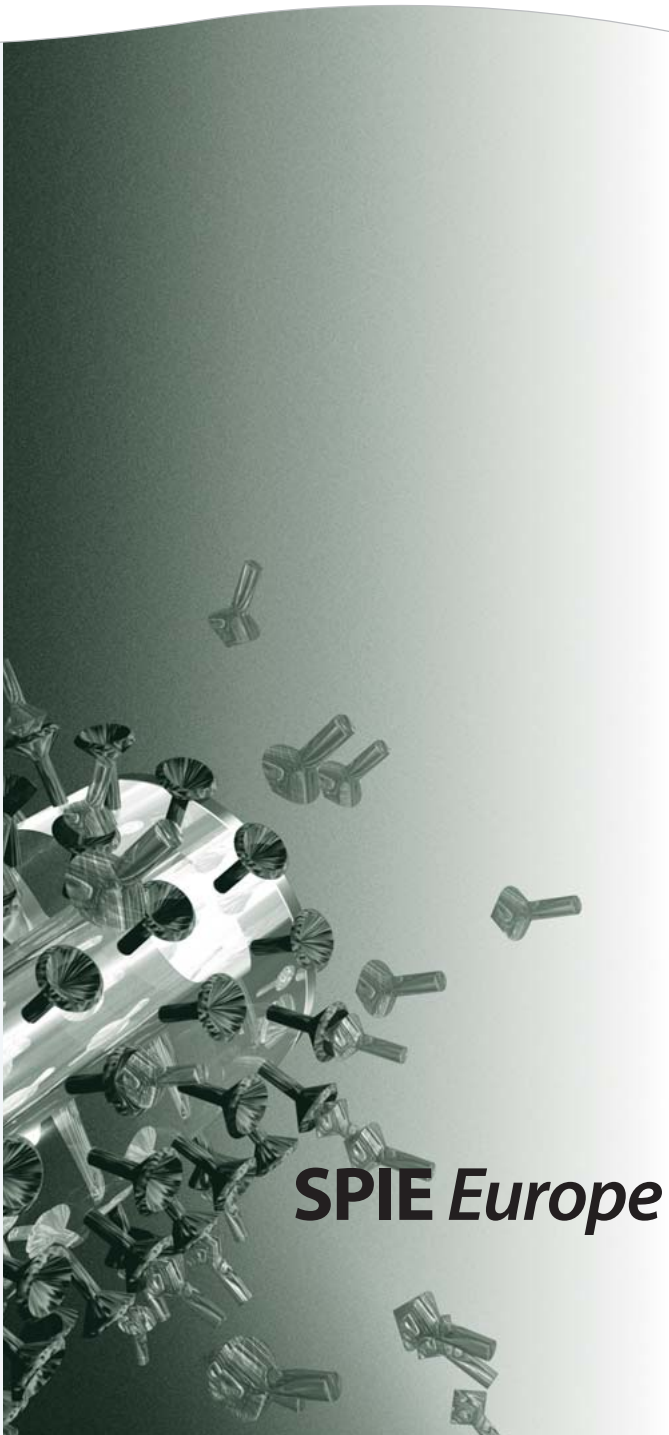
Technical Programme

SPIE *Europe* Remote Sensing

and

SPIE *Europe* Optics/Photonics in Security & Defence

11–14 September 2006
Stockholm International Fairs • Stockholm, Sweden



SPIE *Europe*

Welcome!

11-14 September 2006
Stockholm International Fairs • Stockholm, Sweden

SPIE Europe Remote Sensing

Symposium Chairs
John Gonglewski, Air Force Research Lab (USA)

Guido D'Urso, Univ. di Napoli Federico II (Italy)

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EOS—European Optical Society

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.

SPIE Europe Optics/Photonics in Security & Defence

Keith L. Lewis, Electromagnetic Remote Sensing Defence Technology Center (United Kingdom)
Symposium Chair

Ove Steinvall, Defence Research Establishment (Sweden)
Symposium Cochair

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Welcome Reception

Stockholm City Hall

Monday 11 September . . . . . 20.00 to 21.30

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

Women in Optics Dinner

Tuesday 12 September

Come and meet with your colleagues at this informal networking opportunity. Open to all attendees. Please register onsite at the registration desk.

Special Workshop

Wednesday 13 September . . . . . 8.30 to 12.00

From Concepts to Commercialization: How to Turn Prototypes into Profits

You are invited to attend this new and unique event. This workshop will feature respected leaders in industry teaching on topics spanning project management, technology roadmaping, R&D budget strategies, product development techniques, and commercialization strategies. The Workshop is free to all symposium participants.

Sponsored by Luminex

Poster Session

Wednesday 13 September . . . . . 18.00 to 19.30

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 18.00 to 19.30 to answer questions. 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 *Europe*

Remote Sensing

Plenary Presentations

Room T1

Monday . . . . . 18.00 to 19.30

18.00 to 18.10

Welcome and Introduction

John Gonglewski, Air Force Research Lab (USA)
Remote Sensing 2006 Symposium Chair

18.10 to 18.50

Advanced laser remote sensing for four-dimensional aerosol observations

Jens Bösenberg, Max-Planck-Institut für Meteorologie, Germany

The role of aerosols in the Earth system can hardly be underestimated. Aerosols play an important role in the climate system, their direct and indirect effects cause major uncertainties of present climate predictions. They play a major role in atmospheric chemistry and hence affect the concentrations of other potentially harmful atmospheric constituents, e.g. ozone. They are an important controlling factor for the radiation budget, in particular in the UV-B part of the spectrum. At ground level, they can be harmful, even toxic, to man, animals, and plants. Because of these adverse effects that aerosols can have on human life, it is necessary to achieve an advanced understanding of the processes that generate, redistribute, and remove aerosols in the atmosphere. A quantitative dataset describing the aerosol vertical, horizontal, and temporal distribution, including its variability on a large range of scales, is urgently needed.

There is now general agreement that no single instrument can provide all the required information on aerosols, an integration of many different technologies is necessary to cover at least the most important aspects. Laser remote sensing plays a key role because only lidar methods can provide sufficient information on the vertical distribution of aerosols which is mandatory for studies of transport and transformation. While relatively simple instruments can observe the time-height-distribution of aerosol layers from ground level to the stratosphere, advanced methods can also determine optical properties in a quantitative way. When measurements at several wavelengths are combined and advanced retrieval methods are applied it is possible to estimate micro-physical properties like size distribution, refractive index, or single scattering albedo. A network of such ground-based lidars is presently the only system that covers all 4 dimensions in routine observations, although the coverage is necessarily sparse. The combination of ground-based and space-borne lidar with passive satellite imagery and in-situ monitoring programs appears as the best choice for a future global observation system for aerosols.

Biography: **Jens Bösenberg** was born 1943 in Hamburg, Germany. After completion of his studies in physics with a PhD thesis on optical properties of thin metal films he switched the focal area and got engaged in direct observations of air-sea exchange, in particular turbulence characteristics above ocean waves. In 1981 he started to build the laser remote sensing group of the Max-Planck-Institut für Meteorologie in Hamburg, where he was involved in the development and application of advanced lidar systems for the observation of water vapour, ozone, wind, and aerosols for turbulence studies as well as for routine observations. Since 1998 he is coordinating aerosol lidar networks, first on a national basis in Germany, then at European level in the EARLINET project. He is member of the International Coordination-group for Laser Atmospheric Studies (ICLAS) and of the Scientific Advisory Group Aerosols of the Global Atmospheric Watch program (GAW) of the World Meteorological Organisation.

