**14:30: Roadside remote sensing of vehicle exhaust**, John S. Hager, HEAT, LLC (USA). [8534-50]**14:50: Numerical simulation of the Doppler measurements for the scheme with two lidars**, Evgeniya A. Shelekhova, Alexander P. Shelekhov, Institute for Monitoring of Climatic and Ecological Systems (Russian Federation) [8534-51]**15:10: Flare monitoring for refining process efficiency assessment using the Lidar technique**, Renata F. Da Costa, Eduardo Landulfo, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Roberto Guardani, Escola Politecnica da Univ. de São Paulo (Brazil); Riad Bourayou, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Paulo F. Moreira Jr., Escola Politecnica da Univ. de São Paulo (Brazil); Juliana Steffens, URI (Brazil) [8534-52]

Optics in Atmospheric Propagation and Adaptive Systems

Conference Chairs: **Karin Stein**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **John 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 (USA); **Gregory C. Dente**; **Denis Dion Jr.**, Defence Research and Development Canada, Valcartier (Canada); **Stephen M. Hammel**, Space and Naval Warfare Systems Command (USA); **Vladimir P. Lukin**, V.E. Zuev Institute of Atmospheric Optics (Russian Federation); **Charles L. Matson**, Air Force Research Lab. (USA); **Sergio R. Restaino**, U.S. Naval Research Lab. (USA); **Jim Riker**, Air Force Research Lab. (USA); **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 (USA)

Tuesday 25 September

WELCOME AND INTRODUCTION

Room: Moorfoot Tue 8:25 to 8:30

SESSION 1

Room: Moorfoot Tue 8:30 to 12:00

Characterization of the Environment

Session Chair: **Arthur D. van Rheenen**, Norwegian Defence Research Establishment (Norway)

8:30: **Characteristics of long-range scintillation data over maritime coastal areas**, Arie N de Jong, TNO Defence, Security and Safety (Netherlands) [8535-1]

8:50: **Joint French-German radar measurements for the determination of the refractive index in the maritime boundary layer**, Helmut W. Essen, Andreas J. Danklmayer, Fraunhofer FHR (Germany); Mario Behn, Joerg Förster, WTD 71 (Germany); Yvonick Hurtaud, Ctr. d'Expertise Parisien (France); Vincent Fabbro, Laurent Castanet, ONERA (France); Stefan Sieger, Fraunhofer FHR (Germany) [8535-2]

9:10: **Measurements of IR propagation in the marine boundary layer in cool atmospheric conditions**, Eirik Glimsdal, Arthur D. van Rheenen, Lars T. Heen, Norwegian Defence Research Establishment (Norway) [8535-3]

9:30: **Field deployable TDLAS for long path atmospheric transmission**, Christopher A. Rice, Glen P. Perram, Air Force Institute of Technology (USA) [8535-4]

9:50: **Retrieving atmospheric turbulence features from differential laser tracking motion data**, Dario G. Perez, Pontificia Univ. Católica de Valparaíso (Chile); Luciano Zunino, Ctr. de Investigaciones Ópticas (Argentina) and Univ. Nacional de La Plata (Argentina); Gustavo Funes, Damian Gulich, Ctr. de Investigaciones Ópticas (Argentina); Angel Fernandez, Pontificia Univ. Católica de Valparaíso (Chile) [8535-5]
Coffee Break Tue 10:10 to 10:40

10:40: **Long-term measurements of refractive index structure constant in atmospheric boundary layer**, Otakar Jicha, Pavel Pechac, Stanislav Zvanovec, Czech Technical Univ. in Prague (Czech Republic); Martin Grabner, Vaclav Kvicera, Czech Metrology Institute (Czech Republic) [8535-6]

11:00: **Remote sensing of atmospheric turbulence profiles by laser guide stars**, Xiwen Qiang, Northwest Institute of Nuclear Technology (China) and Xi'an Jiaotong Univ. (China); Junwei Zhao, Shuanglian Feng, Min Wu, Jinyong Chang, Fei Zong, Jing-ru Liu, Northwest Institute of Nuclear Technology (China); Jianping Song, Xi'an Jiaotong Univ. (China) [8535-7]

11:20: **GPS derived spatial ionospheric total electron content variation over South-Indian latitudes during intense geomagnetic storms**, Sampad K. Panda, Shirishkumar S. Gedam, Indian Institute of Technology Bombay (India) [8535-8]

11:40: **Application of independent component analysis method in real-time spectral analysis of gaseous mixtures for acousto-optical spectrometers based on differential optical absorption spectroscopy**, Alexander V. Fadeyev, Vitold E. Pozhar, Scientific and Technological Ctr. for Unique Instrumentation (Russian Federation) [8535-9]

Lunch/Exhibition Break Tue 12:00 to 13:10

SESSION 2

Room: Moorfoot Tue 13:10 to 15:00

Propagation through Turbulent Media

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

13:10: **GPU-based simulations of optical propagation through turbulence for passive and active imaging applications** (*Invited Paper*), Goulven Monnier, François-Régis Duval, Solène Amram, ALYOTECH France (France) [8535-10]

13:40: **Transmitter and receiver modules for free-space optical transmission links in the mid-infrared**, Myriam Raybaut, Sophie Derelle, ONERA (France); Johan Rothman, CEA-LETI (France); Antoine Godard, Joël Deschamps, Aurélie Bonnefois, Nicolas Védrenne, Anne Durécu, ONERA (France) [8535-11]

14:00: **The nonlinear OPC technique for laser beam control in turbulent atmosphere**, Vladimir B. Markov, Advanced Systems & Technologies, Inc. (USA); Anatoliy Khizhnyak, Advanced Systems & Technologies, Inc. (USA) [8535-12]

14:20: **Laser beam propagation through an ensemble of vortex rings in air**, Fedor V Shugaev, Ludmila S Shtemenko, Oksana A Nikolaeva, Oksana A Solenaya, Lomonosov Moscow State Univ. (Russian Federation); Evgenii N Terentiev, Lomonosov Moscow state university (Russian Federation) [8535-13]

14:40: **Scintillation of pseudo-partially coherent Gaussian beam in atmospheric turbulence: application for free-space optical communications**, Xianmei Qian, Wenyue Zhu, Ruizhong Rao, Anhui Institute of Optics and Fine Mechanics (China) [8535-14]

Coffee Break Tue 15:00 to 15:30

SESSION 3

Room: Moorfoot Tue 15:30 to 16:10

Wavefront Correction

Session Chair: **David C. Dayton**, Applied Technology Associates (USA)

15:30: **Holographic wavefront sensing with spatial light modulator in context of horizontal light propagation**, Andreas Zepp, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [8535-15]

15:50: **New wavefront sensing concepts for adaptive optics instrumentation**, Kacem El-Hadi, Lab. d'Astrophysique de Marseille (France); Thierry Fusco, ONERA (France); Brice Le Roux, Lab. d'Astrophysique de Marseille (France) [8535-16]

Remote Sensing Plenary Session

Monday 24 September 16.00 to 17.45

For details, please see page 5

SESSION 4

Room: Moorfoot Tue 16:10 to 17:40

Image Reconstruction

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

16:00: **Remote sensing on a stellar surface** (*Invited Paper*), Oskar von der Lühe, Kiepenheuer-Institut für Sonnenphysik (Germany) [8535-17]

16:30: **Simulation of atmospheric turbulence for a qualitative evaluation of image restoration algorithms**, Claudia S. Huebner, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [8535-18]

16:50: **Image reconstruction of extended objects: demonstration with the Starfire Optical Range 3.5m telescope**, Szymon Gladysz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Roberto Baena Galle, Royal Academy of Sciences and Arts of Barcelona (Spain) and Univ. de Barcelona (Spain); Robert L. Johnson, Lee Kann, Air Force Research Lab. (USA) [8535-19]

17:10: **Multi-frame restoration of turbulence degraded underwater images** (*Invited Paper*), Andrey V Kanaev, U.S. Naval Research Lab. (USA) [8535-20]

STAND-BY ORAL PRESENTATIONS

Laser illuminated image estimation in the presence of atmospheric scintillation, David C. Dayton, Applied Technology Associates (USA); John-Paul Sena, Jeremy S. Oliver, Gregory Fertig, Air Force Research Lab. (USA); Rudolph Nolasco, Applied Technology Associates (USA) [8535-21]

Modified Cessna T206H with retractable MX15HDI turret for airborne ISR applications, Rudolph Nolasco, Applied Technology Associates (USA); Gregory Fertig, John-Paul Sena, Jeremy S. Oliver, Air Force Research Lab. (USA); David C. Dayton, Applied Technology Associates (USA) [8535-22]

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 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); **Fabio Rocca**, Politecnico di Milano (Italy); **Emanuele Santi**, Istituto di Fisica Applicata Nello Carrara (Italy); **Stefan Schneiderbauer**, EURAC research (Italy); **David Small**, Univ. of Zürich (Switzerland)

Wednesday 26 September

WELCOME AND INTRODUCTION

Room: Harris 2 Wed 8:25

SESSION JS1

Room: Fintry Wed 8:40 to 10:00

SAR Data Analysis I

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

Joint Session with Conference 8537, Image and Signal Processing for Remote Sensing

8:40: **Classification of polarimetric SAR data using dictionary learning**, Jacob S. Vestergaard, Anders L. Dahl, Rasmus Larsen, Allan A. Nielsen, Technical Univ. of Denmark (Denmark) [8537-35]

9:00: **Unsupervised change detection in very high spatial resolution Cosmo-SkyMed SAR images**, Nicola Acito, Salvatore Resta, Giovanni Corsini, Marco Diani, Alessandro Rossi, Univ. di Pisa (Italy) [8536-44]

9:20: **A novel approach to building change detection in very high resolution SAR images**, Francesca Bovolo, Univ. degli Studi di Trento (Italy); Carlo Marin, Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy) [8537-36]

9:40: **Blind whitening of correlated speckle to enforce despeckling of single-look high-resolution SAR images**, Alessandro Lapini, Tiziano Bianchi, Fabrizio Argenti, Luciano Alparone, Univ. degli Studi di Firenze (Italy) [8537-37]

Coffee Break Wed 10:00 to 10:30

SESSION JS2

Room: Fintry Wed 10:30 to 12:10

SAR Data Analysis II

Joint Session with Conference 8537, Image and Signal Processing for Remote Sensing

10:30: **An experimental setup for multiresolution despeckling of COSMO-SkyMed image products**, Bruno Aiuzzi, Istituto di Fisica Applicata Nello Carrara (Italy); Luciano Alparone, Fabrizio Argenti, Univ. degli Studi di Firenze (Italy); Stefano Baronti, Istituto di Fisica Applicata Nello Carrara (Italy); Tiziano Bianchi, Alessandro Lapini, Univ. degli Studi di Firenze (Italy) [8536-2]

10:50: **Multi-chromatic analysis of a single SAR image for absolute ranging**, Fabio Bovenga, Consiglio Nazionale delle Ricerche (Italy); Leonardo Gallitelli, Davide O. Nitti, Politecnico di Bari (Italy) . . . [8536-3]

11:10: **Ultra-wide band ISAR imaging by Laguerre Gauss tomographic reconstruction**, Elio D. Di Claudio, Giovanni Jacovitti, Univ. degli Studi di Roma La Sapienza (Italy); Alberto Laurenti, GIAL S.r.l. (Italy) [8536-4]

11:30: **Maritime surveillance with synthetic aperture radar (SAR) and automatic identification system (AIS) onboard a microsatellite constellation**, Erica H. Peterson, Robert E. Zee, Univ. of Toronto (Canada); Georgia Fotopoulos, The Univ. of Texas at Dallas (USA) [8537-38]

11:50: **GLRT-entropy joint location of low-RCS target in heavy sea clutter**, Jianing Wang, Xiaojian Xu, BeiHang Univ. (China) . . . [8537-39]

Lunch/Exhibition Break Wed 12:10 to 13:30

SESSION 1

Room: Harris 2 Wed 13:30 to 15:10

Land Applications I

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

13:30: **Compact polarimetry for C-band land-use classification: a pre-study for the Canadian Radar Constellation Mission (RCM)**, Shane R. Cloude, AEL Consultants (United Kingdom); David G. Goodenough, Hao Chen, Natural Resources Canada (Canada) [8536-5]

13:50: **Comparison of alternative parameters to dual polarimetric SAR data**, Mitsunobu Sugimoto, Kazuo Ouchi, National Defense Academy (Japan) [8536-6]

14:10: **Synergy of Cassini SAR and altimeter acquisitions for retrieval of dunes height on Titan**, Marco Mastrogiuseppe, Univ. degli Studi di Roma La Sapienza (Italy) and Consiglio Nazionale delle Ricerche (Italy) and EURAC research (Italy); Valerio Poggiali, Univ. degli Studi di Roma La Sapienza (Italy) [8536-7]

14:30: **TBA**

14:50: **Georeferencing and geological structures analysis approach in radarSat2 images**, Hafifa Fatima Zohra Haddoud, Mostafa Belhadj-Aissa, Univ. des Sciences et de la Technologie (Algeria) [8536-9]

Coffee Break Wed 15:10 to 15:40

SESSION 2

Room: Harris 2 Wed 15:40 to 17:00

Land Applications II

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

15:40: **Environmental parameters retrieval through SAR tomography: an airborne application**, Erwan Renaudin, Bryan Mercer, Univ. of Calgary (Canada) [8536-10]

16:00: **Rating curve from SAR imagery**, Giovanni Corato, Consiglio Nazionale delle Ricerche (Italy); Renaud Hostache, Patrick Matgen, Ctr. de Recherche Public - Gabriel Lippmann (Luxembourg); Tommaso Moramarco, Consiglio Nazionale delle Ricerche (Italy); Tullio Tucciarelli, Univ. degli Studi di Palermo (Italy) [8536-12]

16:20: **Analysis of ground deformation using SBAS-DInSAR technique applied to COSMO-SkyMed images, the test case of Rome urban area**, Francesca Ardizzone, Consiglio Nazionale delle Ricerche (Italy); Manuela Bonano, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy); Alessandro Giocoli, Istituto di Metodologie per l'Analisi Ambientale (Italy); Riccardo Lanari, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy); Maria Marsella, Univ. degli Studi di Roma La Sapienza (Italy); Antonio Pepe, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy); Angela Perrone, Sabatino Piscitelli, Istituto di Metodologie per l'Analisi Ambientale (Italy); Silvia Scifoni, Marianna Scutti, Univ. degli Studi di Roma La Sapienza (Italy); Giuseppe Solaro, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy) [8536-13]

16:40: **Study of movement and seepage along levees using DInSAR and the airborne UAVSAR instrument**, Cathleen E. Jones, Jet Propulsion Lab. (USA); Gerald Bawden, U.S. Geological Survey (USA); Steven Deverel, HydroFocus, Inc. (USA); Joel Dudas, California Dept. of Water Resources (USA); Scott Hensley, Sang-Ho Yun, Jet Propulsion Lab. (USA) [8536-14]

POSTERS—WEDNESDAY
Wed 17:40 to 19:10

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

- Lessons learned using COSMO-SkyMed imagery for flood mapping: case studies**, Nazzareno Pierdicca, Luca Pulvirenti, Univ. degli Studi di Roma La Sapienza (Italy); Marco Chini, Istituto Nazionale di Geofisica e Vulcanologia (Italy); Frank S. Marzano, Saverio Mori, Univ. degli Studi di Roma La Sapienza (Italy) [8536-32]
- On the Appropriate Feature for General SAR Image Registration**, Dong Li, Graduate Univ. of the Chinese Academy of Sciences (China) and Ctr. for Space Science and Applied Research (China); Yunhua Zhang, Ctr. for Space Science and Applied Research (China) [8536-34]
- The Appropriate Parameter Retrieval Algorithm for Feature-Based SAR Image Registration**, Dong Li, Graduate Univ. of the Chinese Academy of Sciences (China) and Ctr. for Space Science and Applied Research (China); Yunhua Zhang, Ctr. for Space Science and Applied Research (China) [8536-35]
- Oil rigs in full polarization SAR images**, Chen Peng, Jingsong Yang, The Second Institute of Oceanography, SOA (China) [8536-36]
- Movement velocity and snow line estimation in glacier area from interferometric and polarimetric SAR**, Zhen Li, Jianmin Zhou, Bangsen Tian, Lei Huang, Ding Shen, Ctr. for Earth Observation and Digital Earth (China) [8536-37]
- Monitoring of mining-induced land subsidence by PALSAR and TerraSAR-X**, Tomonori Deguchi, Nittetsu Mining Consultants Co., Ltd. (Japan) [8536-38]
- Analysis of terrain influences in Pol-InSAR forest height estimation and attempts to the correction**, Chuanrong Li, Academy of Opto-Electronics, Chinese Academy of Sciences (China); Yonghe Zhang, Information Institute, the Equipment Academy of the Air Force (China) and Institute of Tracking and Telecommunication Technology (China); Yongsheng Zhou, Academy of Opto-Electronics, Chinese Academy of Sciences (China); Wen Hong, Institute of Electronics, Chinese Academy of Sciences (China) [8536-40]
- Exact RCS reconstruction of interested targets from SAR images**, Dandan Gu, Xiaojian Xu, BeiHang Univ. (China) [8536-41]
- Imaging and target-location algorithms for airborne bistatic SAR system**, Yong Li, Ya Li, Nanjing Univ. of Aeronautics and Astronautics (China) [8536-42]
- An experiment of one-stationary bistatic SAR**, Xiong Songya, Institute of Electronics (China) [8536-43]
- A four component decomposition based on the compact polarimetry mode using RADARSAT2 data**, Boularbah Souissi, Mounira Ouarzeddine, Aichouche belhadj-aissa, Univ. des Sciences et de la Technologie (Algeria) [8536-45]
- Automatic and semi-automatic extraction of curvilinear features from SAR images**, Emre Akyilmaz, Osman Erman Okman, Fatih Nar, SDT A.S. (Turkey); Müjdat Çetin, Sabanci Univ. (Turkey) [8536-47]

Thursday 27 September

SESSION 3

Room: Harris 2 Thu 8:40 to 10:00

Maritime Applications I

Session Chair: **Fabio Del Frate**,
 Univ. degli Studi di Roma Tor Vergata (Italy)

- 8:40: New land masking methods in SAR images for ship detection**, Ezz E Ali, Tarek Ahmed Mahmoud, Ahmed Saleh Mashaly, Military Technical College (Egypt) [8536-15]
- 9:00: Confidence levels in the detection of oil spills from satellite imagery: from research to the operational use**, Guido Ferraro, European Commission Joint Research Ctr. (Italy); Olaf Trieschmann, European Maritime Safety Agency (Portugal); Marko Perkovic, Univ. of Ljubljana (Slovenia); Dario Tarchi, European Commission Joint Research Ctr. (Italy) [8536-27]
- 9:20: First demonstration of GMTI for maritime application with TerraSAR-X Dual Receive Antenna mode**, Matteo M. Soccorsi, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . [8536-17]
- 9:40: Sea clutter contamination test with log-cumulants**, Ding Tao, Anthony P. Doulgeris, Camilla Brekke, Univ. of Tromsø (Norway) [8536-18]
- Coffee Break Thu 10:00 to 10:30

SESSION 4

Room: Harris 2 Thu 10:30 to 12:10

SAR in Hydrology

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

- 10:30: Soil moisture retrieval from ASAR Wide Swath mode observations as demonstrator for the future GMES Sentinel-1 capabilities**, Simonetta Paloscia, Istituto di Fisica Applicata Nello Carrara (Italy); Rogier van der Velde, Bob Su, Univ. Twente (Netherlands); Jun Wen, Cold and Arid Regions Environmental and Engineering Research Institute (China); Yaoming Ma, Institute of Tibetan Plateau Research (China) [8536-19]
- 10:50: Future use of the data from the ESA Sentinel-1 mission for operational soil moisture mapping: a multitemporal algorithm**, Nazzareno Pierdicca, Luca Pulvirenti, Univ. degli Studi di Roma La Sapienza (Italy) [8536-20]
- 11:10: COSMO SkyMed X-band SAR imagery for snowpack characterization in mountain areas**, Emanuele Santi, Simonetta Paloscia, Simone Pettinato, Istituto di Fisica Applicata Nello Carrara (Italy); Claudia Notarnicola, Luca Pasolli, Mattia Callegari, EURAC research (Italy) [8536-21]
- 11:30: Mapping spatial and temporal patterns of soil moisture with ASAR imagery in the Alps**, Luca Pasolli, Claudia Notarnicola, EURAC research (Italy); Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy); Giacomo Bertoldi, Marc Zebisch, EURAC research (Italy) . . . [8536-22]
- 11:50: A Bayesian approach to retrieve soil parameters from SAR data: Effect of prior information**, Matias Barber, Martin Maas, Pablo Perna, Francisco M. Grings, Haydee Karszenbaum, Instituto de Astronomía y Física del Espacio (Argentina) [8536-23]
- Lunch Break Thu 12:10 to 13:30

SESSION 5

Room: Harris 2 **Thu 13:30 to 15:10**

Maritime Applications II

Session Chair: **Fabio Del Frate**,
Univ. degli Studi di Roma Tor Vergata (Italy)

13:30: **Sea state measurements using TerraSAR-X data**, Miguel Bruck Sr., Susanne Lehner, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [8536-24]

13:50: **Deepwater Horizon oil slick characterization with UAVSAR**, Cathleen E. Jones, Benjamin M. Holt, Jet Propulsion Lab. (USA); Brent Minchew, California Institute of Technology (USA) [8536-25]

14:10: **Ocean surface slick characterization by multi-polarization Radarsat-2 data**, Stine Skrunes, Camilla Brekke, Torbjørn Eltoft, Univ. of Tromsø (Norway) [8536-26]

14:30: **A new automatic technique for coastline extraction from SAR images**, Daniele Latini, Fabio Del Frate, Univ. degli Studi di Roma Tor Vergata (Italy); Francesco Palazzo, SERCO S.P.A. (Italy); Andrea Minchella, RSAC Ltd (United Kingdom) [8536-16]

14:50: **Slicks in SAR imagery of the sea surface**, Stanislav A Ermakov, Institute of Applied Physics (Russian Federation) . . [8536-28]

Coffee Break Thu 15:10 to 15:30

SESSION 6

Room: Harris 2 **Thu 15:30 to 16:30**

Maritime Applications III

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

15:30: **Fully automatic oil spill detection from COSMO-SkyMed imagery using a neural network approach**, Ruggero G. Avezzano, Fabio Del Frate, Daniele Latini, Univ. degli Studi di Roma Tor Vergata (Italy) [8536-29]

15:50: **Targets observation at sea exploiting reflection symmetry extracted from X-band dual-polarimetric SAR data**, Domenico Velotto, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Ferdinando Nunziata, Maurizio Migliaccio, Univ. degli Studi di Napoli Parthenope (Italy); Susanne Lehner, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [8536-30]

16:10: **Three-dimensional monopulse radar imaging simulation of ships on sea surfaces**, Diao Guijie, Xiaojian Xu, BeiHang Univ. (China) [8536-31]

Image and Signal Processing for Remote Sensing

Conference Chairs: **Lorenzo Bruzzone**, Univ. degli Studi di Trento (Italy); **Jon Atli Benediktsson**, Univ. of Iceland (Iceland); **Sebastiano Bruno Serpico**, Univ. degli Studi di Genova (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); **Francesca Bovolo**, Univ. degli Studi di Trento (Italy); **Gustavo Camps-Valls**, Univ. de València (Spain); **Jocelyn Chanussot**, Lab. des Images et des Signaux (France); **Chi-Hau Chen**, Univ. of Massachusetts Dartmouth (USA); **Melba M. Crawford**, Purdue Univ. (USA); **Fabio Dell'Acqua**, Univ. degli Studi di Pavia (Italy); **Peijun Du**, Nanjing Univ. (China); **Giles M. Foody**, The Univ. of Nottingham (United Kingdom); **Andrea Garzelli**, Univ. degli Studi di Siena (Italy); **Jordi Inglada**, Ctr. d'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 24 September

WELCOME AND INTRODUCTION

Room: Fintry. Mon 8:25 to 8:30

SESSION 1

Room: Fintry. Mon 8:30 to 10:10

Multiresolution Fusion

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

8:30: **Image sharpening: solutions and implementation issues** (*Invited Paper*), **Andrea Garzelli**, Univ. degli Studi di Siena (Italy) [8537-1]

9:10: **Color and spatial distortions of pan-sharpening methods in real and synthetic images**, **Anabella Medina Machín**, **Javier Marcelló Ruiz**, **Francisco Eugenio González**, **Dionisio Rodríguez Esparragón**, **Javier Martín Abasolo**, Univ. de Las Palmas de Gran Canaria (Spain) [8537-2]