18.50 to 19.30

Cloud remote sensing from space in the era of the A-Train

Graeme L Stephens, Department of Atmospheric Sciences, Colorado Sate University, Jet Propulsion Laboratory and California Institute of Technology, USA

Co-author: **Deborah G. Vane,** Jet Propulsion Laboratory and California Institute of Technology, USA

Clouds play an important role in the hydrologic cycle, influence global energy balance, and represent a significant yet poorly understood component of global climate change. As a result, quantitative global observations of liquid and ice cloud microphysical and radiative properties continue to be a focus of a growing number of satellite-based sensors each having an associated suite of retrieval algorithms. While a number of these algorithms have successfully been applied to map clouds, many can only be applied under specific conditions (eg. during the daytime) or over a limited dynamic range (eg. optically thin cirrus) often leading to unphysical discontinuities when one seeks to compile a complete picture of the global distribution of clouds. Furthermore, discrepancies exist between products of different algorithms when they are applied to the same scene by virtue of differences in the information provided by distinct combinations of measurements.

With the emergence of spaceborne cloud radar (CloudSat) and backscattering lidar (CALIPSO) systems as part of the constellation of the A-Train and with potential for combining these observations with more conventional satellite observations of other satellites of this constellation, the promise of new ways of observing clouds is fast approaching. In preparation for understanding how the data from these new sensors might be used optimally with these more conventional radiometric data, it is important to deliberate on the respective information content contained in the measurements of the different sensors. This presentation reviews the problem of cloud microphysical property retrievals using conventional satellite radiance observations and demonstrates how the concept of information content can be used to guide combinations of observations from the A-train. Discussion on how these types of observation might be merged with the observations from the active sensors to provide improved cloud and precipitation will also be presented. It is also expected that Early results from CloudSat will be described.

Biography: **Professor Stephens** completed his B.S. degree with honors from the University of Melbourne in 1973 and received his Ph.D. degree in 1977 from the same university. He was appointed to the CSIRO Division of Atmospheric Research in 1977 as a research scientist and was promoted to senior research scientist in 1982. During 1979 and 1980 Dr. Stephens was a post-doctoral research student at the Department of Atmospheric Science at Colorado State University. He then joined the faculty of that department as an Associate Professor in 1984 and in the spring of 1991 was promoted to Professor. In 2005 he was promoted to University Distinguished Professor. Dr. Stephens professional activities include: Editor of the Journal of the Atmospheric Sciences; Member of NASA/TRMM Science Team; Chairman NSF Facilities Advisory Panel; Chairman AMS Committee on Atmospheric Radiation; Chairman of WMO Joint Scientific Committee Working Group on Radiation Fluxes; Member AMS, OSA; Member, National Research Council, Board on Atmospheric Sciences and Climate (BASC). His work has dealt with the remote sensing of cloud properties from both space borne and aircraft measurements and the application of this information to problems of better understanding the physical processes that define the Earth's atmosphere. Other activities include the fundamental advances in atmospheric radiative transfer and the role of clouds in climate. Dr. Stephens has published over 140 peer-reviewed articles and is the author of Remote Sensing of the Lower Atmosphere: An Introduction. Oxford Univ. Press, March 1994. Among many other honors received and positions held, Dr. Stephens is a Fellow of the American Meteorological Society; Fellow of the American Geophysical Union; Distinguished Visiting Scientist at the Jet Propulsion Laboratory, Pasadena, CA and a is currently the PI of NASA's CloudSat Mission and a University Distinguished Professor.

Plenary Presentations

Room T1

Monday . . . . . 08.30 to 10.00

8.30 to 8.40

Welcome and Introduction

Keith L. Lewis, Electromagnetic Remote Sensing Defence Technology Center (United Kingdom)

Ove Steinvall, Defence Research Establishment (Sweden)

Symposium Chairs

8.40 to 9.20

Optics and Photonics for Defence and Security: A Swedish Perspective

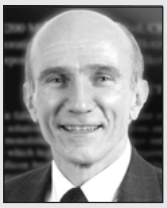
Lena Klasén, Director, Sensor Technology Division, Swedish Defence Research Agency FOI (Sweden)

Many important defence and security issues involve optics and photonics. This presentation will discuss the role of optics and photonics in Defence and Security from a Swedish perspective. Examples of some relevant results in optical systems and technology under reseach and development will be given. Important problem areas will be highlighted and directions for future reserach will be proposed.

Biography: Dr. Lena Klasén is the Director of Swedish Defence Research Agency (FOI) Sensor Technology Division. She has a broad experience in the field of research on image analysis and processing of sensor data for military and and law enforcement applications. During the period 1988-1995 she worked at the Defence Material Administration FMV as a flight test- and systems engineer. Thereafter, during 1996-2000, she worked as a forensic specialist at SKL (National Laboratory of Forensic Science). In 2000 she joined the Laser Systems Department at FOI, and since 2004 she is Director of the Division of Sensor Technology. She obtained her Ph.D in Image Coding from LiU in 2002. She has held several commissions of trust from Interpol, Swedish National Police and also from the Department of Justice in the USA.

9.20 to 10.00

United States Air Force Sensor Challenges



Paul McManamon, Chief Scientist, Sensors Directorate, Air Force Research Lab. (USA)

The Sensors directorate of the Air Force Research Laboratory will be briefly described. This directorate spent $456M last year, and employed about 750 government people, and about 1250 people, including support personnel. Then the new cross directorate initiatives of the Air Force research Laboratory will be described. These are called Focused Long term Challenges, or FLTCs. There are 8 FLTCs. Sensors play a key role in 3 of these. Lastly a number of long term visions for sensing and countermeasures will be described. This will describe the main new thrusts we are pursuing in the Sensors directorate.

Biography: Dr. Paul F. McManamon is chief scientist for the Sensors Directorate, Air Force Research Laboratory, Air Force Materiel Command, Wright-Patterson Air Force Base, Ohio. The Sensors Directorate consists of about 1100 people responsible for developing new sensor technology for the Air Force. Dr McManamon is responsible for the technical portfolio of the Sensors directorate. He has developed multidiscriminate electro-optical sensors, including multifunction laser radar technology, novel electro-optical countermeasure systems, and optical phased-array beam steering technology.

Dr McManamon has participated in three Air Force Scientific Advisory Board summer studies, New World Vistas in 1995, A Roadmap for a 21st Century Aerospace Force in 1998, and Sensors for Difficult Targets in 2001. Dr McManamon has initiated and technically led in many substantial DARPA technology development efforts. Dr McManamon was instrumental in the development of laser flash imaging, initiating the ERASER program as a method to enhance our EO target recognition range by a factor of 4 or 5. Dr McManamon's most recent position was a senior scientist for Infrared Sensors.

Prior to that Dr McManamon served more than two and a half years as acting chief scientist for Avionics. He was the technical lead for more than 500 scientists and engineers, responsible for the technical content of all electro-optical and microwave sensors development, electron device development, automatic target recognition, and for avionics systems, concepts and simulation. McManamon is widely recognized in the electro-optical community.

Dr McManamon is the current President of SPIE. He is also on the board of directors and the SPIE Executive Committee. Dr. McManamon serves on the executive committee for the Military Sensing Symposia, MSS. Dr McManamon received the WRG Baker award from the IEEE in 1998. The WRG Baker award is awarded for the best paper in ANY refereed IEEE journal or publication. Dr McManamon serves on the TTCP SEN panel, and has previously served on the NATO panel 4. Dr McManamon is a Fellow of SPIE, The International Optical Engineering Society. He is also a Fellow of the Air Force Research Laboratory, AFRL, and a Fellow of the Military Sensing Symposia, MSS. He is a senior member of IEEE. Dr McManamon was chairman of the Great Lakes Photonics Symposium in 2004.

Visit the Exhibition!

SPIE *Europe*
Remote Sensing

and

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OPTICS/PHOTONICS in SECURITY & DEFENCE

Exhibition Dates 12-14 September 2006 *Stockholm International Fairs • Stockholm, Sweden*

Leaders from the defence and remote sensing industries from both Europe and North America gather to share topics and photonics technology developments as they relate to these critical industries.

Areas of interest to the attendees range from detectors and sensors to lasers and imaging equipment for the security and defence community, including applications, sensors systems, and satellite platforms in remote sensing.

Technologies:

- **Materials**
- **Optical devices**
- **Sensors**
- **Nanotechnology and bio-inspiration and biometrics**
- **Signal processing**
- **Lidar**
- **Ladar**
- **UV, VIS and IR cameras and imaging systems**
- **Database management**
- **Multi- and hyperspectral imaging**
- **Adaptive optics**
- **MEMS**
- **Image and signal processing**

SPIE *Europe*

Remote Sensing

Symposium Chairs
John Gonglewski, Air Force Research Lab (USA)

Guido D'Urso, Univ. di Napoli Federico II (Italy)

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Monday-Wednesday 11-13 September 2006 • Proceedings of SPIE Vol. 6359

Remote Sensing for Agriculture, Ecosystems, and Hydrology VIII

Conference Chairs: **Manfred Owe**, NASA Goddard Space Flight Ctr. (USA); **Guido D'Urso**, Univ. di Napoli Federico II (Italy); **Christopher M. Neale**, Utah State Univ. (USA)

Cochair: **Ben T. Gouweleeuw**, NASA Goddard Space Flight Ctr. (USA)

Monday 11 September

Welcome and Introduction . . . . . 13.25 to 13.30

Manfred Owe, NASA Goddard Space Flight Ctr.; **Guido D'Urso,** Univ. di Napoli Federico II (Italy); **Christopher M. Neale,** Utah State Univ.

SESSION 1

Room: T33 . . . . . Mon. 13.30 to 16.50

Hydrology and Climate Applications

Chair: **Manfred Owe**, NASA Goddard Space Flight Ctr. (USA)

13.30: **Non-stationary time-series analysis of AVHRR datasets for monitoring vegetation phenology and snow and ice cover,** R. A. Fernandes, R. Latifovic, D. Pouliot, Natural Resources Canada (Canada) . . . . . [6359-01]

13.50: **Date of snow disappearance at 60º and 70º North Latitude from satellite observations,** J. L. Foster, NASA Goddard Space Flight Ctr. (USA); D. Robinson, Rutgers Univ. (USA); D. K. Hall, NASA Goddard Space Flight Ctr. (USA); T. Estilow, Rutgers Univ. (USA) . . . . . [6359-02]

14.10: **Determination of soil heat capacity through an energy balance evaluated by upwelling and downwelling thermal infrared measurements: experimental and theoretical study,** L. Berger, M. Collet, ATMOS (France); C. N. Long, Pacific Northwest National Lab. (USA); T. J. Besnard, ATMOS (France) . . . . . [6359-03]

14.30: **A new approach to reduce inconsistency between MODIS and ASTER land surface temperature products,** Y. Liu, Y. Yamaguchi, T. Hiyama, Nagoya Univ. (Japan) . . . . . [6359-04]

14.50: **Retrieval of land surface properties from the high-spectral resolution infrared sounders: AIRS, IASI, and CrIS,** R. O. Knuteson, E. Borbas, S. C. Moeller, L. Moy, D. C. Tobin, H. E. Revercomb, Univ. of Wisconsin/Madison (USA); S. Nasiri, Texas A&M Univ. (USA) . . . . . [6359-05]

Coffee Break . . . . . 15.10 to 15.30

15.30: **2D weather radar data simulator using specific reflectivity and phase measurements for the rain rate estimation algorithms validation,** E. Amor, R. Abdellfattah, B. Zied, SUPCOM (Tunisia); V. S. Del Rio, Univ. de Vigo (Spain) . . . . . [6359-07]

15.50: **Land surface modeling and satellite passive microwave imagery: a comparison of top soil moisture and surface temperature estimates,** B. T. Gouweleeuw, M. Owe, NASA Goddard Space Flight Ctr. (USA) . . . . [6359-08]

16.10: **Analysis of southern Italy NDVI fluctuations from 1994 to 2006: a search for a climate change indicator,** F. F. Parmiggiani, G. Quarta, G. Marra, D. Conte, Istituto di Scienze dell'Atmosfera e del Clima (Italy) . . . . . [6359-09]

16.30: **The use of ATLAS data to quantify surface radiative budget alteration through urbanization for San Juan, Puerto Rico,** J. C. Luvall, D. I. Rickman, NASA Marshall Space Flight Ctr. (USA); J. Gonzalez, Santa Clara Univ. (USA) . . . . . [6359-10]

Tuesday 12 September

SESSION 2

Room: T33 . . . . . Tues. 09.00 to 11.40

Natural Resource Monitoring with Remote Sensing

Chair: **Guido D'Urso**, Univ. degli Studi di Napoli Federico II (Italy)

09.00: **Historical data set of satellite derived global land surface moisture,** M. Owe, NASA Goddard Space Flight Ctr. (USA); R. A. M. de Jeu, T. R. H. Holmes, Vrije Univ. Amsterdam (Netherlands) . . . . . [6359-12]

09.20: **Forest changes assessment using satellite remote sensing imagery,** M. A. Zoran, National Institute of Research & Development for Optoelectronics (Romania); L. V. Zoran, Univ. Politehnica Bucuresti (Romania) . . . . . [6359-13]

09.40: **Processing and analyzing advanced hyperspectral imagery data,** A. H. El Nahry, National Authority for Remote Sensing and Space Sciences (Egypt) . . . . . [6359-15]

Coffee Break . . . . . 10.00 to 10.20

10.20: **Extended spatial logit models of deforestation due to population and relief energy in East Asia,** S. Tanaka, Shimane Univ. (Japan); R. Nishii, Kyushu Univ. (Japan) . . . . . [6359-16]

10.40: **Estimating timber-volume in a commercial Eucalyptus plantation from Landsat ETM+ imagery: results from two approaches,** P. J. Baruah, T. Endo, The Univ. of Tokyo (Japan); K. Toru, Mitsubishi Group (Japan); Y. Yasuoka, The Univ. of Tokyo (Japan) . . . . . [6359-17]

11.00: **Hyperspectral data and methods for coastal water mapping,** K. G. Nikolakopoulos, Univ. of Athens (Greece); V. Karathanassi, D. Rokos, National Technical Univ. of Athens (Greece) . . . . . [6359-19]

11.20: **Ecosystem management using remote sensing and GIS: a case study from India,** M. Govindaraju, Bharathidasan Univ. (India) . . . . . [6359-20]

Lunch/Exhibition Break . . . . . 11.40 to 13.20

SESSION 3

Room: T33 . . . . . Tues. 13.40 to 17.00

Canopy and Crop Sensing and Modelling

Chair: **Ben T. Gouweleeuw**, NASA Goddard Space Flight Ctr. (USA)

13.40: **Remote sensing of chlorophyll and nitrogen status,** G. R. Ruecker, W. Dorigo, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); J. Lamers, Univ. Bonn (Germany); N. Ibragimov, Uzbekistan National Cotton Growing Research Institute (Uzbekistan); K. Kienzler, Univ. Bonn (Germany); G. Strunz, Deutsches Zentrum für Luft und Raumfahrt e.V. (Germany); P. Vlek, Univ. Bonn (Germany) . . . . . [6359-21]

14.00: **Estimation of canopy structure parameters using multiangular measurements of scattering component abundances,** K. Kirk, H. J. Andersen, Aalborg Univ. (Denmark) . . . . . [6359-23]

14.20: **Leaf area index determination of wheat indicating heterogeneous soil conditions,** P. Weihs, K. Huber, P. Rischbeck, J. Eitzinger, Univ. für Bodenkultur Wien (Austria) . . . . . [6359-24]