9:30: **Advantages of Laplacian pyramids over "à trous" wavelet transforms for pansharpening of multispectral images**, **Bruno Aiazzi**, **Istituto di Fisica Applicata Nello Carrara (Italy)**; **Luciano Alparone**, Univ. degli Studi di Firenze (Italy); **Stefano Baronti**, **Istituto di Fisica Applicata Nello Carrara (Italy)**; **Andrea Garzelli**, Univ. degli Studi di Siena (Italy); **Massimo Selva**, **Istituto di Fisica Applicata Nello Carrara (Italy)** [8537-3]

9:50: **Multiresolution image fusion using compressive sensing and graph cuts**, **V. Hari Kumar**, **Manjunath Joshi**, **Mehul Raval**, **Prakash P Gajjar**, **Dhirubhai Ambani Institute of Information and Communication Technology (India)** [8537-4]

Coffee Break Mon 10:10 to 10:40

SESSION 2

Room: Fintry. Mon 10:40 to 12:20

Techniques for Data Pre-Processing

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

10:40: **Multitemporal evaluation of topographic correction algorithms using synthetic images**, **Ion Sola**, **María González-Audicana**, **Jesús Álvarez-Mozos**, **Jose Luis Torres**, Univ. Pública de Navarra (Spain) [8537-5]

11:00: **An automated method for relative radiometric correction performed through spectral library based classification and comparison**, **Ciro D'Elia**, **Simona Ruscino**, Univ. degli Studi di Cassino e del Lazio Meridionale (Italy) [8537-6]

11:20: **A linear approach for radiometric calibration of full-waveform Lidar data**, **Andreas Roncat**, **Norbert Pfeifer**, **Technische Univ. Wien (Austria)**; **Christian Briese**, **Technische Univ. Wien (Austria)** and **Ludwig Boltzmann Institute for Archaeological Prospection and Virtual Archaeology (Austria)** [8537-7]

11:40: **Spectral discrimination based on the optimal informative parts of the spectrum**, **Seyed Enayat Hosseini Aria**, **Massimo Menenti**, **Ben Gorte**, **Technische Univ. Delft (Netherlands)** [8537-8]

12:00: **A stripe noise removal method of interference hyperspectral imagery based on interferogram correction**, **Chuanrong Li**, **Chun Cheng Zhou**, **Lingling Ma**, **Lingli Tang**, **Xinhong Wang**, **The Academy of Opto-Electronics (China)** [8537-9]

Lunch Break Mon 12:20 to 13:40

SESSION 3

Room: Fintry Mon 13:40 to 15:20

Image Segmentation

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

13:40: **Active contours with edges: combining hyperspectral and grayscale segmentation**, **Alex Chen**, **University of North Carolina, Chapel Hill (USA)** [8537-10]

14:00: **A modular image processing chain for feature extraction from multispectral satellite images**, **Marc Wieland**, **Massimiliano Pittore**, **Helmholtz-Zentrum Potsdam Deutsches GeoForschungsZentrum GFZ (Germany)** [8537-11]

14:20: **Automatic segmentation of textures on a database of remote-sensing images and classification by neural network**, **Philippe Durand**, **Conservatoire National des Arts Métiers (France)**; **Darius Ghorbanzadeh**, **Conservatoire National des Arts et Métiers (France)**; **Luan Jaupi**, **Conservatoire National des Arts et Métiers (France)** [8537-12]

14:40: **Improved boundary tracking by off-boundary detection**, **Alex Chen**, **University of North Carolina, Chapel Hill (USA)** . . [8537-13]

15:00: **Extending the fractional order Darwinian particle swarm optimization to segmentation of hyperspectral images**, **Pedram Ghamisi**, **University of Iceland (Iceland)**; **Micael S. Couceiro**, **Univ. de Coimbra (Portugal)**; **Jon Atli Benediktsson**, **The Univ. of Iceland (Iceland)** [8537-14]

Tuesday 25 September

SESSION 4

Room: Fintry Tue 8:50 to 10:10

Target Detection and Spectral Unmixing

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

8:50: **Target attribute-based false alarm rejection in small infrared target detection**, **Sungho Kim**, **Yeungnam Univ. (Korea, Republic of)** [8537-15]

9:10: **Computationally efficient strategies to perform anomaly detection in hyperspectral images**, **Alessandro Rossi**, **Univ. di Pisa (Italy)**; **Nicola Acito**, **Accademia Navale di Livorno (Italy)**; **Marco Diani**, **Giovanni Corsini**, **Univ. di Pisa (Italy)** [8537-17]

9:30: **Concentration measurements of complex mixtures of broadband absorbers by widely tunable optical parametric oscillator laser spectroscopy**, **Keith Ruxton**, **M Squared Lasers Ltd. (United Kingdom)**; **Neil Macleod**, **Damien Weidmann**, **Rutherford Appleton Lab. (United Kingdom)**; **Graeme P. A. Malcolm**, **Gareth T. Maker**, **M Squared Lasers Ltd. (United Kingdom)** [8537-18]

9:50: **A regularization based method for spectral unmixing of imaging spectrometer data**, **Jignesh Bhatt**, **Manjunath Joshi**, **Mehul Raval**, **Dhirubhai Ambani Institute of Information and Communication Technology (India)** [8537-19]

Coffee Break Tue 10:10 to 10:40

SESSION 5

Room: Fintry Tue 10:40 to 12:20

Classification, Object Detection and Regression

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

10:40: **Application of MODIS NDVI time series data for land cover classification at European scale**, Francesco Vuolo, Florian Gabas, Clement Atzberger, Univ. für Bodenkultur Wien (Austria) [8537-20]

11:00: **A novel active learning method for support vector regression to estimate biophysical parameters from remotely sensed images**, Begüm Demir, Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy) [8537-21]

11:20: **Reduction of training costs using active classification in fused hyperspectral and LiDAR data**, Sebastian Wuttke, Hendrik Schilling, Wolfgang Middelmann, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [8537-22]

11:40: **Detection of built-up areas in ASTER and SAR images using conditional random fields**, Benson K. Kenduiywo, Jomo Kenyatta Univ. of Agriculture and Technology (Kenya); Valentyn A. Tolpekin, Alfred Stein, International Institute for Geo-Information Science and Earth Observation (Netherlands) [8537-23]

12:00: **A new approach to automatic road extraction from satellite images using boosted classifiers**, Umut Cinar, Ersin Karaman, Ekin Gedik, Ugur Halici, Yasemin Yardimci, Middle East Technical Univ. (Turkey) [8537-24]

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

SESSION 6

Room: Fintry Tue 13:40 to 15:00

Image Registration and Analysis of Temporal Data

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

13:40: **Automatic registration of multimodal views on large aerial images**, Anna Pelagotti, Istituto Nazionale di Ottica (Italy); Francesca Uccheddu, Univ. degli Studi di Firenze (Italy); Pasquale Ferrara, Istituto Nazionale di Ottica (Italy) [8537-25]

14:00: **Unsupervised mis-registration noise estimation in multi-temporal hyperspectral images**, Salvatore Resta, Univ. di Pisa (Italy); Nicola Acito, Accademia Navale di Livorno (Italy); Marco Diani, Giovanni Corsini, Univ. di Pisa (Italy) [8537-26]

14:20: **Short term change detection for UAV video**, Günter Saur, Wolfgang Krüger, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [8537-27]

14:40: **Integrating multi-interferometry and change detection techniques: a SAR-based method for improving landslide detection**, Christian Iasio, EURAC research (Italy); Gabriele Moser, Univ. degli Studi di Genova (Italy); Claudia Notarnicola, EURAC research (Italy); Sebastiano B. Serpico, Univ. degli Studi di Genova (Italy) [8537-28]

Coffee Break Tue 15:00 to 15:30

SESSION 7

Room: Fintry Tue 15:30 to 16:50

3D Processing and DEM Extraction

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

15:30: **A rooftop extraction method using color feature, height map information and road information**, Yongzhou Xiang, Ying Sun, Chao Li, National Univ. of Singapore (Singapore) [8537-30]

15:50: **Integration of photogrammetric DSM and advanced image analysis for the classification of urban areas**, Mauro Dalla Mura, Francesco Nex, Fabio Remondino, Michele Zanin, Fondazione Bruno Kessler (Italy) [8537-31]

16:10: **Performance evaluation of DTM area-based matching reconstruction of Moon and Mars**, Cristina Re, Centro Interdipartimentale Studi e Attività Spaziali (CISAS)-G. Colombo, University of Padova (Italy); Riccardo Roncella, Gianfranco Forlani, Dept. of Civil Engineering, University of Parma (Italy); Gabriele Cremonese, INAF - Astronomical Observatory Padova (Italy); Giampiero Naletto, Department of Information Engineering, University of Padova (Italy) and 2CNR-Institute for Photonics and Nanotechnologies UOS Padova LUXOR (Italy) and INAF - Astronomical Observatory Padova (Italy) [8537-33]

16:30: **Automatic generation of digital terrain models from LiDAR and hyperspectral data using Bayesian networks**, Dominik Perpeet, Wolfgang Gross, Wolfgang Middelmann, Fraunhofer Institute of Optronics, System Technologies and Image Exploitation IOSB (Germany) [8537-34]

Wednesday 26 September

WELCOME AND INTRODUCTION

Room: Fintry **Mon 8:25 to 8:30**

SESSION JS1

Room: Fintry **Wed 8:40 to 10:00**

SAR Data Analysis I

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

Joint Session with Conference 8536, SAR Image Analysis, Modeling, and Techniques

8:40: **Classification of polarimetric SAR data using dictionary learning**, Jacob S. Vestergaard, Anders L. Dahl, Rasmus Larsen, Allan A. Nielsen, Technical Univ. of Denmark (Denmark) [8537-35]

9:00: **Unsupervised change detection in very high spatial resolution Cosmo-SkyMed SAR images**, Nicola Acito, Salvatore Resta, Giovanni Corsini, Marco Diani, Alessandro Rossi, Univ. di Pisa (Italy) [8536-44]

9:20: **A novel approach to building change detection in very high resolution SAR images**, Francesca Bovolo, Univ. degli Studi di Trento (Italy); Carlo Marin, Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy) [8537-36]

9:40: **Blind whitening of correlated speckle to enforce despeckling of single-look high-resolution SAR images**, Alessandro Lapini, Tiziano Bianchi, Fabrizio Argenti, Luciano Alparone, Univ. degli Studi di Firenze (Italy) [8537-37]

Coffee Break Wed 10:00 to 10:30

SESSION JS2

Room: Fintry **Wed 10:30 to 12:10**

SAR Data Analysis II

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

Joint Session with Conference 8536, SAR Image Analysis, Modeling, and Techniques

- 10:30: **An experimental setup for multiresolution despeckling of COSMO-SkyMed image products**, Bruno Aiazzi, Istituto di Fisica Applicata Nello Carrara (Italy); Luciano Alparone, Fabrizio Argenti, Univ. degli Studi di Firenze (Italy); Stefano Baronti, Istituto di Fisica Applicata Nello Carrara (Italy); Tiziano Bianchi, Alessandro Lapini, Univ. degli Studi di Firenze (Italy) [8536-2]
- 10:50: **Multi-chromatic analysis of a single SAR image for absolute ranging**, Fabio Bovenga, Consiglio Nazionale delle Ricerche (Italy); Leonardo Gallitelli, Davide O. Nitti, Politecnico di Bari (Italy) . . [8536-3]
- 11:10: **Ultra-wide band ISAR imaging by Laguerre Gauss tomographic reconstruction**, Elio D. Di Claudio, Giovanni Jacovitti, Univ. degli Studi di Roma La Sapienza (Italy); Alberto Laurenti, GIAL S.r.l. (Italy) [8536-4]
- 11:30: **Maritime surveillance with synthetic aperture radar (SAR) and automatic identification system (AIS) onboard a microsatellite constellation**, Erica H. Peterson, Robert E. Zee, Univ. of Toronto (Canada); Georgia Fotopoulos, The Univ. of Texas at Dallas (USA) [8537-38]
- 11:50: **GLRT-entropy joint location of low-RCS target in heavy sea clutter**, Jianing Wang, Xiaojian Xu, BeiHang Univ. (China) . . [8537-39]
- Lunch/Exhibition Break Wed 12:10 to 13:30

POSTERS—WEDNESDAY
Wed 17:40 to 19:10

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

- Detection of hedges based on attribute filters**, Gabrielle Cavallaro, Univ. of Iceland and Univ. degli Studi di Trento (Italy); Benoit Arbelot, Gipsa-lab (France); Mathieu Fauvel, DYNAFOR Lab., INRA, and Univ. of Toulouse (France); Mauro Dalla Mura, Fondazione Bruno Kessler (Italy); Jon Atli Benediktsson, The Univ. of Iceland (Iceland); Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy); Jocelyn Chanussot, Lab. des Images et des Signaux (France); David Sheeren, DYNAFOR Lab., INRA, and Univ. of Toulouse (France) [8537-40]
- A FPGA-based automatic bridge over water recognition in high-resolution satellite images**, Sebastian Beulig, Maria von Schönemark, Felix Huber, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [8537-42]
- Web-based data acquisition and management system for GOSAT validation Lidar data analysis**, Hiroshi Okumura, Shoichiro Takubo, Takeru Kawasaki, Indra N. Abdullah, Saga Univ. (Japan); Osamu Uchino, National Institute for Environmental Studies (Jordan); Isamu Morino, Tatsuya Yokota, National Institute for Environmental Studies (Japan); Tomohiro Nagai, Tetsu Sakai, Takashi Maki, Meteorological Research Institute (Japan); Kohei Arai, Saga Univ. (Japan) . . [8537-43]
- Recognition and quantification of temporal profiles of land cover changes in south-western Colombia by image analysis of Landsat-7 ETM+ samples**, Tatiana Solano-Correa, Apolinar Figueroa-Casas, Leonairo Pencue-Fierro, Univ. del Cauca (Colombia). [8537-44]
- Segmentation of remote sensing images for building detection**, Hamid Moayeri, Islamic Azad Univ. (Iran, Islamic Republic of) [8537-45]
- Learnable hyperspectral measures**, Abdulrahman Galal, Arab Administrative Development Organization (Egypt); Hesham Hassan, Cairo Univ. (Egypt); Ibrahim Imam, Virginia Polytechnic Institute and State Univ. (USA) [8537-46]

- A new coastline extraction in remote sensing images**, Kun Xing, Beijing Institute of Space Mechanics and Electricity (China); Yili Fu, Harbin Institute of Technology (China); Feng Zhou, Beijing Institute of Space Mechanics and Electricity (China) [8537-47]
- De-striping algorithm in ALOS satellite imagery based on adaptive frequency filter**, Yutian Cao, Dongmei Yan, Gang Wang, Ctr. for Earth Observation and Digital Earth (China); Shucheng You, China Land Surveying and Planning Institute (China); An Li, Ctr. for Earth Observation and Digital Earth (China) [8537-48]
- Segmentation of vegetation scenes: the SIEMS method**, Alexandre Alakian, ONERA (France). [8537-49]
- Selection of interpolation methods used to smile correction of SWIR hyperspectral images**, Lin Li, Shanghai Institute of Technical Physics (China) and Graduate University of the Chinese Academy of Sciences (China); Yong Hu, Cailan T. Gong, Shanghai Institute of Technical Physics (China); Mingsheng Peng, Shanghai Univ. (China) [8537-50]
- Junction extraction on road masks by pruned skeletons**, Umut Cinar, Ersin Karaman, Ekin Gedik, Ugur Halici, Yasemin Yardimci, Middle East Technical Univ. (Turkey) [8537-51]
- Integrating region similarity to MRF Model for image segmentation**, Tiancan Mei, Xuebing Guo, Sidong Zhong, Wuhan Univ. (China) [8537-52]
- Imaging and target-location algorithms for airborne bistatic SAR system**, Yong Li, Ya Li, Nanjing Univ. of Aeronautics and Astronautics (China) [8537-53]
- The study of optical fiber communication technology for space optical remote sensing**, Jun Zheng, Sheng-quan Yu, Xiao-hong Zhang, Rong-hui Zhang, Jian-hua Ma, Beijing Institute of Space Mechanics and Electricity (China) . . . [8537-54]
- Elastic band-to-band registration for airborne multispectral scanners with large field of view**, Feng Li, ChuanRong Li, LingLi Tang, The Academy of Opto-Electronics (China); Yi Guo, Commonwealth Scientific and Industrial Research Organization (CSIRO) (Australia) . . . [8537-55]
- Remote sensing image classification by mean shift and color quantization**, Hind Taud, Instituto Politécnico Nacional (Mexico); Stéphane Couturier, José Joel Carrillo-Rivera, Univ. Nacional Autónoma de México (Mexico) [8537-56]
- Object-based image analysis and data mining for building an ontology of informal urban settlements**, Dejrriri Khelifa, Ctr. National des Techniques Spatiales (Algeria) and EEDIS Laboratory, University of Sidi Bel Abbes (Algeria); Malki Mimoun, Univ. of Sidi Bel Abbes (Algeria) [8537-57]
- A parametric statistical model over spectral space for the unmixing of imaging spectrometer data**, Jignesh Bhatt, Manjunath Joshi, Mehul Raval, Dhirubhai Ambani Institute of Information and Communication Technology (India) [8537-58]
- The inpainting of hyperspectral images: a survey and adaptation to hyperspectral data**, Alex Chen, University of North Carolina, Chapel Hill (USA) [8537-59]
- Unsupervised classification of hyperspectral images using an Adaptive Vector Tunnel classifier**, Suleyman Demirci, Turkish Air Force Academy (Turkey); Isin Erer, Istanbul Technical University (Turkey) [8537-61]
- A comparison study of object-based and pixel-based classification techniques for high resolution urban land-cover mapping**, Mohammad Rezaei, Univ. of Tehran (Iran, Islamic Republic of) [8537-64]
- A quaternion-based method for satellite images pan-sharpening**, Chahira Serief, Habib Mahi, Moussa Sofiane Karoui, Ctr. National des Techniques Spatiales (Algeria) [8537-65]
- Hierarchical watershed segmentation based on gradient image simplification**, Mauro Dalla Mura, Fondazione Bruno Kessler (Italy); Francois Cokelaer, Jocelyn Chanussot, Gipsa-lab (France) . . [8537-66]

Earth Resources and Environmental Remote Sensing/GIS Applications

Conference Chairs: **Ulrich Michel**, Univ. of Education Heidelberg (Germany); **Daniel L. Civco**, Univ. of Connecticut (USA); **Manfred Ehlers**, Univ. Osnabrück (Germany)

Conference Co-Chairs: **Karsten Schulz**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Konstantinos G. Nikolakopoulos**, Institute of Geology & Mineral Exploration (Greece)

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

Tuesday 25 September

WELCOME AND INTRODUCTION

Room: Harris 1 Tue 8:55 to 9:00

SESSION 1

Room: Harris 1 Tue 9:00 to 10:00

Processing Methodologies I: Accuracy Assessment

Session Chairs: **Ulrich Michel**, Univ. of Education Heidelberg (Germany); **Daniel L. Civco**, Univ. of Connecticut (USA)

9:00: **Monitoring of changes in areas of conflicts: the example of Darfur**, Holger Thunig, Ulrich Michel, Univ. of Education Heidelberg (Germany) [8538-1]

9:20: **Detection and assessment of land use dynamics on Tenerife (Canary Islands): the agricultural development between 1986 and 2010**, Sebastian Günther, Univ. of Education Heidelberg (Germany) and Ruprecht-Karls-Univ. Heidelberg (Germany); Simone Naumann, Univ. of Education Heidelberg (Germany); Alexander Siegmund, Univ. of Education Heidelberg (Germany) and Ruprecht-Karls-Univ. Heidelberg (Germany) [8538-2]

9:40: **Assessing the spatial fidelity of resolution-enhanced imagery using Fourier analysis: a proof-of-concept study**, Daniel L. Civco, Chandhi Witharana, Univ. of Connecticut (USA) [8538-3]

Coffee Break Tue 10:00 to 10:30

SESSION 2

Room: Harris 1 Tue 10:30 to 11:50

Hazard Mitigation Geologic Application I

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

10:30: **Change detection in time series of high resolution SAR satellite images**, Markus Boldt, Karsten Schulz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) . . . [8538-4]

10:50: **Evaluating remote sensing image fusion algorithms for use in humanitarian crisis management**, Chandhi Witharana, Civco L. Daniel, Univ. of Connecticut (USA) [8538-5]

11:10: **Comparison of 3D textured models depicting micro folds: Panoramic Stereopair Imagery vs. Time of Flight Laser Scanner**, Aristidis D. Vaiopoulos, University of Athens (Greece); Andreas Georgopoulos, National Technical University of Athens (Greece); Stylianos G. Lozios, University of Athens (Greece) and University of Athens (Greece) [8538-6]

11:30: **Analysis of time series geospatial data for seismic precursors detection in Vrancea zone**, Maria A Zoran, Roxana S Savastru, Dan M Savastru, National Institute of Research and Development for Optoelectronics (Romania) [8538-7]

Lunch/Exhibition Break Tue 11:50 to 13:40

SESSION 3

Room: Harris 1 Tue 13:40 to 15:00

Processing Methodologies II

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

13:40: **Data service platform for MODIS Vegetation Indices time series processing at BOKU Vienna: current status and future perspectives**, Francesco Vuolo, Anja Klisch, Clement Atzberger, Univ. für Bodenkultur Wien (Austria) [8538-9]

14:00: **Development of a low altitude airborne remote sensing system for supporting the processing of satellite remotely sensed data intended for archaeological investigations**, Athos Agapiou, Diofantos G. Hadjimitsis, Cyprus Univ. of Technology (Cyprus); Andreas Georgopoulos, National Technical Univ. of Athens (Greece); Kyriacos Themistocleous, Dimitris D. Alexakis, Cyprus Univ. of Technology (Cyprus); Giorgos C. Papadavid, Agricultural Research Institute (Cyprus) [8538-10]

14:20: **Using remote sensing imagery to display geographical places automatically coming from a geoparsing web service**, Erick López-Ornelas, Rocío Abascal-Mena, Sergio Zepeda-Hernández, Univ. Autónoma Metropolitana (Mexico) [8538-11]

14:40: **A new time-to-digital converter for the 3D imaging lidar**, Chunsheng Hu, Zongsheng Huang, Shiqiao Qin, Xingshu Wang, National Univ. of Defense Technology (China) [8538-12]

Coffee Break Tue 15:00 to 15:30

SESSION 4

Room: Harris 1 Tue 15:30 to 17:10

Infrastructures and Urban Areas

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

15:30: **Object-based urban change detection analyzing high resolution optical satellite images**, Markus Boldt, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Antje Thiele, Karlsruher Institut für Technologie (Germany) and Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Karsten Schulz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [8538-13]

15:50: **Integrated data processing of remotely sensed and vector data for building change detection**, Natalia Sofina, Manfred Ehlers, Univ. Osnabrück (Germany); Ulrich Michel, University of Education Heidelberg, Germany (Germany) [8538-14]

16:10: **Ad-hoc model acquisition for combat simulation in urban terrain**, Dimitri Bulatov, Peter Solbrig, Peter Wernerus, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [8538-15]

16:30: **Integrating machine learning techniques and high-resolution imagery to generate GIS-ready information for urban water consumption studies**, Nils Wolf, Angela Hof, Ruhr-Univ. Bochum (Germany) [8538-16]

16:50: **3D campus modeling using LIDAR point cloud data**, Yoshiyuki Kawata, Satoshi Yoshii, Yukihiro Funatsu, Kazuya Takemata, Kanazawa Institute of Technology (Japan) [8538-17]

Wednesday 26 September

SESSION 5

Room: Harris 1 Wed 9:00 to 10:00

Hazard Mitigation Geologic Application II

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

9:00: **Multitemporal satellite data in mine waste monitoring of Medet copper deposit**, Denitsa Borisova, Hristo Nikolov, Doyno Petkov, Space Research and Technology Institute (Bulgaria); Banush Banushev, Univ. of Mining and Geology (Bulgaria) [8538-18]

9:20: **Statistical frameworking of deforestation models based on human population density and relief energy**, Ryuei Nishii, Daiki Miyata, Kyushu Univ. (Japan); Shojiro Tanaka, Shimane Univ. (Japan) [8538-19]

9:40: **Object-oriented industrial solid waste identification using HJ satellite imagery: a case study of phosphogypsum**, Zhuo Fu, Wenming Shen, Rulin Xiao, Wencheng Xiong, Yuanli Shi, Ministry of Environmental Protection (China); Baisong Chen, Chinese Academy of Fishery Sciences (China) [8538-20]