14.40: **Cost-effectiveness of vegetation biophysical parameters retrieval from remote sensing data,** F. Vuolo, Univ. degli Studi Napoli Federico II (Italy); L. Dini, Agenzia Spaziale Italiana (Italy); G. D'Urso, Univ. degli Studi Napoli Federico II (Italy) . . . . . [6359-25]

Coffee Break . . . . . 15.00 to 15.20

15.20: **A cross-combined land use classification system for remote sensing detection of irrigated crops,** A. A. F. Fais, P. P. Nino, Istituto Nazionale di Economia Agraria (Italy); U. Minelli, Snam Progetti SpA (Italy) . . . . . [6359-26]

15.40: **Crop yield prediction using integrated multipolarization radar and multitemporal visible/infrared imagery,** G. G. Wilkinson, I. Davis, Univ. of Lincoln (United Kingdom) . . . . . [6359-28]

16.00: **The use of MODIS-simulated spectral bands for monitoring plant water stress as an help for dynamic fire risk assessment,** C. Maffei, Mediterranean Agency for Remote Sensing and Environmental Control (Italy); A. P. Leone, M. Vella, Consiglio Nazionale delle Ricerche (Italy); G. Meoli, Mediterranean Agency for Remote Sensing and Environmental Control (Italy); M. Menenti, Consiglio Nazionale delle Ricerche (Italy) and Univ. Louis Pasteur (France) . . . . . [6359-29]

16.20: **Study of the diurnal cycle of stressed vegetation for the improvement of fluorescence remote sensing,** J. Amorós-Lopez, L. Gómez-Chova, L. Alonso, J. Vila-Francés, S. del Valle-Gascon, G. Camps-Valls, J. Calpe-Maravilla, J. F. Moreno, Univ. de València (Spain) . . . . . [6359-30]

16.40: **Determination of NDVI for image processing,** B. S. Tirkappaa, B. S. Tirkappaa, Vishveshvaraya Institute of Technology (India) . . . . . [6359-51]

Wednesday 13 September

SESSION 4

Room: T33 . . . . . Wed. 08.30 to 12.00

Evapotranspiration and Energy Balance Estimation using Remote Sensing

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

08.30: **Operational tools for irrigation water management based on Earth Observation: the DEMETER project *(Invited Paper)*,** A. Calera, Univ. de Castilla-La Mancha (Spain); A. M. Jochum, ALFAclima Asesoramiento Medioambiental (Spain) . . . . . [6359-31]

09.00: **Monitoring crop coefficient of orange orchards using energy balance and the remote sensed NDVI,** S. Consoli, A. Toscano, Univ. di Catania (Italy) . . . . . [6359-32]

09.20: **A real-time crop classification system for evapotranspiration estimates in irrigated areas,** C. M. Neale, Utah State Univ. (USA); L. Mateos, M. P. Gonzalez-Dugo, Instituto de Agricultura Sostenible (Spain) . . . [6359-33]

09.40: **Integrated remote sensing and hydrological models for water balance in mountain watersheds,** Y. Lei, L. Zheng, T. Huang, Y. Shu, H. Li, Institute of Genetics and Developmental Biology (China) . . . . . [6359-34]

Coffee Break . . . . . 10.00 to 10.20

10.20: **Actual evapotranspiration estimation by means of airborne and satellite remote sensing data,** G. Ciraolo, Univ. degli Studi di Palermo (Italy); G. D'Urso, Univ. di Napoli Federico II (Italy); M. Minacapilli, Univ. degli Studi di Palermo (Italy) . . . . . [6359-35]

10.40: **Comparison of remote sensing-based methods for estimating crop evapotranspiration,** M. P. Gonzalez-Dugo, Instituto de Agricultura Sostenible (Spain); C. M. U. Neale, Utah State Univ. (USA); L. Mateos, Instituto de Agricultura Sostenible (Spain); W. P. Kustas, U.S. Dept. of Agriculture (USA) . . . . . [6359-36]

11.00: **A methodology to conduct diagnostic analyses and simulation,** Z. Daniele, L'Istituto Agronomico Mediterraneo di Bari (Italy); C. M. U. Neale, Utah State Univ. (USA); N. Lamaddalena, L'Istituto Agronomico Mediterraneo di Bari (Italy) . . . . . [6359-37]

11.20: **Stress detection in orchards with hyperspectral remote sensing data,** P. B. Kempeneers, Vlaamse Instelling voor Technologisch Onderzoek (Belgium); S. De Backer, Univ. of Antwerp (Belgium) . . . . . [6359-38]

11.40: **Ensemble Kalman filter for one-dimensional soil moisture assimilation: assimilating passive microwave brightness temperature,** C. Huang, Cold and Arid Regions Environmental and Engineering Research Institute (China) . . . . . [6359-39]

✔ Interactive Posters—Wednesday

An interactive poster session will be held on Wednesday 18.00 to 19.30. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. An interactive poster session and reception with authors present will be held Wednesday evening from 18.00 to 19.30. Light refreshments will be served.

✔ **Spaceborne high-resolution remote sensing data for the estimation of urban sealed areas,** V. Hochschild, Univ. Tübingen (Germany) . . [6359-40]

✔ **Remote characterization of fuel type use on satellite data,** R. Lasaponara, A. Lanorte, Istituto di Metodologie per l'Analisi Ambientale (Italy) . . . . . [6359-41]

✔ **Application of rangefinder for small forest fire detection,** A. B. Utkin, A. V. Lavrov, Instituto de Novas Tecnologias (Portugal); R. M. Vilar, Instituto Superior Técnico (Portugal) . . . . . [6359-42]

✔ **Error analysis of scaling evapotranspiration over heterogeneous land surface,** Y. Liu, T. Hiyama, Y. Yamaguchi, Nagoya Univ. (Japan) . [6359-43]

✔ **Comparison of different approaches to retrieve plant water content of summer barley canopies from spectroradiometric measurements,** M. Vohland, T. Jarmer, Univ. Trier (Germany) . . . . . [6359-44]

✔ **Improvement of land cover mapping accuracy through NDVI correction,** Y. Park, K. Han, J. Yeom, Y. Kim, Pukyoung National Univ. (South Korea) . . . . . [6359-45]

✔ **Estimating global specific leaf area from MODIS leaf area index using a terrestrial ecosystem model,** P. J. Baruah, Y. Yasuoka, The Univ. of Tokyo (Japan); A. Ito, Japan Agency for Marine-Earth Science and Technology (Japan); T. Sakai, T. Endo, The Univ. of Tokyo (Japan); D. Dye, Japan Agency for Marine-Earth Science and Technology (Japan) . . . . . [6359-46]

✔ **Pinewood Lai and Fapar estimation by multispectral and multi-angular satellite data,** R. Benedetti, S. Cristofori, Lab. per la Meteorologia e la Modellistica Ambientale (Italy); M. Chiesi, F. Maselli, P. Marcoionni, I. Pippi, M. Menenti, Consiglio Nazionale delle Ricerche (Italy) . . . . . [6359-47]

✔ **Paddy rice mapping of the Caspian Sea coast using microwave and optical remotely sensed data,** P. Z. Firouzabadi, Shahid Beheshti Univ. (Iran); J. Sadidy, Tarbiat Moallem Sabzevar Univ. (Iran) . . . . . [6359-49]

✔ **Retrieval of soil moisture spatial distribution and drought discrimination based on remote sensing,** Y. Li, Shandong Agricultural Univ. (China) . . . . . [6359-50]

✔ **Study on oasis landscape fragmentation in northwest China using remote sensing and GIS: a case study of Jinta Oasis,** M. Guo, Cold and Arid Regions Environmental and Engineering Research Institute (China) . . . . . [6359-52]