Coffee Break Wed 10:00 to 10:30

SESSION 6

Room: Harris 1 Wed 10:30 to 12:10

Environmental Monitoring I

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

10:30: **Land cover classification using remote sensing imagery and random forests with anisotropic diffusion**, Xuan Zhu, Monash Univ. (Australia) [8538-21]

10:50: **Assessing regrowth and deforestation processes in western Amazonia (Rondônia, Brazil) using high frequency time series of high spatial resolution remote sensing data**, Joao M. Carreiras, Joana B. Melo, Instituto de Investigação Científica Tropical (Portugal); Richard M. Lucas, Aberystwyth Univ. (United Kingdom); Yosio E. Shimabukuro, Instituto Nacional de Pesquisas Espaciais (Brazil) [8538-22]

11:10: **Impacts of land use land cover (LULC) changes on land surface temperature (LST) in Addis Ababa city in Ethiopia using satellite images of December 1986 and 2010 respectively**, Daniel M. Mbithi, Kenya Meteorological Services (Kenya) [8538-23]

11:30: **A comparison of selected machine learning classifiers in mapping a South African heterogeneous coastal zone: Testing the utility of an object-based classification with WorldView-2 Imagery**, Elhadi E. Adam, Riyad Ismail, Onesimo Mutanga, Univ. of KwaZulu-Natal (South Africa) [8538-24]

11:50: **Sustainable management of coastal resources in Nigeria**, Henry O Odunsi, Earth Info Services (Nigeria) [8538-25]

Lunch/Exhibition Break Wed 12:10 to 13:20

SESSION 7

Room: Harris 1 Wed 13:20 to 15:00

Environmental Monitoring II

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

13:20: **Per-field crop classification in irrigated agricultural regions in middle Asia using random forest and support vector machine ensemble**, Fabian Löw, Julius-Maximilians-Univ. Würzburg (Germany); Gunther Schorcht, Julius-Maximilians-University (Germany); Ulrich Michel, Pädagogische Hochschule Heidelberg (Germany); Stefan W. Dech, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Christopher Conrad, Julius-Maximilians-Univ. Würzburg (USA) [8538-26]

13:40: **Spatio-temporal robustness of fractional cover upscaling: a case study in semi arid savannah's of Namibia and Western Zambia**, Julian Zeidler, Martin Wegmann, Julius-Maximilians-Univ. Würzburg (Germany); Stefan W Dech, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [8538-27]

14:00: **Remote sensing of the hydrology of the Tibetan Plateau**, Volker Hochschild, Eberhard Karls Univ. Tübingen (Germany); Jan Kropacek, Technical Univ. Dresden (Germany); Niklas Neckel, Sebastian Hoerz, Eberhard Karls Univ. Tübingen (Germany) . [8538-29]

14:20: **Modeling the distribution of aboveground biomass in Miombo ecosystems (Mozambique, Southeast Africa) using L-band Synthetic Aperture Radar data**, Joao M. Carreiras, Joana B. Melo, Instituto de Investigação Científica Tropical (Portugal) . [8538-30]

14:40: **SPOT 5 imagery for soil salinity assessment in Iraq**, Sergio Teggi, Sofia Costanzini, Francesca Despini, Univ. degli Studi di Modena e Reggio Emilia (Italy); Francesco Immordino, ENEA (Italy); Paolo Chiodi, Univ. degli Studi di Modena e Reggio Emilia (Italy) [8538-31] Coffee Break Wed 15:00 to 15:30

SESSION 8

Room: Harris 1 Wed 15:30 to 17:10

Environmental Monitoring III

Session Chair: **Sebastian Günther**, Univ. of Education Heidelberg (Germany)

15:30: **Object-based identification of cropland degradation: a case study in Uzbekistan**, Olena Dubovyk, Gunter Menz, Rheinische Friedrich-Wilhelms-Univ. Bonn (Germany); Christopher Conrad, University of Wuerzburg (Germany); Asia Khamzina, Rheinische Friedrich-Wilhelms-Univ. Bonn (Germany) [8538-32]

15:50: **Spatiotemporal object-based image analyses in the Blue Nile area using optical multispectral imagery**, Mustafa M. El-Abbas, Elmar Csaplovics, Technische Univ. Dresden (Germany) . . . [8538-33]

16:10: **Total ozone column distribution over peninsular Malaysia from Scanning Imaging Absorption Spectrometer for Atmospheric Cartography (SCIAMACHY)**, Mohd Zubir M. Jafri, Hwee-San Lim, Kok Chooi Tan, Univ. Sains Malaysia (Malaysia) [8538-35]

16:30: **Combine MODIS and HJ-1 CCD NDVI with logistic model to generate high spatial and temporal resolution NDVI data**, Jingyi Jiang, Jinling Song, Jingdi Wang, Zhiqiang Xiao, Beijing Normal Univ. (China) [8538-36]

16:50: **Remote sensing indices for monitoring land degradation in a semiarid to arid basin in Jordan**, Jawad T. Al-Bakri, Hani Saoub, The Univ. of Jordan (Jordan); William Nickling, Univ. of Guelph (Canada); Ayman Suleiman, The Univ. of Jordan (Jordan); Mohammad Salahat, The Hashemite Univ. (Jordan); Saeb Khresat, Jordan Univ. of Science & Technology (Jordan); Tareq Kandakji, The Univ. of Jordan (Jordan) [8538-37]

POSTERS—WEDNESDAY
Wed 17:40 to 19:10

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Identification of physical geographical borders of Khorezm oasis and its ecosystems through Landsat images, Muzaffar J. Matchanov, Urgench State Univ. (Uzbekistan) and Univ. do Porto (Portugal); Ana C. Teodoro, Neftalí P. Sillero, Univ. do Porto (Portugal) [8538-39]

Interannual variability of surface albedo over east Asia according to land cover, Chang-Suk Lee, Kyung-Soo Han, Kyoung-Jin Pi, In-Hwan Kim, Min-Ji Lee, Pukyong National Univ. (Korea, Republic of) [8538-40]

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Long term seismic noise acquisition and analysis with tunable monolithic horizontal sensors at the INFN Gran Sasso National Laboratory, Fausto Acernese, Univ. degli Studi di Salerno (Italy); Rosangela Canonico, Uni. degli Studi di Salerno (Italy); Rosario De Rosa, Univ. degli Studi di Napoli Federico II (Italy); Gerardo Giordano, Rocco Romano, Fabrizio Barone, Univ. degli Studi di Salerno (Italy) [8538-44]

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Landslide detection using ALOS optical data: the case of Sykies Village in Andritsena, Greece, Konstantinos G Nikolakopoulos, University of Patras / Department of Geology (Greece) [8538-54]

GIS4schools: A new approach in GIS education, Timo Demharter, Ulrich Michel, Univ. of Education Heidelberg (Germany) [8538-55]

Discomfort level and at-satellite land surface temperature: case study of Klang Valley, Illyani Ibrahim, Azizan Abu Samah, Univ. of Malaya (Malaysia) [8538-56]

Monitoring land cover dynamics in the Aral Sea region by remote sensing, Giorgi Kozhoridze, Leah Orlovsky, Nikolai Orlovsky, Ben-Gurion Univ. of the Negev (Israel) [8538-58]

A research framework of payments for environmental services of island based on remote sensing, Li-an Wang, The Second Institute of Oceanography, SOA (China) and Guangdong Ocean Univ. (China); Jianyu Cheng, Qiong Liu, Dongyang Fu, The Second Institute of Oceanography, SOA (China) [8538-61]

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Monday 24 September

WELCOME AND INTRODUCTION

Room: Harris 1 Mon 8:55 to 9:00

SESSION 10

Room: Harris 1 Mon 9:00 to 10:20

Natural Disasters I

9:00: **An automated approach to flood mapping**, Weihua Sun, Donald Mckeown, David W. Messinger, Rochester Institute of Technology (USA) [8538-70]

9:20: **Remote Sensing and GIS for the management of interactions between natural risks and major hazard industrial activities**, Alessandra Marino, Mariano Ciucci D.V.M., Istituto Superiore per la Prevenzione e la Sicurezza del Lavoro (Italy) [8538-72]

9:40: **Flood delineation from synthetic aperture radar data with the help of a prior knowledge from historical acquisitions and digital elevation models in support of near-real-time flood mapping**, Stefan Schläffer, Markus Hollaus, Wolfgang Wagner, Technische Univ. Wien (Austria); Patrick Matgen, Ctr. De Recherche Public – Gabriel Lippmann (Luxembourg) [8538-73]

10:00: **Anomalously strong bora events in the NE part of the Black Sea imaged and studied with SAR and optical imagery**, Anna Yu. Antonyuk, SCANEX Research and Development Ctr. (Russian Federation) and Lomonosov Moscow State Univ. (Russian Federation); Andrey Yu Ivanov, P.P. Shirshov Institute of Oceanology (Russian Federation) [8538-74]

Coffee Break Mon 10:20 to 10:50

SESSION 11

Room: Harris 1 Mon 10:50 to 13:10

Natural Disasters II

10:50: **A new automatic synthetic aperture radar-based flood mapping application hosted on the European Space Agency's Grid Processing of Demand Fast Access to Imagery environment**, Patrick Matgen, Laura Giustarini, Renaud Hostache, Ctr. de Recherche Public - Gabriel Lippmann (Luxembourg) [8538-76]

11:10: **Monitoring El Hierro submarine volcano with low and high resolution satellite images**, Francisco Eugenio, Francisco Javier Marcello Ruiz, Javier Martin, Univ. de Las Palmas de Gran Canaria (Spain) [8538-79]

11:30: **Research study on appropriate interpretation techniques of satellite images for natural disaster management**, Mohammadreza Poursaber, Yasuo Ariki, Kobe Univ. (Japan); Mohammad Safi, Abbaspour Univ. (Iran, Islamic Republic of) [8538-80]

11:50: **Detecting spatio-temporal changes in the extent of seasonal and annual flooding in South Asia using multi-resolution satellite data**, Giriraj Amarnath, Mohamed Ameer, Vladimir Smakhtin, International Water Management Institute (Sri Lanka); Pramod Kumar Aggarwal, International Water Management Institute (India) [8538-81]

12:10: **The effects of orography on win, cloud and Rainfall patterns during typhoon Ketsana (2009)**, Mohd Zubir MatJafri, Hwee-San Lim, Tan Fuyi, Khiruddin Bin Abdullah, Univ. Sains Malaysia (Malaysia) [8538-82]

12:30: **Volcanic precursors retrieval by the synergy of spaceborne sensors and ground instrumentations**, Mohd Nadzri Md Reba, Nor Khairunnisa Abd Latip, Mazlan Hashim, Univ. Teknologi Malaysia (Malaysia) [8538-83]

12:50: **Estimation of Mount Sinabong SO₂ emission using Kalman filter**, Mohd Nadzri Md Reba, Nor Khairunnisa Abd Latip, Univ. Teknologi Malaysia (Malaysia) [8538-84]

Remote Sensing Plenary Session

Monday 24 September 16.00 to 17.45

For details, please see page 5

High-Performance Computing in Remote Sensing

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

Programme Committee: **Saeed H. AL-Mansoori**, Emirates Institution for Advanced Science and Technology (United Arab Emirates); **Adnan Al Rais**, Emirates Institution for Advanced Science and Technology (United Arab Emirates); **Philip E. Ardanuy**, Raytheon Intelligence & Information Systems (USA); **Chein-I Chang**, Univ. of Maryland, Baltimore County (USA); **Yang-Lang Chang**, National Taipei Univ. of Technology (Taiwan); **David J. Crain**, GeoMetWatch Corp. (USA); **Qian Du**, Mississippi State Univ. (USA); **Yong Fang**, Northwest A&F Univ. (China); **Samuel D. Gasster**, The Aerospace Corp. (USA); **Mitchell D. Goldberg**, National Oceanic and Atmospheric Administration (USA); **Lingjia Gu**, Jilin Univ. (China); **Allen H.-L. Huang**, Univ. of Wisconsin-Madison (USA); **Tung-Ju Hsieh**, National Taipei Univ. of Technology (Taiwan); **Dieter Just**, European Organisation for the Exploitation of Meteorological Satellites (Germany); **Roger L. King**, Mississippi State Univ. (USA); **Chulhee Lee**, Yonsei Univ. (Korea, Republic of); **Tsengdar J. Lee**, NASA Headquarters (USA); **Yunsong Li**, Xidian Univ. (China); **Sebastian Lopez Suarez**, Univ. de Las Palmas de Gran Canaria (Spain); **Enrico Magli**, Politecnico di Torino (Italy); **Prashanth Reddy Marpu**, Masdar Institute of Science and Technology (United Arab Emirates); **Jarno Mielikainen**, Univ. of Eastern Finland (Finland); **Abel Paz**, Univ. de Extremadura (Spain); **John J. Pereira**, National Environmental Satellite, Data, and Information Service (USA); **Jordi Portell de Mora**, Univ. de Barcelona (Spain); **Jeffery J. Puschell**, Raytheon Space & Airborne Systems (USA); **Shen-En Qian**, Canadian Space Agency (Canada); **Stefan A. Robila**, Montclair State Univ. (USA); **Luc Rochette**, LR Tech (Canada); **Joan Serra-Sagrasta**, Univ. Autònoma de Barcelona (Spain); **Roger W. Saunders**, Met Office (United Kingdom); **Yuliya Tarabalka**, Univ. of Iceland (Iceland); **Carole Thiebaut**, Ctr. National d'Études Spatiales (France); **Miguel Velez-Reyes**, Univ. de Puerto Rico Mayagüez (USA); **Raffaele Vitulli**, European Space Research and Technology Ctr. (Netherlands); **Shih-Chieh Wei**, Tamkang Univ. (Taiwan); **Jiaji Wu**, Xidian Univ. (China); **Zhen-sen Wu**, Xidian Univ. (China); **Ye Zhang**, Harbin Institute of Technology (China)

Wednesday 26 September

WELCOME AND INTRODUCTION

Room: Carrick 3 Wed 13:15 to 13:20

SESSION 1

Room: Carrick 3 Wed 13:20 to 15:00

High Performance Computing I

13:20: **High-performance computing in image registration**, Mauro Dalla Mura, Claudio Andreatta, Tobia Francesco, Michele Zanin, Fabio Remondino, Fondazione Bruno Kessler (Italy) . . . [8539-1]

13:40: **GPU-parallel performance of the community radiative transfer model (CRTM) with the optical depth in absorber space (ODAS)-based transmittance algorithm**, Jarno Mielikainen, Bormin Huang, Allen H. L. Huang, Univ. of Wisconsin-Madison (USA); Tsengdar J. Lee, NASA Headquarters (USA) [8539-2]

14:00: **Real-time progressive band processing of linear spectral unmixing**, Chein-I Chang, Kenhao Liu, Univ. of Maryland, Baltimore County (USA); Chao-Cheng Wu, National Taipei Univ. of Technology (Taiwan) [8539-3]

14:20: **Fast Fourier Transform Co-processor (FFTC): towards embedded GFLOPs**, Christopher T. F. Kuehl, Uwe Liebstueckel, Felix Witte, EADS Astrium GmbH (Germany); Martin Suess, European Space Research and Technology Ctr. (Netherlands); Nicholas Kopp, Hybrid DSP Systems (Netherlands);

Isaac Tejerina, Michael Uemminghaus, EADS Astrium GmbH (Germany); Michael Kolb, University of Applied Sciences (Germany); Roland Weigand, European Space Research and Technology Ctr. (Netherlands) [8539-4]

14:40: **GPU implementation of a neural network-based classifier for hyperspectral data**, Jose J. Gomez Franco, Javier Plaza, Antonio J. Plaza, Univ. de Extremadura (Spain) [8539-5]

Coffee Break Wed 15:00 to 15:30

SESSION 2

Room: Carrick 3 Wed 15:30 to 17:50

High Performance Computing II

15:30: **Progressive hyperspectral imaging**, Chein-I Chang, Univ. of Maryland, Baltimore County (USA) [8539-6]

15:50: **Accelerating WRF 5-layer thermal diffusion model on a NVidia Fermi GPU**, Melin Huang, Univ. of Wisconsin-Madison (USA); Jarno Mielikainen, Univ. of Eastern Finland (Finland); Allen H. L. Huang, Univ. of Wisconsin-Madison (USA); Mitchell D. Goldberg, National Oceanic and Atmospheric Administration (USA) [8539-7]

16:10: **GPU implementation of attribute profiles for remote sensing image classification**, Sergio Bernabe, Univ. de Extremadura (Spain); Prashanth R. Marpu, Masdar Institute of Science and Technology (United Arab Emirates); Mauro Dalla Mura, Fondazione Bruno Kessler (Italy); Antonio J. Plaza, Univ. de Extremadura (Spain); Jon A. Benediktsson, The Univ. of Iceland (Iceland) [8539-8]

16:30: **An efficient watermarking technique for satellite images using discrete cosine transform**, Saeed H AL-Mansoori, Emirates Institution for Advanced Science and Technology (United Arab Emirates) [8539-9]

16:50: **GPU acceleration of simplex volume algorithm for hyperspectral endmember extraction**, Haicheng Qu, Junping Zhang, Zhouhan Lin, Hao Chen, Harbin Institute of Technology (China) [8539-10]

17:10: **Real-time causal processing of anomaly detection**, Yulei Wang, Harbin Engineering Univ. (China); Shih-Yu Chen, Univ. of Maryland, Baltimore County (USA); Chunhong Liu, China Agriculture Univ. (China); Chein-I Chang, Univ. of Maryland, Baltimore County (USA) [8539-11]

17:30: **Further optimizations of the GPU-based pixel purity index algorithm for hyperspectral unmixing**, Xin Wu, Xiaopeng Shao, Xidian Univ. (China); Antonio J. Plaza, Univ. de Extremadura (Spain); Bormin Huang, Univ. of Wisconsin-Madison (USA) [8539-12]

Remote Sensing Plenary Session
Monday 24 September 16.00 to 17.45
For details, please see page 5

Thursday 27 September

SESSION 3

Room: Carrick 3 Thu 8:30 to 10:10

High Performance Computing III

8:30: **Visualization tools for extremely high resolution DEM models from the LRO and other orbiter satellites**, J. Montgomery, Georgetown Univ. (USA); John McDonald, DePaul Univ. (USA) [8539-13]

8:50: **Modified full abundance-constrained spectral unmixing**, Shih-Yu Chen, Englin Wong, Chein-I Chang, Univ. of Maryland, Baltimore County (USA) [8539-14]

9:10: **Implementation of prediction-based lower triangular transform on the graphics processing unit**, Shih-Chieh Wei, Tamkang Univ. (Taiwan); Bormin Huang, Univ. of Wisconsin-Madison (USA) [8539-15]

9:30: **Evolutionary techniques for sensor networks energy optimization in marine environmental monitoring**, Francesco Grimaccia, Politecnico di Milano (Italy); Ron Johnstone, University of Queensland (Australia); Marco Mussetta, Politecnico di Milano (Italy); Andrea Pirisi, UP – Underground Power (Italy); Riccardo E. Zich, Politecnico di Milano (Italy) [8539-16]

9:50: **Acceleration the electromagnetic composite scattering based on GPU**, Zhen-sen Wu, Xiang Su, Xidian Univ. (China) [8539-17]

Coffee Break Thu 10:10 to 10:40

SESSION 4

Room: Carrick 3 Thu 10:40 to 12:20

High Performance Computing IV

10:40: **A unified theory for virtual dimensionality of hyperspectral imagery**, Chein-I Chang, Univ. of Maryland, Baltimore County (USA) [8539-18]

11:00: **On the acceleration of Eta Ferrier Cloud Microphysics Scheme in the Weather Research and Forecasting (WRF) Model using a GPU**, Jun Wang, Bormin Huang, Allen H. L. Huang, Univ. of Wisconsin-Madison (USA); Mitchell D. Goldberg, National Oceanic and Atmospheric Administration (USA) [8539-19]

11:20: **Review of high performance computing requirements in hyperspectral image processing**, Prashanth R. Marpu, Masdar Institute of Science and Technology (United Arab Emirates); Antonio J. Plaza, Univ. de Extremadura (Spain) [8539-20]

11:40: **Hyperspectral image feature extraction accelerated by GPU**, HaiCheng Qu, Harbin Institute of Technology (China) and Liaoning Technical Univ. (China); Ye Zhang, Zhouhan Lin, Hao Chen, Harbin Institute of Technology (China) [8539-21]

12:00: **High performance cluster system design for remote sensing data processing**, Yuanli Shi, Wenming Shen, Wencheng Xiong, Zhuo Fu, Rulin Xiao, Ministry of Environmental Protection (China) [8539-22]

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Edward M. Carapezza, DARPA and Univ. of Connecticut (USA)
Miloslav Dusek, Palacky Univ. Olomouc (Czech Republic)
Reinhard R. Ebert, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)
John D. Gonglewski, Office of Aerospace R&D (United Kingdom)
Mark T. Gruneisen, Air Force Research Lab. (USA)
Richard C. Hollins, Defence Science and Technology Lab. (United Kingdom)
David A. Huckridge, Ridgeway Consulting (United Kingdom)
Eddie L. Jacobs, The Univ. of Memphis (USA)
François Kajzar, Univ. d'Angers (France)

Gary W. Kamerman, FastMetrix, Inc. (USA)
Leslie C. Laycock, BAE Systems (United Kingdom)
Colin Lewis, Ministry of Defence (United Kingdom)
Keith L. Lewis, Electro Magnetic Remote Sensing Defence Technology Ctr. (United Kingdom)
Thomas J. Merlet, Thales Air Systems S.A. (France)
John G. Rarity, Univ. of Bristol (United Kingdom)
Mark A. Richardson, Cranfield Univ. (United Kingdom)
Neil Anthony Salmon, QinetiQ Ltd. (United Kingdom)
Ove Steinvall, Swedish Defence Research Agency (Sweden)
Attila A. Szep, Air Force Research Lab. (USA)
David H. Titterton, Defence Science and Technology Lab. (United Kingdom)
Henry J. White, BAE Systems (United Kingdom)
Roberto Zamboni, Consiglio Nazionale delle Ricerche (Italy)

Unmanned/Unattended Sensors and Sensor Networks

Conference Chairs: **Edward M. Carapezza**, General Atomics and Carnegie Mellon Univ. (USA)

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

Wednesday 26 September

WELCOME AND INTRODUCTION

Room: Tinto Wed 8:45 to 8:50

SESSION 1

Room: Tinto Wed 8:50 to 9:30

Keynote Session

Session Chair: **Edward M. Carapezza**, General Atomics (USA)

8:50: **Fusion, planning and humans in sensor networks** (Keynote Presentation), Mark E. Campbell, Cornell Univ. (USA) [8540-1]

SESSION 2

Room: Tinto Wed 9:30 to 10:30

Algorithms, Modeling, and Simulation Session

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

9:30: **Modelling systems of weakly characterised sensors**, Christopher J Willis, BAE Systems (United Kingdom) [8540-2]

9:50: **Design of re-locking algorithm using target modeling of histogram ratio during coast tracking mode in infrared image**, Sohyun Kim, Agency for Defense Development (Korea, Republic of); Junmo Kim, KAIST (Korea, Republic of) [8540-3]

10:10: **Global electronic dominance**, Peter S. Sapaty, National Academy of Sciences of Ukraine (Ukraine) [8540-4]

Coffee Break Wed 10:30 to 11:00

SESSION 3

Room: Tinto Wed 11:00 to 12:50

Detectors, Devices, and Networks

Session Chairs: **Tariq Manzur**, Naval Undersea Warfare Ctr. (USA); **Sachi V. Desai**, U.S. Army Armament Research, Development and Engineering Ctr. (USA)

11:00: **Evaluation of range parameters of the cameras for security system protecting the selected critical infrastructure of seaport**, Mariusz Kastek, Jaroslaw Barela, Marek Zyczkowski, Rafal Dulski, Piotr Trzaskawka, Krzysztof Firmanty, Juliusz Kucharz, Military University of Technology (Poland) [8540-5]

11:20: **Uncooled silicon carbide sensor producing optical signal** (Invited Paper), John W. Zeller, Tariq Manzur, Naval Undersea Warfare Ctr. (USA); Aravinda Kar, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8540-34]

11:50: **MOCVD growth and characterization of ZnO nanowire arrays for advanced ultraviolet detectors**, Abdiel Rivera, Univ. of Connecticut (USA); John Zeller, Naval Undersea Warfare Ctr. (USA) and Magnolia Optical Technologies, Inc. (USA); Tariq Manzur, Naval Undersea Warfare Ctr. (USA); Ashok Sood, Magnolia Optical Technologies, Inc. (USA); A.F.M. Anwar, Univ. of Connecticut (USA) [8540-7]

12:10: **Development of a variable climate controlled portable storage facility**, Mitchel Timmins, Kamal Yadav, Kennedy Iroanusi, Andrew J. Tickle, Coventry Univ. (United Kingdom) [8540-8]

12:30: **Monitoring/sensing applications on AirPON**, Ilija Kopacek, SQS Vlákrová optika a.s. (Czech Republic); Michael Pisarik, Czech Technical University in Prague, Dept. of Electromagnetic Field (Czech Republic) and SQS Vlákrová optika a.s. (Czech Republic) ... [8540-9]

Lunch/Exhibition Break Wed 12:50 to 14:00

SESSION 4

Room: Tinto Wed 14:00 to 17:20

Communication Technologies and Systems

Session Chairs: **Henry J. White**, BAE Systems (United Kingdom); **Myron E. Hohil**, U.S. Army Armament Research, Development and Engineering Ctr. (USA)

14:00: **Advances in free-space laser communications at the Naval Research Laboratory** (Invited Paper), Rita Mahon, William S. Rabinovich, Mike S. Ferraro, Peter G. Goetz, James L. Murphy, Harris R. Burris Jr., Christopher I. Moore, U.S. Naval Research Lab. (USA); L.M. Thomas, Fibertek, Inc. (USA); Michael J.

Vilcheck, U.S. Naval Research Lab. (USA) [8540-10]

14:30: **Free-space optical communication at 1.55 μ m and turbulence measurements in the evaporation layer**, John W. Zeller, Naval Undersea Warfare Ctr. (USA) and Magnolia Optical Technologies, Inc. (USA); Tariq Manzur, Naval Undersea Warfare Ctr. (USA) [8540-11]

14:50: **Probability of fade and BER performance of FSO links over the exponentiated Weibull fading channel under aperture averaging**, Ricardo A. Barrios, Federico Dios, Univ. Politècnica de Catalunya (Spain) [8540-12]

15:10: **Adaptive inverse control for gyro-stabilized platform of electro-optical tracking system**, Yun-Xia Xia, Qiliang Bao, Zhijun Li, Institute of Optics and Electronics (China); Qiongyan Wu, Institute of Optics and Electronic, Chinese Academy of Sciences (China) [8540-13]

Coffee Break Wed 15:30 to 16:00

16:00: **The impact of sunlight on the performance of visible light communication systems over the year**, Mahmoud H. Beshr, Ivan Andonovic, Univ. of Strathclyde (United Kingdom); Moustafa H. Aly, Arab Academy for Science, Technology & Maritime Transport (Egypt) [8540-14]

16:20: **High speed GaN micro-light-emitting diode arrays for data communications**, Scott Watson, Univ. of Glasgow (United Kingdom); Jonathan J. D. McKendry, Shuailong Zhang, David Massoubre, Univ. of Strathclyde (United Kingdom); Bruce R. Rae, The Univ. of Edinburgh (United Kingdom); Richard P. Green, Univ. College Cork (Ireland); Erdan Gu, Univ. of Strathclyde (United Kingdom); Robert K. Henderson, The Univ. of Edinburgh (United Kingdom); Anthony E. Kelly, Univ. of Glasgow (United Kingdom); Martin D. Dawson, Univ. of Strathclyde (United Kingdom) [8540-15]

16:40: **An overview of underwater free space communications developments**, Henry J. White, BAE Systems (United Kingdom) [8540-16]

17:00: **Extending the data rate of non-line-of-sight UV communication with polarization modulation**, Hongwei Yin, Honghui Jia, Hailiang Zhang, Xiaofeng Wang, Shengli Chang, Juncai Yang, National Univ. of Defense Technology (China) [8540-17]

POSTERS—WEDNESDAY
Wed 17:40 to 19:10

Conference attendees are invited to attend the Security + Defence Poster Session on Wednesday afternoon. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x32248.xml>.

A novel system with WiMax LDPC-coded OFDM for optical communication, Jing He, Hunan Univ. (China); Jinshu Su, National Univ. of Defense Technology (China); Yuan Huang, Hao Liu, Hunan Univ. (China) [8540-31]

Analytical model of non-line-of-sight multiple-scatterer ultraviolet propagation, Hailliang Zhang, Hongwei Yin, Honghui Jia, Shengli Chang, Juncai Yang, National Univ. of Defense Technology (China) [8540-32]

Simulation of fog influence on laser beam distribution in atmosphere, Vladimir Vašinek, Jan Latal, Petr Koudelka, Jan Vitasek, Karel Witas, Stanislav Hejduk, Technical Univ. of Ostrava (Czech Republic) [8540-33]

Thursday 27 September

SESSION 5

Room: Tinto Thu 9:00 to 10:20
Imaging Technologies and Systems

Session Chairs: **Myron E. Hohil**, U.S. Army Armament Research, Development and Engineering Ctr. (USA);
Tariq Manzur, Naval Undersea Warfare Ctr. (USA)

9:00: **Morphological scene change detection (MSCD) for night-time security**, Benjamin Jarvis, Andrew J. Tickle, Coventry Univ. (United Kingdom) [8540-18]

9:20: **Vector analysis for direction prediction on image strings**, Andrew J. Tickle, Josef E. Grindley, Coventry Univ. (United Kingdom) [8540-19]

9:40: **Integration of a digital watermarking system into a morphological scene change detector (MSCD) for tamper prevention and detection**, Andrew J. Tickle, David Kamfwa, Coventry Univ. (United Kingdom) [8540-20]

10:00: **Examination of data fusion for personnel identification**, Brian Maguire, Sachi V. Desai, U.S. Army Armament Research, Development and Engineering Ctr. (USA) [8540-21]

Coffee Break Thu 10:20 to 10:50

SESSION 6

Room: Tinto Thu 10:50 to 12:50
Unattended and Unmanned Technologies and Systems

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

10:50: **Wireless sensor networks in forest fire detection**, Daniel E. Parra-Beratto, Silvia E. Restrepo, Jorge E. Pezoa Nunez, Univ. de Concepción (Chile) [8540-22]

11:10: **An open communication and sensor platform for urban search and rescue operations**, Marko Korkalainen, Aki P. Mäyrä, Klaus M. Känslä, VTT Technical Research Ctr. of Finland (Finland) [8540-23]

11:30: **Embedded redundancy reduction guidance methodology for unmanned aircraft defense systems**, George Dekoulis, Frederick Univ. (Cyprus) [8540-24]

11:50: **Reconfigurable SoC for the robust control of UGVs**, George Dekoulis, Frederick Univ. (Cyprus) [8540-25]

12:10: **A formulation of bottom line requirements for next generation of unmanned sensor platforms and their networks**, Andre Samberg, Sec-Control Finland Ltd. (Finland) [8540-26]

12:30: **Land cover/use mapping using multi-band imageries captured by Cropcam Unmanned Aerial Vehicle Autopilot(UAV) over Penang Island, Malaysia**, Mohd Zubir MatJafri, Lim Hwee San, Tan Fuyi, Khiruddin Abdullah, Norhaslinda Mohammad Tahrin, Beh Boon Chun, Univ. Sains Malaysia (Malaysia) [8540-27]

Lunch Break Thu 12:50 to 14:00

SESSION 7

Room: Tinto Thu 14:00 to 15:00
Gunfire Related Technologies

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

14:00: **Wireless acoustic modules for real-time data fusion using asynchronous sniper localization algorithms**, Sébastien Hengy, Pascal Duffner, Sebastien De Mezzo, Pierre Naz, Institut Franco-Allemand de Recherches de Saint-Louis (France) [8540-28]

14:20: **Time-domain hybrid model for small caliber ballistic shocks**, Juan R Aguilar, Academia Politecnica Militar. Ejercito de Chile. (Chile); Sachi V. Desai, U.S. Army Armament Research, Development and Engineering Ctr. (USA) [8540-29]

14:40: **Substantial capability enhancement in small arms sensors using material improvements**, Slobodan Rajic, Panos G. Datskos, John T. Simpson, Scott R. Hunter, Oak Ridge National Lab. (USA) [8540-30]

Electro-Optical and Infrared Systems: Technology and Applications

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

Programme Committee: **Christopher C. Alexay**, StingRay Optics, LLC (USA); **Jan Yngve Andersson**, Acreo AB (Sweden); **Rainer Breiter**, AIM INFRAROT-MODULE GmbH (Germany); **Gordon A. Cain**, Vision4ce Ltd. (United Kingdom); **David J. Clarke**, SELEX Galileo Ltd. (United Kingdom); **Gérard L. Destéfanis**, CEA-LETI (France); **Jean-Claude L. Fontanella**, Thales Optronique S.A. (France); **Natan S. Kopeika**, Ben-Gurion Univ. of the Negev (Israel); **José Manuel López-Alonso**, Univ. Complutense de Madrid (Spain); **John F. Parsons**, Thales Optronics Ltd. (United Kingdom); **Stanley R. Rotman**, Ben-Gurion Univ. of the Negev (Israel); **Armin L. Schneider**, Institut Franco-Allemand de Recherches de Saint-Louis (France)

Tuesday 25 September

WELCOME AND INTRODUCTION

Room: Pentland Tue 8:25 to 8:30

SESSION 1

Room: Pentland Tue 8:30 to 10:10

Optical Materials and Optical Systems

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

8:30: **An investigation of material properties and performance for a selection of chalcogenide glasses for precision glass molding**, William V. Moreshead, Alan Symmons, Ray J. Pini, LightPath Technologies, Inc. (USA) [8541-1]

8:50: **Recent advancements in EO/IR sensor windows**, Shyam S. Bayya, Jasbinder S. Sanghera, Woohong Kim, Guillermo R. Villalobos, L. Brandon Shaw, U.S. Naval Research Lab. (USA); Ishwar Aggarwal, Sotera Defense Solutions, Inc. (USA) [8541-2]

9:10: **Multiscale optics for wide field-of-view thermal imaging**, Gonzalo Muyo, Heriot-Watt Univ. (United Kingdom); Alistair Gorman, Univ. of Glasgow (United Kingdom); Nicholas K. Bustin, Andrew P. Wood, Qioptiq Ltd. (United Kingdom); Andrew R. Harvey, Univ. of Glasgow (United Kingdom) [8541-3]

9:30: **Automated optical testing of LWIR objective lenses using focal plane array sensors**, Daniel Winters, Patrik Erichsen, Christian Domagalski, Frank Peter, Josef Heinisch, Eugen Dumitrescu, TRIOPTICS GmbH (Germany) [8541-4]

9:50: **High resistant multispectral optical coatings for Infrared applications**, Michael Degel, E. Gitter, T. Wagner, M. Serwazi, JENOPTIK Optical Systems GmbH (Germany); Peter Maushake, JENOPTIK Optical Systems, Inc. (USA) [8541-61]

Coffee Break Tue 10:10 to 10:30

SESSION 2

Room: Pentland Tue 10:30 to 12:00

European Development in MCT FPAs: Invited Session

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

10:30: **IR detectors at AIM: status and roadmap (Invited Paper)**, Johann Ziegler, Rainer Breiter, Dettlef Eich, Joachim C. Wendler, Jan Wenisch, Richard Wollrab, AIM INFRAROT-MODULE GmbH (Germany) [8541-5]

11:00: **Status of IR detectors for high operating temperature produced by MOVPE growth of MCT on GaAs substrates (Invited Paper)**, Peter Knowles, Les Hipwood, Nick Shorrocks, Ian M Baker, Luke Pillans, Paul Abbott, Richard M Ash, Jay Harji, SELEX Galileo Infrared Ltd. (United Kingdom) [8541-6]

11:30: **Last developments of MCT focal plane arrays in France (Invited Paper)**, Michel Vuillermet, David Billon-Lanfrey, SOFRADIR (France); Gérard Destéfanis, CEA-LETI (France) [8541-7]

SESSION 3

Room: Pentland Tue 12:00 to 12:40

Detector Technologies I

Session Chairs: **Armin L. Schneider**, Institut Franco-Allemand de Recherches de Saint-Louis (France); **José Manuel López-Alonso**, Univ. Complutense de Madrid (Spain)

12:00: **High-performance MCT and QWIP IR detectors at Sofradir**, Yann Reibel, Laurent Rubaldo, Alexandre Kerlain, Alain Manissadjian, SOFRADIR (France); Rohtman Johan, Eric D. De Borniol, Gérard Destéfanis, CEA-LETI (France); Eric M. Costard, Thales Research & Technology (France) [8541-8]

12:20: **Uncooled 17 µm 1/4 VGA FPA development for compact and low power systems**, Jean-Luc M. Tissot, Patrick Robert, David Pochic, Vincent Gravot, Fabien Bonnaire, Hervé Clerambault, Alain Durand, Sebastien Tinnes, ULIS (France) [8541-9]

Lunch/Exhibition Break Tue 12:40 to 14:10

SESSION 4

Room: Pentland Tue 14:10 to 15:30

Detector Technologies II

Session Chairs: **Armin L. Schneider**, Institut Franco-Allemand de Recherches de Saint-Louis (France); **José Manuel López-Alonso**, Univ. Complutense de Madrid (Spain)

14:10: **Latest developments for pixel size reduction of uncooled IR-FPA at CEA, LETI**, Sebastien Becker, Pierre Imperinetti, Jean-Jacques Yon, Jean-Louis Ouvrier-Buffer, Valérie Goudon, Antoine Hamelin, Claire Vialle, Agnes Arnaud, CEA, LETI (France) ... [8541-10]

14:30: **320 x 240 uncooled IRFPA with pixel wise thin film vacuum packaging**, Jean-Jacques Yon, Geoffroy Dumont, Wilfried Rabaud, Sebastien Becker, Laurent Carle, Valérie Goudon, CEA, LETI, Minatec (France); Claire Vialle, CEA, LETI, Minatec (France); Antoine Hamelin, Agnès Arnaud, CEA, LETI, Minatec (France) [8541-11]

14:50: **Metamaterials for infrared microbolometers**, Dean P. Neikirk, Jong Yeon Park, Hoo Kim, The Univ. of Texas at Austin (USA); Joo-Yun Jung, Korea Institute of Machinery & Materials (Korea, Republic of) [8541-12]

15:10: **Short-wave infrared InGaAsSb photodiodes grown on GaAs substrates**, Andrew R. J. Marshall, Lancaster Univ. (United Kingdom); Kalyan C. Nunna, California NanoSystems Institute (USA); Siew Li Tan, The Univ. of Sheffield (United Kingdom); Charles J. Reyner, Univ. of California, Los Angeles (USA); Baolai Liang, California NanoSystems Institute (USA); Anitha Jallipalli, Univ. of California, Los Angeles (USA); John P. R. David, The Univ. of Sheffield (United Kingdom); Diana L. Huffaker, Univ. of California, Los Angeles (USA) and California NanoSystems Institute (USA) [8541-13]

Coffee Break Tue 15:30 to 16:00

SESSION 5

Room: Pentland **Tue 16:00 to 17:40**

Sensor Systems and Related Technologies I

Session Chairs: **David J. Clarke**, SELEX Galileo Ltd. (United Kingdom); **Christopher C. Alexay**, StingRay Optics, LLC (USA)

16:00: **A novel snapshot polarimetric imager**, Gerald J Wong, Ciaran McMaster, Robert Struthers, SELEX Galileo Ltd. (United Kingdom); Alistair Gorman, Univ. of Glasgow (United Kingdom); Peter Sinclair, Robert A. Lamb, SELEX Galileo Ltd. (United Kingdom); Andrew R. Harvey, Univ. of Glasgow (United Kingdom) [8541-15]

16:20: **Polarimetric imaging for air accident investigation**, Mark D. Ashe, Grant J. Privett, Defence Science and Technology Lab. (United Kingdom); Dennis Holland, JARIC - The National Imagery Exploitation Ctr. (United Kingdom); Matthew Greaves, Cranfield Univ. (United Kingdom); Les Davidson, Defence Science and Technology Lab. (United Kingdom) [8541-16]

16:40: **OTHELLO: a novel SWIR dual band detection system and its applications**, Gil A. Tidhar, Elta Systems Ltd. (Israel) [8541-17]

17:00: **Archeological treasures protection based on early forest wildfire multi-band imaging detection system**, Benedict Gouverneur, Xenics NV (Belgium); Steven Verstockt, IBBT (Belgium); Eric J. Pauwels, Jungong Han, Paul M. de Zeeuw, Ctr. voor Wiskunde en Informatica (Netherlands); Jan P. Vermeiren, Xenics NV (Belgium) [8541-18]

17:20: **Acoustic and optical multisensor threat detection system for border patrol against aerial threats**, Motasem S. Alsawadi, Ahmad Ismail, Munir M. El-Desouki, Sultan Alghamdi, Mansour Alghamdi, Mansour Alghamdi, King Abdulaziz City for Science and Technology (Saudi Arabia); Badeea F. Al-Azem, Alfaisal Univ. (Saudi Arabia) [8541-19]

Wednesday 26 September

SESSION 6

Room: Pentland **Tue 8:50 to 10:50**

Sensor Systems and Related Technologies

Session Chairs: **John F. Parsons**, Thales Optronics Ltd. (United Kingdom); **Gordon A. Cain**, Vision4ce Ltd. (United Kingdom)

8:50: **A compact 2048x1536 pixel infrared imager for long distance surveillance**, Claude Chevalier, Nathalie Blanchard, Anne Martel, Marc Terroux, Carl Vachon, Luc Mercier, Lucie Gagnon, Bruno Tremblay, Linda Marchese, Alain Bergeron, INO (Canada) . . . [8541-20]

9:10: **Evaluation of appropriate sensor specifications for space based ballistic missile detection**, Caroline Schweitzer, Norbert Wendelstein, Karin Stein, Fraunhofer Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [8541-21]

9:30: **Thermal imaging for current D&S priorities**, Robert Craig, John Parsons, Thales UK (United Kingdom) [8541-60]

9:50: **Infrared detection, recognition and identification of handheld objects**, Uwe Adomeit, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [8541-22]

10:10: **Electro-optical sensor with automatic suppression of laser dazzling**, Gunnar Ritt, Bernd Eberle, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [8541-23]

Coffee Break Wed 10:30 to 11:00

SESSION 7

Room: Pentland **Wed 11:00 to 12:40**

Lasers and Active Sensors

Session Chairs: **José Manuel López-Alonso**, Univ. Complutense de Madrid (Spain);

Rainer Breiter, AIM INFRAROT-MODULE GmbH (Germany)

11:00: **Intracavity, common resonator, Nd:YAG pumped KTP OPO**, James D. Beedell, SELEX Galileo Ltd. (United Kingdom) and Heriot-Watt Univ. (United Kingdom); David Legge, Ian F. Elder, SELEX Galileo Ltd. (United Kingdom); Duncan P. Hand, Heriot-Watt Univ. (United Kingdom) [8541-25]

11:20: **Athermal diode-pumped laser designator modules for targeting application**, Bruno Crépy, Guillaume Closse, José Da Cruz, David Sabourdy, Luc Nguyen Duy, Jean E. Montagne, CILAS (France) [8541-26]

11:40: **3D sensor for indirect ranging with pulsed laser source**, Danilo Bronzi, Simone Bellisai, Federica A. Villa, Carmelo Scarcella, Andrea Bahgat Shehata, Alberto Tosi, Giorgio M. Padovini, Franco Zappa, Politecnico di Milano (Italy); Daniel Durini, Sascha Weyers, Werner Brockherde, Fraunhofer-Institut für Mikroelektronische Schaltungen und Systeme (Germany) [8541-30]

12:00: **Development of highly compact and low power consumption athermal military laser designators**, Andrew Sijan, SELEX Galileo Ltd. (United Kingdom) [8541-31]

12:20: **IR thermography methods in detection of buried mines**, Waldemar Swiderski, Pawel Hlosta, Maciej Miszczak, Military Institute of Armament Technology (Poland) [8541-32]

Lunch/Exhibition Break Wed 12:40 to 14:00

SESSION 8

Room: Pentland **Wed 14:00 to 16:10**

Processing for Sensor Systems

Session Chairs: **Armin L. Schneider**, Institut Franco-Allemand de Recherches de Saint-Louis (France); **Jan Yngve Andersson**, Acreo AB (Sweden)

14:00: **High dynamic range compression for visualization of IR images in maritime scenarios**, Alessandro Rossi, Università di Pisa (Italy); Nicola Acito, Accademia Navale di Livorno (Italy); Marco Diani, Giovanni Corsini, Univ. di Pisa (Italy) [8541-33]

14:20: **IR-videostream rendering based on high-level object information**, Stefan Becker, Wolfgang Hübner, Michael Arens, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [8541-34]

14:40: **3D building structure generation from digital aerial images**, Gaojin Wen, Beijing Institute of Space Mechanics and Electricity (China); Guijuan Zhang, Shenzhen Institute of Advanced Technology (China); Weiwei Zhang, Zhaorong Lin, Yigang Yao, Qian Zhang, Beijing Institute of Space Mechanics and Electricity (China) [8541-35]

Coffee Break Wed 15:00 to 15:30

15:30: **A hardware Kalman-based offset estimator for nonuniformity correction on IRFPA**, Miguel E. Figueroa, Javier Contreras, Rodolfo Redlich, Sergio N. Torres, Univ. de Concepción (Chile) [8541-36]

15:50: **Digital image processing techniques for uncooled LWIR thermal camera**, Thiago Bittencourt, Centro Tecnológico do Exército (Brazil); Adilson Gonzaga, Univ. de São Paulo (Brazil) [8541-37]

POSTERS—WEDNESDAY
Wed 17:40 to 19:10

Thursday 27 September

SESSION 9

Room: Pentland Thu 8:40 to 11:10

Processing: Detection and Tracking

Session Chairs: **David J. Clarke**, SELEX Galileo Ltd. (United Kingdom); **Christopher C. Alexay**, StingRay Optics, LLC (USA)

8:40: Long range staring and wide area assisted detection onboard land fighting vehicles, Douglas J. Macdonald, Thales Optronics Ltd. (United Kingdom). [8541-38]

9:00: Single frame IR point target detection based on a Gaussian mixture model classification, Laure Genin, ONERA (France) and Astrium Satellites (France); Frédéric Champagnat, Guy Le Besnerais, ONERA (France) [8541-39]

9:20: Vehicle detection using multimodal imaging sensors from a moving platform, Christopher N Dickson, Thales UK (United Kingdom) and Heriot-Watt Univ. (United Kingdom); Matthew Kitchin, Thales UK (United Kingdom); Andrew M. Wallace, Heriot-Watt Univ. (United Kingdom); Barry Connor, Thales UK (United Kingdom) [8541-40]

9:40: A research of the maritime moving target detection onboard processing techniques based on optical remote sensing, Yanhua Li, Beijing Institute of Space Mechanics and Electricity (China) [8541-41]

Coffee Break Thu 10:00 to 10:30

10:30: Foreground/background separation methods for low SNR target tracking, John R. Maclean, SELEX Galileo Ltd. (United Kingdom) [8541-42]

10:50: A continuous object tracking system with stationary and moving camera modes, Deniz Emeksziz, Alptekin Temizel, Middle East Technical Univ. (Turkey) [8541-43]

SESSION 10

Room: Pentland Thu 11:10 to 12:10

Spectral Sensing

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

11:10: SR 5000N: a new IR spectroradiometer implementation, Dario Cabib, Amir Gil, Shmuel Shapira, Moshe Lavi, Uri Milman, CI Systems (Israel) Ltd. (Israel). [8541-44]

11:50: Influence of area focal plane arrays on the deterioration of interference modulation for fourier transform spectral imaging, Xiarui Guo, Yan Li, Dongdong Fan, China Academy of Space Technology (China) [8541-46]

Conference attendees are invited to attend the Security + Defence Poster Session on Wednesday afternoon. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x32248.xml>.