✔ **Correlation analysis of simulated MODIS vegetation indices and rice leaf area index and leaf chlorophyll content,** Q. Cheng, X. Wu, Zhejiang Gongshang Univ. (China) . . . . . [6359-53]

✔ **Analysis of difference between NOAA/AVHRR and MODIS vegetation indices,** X. Wu, Q. Cheng, Zhejiang Gongshang Univ. (China) . . . [6359-54]

✔ **A three-band algorithm to retrieve land surface temperature from MODIS data for agricultural drought monitoring in China,** Z. Qin, Chinese Academy of Agricultural Sciences (China); W. Li, Umeå Univ. (Sweden); M. Gao, L. Jiang, Nanjing Univ. (China) . . . . . [6359-55]

✔ **Forest canopy density mapping and monitoring based on ETM+ imagery data,** L. Yaolin, Wuhan Univ. (China) . . . . . [6359-56]

✔ **Estimating canopy chlorophyll and nitrogen concentration of rice from EO-1 Hyperion data,** J. Chen, Q. Tian, Nanjing Univ. (China) . . . [6359-57]

✔ **Quantitative retrieving forest ecological parameters based on remote sensing in Liping County of China,** Q. Tian, Nanjing Univ. (China); J. Chen, Univ. of Toronto (Canada); G. Zheng, X. Xia, J. Chen, Nanjing Univ. (China) . . . . . [6359-58]

✔ **Water resource management through remote sensing and GIS for Thoothukudi Taluk of Tamil Nadu, India,** M. Govindaraju, Bharathidsan Univ. (India) . . . . . [6359-59]

✔ **Modification and application of a GIS-based distributed hydrological model on streamflow prediction for a high-altitude cold semi-arid mountainous catchment,** W. Zhang, Regional Ctr. for Temperate East Asia (China) and The International Institute for Earth System Science (China); D. Zhang, Q. Huang, Nanjing Univ. (China) . . . . . [6359-60]

✔ **Rainfall runoff simulations based on improved TOPMODEL to a meso-scale mountainous catchment over Heihe River Basin, nothwestern China,** W. Zhang, Regional Ctr. for Temperate East Asia (China) and International Institute for Earth System Science (China); J. Han, Regional Ctr. for Temperate East Asia (China); D. Zhao, Nanjing Univ. (China)[6359-61]

✔ **Distributed hydrological modeling study with the dynamic water yielding mechanism and RS/GIS techniques,** D. Zhang, Nanjing Univ. (China); W. Zhang, Regional Ctr. for Temperate East Asia (China) . [6359-62]

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Remote Sensing of the Ocean, Sea Ice, and Large Water Regions 2006

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

Monday 11 September

Welcome and Introduction . . . . . 10.30 to 10.40

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

SESSION 1

Room: T6 . . . . . Mon. 10.40 to 12.30

Coastal Meteorology and Oceanography, In-Situ Data and Sensor Analysis

Chairs: **Ove K. S. Gustafsson**, Swedish Defence Research Agency (Sweden); **Igor L. Bashmachnikov**, Univ. dos Açores (Portugal)

10.40: **The use of measured RF power signals to evaluate feasibility of inverse methods to retrieve refractivity parameters *(Invited Paper),*** O. K. S. Gustafsson, Swedish Defence Research Agency (Sweden); G. Eriksson, Swedich Defence Research Agency (Sweden); P. Holm, Å. Waern, P. von Schoenberg, L. Thaning, R. T. I. Persson, Swedish Defence Research Agency (Sweden); M. Nordstrand, Swedish Defence Research Agency (Sweden) . . . . . [6360-01]

11.10: **Observation of Three Meddies from in situ and altimetry data in the Azores region,** I. L. Bashmachnikov, A. M. Martins, A. H. Mendonca, Univ. dos Açores (Portugal) . . . . . [6360-02]

11.30: **The polarization properties of reflectance from coastal waters and the ocean-atmosphere system,** S. A. Ahmed, A. Gilerson, M. Oo, J. Zhou, City College/CUNY (USA); J. Chowdhary, Columbia Univ. (USA); B. Gross, F. Moshary, City College/CUNY (USA) . . . . . [6360-03]

11.50: **Imagine spectroscopy for coastal biogeochemistry of estuaries and plumes,** M. Shimoni, M. Acheroy, Royal Belgian Military Academy (Belgium) . . . . . [6360-04]

12.10: **Time-variable gravity as a new remote sensing tool for global hydrospheric mass transports,** B. F. Chao, National Central Univ. (Taiwan) . . . . . [6360-05]

Lunch Break . . . . . 12.20 to 13.40

SESSION 2

Room: T6 . . . . . Mon. 13.40 to 15.00

Water Surface Reflectance: Sensors, Modelling, and Analysis

Chairs: **Karine Caillault**, ONERA (France); **Lisa H. Huddleston**, NASA Kennedy Space Ctr. (USA)

13.40: **Infrared multiscale sea surface modeling,** K. Caillault, S. Fauqueux, P. Simoneau, ONERA (France) . . . . . [6360-06]

14.00: **Integration of wave curvature in calculating reflectivity from one-dimensional rough surfaces by ray tracing technique including multiple reflections,** P. Schott, Ecole Supérieure d'Informatique Electronique Automatique (France) . . . . . [6360-07]

14.20: **Sensitivity analysis of irradiance reflectance to the shape factor using an iterative layered approximation to the radiative transfer equation in an aquatic environment,** L. H. Huddleston, NASA Kennedy Space Ctr. (USA); C. R. Bostater, Jr., Florida Institute of Technology (USA) . . . . [6360-08]

14.40: **A GRID enabled a Monte Carlo Hyperspectral Synthetic Image remote sensing model (GRID-MCHSIM) for coastal water quality algorithm research,** G. Chiang, Univ. of Cambridge (United Kingdom); C. R. Bostater, Jr., Florida Institute of Technology (USA) . . . . . [6360-09]

Coffee Break . . . . . 15.00 to 15.20

SESSION 3

Room: T6 . . . . . Mon. 15.20 to 16.40

Coastal Mapping and Related In-Situ Image Analysis in Shallow Waters

Chairs: **Miguel Vélez-Reyes**, Univ. de Puerto Rico Mayagüez (USA); **Carlton R. Hall**, Dynamac Corp. (USA)

15.20: **Remote Sensing of Deep Coral Reefs in Puerto Rico and the U.S. Virgin Islands Using the Seabed Autonomous Underwater Vehicle,** R. A. Armstrong, University of Puerto Rico at Mayaguez (USA); H. Singh, Woods Hole Oceanographic Institution (USA) . . . . . [6360-10]

15.40: **Development of a Field Test Environment for the Validation of Coastal Remote Sensing Algorithms: Enrique Reef, Puerto Rico,** J. Goodman, M. Velez-Reyes, R. A. Armstrong, University of Puerto Rico at Mayaguez (USA) . . . . . [6360-11]

16.00: **Benthic Habitat Mapping using Hyperspectral Remote Sensing,** M. Vélez-Reyes, J. Goodman, University of Puerto Rico at Mayaguez (USA); L. O. Jimenez-Rodriguez, Univerisity of Puerto Rico at Mayaguez (USA); R. A. Armstrong, S. D. Hunt, University of Puerto Rico at Mayaguez (USA) [6360-12]

16.20: **Implementation of a ground truth process for development of a submerged aquatic vegetation (SAV) mapping protocol using Hyperspectral imagery,** C. R. Hall, Dynamac Corp. (USA); C. R. Bostater, Jr., Florida Institute of Technology (USA) . . . . . [6360-13]

SESSION 4

Room: T6 . . . . . Mon. 16.40 to 18.00

SAR, Scatterometry, Radar and Altimetry

Chairs: **Elena Cristea**, Austrian Academy of Sciences (Austria); **Xavier Neyt**, Royal Belgian Military Academy (Belgium)

16.40: **Analysis of the impact of ASCAT's pulse compression,** N. G. Manise, X. Neyt, M. Acheroy, Royal Belgian Military Academy (Belgium) . . . . [6360-14]

17.00: **Altimeter range determination and applications using a transponder,** E. Cristea, Austrian Academy of Sciences (Austria) . . . [6360-15]

17.20: **On the combined use of sun glint Modis signatures and SAR data to detect oil slicks,** M. Adamo, Univ. degli Studi di Bari (Italy); G. De Carolis, V. De Pasquale, G. Pasquariello, Consiglio Nazionale delle Ricerche (Italy) . . . . . [6360-16]

17.40: **An ultrawideband airborne radar measurements of thickness of snow over sea ice,** S. Gogineni, P. Kanagaratnam, R. Willyard, The Univ. of Kansas (USA); T. Markus, D. J. Cavalieri, NASA Goddard Space Flight Ctr. (USA) . . . . . [6360-17]

Tuesday 12 September

SESSION 5

Room: C7 . . . . . Tues. 08.30 to 10.10

Feature Extraction and Image Analysis: Airborne and Satellite Sensors

Chairs: **Sivaprasad Gogineni**, The Univ. of Kansas (USA); **Ka Bian**, Univ. of Surrey (United Kingdom)

08.30: **Application of an integrated Digital Terrain Model to monitoring offshore areas in the Rance estuary (Golf Normand-Breton, west France),** K. Zeineb, Univ. de Marne-la-Vallée (France) . . . . . [6360-18]

08.50: **A pixel to pixel Hyperspectral synthetic image model inter-comparison study,** L. Bassetti, C. R. Bostater, Jr., Florida Institute of Technology (USA) . . . . . [6360-19]

09.10: **Modeling and data analysis of GPS reflections from LEO,** K. Bian, S. Mackin, Univ. of Surrey (United Kingdom) . . . . . [6360-20]

09.30: **Optimal band selection in Hyperspectral remote sensing of aquatic benthic features,** C. R. Bostater, Jr., Florida Institute of Technology (USA) . . . . . [6360-21]

(Stand-by Oral Presentation)
09.50: **Sensor motion control and mobile platforms for aquatic remote sensing,** C. R. Bostater, Jr., Florida Institute of Technology (USA) . . [6360-22]

Wednesday 13 September

✔ Interactive Posters—Wednesday

An interactive poster session will be held on Wednesday 18.00 to 19.30. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. An interactive poster session and reception with authors present will be held Wednesday evening from 18.00 to 19.30. Light refreshments will be served.

Monday-Wednesday 11-13 September 2006 • Proceedings of SPIE Vol. 6361

Sensors, Systems, and Next-generation Satellites XII

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-Pe**, EADS Astrium (France); **Michael E. Schaepman-Strub**, Wageningen Univ. (Netherlands); **Philippe M. Teillet**, Canada Ctr. for Remote Sensing (Canada)

Monday 11 September

Welcome and Introduction . . . . . 10.25 to 10.30

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

SESSION 1

Room: T5 . . . . . Mon. 10.30 to 12.40

Japanese Missions

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

10.30: **Overview of Japanese Earth observation programs *(Invited Paper)*,** H. Shimoda, Japan Aerospace Exploration Agency (Japan) . . . . . [6361-01]

11.00 **GOSAT,** I. Yaouka, Japan Aerospace Exploration Agency (Japan) . . . . . [6361-62]

11.20: **PALSAR initial calibration,** M. Shimada, N. Ito, M. Watanabe, T. Moriyama, T. Tadono, Japan Aerospace Exploration Agency (Japan) [6361-02]

11.40: **Preliminary results of calibration for ALOS optical sensors and validation of generated PRISM DSM,** T. Tadono, M. Shimada, Japan Aerospace Exploration Agency (Japan); A. Mukaida, J. Takaku, S. Kawamoto, Remote Sensing Technology Ctr. of Japan (Japan) . . . . . [6361-03]

12.00: **Status of the GCOM-W and onboard AMSR follow-on instrument,** K. Imaoka, A. Shibata, M. Kachi, M. Kasahara, Y. Iida, K. Tanaka, T. Kimura, Y. Tange, Japan Aerospace Exploration Agency (Japan); H. Shimoda, Japan Aerospace Exploration Agency (Japan) and Tokai University Research and Information Center (Japan) . . . . . [6361-04]

12.20: **The possibility of SGLI/GCOM-C for global environment change monitoring,** Y. Honda, Chiba Univ. (Japan); H. Yamamoto, M. Hori, H. Murakami, N. Kikuchi, Japan Aerospace Exploration Agency (Japan) [6361-05]

Lunch Break . . . . . 12.40 to 13.40

SESSION 2

Room: T5 . . . . . Mon. 13.40 to 15.30

European Missions

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

13.40: **Status of ESA Earth observation missions *(Invited Paper)*,** R. Meynart, European Space Research and Technology Ctr. (Netherlands); P. Silvestrin, European Space Agency (Netherlands) . . . . . [6361-06]

14.10: **Next generation of optical sensor systems for photogrammetry and remote sensing,** A. Eckardt, A. Börner, H. Jahn, S. Hilbert, I. Walter, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [6361-07]

14.30: **The Geostationary Atmospheric Sounder Instrument: GAS,** J. B. Christensen, Saab Ericsson Space AB (Sweden); A. Carlström, Saab Ericsson Space AB (USA); A. Emrich, Omnisys Instrument AB (USA); P. J. I. de Maagt, European Space Agency (Netherlands) . . . . . [6361-08]

14.50: **A wide-band nadir-sounding spectroradiometer for the characterisation of the Earth's outgoing long-wave radiation,** G. Bianchini, L. Palchetti, B. Carli, S. Del Bianco, U. Cortesi, Istituto di Fisica Applicata Nello Carrara (Italy) . . . . . [6361-09]

15.10: **MARSCHALS: airborne simulator of a future space instrument to observe millimeter-wave limb emission from the upper troposphere and lower stratosphere,** B. P. Moyna, M. Oldfield, A. Goizel, D. N. Matheson, B. J. Kerridge, Rutherford Appleton Lab. (United Kingdom); P. J. I. de Maagt, J. Langen, European Space Agency (Netherlands) . . . . . [6361-10]

Coffee Break . . . . . 15.30 to 15.50

SESSION 3

Room: T5 . . . . . Mon. 15.50 to 17.40

US Missions I

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

15.50: **NASA's Earth observation programs *(Invited Paper)*,** S. P. Neeck, T. F. Hammer, NASA Headquarters (USA) . . . . . [6361-11]

16.20: **A spaceborne microwave radar system for looking inside clouds,** R. Basilio, E. Im, M. J. Rokey, D. G. Vane, Jet Propulsion Lab. (USA) . . [6361-12]

16.40: **CALIPSO on-orbit engineering performance assessment,** W. S. Luck, Jr., M. C. Pitts, NASA Langley Research Ctr. (USA); C. S. Weimer, Ball Aerospace & Technologies Corp. (USA) . . . . . [6361-13]

17.00: **Helping to accurately measuring sea surface height: the JPL instrument suite on OSTM (Ocean Surface Topography Mission),** R. Basilio, M. M. Abid, S. Brown, A. R. Dorsey, A. Kitiyakara, P. V. Vaze, Jet Propulsion Lab. (USA) . . . . . [6361-14]

17.20: **Precise monitoring of terrestrial aerosols and total solar irradiance: introducing the NASA Glory Mission,** M. I. Mishchenko, L. D. Travis, B. Cairns, NASA Goddard Institute for Space Studies (USA) . . . . . [6361-15]