Speckle reduction of polarization image using CLEAN algorithm, Xuguo Zhang, Zhaorong Lin, Li Wang, Beijing Institute of Space Mechanics and Electricity (China) [8541-29]

Design and implementation of digital airborne multispectral camera system, Zhaorong Lin, Xuguo Zhang, Li Wang, Deai Pan, Beijing Institute of Space Mechanics and Electricity (China) [8541-45]

Comparative analysis of high-performance infrared avalanche Hg_{1-x}Cd_xTe and In_xGa_{1-x}As_yP_{1-y} heterophotodiodes, Mikhail S. Nikitin, Alpha (Russian Federation); Viacheslav A. Kholodnov, Albina A. Drugova, Institute of Radio Engineering and Electronics (Russian Federation); Galina V. Chekanova, Alpha (Russian Federation) [8541-47]

Design of large-field hyperspectral imaging system, ZhengHui Zhang, Beijing Institute of Space Mechanics and Electricity (China) [8541-48]

The technology of non-uniformity correction for mid-infrared channel based on adjusting integration time to acquire imaging of single and uniform radiation field, Zhicheng Shi, Beijing Institute of Space Mechanics and Electricity (China) [8541-49]

Determination of range parameters of observation devices, Jaroslaw Barela, Mariusz Kastek, Krzysztof Firmanty, Piotr Trzaskawka, Rafal Dulski, Juliusz Kucharz, Military Univ. of Technology (Poland) [8541-50]

360° panoramic dynamic data acquisition system based on unmanned helicopter, Yigang Yao, Beijing Institute of Space Mechanics and Electricity (China); Shuguang Zhao, Tianjin Aurora UAV Technology Co., Ltd. (China); Zhaorong Lin, Gaojin Wen, Qing Zhang, Weiwei Zhang, Beijing Institute of Space Mechanics and Electricity (China) [8541-51]

Testing of hardware implementation of infrared image enhancing algorithm, Rafal Dulski, Tomasz Sosnowski, Piotr Trzaskawka, Mariusz Kastek, Tadesz Piatkowski, Juliusz Kucharz, Military Univ. of Technology (Poland) [8541-52]

narcissus analysis of cooled IR optical system with multi-magnification in wide field of view, Jinsuk Hong, Youngsoo Kim, Samsung Thales Co., Ltd. (Korea, Republic of) [8541-53]

High resolution and high frame rate three-dimensional LADAR architecture utilizing a large area detector, Bongki Mheen, Electronics and Telecommunications Research Institute (Korea, Republic of) [8541-54]

Research on sensor technology of Lamb-wave signal acquisition using optical low-coherence, Yongkai Zhu, Nanjing Univ. of Aeronautics and Astronautics (China) [8541-55]

Determining the responsivity of microbolometer FPA using variable optical aperture stop, Grzegorz Bieszczad, S?awomir Gogler, Tomasz Sosnowski, Henryk Madura, Juliusz Kucharz, Military Univ. of Technology (Poland); Alicja Zarzycka, Bumar ?o?nierz S. A. (Poland) [8541-56]

Model of an optical system's influence on sensitivity of microbolometric focal plane array, Slawomir Gogler, Grzegorz Bieszczad, Military Univ. of Technology (Poland); Alicja Zarzycka, Bumar Zolnierz S. A. (Poland); Magdalena Szymanska, Warsaw University of Technology, The Faculty of Electronics and Information Technology (Poland); Tomasz Sosnowski, Military Univ. of Technology (Poland) [8541-57]

Research on infrared small-target tracking technology under complex background, Lei Liu, Nanjing Univ. of Science & Technology (China); Xin Wang, Hohai Univ. (China); Jilu Chen, Tao Pan, Nanjing Univ. of Science & Technology (China) [8541-58]

Solution based Al/PbS and Ti-Au/PbS Schottky Photodiodes for SWIR detection, Emre Heves, Yasar Gurbuz, Sabanci Univ. (Turkey) [8541-59]

Electro-Optical Remote Sensing

Conference Chairs: **Gary W. Kamerman**, FastMetrix, Inc. (USA); **Ove Steinvall**, Swedish Defence Research Agency (Sweden)

Programme Committee: **Robert J. Grasso**, Northrop Grumman Electronic Systems (USA); **Laurent Hespel**, ONERA (France); **Dennis K. Killinger**, Univ. of South Florida (USA); **Martin Laurenzis**, Institut Franco-Allemand de Recherches de Saint-Louis (France); **Peter Lutzmann**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Kenneth John McEwan**, Defence Science and Technology Lab. (United Kingdom); **Vasyl Molebny**, National Taras Shevchenko Univ. of Kyiv (Ukraine); **Philip J. Russell**, Max Planck Institute for the Science of Light (Germany); **Peter N. Randall**, QinetiQ Ltd. (United Kingdom); **Philippe Réfrégier**, Institut Fresnel (France); **Monte D. Turner**, Defense Advanced Research Projects Agency (USA); **Maria Josefa Yzuel**, Univ. Autònoma de Barcelona (Spain)

Tuesday 25 September

WELCOME AND INTRODUCTION

Room: Sidlaw Tue 13:00 to 13:10

SESSION 1

Room: Sidlaw Tue 13:10 to 15:00

Active Imaging and Mapping

Session Chair: **Gary W. Kamerman**, FastMetrix, Inc. (USA)

13:10: **A decade of experience from commercial laser range sensors for ground applications** (*Invited Paper*), Håkan Larsson, Swedish Defence Research Agency (Sweden) [8542-39]

13:40: **Range gated imaging with speckle-free and homogeneous laser illumination**, Martin Laurenzis, Jean-Michel Poyet, Yves Lutz, Alexis Matwyschuk, Frank Christnacher, Institut Franco-Allemand de Recherches de Saint-Louis (France) [8542-2]

14:00: **Coding of range-gates with ambiguous sequences for extended three-dimensional imaging**, Martin Laurenzis, Emmanuel Bacher, Nicolas Metzger, Stéphane Schertzer, Frank Christnacher, Institut Franco-Allemand de Recherches de Saint-Louis (France) [8542-3]

14:20: **Range accuracy of a Gated-Viewing system as a function of the number of averaged images**, Benjamin Göhler, Peter Lutzmann, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [8542-4]

14:40: **Identification of handheld objects and human activities in active and passive imaging**, Ove Steinvall, Magnus Elmqvist, Rolf T. I. Persson, Swedish Defence Research Agency (Sweden) [8542-5]

Coffee Break Tue 15:00 to 15:30

SESSION 2

Room: Sidlaw Tue 15:30 to 17:00

Passive Electro-Optical Systems and Processing Techniques

Session Chair: **Gary W. Kamerman**, FastMetrix, Inc. (USA)

15:30: **Infrared focal plane detector modules for space applications at AIM** (*Invited Paper*), Dominique Hübner, Kai-Uwe Gassmann, Markus Haiml, Luis-Dieter Haas, Stefan Hanna, Andreas Weber, Johann Ziegler, Hans-Peter Nothaft, Richard Thöt, Wolfgang Fick, AIM INFRAROT-MODULE GmbH (Germany) [8542-6]

16:00: **A decision surface-based taxonomy of detection statistics**, François Bouffard, Defence Research and Development Canada - Valcartier (Canada) [8542-7]

16:20: **Implementation of a filters array on a VisSWIR InGaAs sensor for contrast enhancement**, Jean-Luc Reverchon, Odile Huet, Jean Decobert, Mauricio Pires, Maxime Pozzi, Anne Rouvie, Jean-Patrick Truffer, Alcatel-Thales III-V Lab. (France); Bogdan Arion, Yang Ni, Vincent Noguier, New Imaging Technologies (France) ... [8542-10]

16:40: **Spectral reflectance of Kelantan Estuary with ALOS data to estimate turbidity and transparency**, Saumi Syahreza, Univ. Sains Malaysia (Malaysia) and Syiah Kuala Univ. (Indonesia); Muhammad Z. Mat Jafri, Hwee-San Lim, Univ. Sains Malaysia (Malaysia) ... [8542-11]

Wednesday 26 September

SESSION 3

Room: Sidlaw Wed 9:00 to 10:20

Active Systems and Technology I

Session Chair: **Ove K Steinvall**, Swedish Defence Research Agency (Sweden)

9:00: **3D imaging flash lidar for space applications**, Farzin Amzajerian, Vincent Roback, Paul Brewster, NASA Langley Research Ctr. (USA); Alexander Bulyshev, Analytical Mechanics Associates, Inc. (USA); Carl S. Mills, NASA Langley Research Ctr. (USA); William Carrion, Coherent Applications, Inc. (USA); Anna M. Noe, Bruce W. Barnes, NASA Langley Research Ctr. (USA) [8542-12]

9:20: **Multi-channel photon counting three-dimensional imaging laser radar system using fiber array coupled Geiger-mode avalanche photodiode**, Rong Shu, Genghua Huang, Libing Hou, Zhiping He, Yihua Hu, Shanghai Institute of Technical Physics (China) [8542-13]

9:40: **Kilometre range depth imaging at 1550nm wavelength using a superconducting nanowire single photon detector**, Nathan R. Gemmell, Aongus McCarthy, Ximing Ren, Nils J. Krichel, Michael G. Tanner, Robert H. Hadfield, Gerald S. Buller, Heriot-Watt Univ. (United Kingdom) [8542-14]

10:00: **Optical reflectance tomography using TCSPC laser radar**, Markus Henriksson, Tomas Olofsson, Christina A. Grönwall, Carl Brännlund, Lars J. Sjöqvist, Swedish Defence Research Agency (Sweden) [8542-15]

Coffee Break Wed 10:20 to 10:50

SESSION 4

Room: Sidlaw Wed 10:50 to 12:10

Active Systems and Technology II

Session Chair: **Kenneth John McEwan**, Defence Science and Technology Lab. (United Kingdom)

10:50: **A new gain control and amplifying circuit for the 3D imaging lidar**, Chunsheng Hu, Zongsheng Huang, Xingshu Wang, Ying Feng, National Univ. of Defense Technology (China) [8542-16]

11:10: **SPAD imagers for remote sensing at the single-photon level**, Federica A. Villa, Danilo Bronzi, Simone Bellisai, Gianluca Boso, Andrea Bahgat Shehata, Carmelo Scarcella, Alberto Tosi, Franco Zappa, Politecnico di Milano (Italy); Simone Tisa, Micro Photon Devices S.r.l. (Italy); Daniel Durini, Fraunhofer-Institut für Mikroelektronische Schaltungen und Systeme (Italy); Sascha Weyers, Werner Brockherde, Fraunhofer-Institut für Mikroelektronische Schaltungen und Systeme (Germany) [8542-17]

11:30: **Real-time self-mixing sensor for vibration measurements**, Michele Norgia, Alessandro Magnani, Alessandro Pesatori, Politecnico di Milano (Italy) [8542-18]

11:50: **Measurement and modeling of laser range profiling of small maritime targets**, Ove Steinvall, Tomas R. Chevalier, Carl Brännlund, Swedish Defence Research Agency (Sweden) [8542-20]

Lunch/Exhibition Break Wed 12:10 to 13:40

SESSION 5

Room: Sidlaw **Wed 13:40 to 15:30**

Signal and Image Processing I

Session Chair: **Laurent Hespel**, ONERA (France)

13:40: **Practical issues in automatic 3D reconstruction and navigation applications using man-portable or vehicle-mounted sensors** (*Invited Paper*), Chris Harris, Carl Stennett, Estelle Tidey, Roke Manor Research Ltd. (United Kingdom) [8542-21]

14:10: **Segmentation, classification, and pose estimation of maritime targets in flash-ladar imagery**, Walter Armbruster, Marcus Hammer, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [8542-22]

14:30: **Consistency in multimodal automated target detection using temporally filtered reporting**, Toby P. Breckon, Ji W. Han, Cranfield Univ. (United Kingdom); Julia Richardson, Stellar Research Services (United Kingdom) [8542-23]

14:50: **Sensor fusion for improved indoor navigation**, Erika Emilsson, Joakim Rydell, Swedish Defence Research Agency (Sweden) [8542-24]

15:10: **Object tracking in the video sequence based on the automatic selection of the appropriate coordinate estimation method**, Boris A. Alpatov, Pavel V. Babayan, Sergey Smirnov, Ryazan State Radio Engineering Univ. (Russian Federation) [8542-25]

Coffee Break Wed 15:30 to 16:00

SESSION 6

Room: Sidlaw **Wed 16:00 to 17:30**

Signal and Image Processing II

Session Chair: **Vasyl Molebny**, National Taras Shevchenko Univ. of Kyiv (Ukraine)

16:00: **An overview of turbulence compensation** (*Invited Paper*), Klamer Schutte, Adam van Eekeren, Judith Dijk, Piet B. W. Schwering, Miranda van Iersel, TNO Defence, Security and Safety (Netherlands); Niek Doelman, TNO (Netherlands) [8542-26]

16:30: **Active range imaging via random gating**, Grigorios Tsagkatakis, Foundation for Research and Technology-Hellas (Greece); Arnaud Woiselle, Sagem (France); George Tzagkarakis, Commissariat à l'Énergie Atomique (France); Marc Bousquet, Sagem (France); Jean-Luc Starck, Commissariat à l'Énergie Atomique (France); Panagiotis Tsakalides, Foundation for Research and Technology-Hellas (Greece) [8542-27]

16:50: **Semi-automatic people counting in aerial images of large crowds**, Christian Herrmann, Juergen Metzler, Dieter N Willersinn, Fraunhofer Institute of Optronics, System Technologies and Image Exploitation IOSB (Germany) [8542-29]

17:10: **The design of image stabilization control system**, Zhe Lin, Fei Yu, Beijing Institute of Space Mechanics and Electricity (China); Chunnan Wu, China Academy of Space Technology (China); Xiao-jun Kang, Beijing Institute of Space Mechanics and Electricity (China) [8542-30]

POSTERS—WEDNESDAY

Wed 17:40 to 19:10

Conference attendees are invited to attend the Security + Defence Poster Session on Wednesday afternoon. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x32248.xml>.

Analysis of the application of mid-wave infrared HgCdTe FPAs on remote sensing systems, Xiaoman Li, Beijing Institute of Space Mechanics and Electricity (China) [8542-9]

A wideband low-noise pulse laser detection circuit for the 3D imaging lidar, Chunsheng Hu, Zongsheng Huang, Xingshu Wang, Shiqiao Qin, National Univ. of Defense Technology (China) . . [8542-31]

Disturbance observer based control system design for inertially stabilized platform, Chunnan Wu, Zhe Lin, Beijing Institution of Space Mechanics and Electricity (China) [8542-32]

Circular Variable Filters (CVF) at CI: progress and new performance, Dario Cabib, CI Systems (Israel) Ltd. (Israel); Henry J. B. Orr, Nelson Consulting Partnership (United Kingdom) [8542-33]

A compact rangefinder based on self-mixing interferometry, Michele Norgia, Alessandro Magnani, E. Nastasi, Alessandro Pesatori, Politecnico di Milano (Italy) [8542-34]

Innovative optical sensor for displacement measurement by precision laser applications, Dumitru Ulieru, SITEX 45 (Romania); Florian N. Pistritu, National Institute for Research and Development in Microtechnologies (Romania); Adrian Tantau, SITEX 45 (Romania) [8542-35]

Water quality assessment in Kelantan delta using remote sensing technique, Mohd Riffan Mustapha, Hwee-San Lim, Saumi Syahreza, Mohd Zubir M. Jafri, Univ. Sains Malaysia (Malaysia) [8542-37]

Improved Hough transform for curve detection based on directional control of connected regions, Shi Yu, Yuan Jie, Guoyou Wang, Li XiuHua, Huazhong Univ. of Science and Technology (China) [8542-38]

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 Air Systems S.A. (France)

Programme Committee: **Helen Bennett**, QinetiQ Ltd. (United Kingdom); **Tibor Berceli**, Budapest Univ. of Technology and Economics (Hungary); **Gerald S. Buller**, Heriot-Watt Univ. (United Kingdom); **Béatrice Cabon**, Institut National Polytechnique de Grenoble (France); **Didier J. Decoster**, Univ. des Sciences et Technologies de Lille (France); **John P. R. David**, The Univ. of Sheffield (United Kingdom); **Hugh D. Griffiths**, Univ. College London (United Kingdom); **Dominique Hamoir**, ONERA (France); **Eddie L. Jacobs**, The Univ. of Memphis (USA); **Steven R. Jost**, BAE Systems (USA); **Chris R. Lawrence**, QinetiQ Ltd. (United Kingdom); **Robert A. Lamb**, SELEX Galileo Ltd. (United Kingdom); **Javier Marti**, Univ. Politécnic de Valencia (Spain); **Stephen P. McGeoch**, Thales Optronics Ltd. (United Kingdom); **Miguel A. Piqueras**, DAS Photonics (Spain); **Julien Poette**, Institut National Polytechnique de Grenoble (France); **Ian K. Proudler**, Malvern Innovations (United Kingdom); **Kevin Ridley**, Malvern Innovations (United Kingdom); **Alwyn J. Seeds**, Univ. College London (United Kingdom); **Béla Szentpáli**, Research Institute for Technical Physics and Materials Science (Hungary); **Ian A. W. Vance**, Photonics Leadership Group (United Kingdom); **Mauro G. Varasi**, Crisel Instruments, s.r.l. (Italy); **Jean-Pierre Vilcot**, Institut d'Electronique, de Microélectronique, et de Nanotechnologie (France)

Monday 24 September

WELCOME AND INTRODUCTION

Room: Sidlaw Mon 11:10 to 11:10

SESSION 7

Room: Sidlaw Mon 11:10 to 13:00

Integration

Session Chairs: **Keith L. Lewis**, Sciovis Ltd. (United Kingdom); **Robert A. Lamb**, SELEX Galileo Ltd. (United Kingdom)

11:10: **Future directions in information sciences research: the role of sensors and networks** (*Keynote Presentation*), John Pellegrino, Barbara D. Broome, U.S. Army Research Lab. (USA) [8542-40]

11:50: **The other end of the scale: coded apertures in the near field for high resolution 3D gamma event localization in bulk scintillators** (*Invited Paper*), Klaus P. Ziock, Oak Ridge National Lab. (USA); Joshua B. Braverman, The Univ. of Tennessee (USA); Lorenzo Fabris, Mark J. Harrison, Oak Ridge National Lab. (USA) . . . [8542-41]

12:20: **Enabling technologies for advanced imaging** (*Keynote Presentation*), Nibir K. Dhar, Defense Advanced Research Projects Agency (USA) [8542-42]

Lunch Break Mon 13:00 to 14:00

SESSION 8

Room: Sidlaw Mon 14:00 to 15:40

Active Imaging, Processing and Communication

Session Chairs: **Richard C. Hollins**; **Keith L. Lewis**, Sciovis Ltd. (United Kingdom); **Keith L. Lewis**, Sciovis Ltd. (United Kingdom); **Keith L. Lewis**, Sciovis Ltd. (United Kingdom)

14:00: **Depth imaging using single-photon detection** (*Keynote Presentation*), Gerald S. Buller, Heriot-Watt Univ. (United Kingdom) [8542-43]

14:40: **An all-optronic synthetic aperture lidar**, Simon Turbide, Linda Marchese, Marc Terroux, François Babin, Alain Bergeron, INO (Canada) [8542-44]

15:00: **A photon-counting optical communication system for underwater data transfer**, Philip A. Hiskett, Robert Struthers, Roy Tatton, Robert A. Lamb, SELEX Galileo Ltd. (United Kingdom) [8542-45]

15:20: **Evaluation of image deblurring methods via a classification metric**, Daniele Perrone, Heriot-Watt Univ. (United Kingdom); David Humphreys, Robert A. Lamb, SELEX Galileo Ltd. (United Kingdom); Paolo Favaro, Heriot-Watt Univ. (United Kingdom) [8542-46]

Coffee Break Mon 15:40 to 16:00

SESSION 9

Room: Sidlaw Mon 16:00 to 17:20

Emerging Technologies

Session Chairs: **Keith L. Lewis**, Sciovis Ltd. (United Kingdom); **Nibir K. Dhar**, Defense Advanced Research Projects Agency (USA)

16:00: **Controlling the localization and migration of optical excitation** (*Keynote Presentation*), David L Andrews, David S Bradshaw, Univ. of East Anglia Norwich (United Kingdom) . . [8542-47]

16:40: **Mid-infrared photonics enabled by 3D laser writing chalcogenide glass**, Airán Ródenas, John McCarthy, Heriot-Watt Univ. (United Kingdom); Nicholas D Psaila, Optoscribe Ltd. (United Kingdom); Graeme Brown, Henry T. Bookey, Robert R. Thomson, Ajay K. Kar, Heriot-Watt Univ. (United Kingdom) [8542-48]

17:00: **Efficient, massively parallel exploration of networks by biological agents**, Dan V. Nicolau, Univ. of Liverpool (United Kingdom); Dan V. Nicolau Jr., Molecular Sense Ltd. (United Kingdom) [8542-49]

Tuesday 25 September

SESSION 10

Room: Sidlaw Tue 8:30 to 10:30

Nanophotonics and Sensors

Session Chairs: **Nibir K. Dhar**, Defense Advanced Research Projects Agency (USA); **Robert A. Lamb**, SELEX Galileo Ltd. (United Kingdom)

8:30: **Plasmonics in nanophotonics and sensing** (*Keynote Presentation*), Anatoly V. Zayats, King's College London (United Kingdom) [8542-50]

9:10: **Developments in MOVPE HgCdTe arrays for passive and active infrared imaging** (*Keynote Presentation*), Ian M Baker, Chris Maxey, Les Hipwood, Harald Weller, Peter Thorne, SELEX Galileo Ltd. (United Kingdom) [8542-51]

9:50: **Linear photon-counting HgCdTe APDs**, Gauthier Vojetta, Lydie Mathieu, Fabrice Guellec, CEA-LETI-Minatec (France); Philippe Feautrier, Institut de Planétologie et d'Astrophysique de Grenoble (France); Johan Rothman, CEA-LETI-Minatec (France) [8542-52]

10:10: **Fabrication of novel 3D stacked microbolometers for multispectral infrared detection**, Jong Yeon Park, Dean P. Neikirk, The Univ. of Texas at Austin (USA) [8542-53]

Coffee Break Tue 10:30 to 11:00

SESSION 11

Room: Sidlaw Tue 11:00 to 12:20

Metamaterials, Lasers and Guided Wave Technologies

Session Chairs: **Thomas J. Merlet**, Thales Air Systems S.A. (France); **Keith L. Lewis**, Sciovis Ltd. (United Kingdom)

11:00: **Advances in active and nonlinear metamaterials** (*Keynote Presentation*), Allan D Boardman, Rhiannon Mitchell-Thomas, Univ. of Salford (United Kingdom); Yuriy Rapoport, Kyiv National University (Ukraine) [8542-54]

11:40: **Latest developments in AlGaInN laser diode technology for defence applications**, Stephen Najda, Piotr Perlin, TopGaN Ltd. (Poland); T Suski, L Marona, Institute of High Pressure Physics PAS (Poland); M M. Bożkowski, M M. Leszczyński, P Wisniewski, R Czernecki, TopGaN Ltd. (Poland); R Kucharski, Ammono S.A. (Poland); G Targowski, TopGaN Ltd. (Poland) [8542-55]

12:00: **Emerging optical fibre technologies with potential defence applications**, Wei H. Loh, Dan W. Hewak, Marco Petrovich, John R. Hayes, Will J. Stewart, W. Andrew Clarkson, Univ. of Southampton (United Kingdom). [8542-56]

Wednesday 26 September

POSTERS—WEDNESDAY
Wed 17:40 to 19:10

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Test environment for image synthesis of a single pixel camera, Marcin Kowalski, Marek Piszczek, Mieczyslaw Szustakowski, Military Univ. of Technology (Poland) [8542-57]

Determination of the density-of-states function in highly degenerate semiconductors in the existence of electric field strength, Subhamoy Singha Roy, JIS College of Engineering (India). [8542-58]

Quantum-Physics-Based Information Security

Conference Chairs: **Mark T. Gruneisen**, Air Force Research Lab. (USA); **Miloslav Dusek**, Palacký 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); **John Gonglewski**, European Office of Aerospace R&D (United Kingdom); **Richard J. Hughes**, Los Alamos National Lab. (USA); **Gregory S. Kanter**, NuCrypt LLC (USA); **Prem Kumar**, Northwestern Univ. (USA); **Norbert Lütkenhaus**, Univ. of Waterloo (Canada); **Vadim V. Makarov**, Norwegian Univ. of Science and Technology (Norway); **Ronald E. Meyers**, U.S. Army Research Lab. (USA); **Jane E. Nordholt**, Los Alamos National Lab. (USA); **Miles J. Padgett**, Univ. of Glasgow (United Kingdom); **Momtchil Peev**, Austrian Research Ctrs. GmbH - ARC (Austria); **Renato Renner**, ETH Zurich (Switzerland); **Andrew J. Shields**, Toshiba Research Europe Ltd. (United Kingdom); **Rupert Ursin**, Univ. Wien (Austria)

Tuesday 25 September

WELCOME AND INTRODUCTION

Room: Carrick 3 Tue 8:25 to 8:30

SESSION 12

Room: Carrick 3 Tue 8:30 to 10:20

Information Security: From Classical to Quantum

Session Chair: **John Rarity**, Bristol Univ. (United Kingdom)

8:30: **Information security: from classical to quantum** (*Invited Paper*), Stephen M Barnett, Thomas Brougham, Univ. of Strathclyde (United Kingdom) [8542-60]

9:00: **Direction in optical implementations of quantum key distribution** (*Invited Paper*), Norbert Lütkenhaus, Agnes Ferenczi, Raziieh Annabestani, Univ. of Waterloo (Canada); Xiongfang Ma, Tsinghua Univ. (China) [8542-61]

9:30: **Practical treatment of quantum bugs** (*Invited Paper*), Marco Lucamarini, Toshiba Research Europe Ltd. (United Kingdom); James F Dynes, Zhiliang L Yuan, Andrew J Shields, Toshiba Research Europe Ltd. (United Kingdom) and Corporate Research & Development Center, Toshiba Corporation (Japan) [8542-62]

10:00: **Towards long-distance continuous-variable quantum key distribution enforced by nonclassicality**, Vladyslav C. Usenko, Palacký Univ. Olomouc (Czech Republic) and Bogolyubov Institute for Theoretical Physics (Ukraine); Radim Filip, Palacký Univ. Olomouc (Czech Republic) [8542-63]

Coffee Break Tue 10:20 to 10:50

SESSION 13

Room: Carrick 3 Tue 10:50 to 12:00

Implementation of QKD and Other Quantum Protocols

Session Chair: **Miloslav Dusek**, Palacký Univ. (Czech Republic)

10:50: **High bit rate quantum key distribution** (*Invited Paper*), Zhiliang Yuan, James Dynes, Andrew Sharpe, Alex R. Dixon, Andrew J. Shields, Toshiba Research Europe Ltd. (United Kingdom) [8542-64]

11:20: **Report on proof-of-principle implementations of novel QKD schemes performed at INRIM**, Alessio Avella, INRIM (Italy) and Dipartimento di Fisica - Università di torino (Italy); Giorgio Brida, INRIM (Italy); Andrea Cavanna, Max Planck Institut für die Physik des Lichts (Germany); Dino Carpentras, Ivo Pietro Degiovanni, Marco Genovese, Marco Gramegna, Paolo Traina, INRIM (Italy) [8542-65]

11:40: **Experimental demonstration of quantum digital signatures**, Robert J. Collins, Patrick J. Clarke, Vedran Dunjko, Erika Andersson, Heriot-Watt Univ. (United Kingdom); John Jeffers, Univ. of Strathclyde (United Kingdom); Gerald S. Buller, Heriot-Watt Univ. (United Kingdom) [8542-66]

Lunch Break Tue 12:00 to 13:10

SESSION 14

Room: Carrick 3 Tue 13:10 to 15:00

Alternative Information Encoding in Quantum Cryptography

Session Chair: **Stephen Barnett**, Univ. of Strathclyde (United Kingdom)

13:10: **Photon orbital angular momentum: generation and measurement and application to QKD** (*Invited Paper*), Miles J. Padgett, Daniele Giovannini, Martin P. J. Lavery, Univ. of Glasgow (United Kingdom); Jacqui Romero, Univ. of Glasgow (United Kingdom) and Univ. of Strathclyde (United Kingdom); Stephen M. Barnett, Filippo Miatto, Univ. of Strathclyde (United Kingdom); Robert W. Boyd, Jonathan Leach, Univ. of Ottawa (Canada) . [8542-67]

13:40: **Projective quantum measurements on spatial modes of the photon**, Mark T. Gruneisen, Air Force Research Lab. (USA); Raymond C. Dymale, James P. Black, Boeing-SVS, Inc. (USA); Kurt E. Stoltenberg, Boeing-SVS, Inc. (USA) and Air Force Research Lab. (USA) [8542-68]

14:00: **The efficient sorting of light's orbital angular momentum for optical communications**, Martin P. J. Lavery, Univ. of Glasgow (United Kingdom); David Roberston, Durham Univ. (United Kingdom); Mehul Malik, Brandon Robenbourg, Univ. of Rochester (USA); Johannes Courtial, Univ. of Glasgow (United Kingdom); Robert W. Boyd, Univ. of Rochester (USA) and Univ. of Ottawa (Canada); Miles J. Padgett, Univ. of Glasgow (United Kingdom) [8542-69]

14:20: **Increasing the orbital angular momentum bandwidth of entangled photons**, Mary Jacqueline Romero, Univ. of Glasgow (United Kingdom) and Univ. of Strathclyde (United Kingdom); Daniele Giovannini, Sonja Franke-Arnold, Univ. of Glasgow (United Kingdom); Stephen M. Barnett, Univ. of Strathclyde (United Kingdom); Miles J. Padgett, Univ. of Glasgow (United Kingdom) [8542-70]

14:40: **High-dimensional spatial entanglement observed with an electron multiplying CCD camera**, Daniel S. Tasca, Matthew P. Edgar, Univ. of Glasgow (United Kingdom); Frauke Izdebski, Ryan E. Warburton, Heriot-Watt Univ. (United Kingdom); Jonathan Leach, Megan Agnew, Univ. of Ottawa (Canada); Gerald S. Buller, Heriot-Watt Univ. (United Kingdom); Robert W. Boyd, Univ. of Ottawa (Canada); Miles J. Padgett, Univ. of Glasgow (United Kingdom) [8542-71]

Coffee Break Tue 15:00 to 15:20

SESSION 15

Room: Carrick 3 Tue 15:20 to 16:20

Detectors for Quantum Cryptography and Quantum Information Processing

Session Chair: **Zhiliang Yuan**,
Toshiba Research Europe Ltd. (United Kingdom)

15:20: **Single-photon detectors for practical quantum cryptography** (*Invited Paper*), Alberto Tosi, Franco Zappa, Sergio Cova, Politecnico di Milano (Italy) [8542-72]

15:50: **Single photon detection and quantum cryptography** (*Invited Paper*), Gerald S. Buller, Patrick J. Clarke, Robert J. Collins, Heriot-Watt Univ. (United Kingdom) [8542-73]

SESSION 16

Room: Carrick 3 Tue 16:20 to 17:50

Device-Independent Quantum Cryptography

Session Chair: **Norbert Leutkenhaus**, Univ. of Waterloo (Canada)

16:20: **Device-independent security for quantum cryptography** (*Invited Paper*), Renato Renner, ETH Zurich (Switzerland) . . . [8542-74]

16:50: **Measurement-device-independent quantum key distribution protocol with weak coherent sources** (*Invited Paper*), Hoi-Kwong Lo, Univ. of Toronto (Canada); Marcos Curty, Univ. de Vigo (Spain); Bing Qi, Univ. of Toronto (Canada) [8542-75]

17:20: **Reference frame independence, device independence and limitless range quantum communications** (*Invited Paper*), John G. Rarity, Chengyong Hu, Univ. of Bristol (United Kingdom). . . [8542-76]

Military Applications in Hyperspectral Imaging and High Spatial Resolution Sensing

Conference Chairs: **Gary J. Bishop**, BAE Systems (United Kingdom); **John Goglewski**, European Office of Aerospace R&D (United Kingdom)

Programme Committee: **David C. Dayton**, Applied Technology Associates (USA); **Detlev M. Even**, NovaSol (USA); **Andrey V. Kanaev**, U.S. Naval Research Lab. (USA); **Ainsley Killey**, BAE Systems (United Kingdom); **Michael M. Myers**, Air Force Research Lab. (USA); **Jorge E. Pezoa**, Univ. de Concepción (Chile); **Michael F. Reiley**, H-Nu Photonics (USA); **Stanley R. Rotman**, Ben-Gurion Univ. of the Negev (Israel)

Monday 24 September

WELCOME AND INTRODUCTION

Room: Moorfoot Mon 11:10

SESSION 17

Room: Moorfoot Mon 11:10 to 12:30

Military Applications in Hyperspectral Imaging and High Spatial Resolution Sensing I

Session Chair: **Ainsley Killey**, BAE Systems (United Kingdom)

11:10: **TBA**, BAE Systems, (United Kingdom)

11:30: **A novel technique for adaptive anomalous change detection in airborne hyperspectral imagery**, Marco Diani, Salvatore Resta, Nicola Acito, Giovanni Corsini, Univ. di Pisa (Italy); Sergio U. de Ceglie, CISAM (Italy) [8542-81]

11:50: **People detection using fused hyperspectral and thermal imagery**, Adrian Blagg, BAE Systems (United Kingdom) [8542-82]

12:10: **A prior knowledge model for multidimensional striping noise compensation in hyperspectral imaging devices**, Pablo F. Meza Narvaez, Jorge E. Pezoa Nunez, Francisca I. Parra, Sergio N. Torres, Univ. de Concepción (Chile) [8542-83]

Lunch Break Mon 12:20 to 13:30

SESSION 18

Room: Moorfoot Mon 13:30 to 15:30

Military Applications in Hyperspectral Imaging and High Spatial Resolution Sensing II

Session Chair: **David C. Dayton**, Applied technology Associates (United States)

13:30: **Advanced hyperspectral imaging solutions for near real-time target detection**, Oliver Weatherbee, Justin Janaskie, SpecTIR, LLC (USA); Timo Hyvärinen, Specim Spectral Imaging Ltd. (Finland)..... [8542-84]

13:50: **Compact snapshot birefringent imaging Fourier transform spectrometer**, Michael W. Kudenov, Victoria C Chan, Eustace L. Dereniak, College of Optical Sciences, The Univ. of Arizona (USA) [8542-85]

14:10: **Compact medium-resolution hyperspectral imaging VIS/NIR sensors based on linearly variable filters for target identification and classification**, Michele Dami, Gianluca Aroldi, SELEX Galileo S.p.A. (Italy) [8542-86]

14:30: **Airborne infrared hyperspectral imager for intelligence, surveillance and reconnaissance applications**, Philippe Lagueux, Vincent Farley, Martin Chamberland, Telops (Canada); Eldon Puckrin, Caroline S. Turcotte, Defence Research and Development Canada, Valcartier (Canada); John C. R. Bastedo, PV Labs (Canada) . [8542-87]

14:50: **Remote sensing of gases by hyperspectral imaging: algorithms and results of field measurements**, Samer Sabbah, Peter Rusch, Bruker Optik GmbH (Germany); Jens Eichmann, Technische Univ. Hamburg-Harburg (Germany); Joern-Hinnrich Gerhard, Roland Harig, Bruker Optik GmbH (Germany) [8542-88]

15:10: **Evaluation of remote detection of explosives by multispectral and hyperspectral infrared detection techniques**, Mariusz Kastek, Tadeusz Piatkowski, Tomasz Sosnowski, Rafal Dulski, Piotr Trzaskawka, Norbert Palka, Stanislaw Cudzilo, Military Univ. of Technology (Poland) [8542-89]

Coffee Break Mon 15:30 to 16:00

SESSION 19

Room: Moorfoot Mon 16:00 to 18:00

Military Applications in Hyperspectral Imaging and High Spatial Resolution Sensing III

Session Chair: **John Goglewski**, European Office of Aerospace R&D (United Kingdom)

16:00: **A comparative study of algorithms for target detection in hyperspectral images**, Kailash C. Tiwari, Bharati Vidyapeeth's College of Engineering (India); Manoj K. Arora, Dharmendra P. Singh, Indian Institute of Technology Roorkee (India) [8542-90]

16:20: **Standoff aircraft IR characterization with ABB dual-band HSI**, Florent M. Prel, Louis M. Moreau, Stephane Lantagne, ABB Analytical Measurement (Canada); Ritchie D. Bullis Jr., Naval Air Warfare Ctr. Aircraft Div. (USA) and PRISM (USA); Claude B. Roy, Christian A. Vallières, Luc E. Levesque, ABB Analytical Measurement (Canada) [8542-91]

16:40: **Multispectral and hyperspectral measurements of smoke candles and soldier's camouflage equipment**, Philippe Lagueux, Telops (Canada); Mariusz Kastek, Tadeusz Piatkowski, Rafal Dulski, Military Univ. of Technology (Poland); Marc-André Gagnon, Telops (Canada); Piotr Trzaskawka, Military Univ. of Technology (Poland) [8542-92]

17:00: **Classification of parasite infected clams using hyperspectral images**, María J. Parra, Silvia E. Restrepo, Pablo F. Meza Narvaez, Jorge E. Pezoa Nunez, Sergio N. Torres, Miguel E. Figueroa, Univ. de Concepción (Chile) [8542-94]

17:20: **Project "Peregrine: In-flight processing and streaming of hyperspectral imagery: an overview of the MOD funded proof-of-concept**, David Burrige, Gareth Crisford, Exelis Visual Information Solutions (United Kingdom)..... [8542-95]

17:40: **Chromotomosynthesis for high speed hyperspectral imagery**, Randall L. Bostick, Glen P. Perram, Air Force Institute of Technology (USA) [8542-93]

Technologies for Optical Countermeasures

Conference Chairs: **David H. Titterton**, Defence Science and Technology Lab. (United Kingdom); **Mark A. Richardson**, Cranfield Univ. (United Kingdom)

Programme Committee: **Zahir Daya**, Defence Research and Development Canada, Atlantic (Canada); **Brian Butters**, Chemring Countermeasures Ltd. (United Kingdom); **Marc Eichhorn**, Institut Franco-Allemand de Recherches de Saint-Louis (France); **Ian F. Elder**, SELEX Galileo Ltd. (United Kingdom); **Robert J. Grasso**, Northrop Grumman Electronic Systems (USA); **Helena Jelinková**, Czech Technical Univ. in Prague (Czech Republic); **Stephen P. McGeoch**, Thales Optronics Ltd. (United Kingdom); **Espen Lippert**, Norwegian Defence Research Establishment (Norway); **Benoit Mellier**, DGA/DCE/CELAR (France); **Ric H. M. A. Schlijpen**, TNO Defence, Security and Safety (Netherlands); **Dirk Peter Seiffer**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Ove Steinvall**, Swedish Defence Research Agency (Sweden); **Mark R.G. Taylor**, Defence Science and Technology Organisation (Australia); **Hans Dieter Tholl**, Diehl BGT Defence GmbH & Co. KG (Germany); **Maria Willers**, Denel Dynamics (South Africa); **Nellis Willers**, Council for Scientific and Industrial Research (South Africa)

Wednesday 26 September

WELCOME AND INTRODUCTION

Room: Moorfoot Wed 8:50 to 9:00

SESSION 1

Room: Moorfoot Wed 9:00 to 10:20

Keynote Session

Session Chair: **Robert J. Grasso**,
Northrop Grumman Electronic Systems (USA)

9:00: **Trends in electronic warfare** (*Keynote Presentation*),
Carl R. Smith, Northrop Grumman Corp. (USA) [8543-1]

9:40: **Laser manufacturing: strategies for coping with the challenges** (*Keynote Presentation*),
John R. M Barr, SELEX Galileo Ltd. (United Kingdom) [8543-2]

Coffee Break Wed 10:20 to 10:50

SESSION 2

Room: Moorfoot Wed 10:50 to 12:10

QCLs

Session Chair: **Lars J. Sjöqvist**,
Swedish Defence Research Agency (Sweden)

10:50: **Quantum cascade lasers ready for IRCM applications** (*Invited Paper*),
Manijeh Razeghi, Northwestern Univ. (USA) .. [8543-3]

11:20: **New device development and 2 micron operation for IRCM** (*Invited Paper*),
Erwan L. Normand, Cascade Technologies Ltd. (United Kingdom) [8543-4]

11:50: **A hollow waveguide integrated optic QCL beam combiner**,
Ian F. Elder, Robert A. Lamb, SELEX Galileo Ltd. (United Kingdom);
Richard M. Jenkins, HollowGuide Ltd. (United Kingdom) [8543-5]

Lunch/Exhibition Break Wed 12:10 to 13:30

SESSION 3

Room: Moorfoot Wed 13:30 to 15:10

Two Micron I

Session Chair: **Ric Schlijpen**,
TNO Defence, Security and Safety (Netherlands)

13:30: **Efficient single-pass resonantly-pumped Ho:YAG laser** (*Invited Paper*),
Ian F. Elder, SELEX Galileo Ltd. (United Kingdom);
Timothy M. J. Kendall, Defence Science and Technology Lab. (United Kingdom) [8543-6]

14:00: **Fiber laser pumped high energy cryogenically cooled Ho:YLF laser** (*Invited Paper*),
Espen Lippert, Helge Fonnum, Knut Stenersen, Norwegian Defence Research Establishment (Norway) [8543-7]

14:30: **Operation improvement of side-pumped Er:Yb:glass lasers through optical compensation techniques**,
Marco Vitiello, Elisa Spinozzi, GEM elettronica (Italy) [8543-8]

14:50: **Single longitudinal mode and dual wavelength CW VBG lasers at 1342nm and 1064nm**,
Andrew L. White, Ian F. Elder, Gavin J. Hall, SELEX Galileo Ltd. (United Kingdom) [8543-9]

Coffee Break Wed 15:10 to 15:40

SESSION 4

Room: Moorfoot Wed 15:40 to 17:10

Two Micron II

Session Chair: **Ian F. Elder**, SELEX Galileo Ltd. (United Kingdom)

15:40: **High-energy laser research for infrared countermeasures** (*Invited Paper*),
Cobus C. Jacobs, Hencharl J. Strauss, Wayne S. Koen, Dieter Preussler, Lourens R. Botha, Oliver J. P. Collett, Council for Scientific and Industrial Research (South Africa); Christoph Bollig, Carl von Ossietzky Univ. Oldenburg (Germany) and Council for Scientific and Industrial Research (South Africa); M. J. Daniel Esser, Council for Scientific and Industrial Research (South Africa) . [8543-10]

16:10: **Ho:YAG (2.09µm) laser system pumped by cw Thulium fiber laser (1.9µm) with >120mJ pulse energy at 100Hz repetition rate**,
Karsten Schmidt, Christoph Reiter, Heike Voss, Frank Massmann, Martin D. Ostermeyer, IBL Innovative Berlin Laser GmbH (Germany) [8543-11]

16:30: **MILDA: Mid-infrared laser source for DIRCM application**,
Bruno Crépy, Guillaume Closse, Sandrine Cussat-Blanc, Marc Le Nevé, Jean E. Montagne, Pierre Morin, CILAS (France); Benoit Mellier, DGA-MI (France); Olivier Squaglia, CILAS (France) [8543-12]

16:50: **Demonstration of a wavelength selected optically pumped HBr laser**,
Wayne Koen, Cobus Jacobs, Christoph Bollig, Hencharl J. Strauss, Lourens R. Botha, M. J. Daniel Esser, Council for Scientific and Industrial Research (South Africa) [8543-13]

POSTERS—WEDNESDAY
Wed 17:40 to 19:10

Conference attendees are invited to attend the Security + Defence Poster Session on Wednesday afternoon. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x32248.xml>.

The European air defence high energy laser weapon project, Karsten Diener, Institut Franco-Allemand de Recherches de Saint-Louis (France); Rudolf Protz, MBDA Germany (Germany) . . . [8543-17]

Thursday 27 September

SESSION 5

Room: Moorfoot Thu 9:00 to 10:20

Laser Effects

Session Chair: **Hans Dieter Tholl**, Diehl BGT Defence GmbH & Co. KG (Germany)

9:00: Optics detection using a dual channel approach (*Invited Paper*), Lars J. Sjöqvist, Lars Allard, Göran Bolander, Magnus Pettersson, Sten Edström, Swedish Defence Research Agency (Sweden) [8543-14]

9:20: Non-lethal optical interruption (dazzling): technology, devices, and scenarios (*Invited Paper*), David Shannon, B.E. Meyers & Co., Inc. (USA) [8543-16]

9:40: Coherent source transverse field profiles and far-field energy distribution, Ron K Meyer, Northrop Grumman Electronic Systems (USA) [8543-26]

Coffee Break Thu 10:20 to 10:50

SESSION 6

Room: Moorfoot Thu 10:50 to 12:30

Modelling and Simulation I

Session Chair: **Lars J. Sjöqvist**, Swedish Defence Research Agency (Sweden)

10:50: Modelling infrared signatures of ships and decoys for countermeasures effectiveness studies (*Invited Paper*), Ric H. M. A. Schleijsen, Marianne A. Degache, Henry Veerman, Ronald van Sweeden, TNO Defence, Security and Safety (Netherlands); Bernadetta Devecchi, TNO (Netherlands) [8543-18]

11:20: An open-source toolkit for infrared calculation and data processing (*Invited Paper*), Cornelius J. Willers, Council for Scientific and Industrial Research (South Africa); Maria S. Willers, Petrus J van der Merwe, Denel Dynamics (South Africa); Johannes J. Calitz, Azwitamisi E. Mudau, Council for Scientific and Industrial Research (South Africa); Alta de Waal, Council for Scientific and Industrial Research (South Africa); Ricardo Augusto T. Santos, ITA (Brazil) [8543-19]

11:50: Modelling of self phase modulation for broadband DIRCM lasers, Robert A. Lamb, SELEX Galileo Ltd. (United Kingdom) [8543-20]

12:10: An intelligent tracking algorithm for an imaging infrared anti-ship missile, Greer J. Gray, Nabil Aouf, Mark A. Richardson, Cranfield Univ. (United Kingdom); Brian Butters, Meon Technology Ltd. (United Kingdom); Roy Walmsley, Chemring Countermeasures Ltd. (United Kingdom) [8543-21]

Lunch Break Thu 12:30 to 13:40

SESSION 7

Room: Moorfoot Thu 13:40 to 15:40

Modelling and Simulation II

Session Chair: **Ian F. Elder**, SELEX Galileo Ltd. (United Kingdom)

13:40: Simulating the DIRCM engagement: component and system level performance (*Invited Paper*), Cornelius J. Willers, Council for Scientific and Industrial Research (South Africa); Maria S. Willers, Denel Dynamics (South Africa) [8543-22]

14:10: Key considerations in infrared simulations of the missile-aircraft engagement (*Invited Paper*), Maria S. Willers, Denel Dynamics (South Africa); Cornelius J. Willers, Council for Scientific and Industrial Research (South Africa) [8543-23]

14:40: Future-proofing an aircraft self-protection IR signature database, Mrwan Alayed, Munir M. El-Desoukia, Motasem S. Alsawadi, Khalid Alghamdi, King Abdulaziz City for Science and Technology (Saudi Arabia); Attiah A. Al-Ghamdi, King Abdulaziz Univ. (Saudi Arabia); Cornelius J. Willers, Council for Scientific and Industrial Research (South Africa); Johannes J. Calitz, Council for Scientific and Industrial Research (Saudi Arabia); Azwitamisi E. Mudau, Dirk F. Bezuidenhout, Council for Scientific and Industrial Research (South Africa) [8543-24]

15:00: Aircraft plume infrared radiance inversion and subsequent simulation model, Stephanus J P Retief, Denel Dynamics (South Africa) [8543-25]

15:20: A novel system of equations for minimum resolvable contrast modelling and validation via measurements, Nicholas P. Smart, Thales Optronics Ltd. (United Kingdom) [8543-28]

Millimetre Wave and Terahertz Sensors and Technology

Conference Chairs: **Neil Anthony Salmon**, MMW Sensors Ltd. (United Kingdom); **Eddie L. Jacobs**, The Univ. of Memphis (USA)

Programme Committee: **Amir Abramovich**, Ariel Univ. Ctr. of Samaria (Israel); **Nicholas J. Bowring**, Manchester Metropolitan Univ. (United Kingdom); **Markus Peichl**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Douglas T. Petkie**, Wright State Univ. (USA); **Christopher A. Schuetz**, Phase Sensitive Innovations, Inc. (USA)

Wednesday 26 September

WELCOME AND INTRODUCTION

Room: Fintry Wed 13:25 to 13:30

SESSION 1

Room: Fintry Wed 13:30 to 15:00

Systems I

Session Chairs: **Neil Anthony Salmon**, MMW Sensors Ltd. (United Kingdom); **Nicholas J. Bowring**, Manchester Metropolitan Univ. (United Kingdom)

13:30: **Development of passive submillimetre-wave video imaging systems for security applications** (*Invited Paper*), Erik Heinz, Torsten May, Detlef Born, Gabriel Zieger, Anika Brömel, Solveig Anders, Viatcheslav Zakosarenko, Torsten Krause, André Krüger, Marco Schulz, Frank Bauer, Hans-Georg Meyer, Institut für Photonische Technologien e.V. (Germany) [8544-1]

14:00: **SUMIRAD: a near real-time mmw radiometer imaging system for threat detection in an urban environment**, Stephan Dill, Markus Peichl, Daniel Rudolf, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [8544-2]

14:20: **IMAGINE project: a low cost, high performance, monolithic passive mm-wave imager front-end**, Duncan Platt, Acreo AB (Sweden); Naomi E. Alexander, GATE S.A. (Spain); Peter Frijlink, OMMIC (France); John Hendricks, Rogers Corp. (Belgium); Ernesto Limiti, TECS - Technological Consulting Svcs S.R.L. (Italy); Sebastian Löffler, RHe Microsystems (Germany); Colin Macdonald, Rogers Corp. (United Kingdom); Hassan Maher, OMMIC (France); Lars Pettersson, Acreo AB (Sweden); Paul Rice, GATE S.A. (United Kingdom); Markus B. K. Riestler, Daniel Schulze, Dyconex AG (Switzerland); Vessen Vassilev, Chalmers Univ. of Technology (Sweden) [8544-3]

14:40: **Simulation and experiments to understand performance enhancements in aperture synthesis passive millimetre wave imagers**, Neil A. Salmon, MMW Sensors Ltd. (United Kingdom) [8544-4]

Coffee Break Wed 15:00 to 15:30

SESSION 2

Room: Fintry Wed 15:30 to 17:20

Systems II

Session Chairs: **Markus Peichl**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Eddie L. Jacobs**, The Univ. of Memphis (USA)

15:30: **3D millimetre-wave scanner for luggage and parcels** (*Invited Paper*), Helmut W. Essen, Ralph P. Zimmermann, Maxonic GmbH (Germany); Sebastian Hantscher, Fraunhofer FHR (Germany); Nils Pohl, Ruhr-Univ. Bochum (Germany) [8544-5]

16:00: **Design and integration of ACTPol, a millimeter-wavelength, polarization-sensitive receiver for the Atacama Cosmology Telescope**, Benjamin L. Schmitt, Univ. of Pennsylvania (USA); for the ACTPol Collaboration, Princeton Univ. (USA) [8544-6]

16:20: **Indoor portal security screening of personnel using a large aperture 35 GHz quasi-optical passive imaging system**, Neil Anthony Salmon, Peter N. Wilkinson, The Univ. of Manchester (United Kingdom) [8544-7]

16:40: **Millimeter-wave measuring system for biomedical application**, Yaroslav V. Savenko, Volodymyr I. Vodotovka, Fedir Repa, National Technical Univ. of Ukraine (Ukraine) [8544-8]

17:00: **Millimeter-wave technology and system for milk quality inspection**, Yaroslav V. Savenko, Fedir Repa, Volodymyr I. Vodotovka, National Technical Univ. of Ukraine (Ukraine) [8544-9]

POSTERS—WEDNESDAY

Room: Cromdale Hall Wed 17:40 to 19:10

Conference attendees are invited to attend the Security + Defence Poster Session on Wednesday afternoon. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x32248.xml>.