Tuesday 12 September

SESSION 4

Room: T5 . . . . . Tues. 08.30 to 10.20

US Missions II

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

8.30 **TBA** (Invited Paper) . . . . . [6361-62]

09.00: **Aquarius/SAC-D mission overview,** A. Sen, Y. Kim, Jet Propulsion Lab. (USA); D. Caruso, Comision Nacionales de Actividades Espaciales (Argentina); G. S. E. Lagerloef, Earth and Space Research (USA); R. Colomb, Comision Nacionales de Actividades Espaciales (Argentina); D. M. Le Vine, NASA Goddard Space Flight Ctr. (USA); S. H. Yueh, Jet Propulsion Lab. (USA) . . . . . [6361-17]

09.20: **Mapping ocean surface topography with a synthetic-aperture interferometry radar,** L. Fu, E. Rodriguez, Jet Propulsion Lab. (USA) [6361-18]

09.40: **GeoSTAR: a microwave sounder for geostationary applications,** B. H. Lambrigtsen, T. Gaier, A. B. Tanner, P. P. Kangaslahti, S. Brown, Jet Propulsion Lab. (USA); C. Ruf, Univ. of Michigan (USA); J. Piepmeier, NASA Goddard Space Flight Ctr. (USA) . . . . . [6361-19]

10.00: **Adaptive targeting of a space-based Doppler wind lidar: data and technology implications,** G. D. Emmitt, Simpson Weather Associates, Inc. (USA) . . . . . [6361-20]

Coffee Break . . . . . 10.20 to 10.40

SESSION 5

Room: T5 . . . . . Tues. 10.40 to 12.00

GPM

Chair: **Shuji Shimizu**, Japan Aerospace Exploration Agency (Japan)

10.40: **Global precipitation measurement development,** A. A. Azarbarzin, R. K. Kakar, NASA Headquarters (USA); J. F. Durning, A. Y. Hou, NASA Goddard Space Flight Ctr. (USA) . . . . . [6361-21]

11.00: **Development of spaceborne dual frequency precipitation radar for the global precipitation measurement mission,** S. Shimizu, R. Oki, M. Kojima, Japan Aerospace Exploration Agency (Japan); T. Iguchi, National Institute of Information and Communications Technology (Japan); K. Nakamura, Nagoya Univ. (Japan) . . . . . [6361-22]

11.20: **Global precipitation measurement (GPM) microwave imager (GMI),** S. Bidwell, NASA Goddard Space Flight Ctr. (USA) . . . . . [6361-23]

11.40: **Global precipitation measurement (GPM): core spacecraft systems engineering challenges,** D. J. Bundas, NASA Goddard Space Flight Ctr. (USA) . . . . . [6361-24]

Lunch/Exhibition Break . . . . . 12.00 to 13.10

SESSION 6

Room: T5 . . . . . Tues. 13.10 to 15.10

Calibration I

Chair: **Brian L. Markham**, NASA Goddard Space Flight Ctr. (USA)

13.10: **Four years of Aqua MODIS on-orbit radiometric calibration,** W. L. Barnes, B. W. Guenther, Univ. of Maryland/Baltimore County (USA); X. Xiong, NASA Goddard Space Flight Ctr. (USA) . . . . . [6361-25]

13.30: **Four-years of on-orbit spectral characterization results for Aqua MODIS reflective solar bands,** X. Xiong, V. V. Salomonson, NASA Goddard Space Flight Ctr. (USA); Y. Xie, George Mason Univ. (USA) . . . . . [6361-26]

13.50: **Status of Aqua MODIS spatial characterization and performance,** N. Che, Science Systems and Applications, Inc. (USA); X. Xiong, NASA Goddard Space Flight Ctr. (USA); W. L. Barnes, Univ. of Maryland/Baltimore County (USA) . . . . . [6361-27]

14.10: **Radiometric calibration of the EO-1 Advanced Land Imager: 5 years on-orbit,** B. L. Markham, L. Ong, J. A. Barsi, NASA Goddard Space Flight Ctr. (USA); J. A. Mendenhall, D. E. Lencioni, MIT Lincoln Lab. (USA); D. L. Helder, South Dakota State Univ. (USA); D. Hollaren, R. Morfitt, Science Applications International Corp. (USA) . . . . . [6361-28]

14.30: **Evaluation of the Landsat-5 TM radiometric calibration history using desert test sites,** B. L. Markham, J. A. Barsi, NASA Goddard Space Flight Ctr. (USA) . . . . . [6361-29]

14.50: **Onboard calibration status of ASTER,** F. Sakuma, National Institute of Advanced Industrial Science and Technology (Japan); T. Sato, Japan Resources Observation System Organization (Japan); H. Inada, NEC TOSHIBA Space Systems, Ltd. (Japan); S. Akagi, Mitsubishi Electric Corp. (Japan); H. Ono, Fujitsu Ltd. (Japan) . . . . . [6361-30]

Coffee Break . . . . . 15.10 to 15.30

SESSION 7

Room: T5 . . . . . Tues. 15.30 to 17.50

Calibration II

Chair: **William L. Barnes**, Univ. of Maryland (USA)

15.30: **Application of a comprehensive radiometric validation protocol for the CERES Earth radiation budget climate record sensors,** K. J. Priestley, NASA Langley Research Ctr. (USA); S. Thomas, Science Applications International Corp. (USA); G. Matthews, Analytical Services and Materials, Inc. (USA) . . . . . [6361-31]

15.50: **Determination of wavelength-dependent spectral darkening occurring on a broadband Earth observing radiometer: application to clouds and the Earth's radiant energy system (CERES),** G. Matthews, Analytical Services & Materials, Inc. (USA); K. J. Priestley, NASA Langley Research Ctr. (USA); D. R. Walikainen, S. Thomas, Science Applications International Corp. (USA) . . . . . [6361-32]

16.10: **Sources of differences in on-orbit total solar irradiance measurements,** J. J. Butler, NASA Goddard Space Flight Ctr. (USA); C. Johnson, J. P. Rice, E. L. Shirley, National Institute of Standards and Technology (USA); R. A. Barnes, Science Applications International Corp. (USA) . . . . . [6361-33]

16.30: **APEX calibration facility: status and first commissioning results,** B. Suhr, J. Fries, P. Gege, H. H. Schwarzer, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [6361-34]

16.50: **Enhancement of diffusers BSDF accuracy: spectral features effect,** H. H. van Brug, G. Bazalgette Gourrèges-Lacoste, TNO TPD (Netherlands) [6361-35]

17.10: **Radiometric calibration concept of the GOCI (Geostationary Ocean Color Imager),** G. Kang, Korea Aerospace Research Institute (South Korea) . . . . . [6361-36]

17.30: **On ground Italian volcanic area spectral characterization for the validation of remote sensing data,** S. Amici, L. Merucci, Istituto Nazionale di Geofisica e Vulcanologia (Italy); S. Pugnaghi, S. Corradini, Univ. degli Studi di Modena e Reggio Emilia (Italy) . . . . . [6361-37]

Wednesday 13 September

SESSION 8

Room: T5 . . . . . Wed. 08.30 to 10.00

Focal Plane Technologies I

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

08.30: **New results for CMOS image sensors developed for space applications *(Invited Paper)*,** O. Saint-Pe, M. Tulet, R. Davancens, F. Larnaudie, M. Breart de Boisanger, EADS Astrium (France); P. Magnan, F. Corbiere, P. Martin-Gonthier, M. Estribeau, École Nationale Supérieure de l'Aéronautique et de l'Espace (France) . . . . . [6361-38]

09.00: **Smart FPA's: are they worth the effort?,** J. Leijtens, TNO (Netherlands) . . . . . [6361-39]

09.20: **Quantum dot infrared photodetector (QDIP) focal plane arrays for space instruments,** S. D. Gunapala, Jet Propulsion Lab. (USA) . . . . [6361-40]