Perimeter surveillance using a miniaturized millimetre wave radar, Helmut W Essen, Maxonic GmbH (Germany); Stephan Stanko, Winfried Johannes, Fraunhofer FHR (Germany) [8544-21]

Frequency multidimensional classification applied for reflection spectra of hexogen-based explosives, Radoslaw Ryniec, Norbert Palka, Marek Piszczek, Mieczyslaw Szustakowski, Military Univ. of Technology (Poland) [8544-22]

Hot electron bolometer for detection of fast terahertz impulses from optical parametric oscillator, Norbert Palka, Przemyslaw Zagrajek, Military Univ. of Technology (Poland); Adam Czerwinski, Warsaw University of Technology, Faculty of Physics (Poland); Tomasz Trzcinski, Elzbieta Rurka, Mieczyslaw Szustakowski, Military Univ. of Technology (Poland); Maciej Sypek, Warsaw University of Technology, Faculty of Physics (Poland) [8544-23]

Improvement of passive THz camera images, Marcin Kowalski, Marek Piszczek, Norbert Palka, Mieczyslaw Szustakowski, Military Univ. of Technology (Poland) [8544-24]

Thursday 27 September

SESSION 3

Room: Fintry Thu 8:50 to 11:20

Devices

Session Chairs: **Douglas T. Petkie**, Wright State Univ. (USA); **Neil Anthony Salmon**, MMW Sensors Ltd. (United Kingdom)

8:50: **Unbiased and biased millimetre wave video detectors** (*Invited Paper*), Peter G. Huggard, Byron Alderman, Rutherford Appleton Lab. (United Kingdom); Jesús Grajal, Carlos G. Pérez-Moreno, Univ. Politécnica de Madrid (Spain) [8544-10]

9:20: **Components, concepts and technologies for useful video rate THz imaging**, Linda Marchese, Marc Terroux, Ovidiu Pancrati, Martin Bolduc, Hubert Jerominek, Alain Bergeron, INO (Canada) [8544-11]

9:40: **Amorphous semiconducting Y-Ba-Cu-O: a silicon-compatible material for IR uncooled sensitive detection with microsecond response time**, Alain J. Kreisler, Ecole Supérieure d'Electricité (France); Vishal S Jagtap, SUPELEC (France) and Univ Paris Diderot (France); Annick F Degardin, UPMC Univ Paris 06 (France) [8544-12]

Coffee Break Thu 10:00 to 10:20

10:20: **Low cost satellite receivers for aperture synthesis passive millimetre wave imaging**, Joel Radiven, The Univ. of Manchester (United Kingdom); Neil A. Salmon, MMW Sensors Ltd. (United Kingdom) [8544-13]

10:40: **Innovative monolithic detector for tri-spectral (THz, IR, Vis) imaging**, Stephane Pocas, CEA, LETI-MINATEC (France); Matteo Perenzoni, Nicola Massari, Fondazione Bruno Kessler (Italy); François Simoens, Jérôme Meilhan, Wilfried Rabaud, Sebastien Martin, Baptiste Delplanque, Pierre Imperinetti, Valérie Goudon, Claire Vialle, Agnès Arnaud, CEA, LETI-MINATEC (France) [8544-14]

11:00: **Micro-machined millimetre wave sensor array for FM radar application**, Janez Trontelj, Aleksander Sesek, Univ. of Ljubljana (Slovenia) [8544-15]

SESSION 4

Room: Fintry Thu 11:20 to 12:30

Image Processing and Phenomenology

Session Chairs: **Amir Abramovich**, Ariel Univ. Ctr. of Samaria (Israel); **Eddie L. Jacobs**, The Univ. of Memphis (USA)

11:20: **Simulating the operation of millimeter-wave imaging systems** (*Invited Paper*), Roger Appleby, Stuart Ferguson, Queen's Univ. Belfast (United Kingdom) [8544-17]

11:50: **A millimetre-wave MIMO radar system for threat detection in urban environments**, Andreas J. Kirschner, Johanna Guetlein, Sebastian Bertl, Juergen Detlefsen, Technische Univ. München (Germany) [8544-18]

12:10: **Real-time computer processing of image from the THz passive imaging device for the improving of images**, Vyacheslav A. Trofimov, Vladislav A. Trofimov, Lomonosov Moscow State Univ. (Russian Federation) [8544-20]

Optical Materials and Biomaterials in Security and Defence Systems Technology

Conference Chairs: **Roberto Zamboni**, Consiglio Nazionale delle Ricerche (Italy); **François Kajzar**, Univ. d'Angers (France); **Attila A. Szep**, Air Force Research Lab. (USA)

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. (USA); **Werner J. Blau**, Trinity College Dublin (Ireland); **Fabrice Charra**, Commissariat à l'Énergie Atomique (France); **Larry R. Dalton**, Univ. of Washington (USA); **Manfred Eich**, Technische Univ. Hamburg-Harburg (Germany); **Patrick Fenevrou**, Thales Research & Technology (France); **Barrett Flake**, European Office of Aerospace Research and Development (USA); **Marina Saphiannikova Grenzer**, Leibniz-Institut für Polymerforschung Dresden e.V. (Germany); **Emily M. Heckman**, Air Force Research Lab. (USA); **Charles Y. C. Lee**, Air Force Office of Scientific Research (USA); **Antoni C. Mitus**, Wroclaw Univ. of Technology (Poland); **Dieter Neher**, Univ. Potsdam (Germany); **Robert L. Nelson**, Air Force Research Lab. (USA); **Fahima Ouchen**, Air Force Research Lab. (USA); **Ullrich Pietsch**, Univ. Siegen (Germany); **Ileana Rau**, Polytechnical Univ. of Bucharest (Romania); **Niyazi Serdar Sariciftci**, Johannes Kepler Univ. Linz (Austria); **Renato Seeber**, Univ. degli Studi di Modena e Reggio Emilia (Italy); **Kenneth D. Singer**, Case Western Reserve Univ. (USA)

Wednesday 26 September

WELCOME AND INTRODUCTION

Room: Carrick 1&2 Wed 13:00 to 13:10

SESSION 1

Room: Carrick 1&2 Wed 13:10 to 15:00

Nonlinear Optics

Session Chair: **Ileana Bradusa Rau**, Polytechnical Univ. of Bucharest (Romania)

13:10: **Enhancement of the second harmonic response with the aspect ratio of gold nanorods** (*Keynote Presentation*), Isabelle N. Ledoux-Rak, Anu Singh, Ecole Normale Supérieure de Cachan (France); Anais Lehoux, Lab. de Chimie Physique (France) and Univ. Paris Sud (France); Joseph Zyss, Ecole Normale Supérieure de Cachan (France); Hynd Remita, Institut d'Électronique Fondamentale (France) and Univ. Paris Sud (France) [8545-1]

13:50: **Investigations of nanoparticles for optical power limiting** (*Invited Paper*), Bernd Eberle, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Olivier Muller, Institut Franco-Allemand de Recherches de Saint-Louis (France); Gunnar Ritt, Stefanie Dengler, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [8545-2]

14:20: **Mid- to long-wavelength infrared surface plasmon properties in doped zinc oxides**, Justin W. Cleary, Michael Snure, Kevin D. Leedy, Air Force Research Lab. (USA); David C. Look, Wyle Labs. (USA); Kurt G. Eyink, Air Force Research Lab. (USA); Ashutosh Tiwari, The Univ. of Utah (USA) [8545-3]

14:40: **Proposal of a novel method for all optical switching with MMI coupler**, Mehdi Tajaldini, Islamic Azad Univ. (Iran, Islamic Republic of) and Univ. Sains Malaysia (Malaysia); Mohd Zubir Mat Jafri, Univ. Sains Malaysia (Malaysia) [8545-4]

Coffee Break Wed 15:00 to 15:30

SESSION 2

Room: Carrick 1&2 Wed 15:30 to 17:10

Nonlinear Optics and Sensing

Session Chair: **Isabelle N. Ledoux-Rak**, École Normale Supérieure de Cachan (France)

15:30: **Semiconducting nanocrystals for photonic applications** (*Keynote Presentation*), Kwang-Sup Lee, Hannam Univ. (Korea, Republic of) [8545-5]

16:10: **Effects of the liquid-crystalline order on the light-induced deformation of azobenzene elastomers** (*Invited Paper*), Vladimir P. Toshchevikov, Marina Saphiannikova Grenzer, Gert Heinrich, Leibniz-Institut für Polymerforschung Dresden e.V. (Germany) [8545-6]

16:40: **Two photon photosensitizers for PDT: molecular engineering towards understanding of their excited state photophysics** (*Invited Paper*), P.-H. Lanoë, Univ. de Nantes (France); Thibault Gallavardin, Ecole Normale Supérieure de Lyon (USA); Bastien Mettra, Lab. de Chimie Physique (France); Cyrille Monnerau, Chantal Andraud, Ecole Normale Supérieure de Lyon (France) [8545-26]

POSTERS—WEDNESDAY Wed 17:40 to 19:10

Conference attendees are invited to attend the Security + Defence Poster Session on Wednesday afternoon. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x32248.xml>.

New side-chain azo-polymers for optical applications: Synthesis and characterization, Mitica Cezar Spiridon, Florica Adriana Jerca, Valentin Victor Jerca, Costin D. Nenitescu Institute of Organic Chemistry (Romania); Dan Sorin Vasilescu, Polytechnical Univ. of Bucharest (Romania); Dumitru Mircea Vuluga, Costin D. Nenitescu Institute of Organic Chemistry (Romania) [8545-7]

Durability Evaluation of DLC coating through the Enhanced Environmental Tests, Joongkyu Choi, Sun Kyu Lee, Chang Jun Yoon, Seung Eun Oh, Samsung Thales Co., Ltd. (Korea, Republic of); Chang Hee Lee, Defense Agency for Technology and Quality (Korea, Republic of) [8545-21]

Solid state isomerization kinetics and third harmonic generation study of 2,4-substituted azobenzenes containing-poly(methacrylates), Florica Adriana Jerca, Ilie Murgulescu Institute of Physical Chemistry of the Roman Academy (Romania) and Costin D. Nenitescu Institute of Organic Chemistry (Romania); Valentin Victor Jerca, Costin D. Nenitescu Institute of Organic Chemistry (Romania); Ileana B. Rau, Francois Kajzar, Polytechnical Univ. of Bucharest (Romania); Dumitru Mircea Vuluga, Costin D. Nenitescu Institute of Organic Chemistry (Romania) [8545-22]

Some technical methods to study the roughness of some surfaces, generated into metallic targets by laser micro piercing in determined conditions, Corina Bokor, Univ. Lucian Blaga in Sibiu (Romania); Ileana B. Rau, Polytechnical Univ. of Bucharest (Romania); Ilie V. Isarie, Claudiu Isarie, Univ. Lucian Blaga in Sibiu (Romania); Wilhelm Kappel, National Institute for Research and Development for Electrical Engineering (Romania); Doina Mortoiu, Aurel Vlaicu Univ. of Arad (Romania); Sorin Itu, Univ. Lucian Blaga in Sibiu (Romania) [8545-24]

Optical third-harmonic generation measurements in biopolymer complexes, Ana Maria Manea, Alexandrina Tane, Roxana Zgarian, Polytechnical Univ. of Bucharest (Romania); James G. Grote, Air Force Research Lab. (USA); Francois Kajzar, Ileana B. Rau, Polytechnical Univ. of Bucharest (Romania) [8545-25]

Thursday 27 September

SESSION 3

Room: Carrick 1&2 Thu 8:30 to 10:00

Applications I

Session Chair: **Roberto Zamboni**,
Istituto per la Sintesi Organica e la Fotoreattività (Italy)8:30: **Spectroelectrochemistry as a strategy for improving selectivity of sensors for security and defense applications** (*Keynote Presentation*), William R. Heineman, Carl J. Seliskar, Laura K Morris, Univ. of Cincinnati (USA); Sam A. Bryan, Pacific Northwest National Lab. (USA) [8545-9]9:10: **Direction sensing with a patterned bacteriorhodopsin film** (*Invited Paper*), Yoshiko Okada-Shudo, The Univ. of Electro-Communications (Japan) [8545-10]9:40: **Experimental design-based strategy for the simulation of complex gaseous mixture spectra to detect drug precursors**, Marco Calderisi, Alessandro Ulrici, Laura Pigani, Univ. degli Studi di Modena e Reggio Emilia (Italy) and Consorzio INSTM (Italy); Alberto Secchi, SELEX Sistemi Integrati S.p.A. (Italy); Renato Seeber, Univ. degli Studi di Modena e Reggio Emilia (Italy) and Consorzio INSTM (Italy) [8545-23]

Coffee Break Thu 10:00 to 10:30

SESSION 4

Room: Carrick 1&2 Thu 10:30 to 12:10

Biomaterials

Session Chair: **Francois Kajzar**,
Polytechnical Univ. of Bucharest (Romania)10:30: **Advances in surface plasmon resonance biosensors and their applications** (*Keynote Presentation*), Jiri Homola, Institute of Photonics and Electronics of the ASCR, v.v.i. (Czech Republic) [8545-11]11:10: **On electronic structure and optical properties of anthocyanidines extracted from grapes** (*Invited Paper*), Ileana B. Rau, Polytechnical Univ. of Bucharest (Romania); Ion Iosub, Univ. of Pitesti (Romania); Francois Kajzar, Polytechnical Univ. of Bucharest (Romania); Malgorzata Makowska-Janusik, J. Dlugosz Univ. de Czestochowa (Poland); Aurelia Meghea, Alexandrina Tane, Roxana Zgarian, Polytechnical Univ. of Bucharest (Romania) [8545-13]11:40: **Biomimetic DNA liquid crystals imaged by polarization sensitive two-photon microscopy** (*Invited Paper*), Katarzyna Matczyszyn, Joanna Olesiak-Banska, Marek J. Samoc, Wroclaw Univ. of Technology (Poland); Joseph Zyss, Ecole Normale Supérieure de Cachan (France) [8545-14]

Lunch Break Thu 12:10 to 13:20

SESSION 5

Room: Carrick 1&2 Thu 13:20 to 15:00

Applications II

Session Chair: **Attila A. Szep**, Air Force Research Lab. (USA)13:20: **Optical sensing: recognition elements and devices** (*Keynote Presentation*), Guenter G Gauglitz, Eberhard Karls Univ. Tübingen (Germany) [8545-16]14:00: **Drugs and precursor sensing by complementing low cost multiple techniques: overview of the European FP7 Project CUSTOM**, Alberto Secchi, Anna Maria Fiorello, SELEX Sistemi Integrati S.p.A. (Italy); Sabato D'Auria, Antonio Varriale, Consiglio Nazionale delle Ricerche (Italy); Alessandro Ulrici, Renato Seeber, Univ. degli Studi di Modena e Reggio Emilia (Italy); Juho Uotila, Gasera Ltd. (Finland); Vincenzo Venditto, Univ. degli Studi di Salerno (Italy); Juan Carlos Antolin, Tecnalia (Spain); Francesco Colao, ENEA (Italy); Tom Kuusela, University of Turku (Finland); Ilkka Tittonen, Aalto University (Finland); Gregory Maisons, III-V Labs (France) . . . [8545-17]14:20: **Analysis and design of a multisensory array for explosive substances based on solid electrodes**, Jose Gonzalez-Rodriguez, Mark G. Baron, Richard Barrett, Univ. of Lincoln (United Kingdom) [8545-19]14:40: **Drug precursor vapor phase sensing by cantilever enhanced photoacoustic spectroscopy and quantum cascade laser**, Juho Uotila, Gasera Ltd. (Finland); Jaakko Lehtinen, Tom Kuusela, Univ. of Turku (Finland); Sauli Sinisalo, Gasera Ltd. (Finland); Grégory Maisons, III-V lab. (France); Fabio Terzi, Univ. degli Studi di Modena e Reggio Emilia (Italy); Ilkka Tittonen, Aalto Univ. School of Science and Technology (Finland) [8545-8]

Coffee Break Thu 15:00 to 15:20

SESSION 6

Room: Carrick 1&2 Thu 15:20 to 16:40

Applications III

15:20: **Integrated luminescent chemical microsensors based on GaN LEDs for security applications using smartphones** (*Keynote Presentation*), Guillermo Orellana, Univ. Complutense de Madrid (Spain); Elias Muñoz, Univ. Politécnica de Madrid (Spain); Luz K. Gil-Herrera, Univ. Complutense de Madrid (Spain); Pablo Muñoz, Univ. Politécnica de Madrid (Spain); Juan Lopez-Gejo, Univ. Complutense de Madrid (Spain); Carlos Palacio, Univ. Autónoma de Madrid (Spain) [8545-12]16:00: **A feature selection strategy for the analysis of spectra from a photoacoustic sensing system**, Alessandro Ulrici, Renato Seeber, Marco Calderisi, Università di Modena e Reggio Emilia (Italy) and Consorzio INSTM (Italy); Giorgia Foca, Università di Modena e Reggio Emilia (Italy); Juho Uotila, Gasera Ltd. (Finland); Mathieu Carras, Alcatel-Thales III-V Lab. (France); Anna Maria Fiorello, SELEX Sistemi Integrati S.p.A. (Italy) [8545-18]16:20: **Antioxidant and antimicrobial activities of Green Tea Extract loaded into solid lipid nanoparticles**, Ana-Maria Manea, Nicoleta Badea, Ioana Lacatusu, Aurelia Meghea, Polytechnical Univ. of Bucharest (Romania) [8545-15]

Optics and Photonics for Counterterrorism, Crime Fighting and Defence

Conference Chairs: **Colin Lewis**, Ministry of Defence (United Kingdom); **Douglas Burgess**, Burgess Consulting (United Kingdom)

Programme Committee: **David A. Atkinson**, Pacific Northwest National Lab. (USA); **Benedicte Bascle**, Thales Optronique S.A. (France); **Richard R. Botten**, Ministry of Defence (United Kingdom); **David J. Clarke**, SELEX Galileo Ltd. (United Kingdom); **Giovanni Cocca**, SELEX Galileo Ltd. (United Kingdom); **Howard J. Cummins**, Her Majesty's Government Communications Ctr. (United Kingdom); **Bruno Desruelle**; **Brian E. Foulger**, Ministry of Defence (United Kingdom); **Gillian F. Marshall**, QinetiQ Ltd. (United Kingdom); **Niamh NicDaeid**, Univ. of Strathclyde (United Kingdom); **Svante C.M. Ödman**, Swedish Defence Research Agency (Sweden); **Harbinder S. Rana**, Defence Science and Technology Lab. (United Kingdom); **Salman Rosenwaks**, Ben-Gurion Univ. of the Negev (Israel); **Andrew M. Scott**, QinetiQ Ltd. (United Kingdom); **Neil C. Shand**, Defence Science and Technology Lab. (United Kingdom); **Mauro G. Varasi**, Finmeccanica (Italy); **Peter W. Yuen**, Cranfield Univ. (United Kingdom); **Robert J Stokes**, Nanoink Inc (USA) (United Kingdom)

Monday 24 September

WELCOME AND INTRODUCTION

Room: Ochill 1&2 Mon 11:15 to 11:20

SESSION 1

Room: Ochill 1&2 Mon 11:20 to 12:20

Detection of Hazardous Materials: Sensors and Components for Close-by Protection I

11:20: **Trace detection of explosives by Surface Enhanced Raman Spectroscopy**, Salvatore Almaviva, Antonio Palucci, Sabina Botti, ENEA (Italy); Francesco Saverio Romolo, Univ. degli Studi di Roma La Sapienza (Italy); Lars Landstrom, Serstech AB (Sweden); Alessandro Rufoloni, Luciano Cantarini, ENEA (Italy) [8546-1]

11:40: **Miniature multi-excitation wavelength raman spectrometers for handheld measurements of real-world samples**, William Yang, BaySpec Inc. (USA) [8546-2]

12:00: **The detection limit of imaging Raman spectroscopy for 2,4,6-TNT, 2,4-DNT and RDX**, Markus Nordberg, Henric Östmark, Swedish Defence Research Agency (Sweden) [8546-3]

Lunch Break Mon 12:20 to 14:00

SESSION 2

Room: Ochill 1&2 Mon 14:00 to 15:20

Detection of Hazardous Materials: Sensors and Components for Close-by Protection II

14:00: **Variable basis function least squares for chemical classification**, Darren K. Emge, U.S. Army Edgewood Chemical Biological Ctr. (USA); Steven Kay, The Univ. of Rhode Island (USA); Jason A. Guicheteau, U.S. Army Edgewood Chemical Biological Ctr. (USA) [8546-4]

14:20: **Lab-on-a-Bubble: direct and indirect assays with portable Raman instrumentation**, Keith Carron, Snowy Range Instruments (USA); Aaron Strickland, iFyber, LLC (USA) [8546-5]

14:40: **Time-resolved spectral characterization of a pulsed external-cavity quantum cascade laser**, Jean-Michel Melkonian, Myriam Raybaut, Antoine Godard, Johan Petit, Michel Lefebvre, ONERA (France) [8546-6]

15:00: **Ultra-high-brightness laser diode arrays for pumping of compact solid state lasers and direct applications**, Andreas Kohl, Thierry Fillardet, Arnaud Laugustin, Olivier Rabot, Quantel Group (France) [8546-7]

Coffee Break Mon 15:20 to 15:50

SESSION 3

Room: Ochill 1&2 Mon 15:50 to 16:50

Forensic-Level Sensing

15:50: **A first approach for digital representation and automated classification of toolmarks on locking cylinders using confocal 3D laser microscopy**, Eric Clausing, Otto-von-Guericke Univ. Magdeburg (Germany) and Brandenburg University of Applied Sciences (Germany); Christian Kraetzer, Jana Dittmann, Otto-von-Guericke Univ. Magdeburg (Germany); Claus Vielhauer, Fachhochschule Brandenburg (Germany) and Otto-von-Guericke Univ. Magdeburg (Germany) [8546-8]

16:10: **A first approach to the detection and equalization of distorted latent fingerprints and microtraces on non-planar surfaces with confocal laser microscopy**, Stefan Kirst, Eric Clausing, Otto-von-Guericke Univ. Magdeburg (Germany) and Fachhochschule Brandenburg (Germany); Jana Dittmann, Otto-von-Guericke Univ. Magdeburg (Germany); Claus Vielhauer, Fachhochschule Brandenburg (Germany) [8546-9]

16:30: **High-speed biometrics ultrasonic system for 3D fingerprint imaging**, Roman G. Maev, Fedar Severin, Univ. of Windsor (Canada) [8546-10]

Tuesday 25 September

SESSION 4

Room: Ochill 1&2 Tue 8:50 to 10:30

Screening Techniques, including Novel Wavebands

8:50: **Combined optics and ultrasound for security screening**, David A. Hutchins, Lee Davis, Aamer Saleem, The Univ. of Warwick (United Kingdom) [8546-12]

9:10: **Criteria for the detection and identification of compound substances on the base of comparison of spectral lines dynamics**, Vyacheslav A. Trofimov, Nikolay V. Peskov, Lomonosov Moscow State Univ. (Russian Federation); Norbert Palka, Mieczyslaw Szustakowski, Tomasz Trzcinski, Military Univ. of Technology (Poland) [8546-13]

9:30: **Detection of bottled liquid explosive by near infrared**, Hideo Itozaki, Ryu Miyamura, Hideo Sato-Akaba, Osaka Univ. (Japan) [8546-14]

9:50: **Identification and mapping of spilled liquids by passive hyperspectral imaging**, Rene Braun, Roland Harig, Bruker Optik GmbH (Germany) [8546-15]

10:10: **Increasing the quality of image of a commercially available passive THz camera due to computer processing of image**, Vyacheslav A. Trofimov, Vladislav Trofimov, Lomonosov Moscow State Univ. (Russian Federation); Norbert Palka, Military Univ. of Technology (Russian Federation); Marcin Kowalski, Military Univ. of Technology (Poland) [8546-16]

Coffee Break Tue 10:30 to 11:00

SESSION 5

Room: Ochill 1&2 Tue 11:00 to 12:40

Stand-off and Remote Detection of Hazardous Materials

- 11:00: **Active coherent laser spectrometer for remote detection and identification of chemicals**, Neil A. MacLeod, Damien Weidmann, Rutherford Appleton Lab. (United Kingdom) [8546-17]
- 11:20: **Real-time standoff gas detection and environmental monitoring with LWIR HSI**, Florent M. Prel, Louis M. Moreau, ABB Analytical Measurement (Canada); Hugo Lavoie, Francois Bouffard, Jean-Marc Thériault, Defence Research and Development Canada, Valcartier (Canada); Christian A. Vallières, Claude B. Roy, ABB Analytical Measurement (Canada); Denis Dubé, Defence Research and Development Canada, Valcartier (Canada) [8546-18]
- 11:40: **LWIR hyperspectral imaging application and detection of chemical precursors**, Hugo Lavoie, Francois Bouffard, Jean-Marc Thériault, Eldon Puckrin, Denis Dubé, Defence Research and Development Canada, Valcartier (Canada) [8546-19]
- 12:00: **Infrared hyperspectral imaging for chemical vapour detection**, Keith Ruxton, Gordon Robertson, William Miller, Graeme P. A. Malcolm, Gareth T. Maker, M Squared Lasers Ltd. (United Kingdom); Chris R. Howle, Defence Science and Technology Lab. (United Kingdom) [8546-20]
- 12:20: **Surveillance in an urban environment using mobile sensors**, Wim Mees, Royal Belgian Military Academy (Belgium); Andreas J. Kirschner, Technische Univ. München (Belgium); Markus Peichl, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Oscar Tejedor, GMV S.A. (Spain) [8546-21]
- Lunch/Exhibition Break Tue 12:40 to 14:00

SESSION 6

Room: Ochill 1&2 Tue 14:00 to 15:00

Minimising Atmospheric Turbulence Effects on Imagery

- 14:00: **A real-time processor for imaging through turbulence and other sub-optimal environments**, John A. Cochrane, Melford Resolution Ltd. (United Kingdom); Steve Collier, Nigel Mitchell, Jon Shadforth, Amber Optix Ltd. (United Kingdom) [8546-22]
- 14:20: **Real-time Dictionary based Super-Resolution of Surveillance Video Streams and Targets**, Timothy M. Hospedales, Shaogang Gong, Vision Semantics Ltd. (United Kingdom) . . [8546-23]
- 14:40: **Simulation of atmospheric turbulence effects and mitigation algorithms on stand-off automatic facial recognition**, Kevin R. Leonard, U.S. Army Night Vision & Electronic Sensors Directorate (USA); Jonathan Howe, Defence Science and Technology Lab. (United Kingdom); David E. Oxford, Defence Science and Technology Lab. (United Kingdom) and U.S. Army Night Vision & Electronic Sensors Directorate (USA) [8546-24]
- Coffee Break Tue 15:00 to 15:20

PANEL DISCUSSION

Room: Ochill 1&2 Tue 15:20 to 16:30

Counteracting a Turbulent Atmosphere

Moderators: Colin Lewis, Ministry of Defence (United Kingdom), and Doug Burgess, Burgess Consulting (United Kingdom)

This debate is open to all symposium attendees, and will cover topics such as

- How much and when can technology improve imagery?
- What doesn't work?
- Will computer developments change conclusions?
- What happens close to the ground, at different heights, and is airborne surveillance different?

Come along and share your experiences. If you might be involved in this area in the future, come along and get an insight from practitioners in the area.

Wednesday 26 September

SESSION 7

Room: Carrick 3 Wed 9:00 to 11:30

Understanding Scenes through Image Processing

Please note a room change. New room: Carrick 3

- 9:00: **A visual scene busyness measure through a region growing spatial segmentation**, Gaurav Gupta, Alexandra Psarrou, Sophie Triantaphillidou, Jae-Young Park, Univ. of Westminster (United Kingdom) [8546-25]
- 9:20: **Robust background subtraction for automated detection and tracking of targets in wide area motion imagery**, Philip J Kent, QinetiQ Ltd. (United Kingdom); Simon Maskell, QinetiQ Ltd. (United Kingdom) and Imperial College London (United Kingdom); Oliver Payne, Sean Richardson, QinetiQ Ltd. (United Kingdom); Larry A. Scarff, Goodrich ISR Systems (USA) [8546-26]
- 9:40: **Scaling up multi-camera tracking for real-world deployment**, Yogesh Raja, Shaogang Gong, Vision Semantics Ltd. (United Kingdom) [8546-27]
- Coffee Break Wed 10:00 to 10:30
- 10:30: **A methodology to evaluate the effect of video compression on the performance of analytics systems**, Anastasia Tsifouti, Home Office (United Kingdom); Moustafa M Nasralla, Manzoor Razaak, James Cope, James Orwell, Maria G. Martini, Kingston Univ. (United Kingdom); Kingsley Sage, Home Office (United Kingdom) . . . [8546-28]
- 10:50: **Multisensor data fusion for IED threat detection**, Wim Mees, Royal Belgian Military Academy (Belgium); Roel Heremans, Royal Belgian Military Academy (Belgium) and AGT Group (R&D) (Germany) [8546-29]
- 11:10: **Is automated conversion of video to text a reality?**, Richard Bowden, Univ. of Surrey (United Kingdom); Stephen J. Cox, Richard W. Harvey, Yuxuan Lan, Univ. of East Anglia Norwich (United Kingdom); Eng-Jon Ong, Univ. of Surrey (United Kingdom); Gari Owen, Annwyn Solutions (United Kingdom); Barry-John Theobald, Univ. of East Anglia Norwich (United Kingdom) [8546-30]

ADJOURN

Room: Ochill 1&2 Wed 11:30

POSTERS—WEDNESDAY

Wed 17:40 to 19:10

Conference attendees are invited to attend the Security + Defence Poster Session on Wednesday afternoon. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x32248.xml>.

- Mid-infrared hyperspectral imaging for the detection of explosive compounds**, Keith Ruxton, Gordon Robertson, Bill Miller, Graeme P. A. Malcolm, Gareth T. Maker, M Squared Lasers Ltd. (United Kingdom) [8546-31]
- Stand-off detection of traces of explosives and precursors on fabrics by UV Raman spectroscopy**, Roberto Chirico, Salvatore Almaviva, Sabina Botti, Luciano Cantarini, Francesco Colao, Luca Fiorani, Marcello Nuvoli, Antonio Palucci, ENEA (Italy) [8546-32]
- Stand-off spectroscopy for the detection of chemical warfare agents**, Rhea Clewes, Chris R. Howle, Defence Science and Technology Lab. (United Kingdom); David J. M. Stothard, Malcolm H. Dunn, Univ. of St. Andrews (United Kingdom); Gordon Robertson, William Miller, Graeme P. A. Malcolm, Gareth T. Maker, M Squared Lasers Ltd. (United Kingdom); Rick Cox, Brad Williams, Matt Russell, DeltaNu, Inc. (USA) [8546-33]
- TATP stand-off detection with open path: FTIR techniques**, Christian Fischer, Tobias Pohl, Konradin Weber, Andreas Vogel, Günther van Haren, Fachhochschule Düsseldorf (Germany); Wenka Schweikert, Fraunhofer-Institut für Chemische Technologie (Germany) [8546-34]
- Exploiting high resolution Fourier Transform spectroscopy to inform the development of quantum cascade laser based explosives detection systems**, Felicity Carlysle, Niamh Nic Daëid, Univ. of Strathclyde (United Kingdom); Erwan L. Normand, Michael T. McCulloch, Cascade Technologies Ltd. (United Kingdom) . . [8546-35]

High-Power Lasers: Technology and Systems

Conference Chair: Harro Ackermann, High Energy Laser Joint Technology Office (USA); Willy L. Bohn, BohnLaser Consult (Germany)

Monday 24 September

WELCOME AND INTRODUCTION

Room: Tinto Mon 11:10 to 11:15

SESSION 1

Room: Tinto Mon 11:15 to 12:25

High Power Laser Systems and Demonstrations I

Session Chairs: Harro Ackermann,
High Energy Laser Joint Technology Office (USA);
Willy L. Bohn, BohnLaser Consult (Germany)

11:15: **Directed energy: a service perspective**
(Keynote Presentation), David Robie, U.S. Air Force (USA) . . . [8547-1]

11:55: **HEL: Joint Technology Office** (Invited Paper), Mark W. Neice,
High Energy Laser Joint Technology Office (USA) [8547-2]

Lunch Break Mon 12:25 to 13:30

SESSION 2

Room: Tinto Mon 13:30 to 16:30

High Power Laser Systems and Demonstrations II

Session Chairs: Harro Ackermann,
High Energy Laser Joint Technology Office (USA);
Willy L. Bohn, BohnLaser Consult (Germany)

13:30: **Overview of the Laser activities at Rheinmetall Waffe Munition** (Invited Paper), Markus Jung, Klaus Ludewigt, Thomas Riesbeck, Rheinmetall Waffe Munition GmbH (Germany); Thomas Schreiber, Ramona Eberhardt, Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) . . [8547-3]

14:00: **US Navy LaWS System Overview, Historical Retrospective and Future Directions** (Invited Paper), Robert J. Pawlak, Naval Surface Warfare Ctr. Dahlgren Div. (USA) [8547-4]

14:30: **Robust Electric Laser Initiative** (Invited Paper), Robert S. Afzal, Lockheed Martin Aculight (USA) [8547-5]

Coffee Break Mon 15:00 to 15:30

15:30: **US Army's high energy laser demonstrations for counter-rocket, artillery, mortar and missile and unmanned Ariel Systems defeat applications** (Invited Paper), Kip R. Kendrick, U.S. Army Space and Missile Defense Command (USA) [8547-6]

16:00: **High-power beam combining - a step to a future laser weapon system** (Invited Paper), Rudolf Protz, Jürgen Zoz, Franz Geidek, Stephan Dietrich, MBDA Germany (Germany); Michael Fall, MBDA Germany (Germany) and MBDA Germany (Germany) . . [8547-7]

SESSION 3

Room: Tinto Mon 16:30 to 17:20

Gas Laser Technology I

Session Chair: Glen P. Perram,
Air Force Institute of Technology (USA)

16:30: **Diode-pumped alkali laser-bleached wave dynamics** (Invited Paper), Glen P Perram, Air Force Institute of Technology (USA) [8547-8]

17:00: **Determination of low pressure broadening and shift rates for K, Rb, and Cs collisions with rare gases from Anderson Tallman theory**, Gordon D. Hager, Matthew D Rotondaro,

Glen P. Perram, Air Force Institute of Technology (USA) [8547-9]

Tuesday 25 September

SESSION 4

Room: Tinto Tue 8:30 to 10:20

Thin Disk Laser Technology

Session Chair: Adolf Giesen,
Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)

8:30: **High-power thin disk lasers** (Invited Paper), Adolf Giesen, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . [8547-10]

9:00: **Recent disk laser developments at Trumpf** (Invited Paper), Tina Gottwald, Dominik Bauer, Alexander Killi, Jochen D. Kleinbauer, Vincent Kuhn, Sven Schach, Christian Stolzenburg, Dirk H. Sutter, TRUMPF Laser GmbH & Co. KG (Germany); Thomas Metzger, TRUMPF Scientific Lasers GmbH + Co. KG (Germany) [8547-11]

9:30: **Thin disk laser work at Boeing** (Invited Paper), Michael Rinn, Matthew D. Nixon, Boeing-SVS, Inc. (USA) [8547-12]

10:00: **Thin disk laser in the 2µm wavelength range**, Günther Renz, Jochen Speiser, Adolf Giesen, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [8547-13]

Coffee Break Tue 10:20 to 10:40

SESSION 5

Room: Tinto Tue 10:40 to 12:30

Ultrashort Pulse Lasers and Applications

Session Chair: Czeslaw Radzewicz, Univ. of Warsaw (Poland)

10:40: **Efficient broadband OPCPA** (Invited Paper), Czeslaw Radzewicz, Univ. of Warsaw (Poland) [8547-14]

11:10: **Triggering and guiding electric discharge by a train of ultrashort UV pulses and a long UV pulse emitted by a hybrid Ti:Sapphire-KrF laser facility** (Invited Paper), Andrey A. Ionin, Sergej I. Kudryashov, Alexey O. Levchenko, Leonid V. Seleznev, Aleksey Shutov, Dmitry V. Sinitsyn, Igor V. Smetanin, Nikolai N. Ustinovskii, Vladimir D. Zvorykin, P.N. Lebedev Physical Institute (Russian Federation) [8547-15]

11:40: **Experimental Component of the AFOSR-Supported MURI Program on Ultrafast Laser Filamentation in Transparent Dielectric Media** (Invited Paper), Pavel G Polynkin, College of Optical Sciences, The Univ. of Arizona (USA) [8547-16]

12:10: **Power Scaling of High-Power Optically-Pumped Semiconductor Lasers for Continuous Wave and Ultrashort Pulse Generation**, Alexandre Laurain, Maik Scheller, Tsuei-Lian Wang, College of Optical Sciences, The Univ. of Arizona (USA); Jörg Hader, College of Optical Sciences, The Univ. of Arizona (USA) and Nonlinear Control Strategies, Inc. (USA); Jerome V. Moloney, College of Optical Sciences, The Univ. of Arizona (USA); Stephan W. Koch, Philipps- Univ. Marburg (Germany) and College of Optical Sciences, The Univ. of Arizona (USA) and Nonlinear Control Strategies, Inc. (USA); Bernd Heinen, Martin Koch, Bernardette Kunert, Wolfgang Stolz, Philipps- Univ. Marburg (Germany) [8547-17]

Lunch Break Tue 12:30 to 13:30

SESSION 6

Room: Tinto Tue 13:30 to 15:20

Fiber Laser Technology

Session Chair: **Jens Limpert**, Friedrich-Schiller-Univ. Jena (Germany)

13:30: **All-solid photonic bandgap fibers for high power lasers** (*Invited Paper*), Liang Dong, Clemson Univ. Research Foundation (USA); Kunimasa Saitoh, Hokkaido Univ. (Japan); Fanting Kong, Paul Foy, Clemson Univ. Research Foundation (USA); Thomas Hawkins, Clemson Univ. (USA); Devon McClane, Guancheng Gu, Clemson Univ. Research Foundation (USA) [8547-18]

14:00: **Single crystal fibers for high power lasers** (*Invited Paper*), Jasbinder S. Sanghera, Woohong Kim, U.S. Naval Research Lab. (USA); Catalin Florea, Sotera Defense Solutions, Inc. (USA); L. Brandon Shaw, Steven R. Bowman, Shawn P. O'Connor, Shyam S. Bayya, Guillermo R. Villalobos, Colin Baker, Daniel J. Gibson, U.S. Naval Research Lab. (USA); Ishwar Aggarwal, Sotera Defense Solutions, Inc. (USA) [8547-19]

14:30: **High power all-fiber isolator** (*Invited Paper*), Shibin Jiang, AdValue Photonics, Inc. (USA) [8547-20]

15:00: **Single-mode, high-power, narrow-linewidth, lightweight fiber amplifiers**, John Edgecumbe, Kevin F. Farley, Josh Galipeau, David Björk, David Hosmer, Chih-Hao Wang, Kanxian Wei, Imtiaz Majid, Scott Christensen, Nufern (USA) [8547-21]

Coffee Break Tue 15:20 to 15:40

SESSION 7

Room: Tinto Tue 15:40 to 18:10

Beam Combining Technology

Session Chair: **Jens Limpert**, Friedrich-Schiller-Univ. Jena (Germany)

15:40: **Coherent combination of high-power fiber amplified femtosecond pulses** (*Invited Paper*), Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany) [8547-22]

16:10: **New design for passive coherent coupling of fiber lasers** (*Invited Paper*), David Sabourdy, CILAS (France); Jean E. Montagne, XLIM Institut de Recherche (France); François Jeux, XLIM Institut de Recherche (France) and Astrium (France); Agnes Desfarges-Berthelemot, Vincent Kermène, Alain Barthélémy, XLIM Institut de Recherche (France) [8547-23]

16:40: **Monolithic eye-safer photonic crystal fiber lasers and amplifiers** (*Invited Paper*), Chad G. Carlson, Benjamin G. Ward, U.S. Air Force Academy (USA); Donald L. Sipes Jr., Jason D. Tafoya, Optical Engines, Inc. (USA) [8547-24]

17:10: **Spectral and coherent combining of fiber lasers by multiplexed volume Bragg gratings**, Leonid B. Glebov, Apurva Jain, George B. Venus, Ivan B. Divliansky, Vadim Smirnov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8547-25]

17:30: **Beam combining concepts using Stimulated Brillouin Scattering**, Andrew M. Scott, QinetiQ Ltd. (United Kingdom) [8547-26]

17:50: **Filled-aperture beam combining of high power Yb fiber amplifiers**, Charles X. Yu, Steven J. Augst, Shawn M. Redmond, Oleg Shatrovov, Daniel V. Murphy, Antonio Sanchez, Tso Yee Fan, Daniel J. Ripin, MIT Lincoln Lab. (USA) [8547-28]

Wednesday 26 September

SESSION 8

Room: Kylsyth Wed 8:30 to 11:30

Solid State and Semiconductor Laser Technology

Session Chair: **Mark Dubinskii**, U.S. Army Research Lab. (USA)

Please note a room change. New room: Kylsyth

8:30: **Resonantly (in-band) pumped Er-doped eye-safe lasers: scaling power with high efficiency** (*Invited Paper*), Mark Dubinskii, U.S. Army Research Lab. (USA) [8547-28]

9:00: **Coherent Polarization Locking of thermal sensitive Ho:YAG laser**, Chern Fei Chua, Temasek Laboratories, Nanyang Technological University (Singapore) and School of Physical and Mathematical Sciences, Nanyang Technological University (Singapore); Lihao Tan, School of Physical and Mathematical Sciences, Nanyang Technological University (Singapore); Poh Boon Phua, Temasek Laboratories, Nanyang Technological University (Singapore) and School of Physical and Mathematical Sciences, Nanyang Technological University (Singapore) [8547-29]

9:20: **Recent advances in eye-safe Er³⁺:YAG solid-state heat-capacity technology** (*Invited Paper*), Marc Eichhorn, Stefano Bigotta, Thierry Ibach, Institut Franco-Allemand de Recherches de Saint-Louis (France) [8547-30]

9:50: **Transient analysis of thermal effects in non symmetrically pumped laser slabs**, Elisa Spinozzi, Marco Vitiello, GEM elettronica (Italy) [8547-31]

Coffee Break Wed 10:10 to 10:40

10:40: **An overview on new diode lasers for defense applications**, Joerg Neukum, DILAS Diodenlaser GmbH (Germany) [8547-32]

11:00: **High power high brightness volume Bragg semiconductor lasers** (*Invited Paper*), Leonid B. Glebov, George B. Venus, Ivan B. Divliansky, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); K. Shavitrnanuruk, Vadim Smirnov, OptiGrate Corp. (USA) [8547-33]

SESSION 9

Room: Kylsyth Wed 11:30 to 12:40

Gas Laser Technology II

Session Chair: **Glen P. Perram**, Air Force Institute of Technology (USA)

11:30: **Gain and lasing of optically pumped metastable rare gas atoms** (*Invited Paper*), Michael C. Heaven, Jiande Han, Emory Univ. (USA) [8547-34]

12:00: **Modeling of static and flowing-gas diode pumped alkali lasers**, Boris D. Barmashenko, Salman Rosenwaks, Ben-Gurion Univ. of the Negev (Israel) [8547-35]

12:20: **Advanced CO laser systems**, Andrey A. Ionin, P.N. Lebedev Physical Institute (Russian Federation) [8547-36]

POSTERS—WEDNESDAY

Wed 17:40 to 19:10

Conference attendees are invited to attend the Security + Defence Poster Session on Wednesday afternoon. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x32248.xml>.

Analysis of a passively q-switched Nd:YAG slab laser oscillator/amplifier system, Ion I Lancranjan, CSA-INCAS -Advanced Study Center of National Institute for Aerospace Research Elie Carafoli (Romania); Dan M. Savastru, Sorin I. Miclos, Roxana S. Savastru, National Institute of Research and Development for Optoelectronics (Romania) [8547-37]

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(Includes Vols. 8540-8547)

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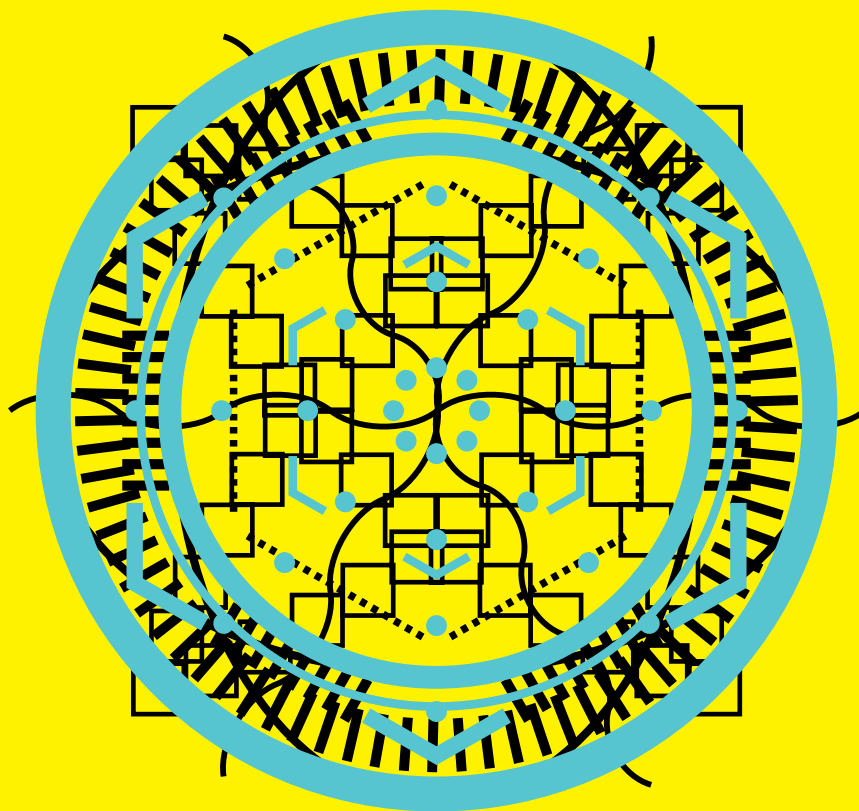
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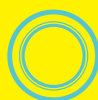
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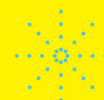
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