09.40: **QWIP from 4μm up to 18μm,** E. M. Costard, A. Nedelcu, X. Marcadet, J. A. Robo, P. F. Bois, Thales Research & Technology (France) . . . . . [6361-41]

Coffee Break . . . . . 10.00 to 10.20

SESSION 9

Room: T5 . . . . . Wed. 10.20 to 12.00

Focal Plane Technologies II

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

10.20: **From LWIR to VLWIR FPAs made with HgCdTe at Defir,** O. Gavrand, E. De Borniol, G. L. Destefanis, CEA-LETI (France); A. Manissadjian, P. M. Tribolet, C. Pautet, P. Chorier, Sofradir (France) . . . . . [6361-42]

10.40: **AIM Activities for space-qualified HgCdTe photo-voltaic detector arrays from 0.9-μm to 15-μm spectral range,** M. Haiml, H. Bitterlich, M. Bruder, K. Eberhardt, K. Hofmann, H. Lutz, H. Nothaft, J. C. Wendler, R. Wollrab, J. Ziegler, AIM Infrarot-Module GmbH (Germany) . . . . . [6361-43]

11.00: **Curved focal plane array technologies enabling compact wide field of view optical systems,** S. Nikzad, M. E. Hoenk, T. J. Jones, Jet Propulsion Lab. (USA) . . . . . [6361-44]

11.20: **Focal plane electronics for the GAIA focal plane demonstrator,** H. Michaelis, Deutsches Zentrum für Luft und Raumfahrt e.V. (Germany); T. Behnke, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [6361-45]

11.40: **Latest Sofradir technology developments usable for space applications,** M. Vuillermet, P. Chorier, Sofradir (France) . . . . . [6361-46]

Lunch/Exhibition Break . . . . . 12.00 to 13.00

SESSION 10

Room: T5 . . . . . Wed. 13.00 to 15.00

Sensing Technologies I

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

13.00: **Design of the GOSAT interferometer,** F. J. Châteauneuf, M. A. Soucy, G. P. Perron, L. E. Lévesque, ABB Inc. (Canada); J. Tanii, NEC TOSHIBA Space Systems, Ltd. (Japan) . . . . . [6361-47]

13.20: **The VENμS super-spectral camera,** J. M. Topaz, Electro-Optics Industries Ltd. (Israel); F. Tinto, O. Hagolle, Ctr. National d'Études Spatiales (France) . . . . . [6361-48]

13.40: **Contour mapping of Europa using frequency diverse spatial heterodyne imaging,** R. L. Kendrick, Lockheed Martin Advanced Technology Ctr. (USA); J. C. Marron, Lockheed Martin Coherent Technolgies (USA); J. T. Pitman, Lockheed Martin Advanced Technology Ctr. (USA) . . . . . [6361-49]

14.00: **Characteristics of COMS Meteorological Imager,** Y. Cho, Korea Aerospace Research Institute (France); H. Youn, Korea Aerospace Research Institute (South Korea) . . . . . [6361-50]

14.20: **Spectral angle mapper-based assessment of detectability of man-made targets from hyperspectral imagery after SNR enhancement,** S. Qian, H. Othman, Canadian Space Agency (Canada); J. Lévesque, Defence Research and Development Canada (Canada) . . . . . [6361-51]

14.40: **The flight test of Pi-SAR(L) for the repeat-pass interferometric SAR,** H. Nohmi, NEC Corp. (Japan); M. Shimada, Japan Aerospace Exploration Agency (Japan); M. Miyawaki, NEC Aerospace Systems, Ltd. (Japan) [6361-52]

Coffee Break . . . . . 15.00 to 15.20

SESSION 11

Room: T5 . . . . . Wed. 15.20 to 17.00

Sensing Technologies II

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

15.20: **New generation of space capabilities resulting from US/RF cooperative efforts,** T. W. Humpherys, Utah State Univ. (USA); V. Sinelshchikov, V. Misnik, TsNPO Kometa (Russia); A. T. Stair, Jr., J. Carpenter, Visidyne, Inc. (USA); J. Watson, The Aerospace Corp. (USA); D. V. Chvanov, Space Dynamics Lab. (Russia); V. Khatulev, Khrunichev State Research & Production Ctr. FGUC (Russia) . . . . . [6361-53]

15.40: **Real-time beamforming synthetic aperture radar processor,** R. F. Rincon, L. Hilliard, D. Bradley, S. Sheikh, J. Lucey, NASA Goddard Space Flight Ctr. (USA) . . . . . [6361-54]

16.00: **Rapid full-spectrum hyperspectral scene simulation for sensor trade studies,** R. L. Sundberg, Spectral Sciences, Inc. (USA); S. C. Richtsmeier, Spectral Sciences, Inc (USA); R. E. Haren, F. O. Clark, Air Force Research Lab. (USA) . . . . . [6361-56]

16.20: **Non-radiation hardened microprocessors in space-based remote sensing systems,** R. J. DeCoursey, NASA Headquarters (USA); R. Melton, Ball Aerospace & Technologies Corp. (USA); R. R. Estes, Jr., NASA Langley Research Ctr. (USA) . . . . . [6361-57]

16.40: **Air liquid cryocoolers for space applications,** J. Buquet, T. Trollier, J. Tanchon, A. Ravex, P. Crespi, Air Liquide (France) . . . . . [6361-58]

✔ Interactive Posters—Wednesday

An interactive poster session will be held on Wednesday 18.00 to 19.30. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. An interactive poster session and reception with authors present will be held Wednesday evening from 18.00 to 19.30. Light refreshments will be served.

✔ **Airborne remote sensor of sea environment monitor (MAMS),** Y. Yang, Y. Xue, L. Yu, Shanghai Institute of Technical Physics (China) . . . . . [6361-60]

✔ **Laser cryogenic gravimeter for high-sensitivity gravitational measurements,** V. A. Yatsenko, Institute of Space Research (Ukraine); D. Vasilogiannis, P. M. Pardalos, Univ. of Florida (USA) . . . . . [6361-61]

Monday-Thursday 11-14 September 2006 • Proceedings of SPIE Vol. 6362

Remote Sensing of Clouds and the Atmosphere XI

Conference Chairs: **James R. Slusser**, Colorado State Univ. (USA); **Klaus Schäfer**, Forschungszentrum Karlsruhe (Germany); **Adolfo Comerón**, Univ. Politècnica de Catalunya (Spain)

Programme Committee: **Michel R. Carleer**, Univ. Libre de Bruxelles (Belgium); **Sonnik Clausen**, Risø National Lab. (Denmark); **Wei Gao**, Colorado State Univ. (USA); **Roland Harig**, Technische Univ. Hamburg-Harburg (Germany); **Richard H. Picard**, Air Force Research Lab. (USA); **Nicolaos I. Sifakis**, National Observatory of Athens (Greece); **Michiel van Weele**, Koninklijk Nederlands Meteorologisch Instituut (Netherlands)

Monday 11 September

Welcome and Introduction . . . . . 10.25 to 10.30

James R. Slusser, Colorado State Univ.; **Klaus Schäfer,** Forschungszentrum Karlsruhe (Germany); **Adolfo Comerón,** Univ. Politècnica de Catalunya (Spain)

SESSION 1

Room: C7 . . . . . Mon. 10.30 to 12.00

Aerosol Properties from Sun Photometry

Chair: **Mikhail D. Alexandrov**, Columbia Univ. (USA)

10.30: **Science on a budget: genesis of modern sun photometry *(Invited Paper),*** G. E. Shaw, Univ. of Alaska/Fairbanks (USA) . . . . . [6362-01]

11.00: **Remote sensing of absorbing aerosols and precipitable water vapor using MFRSR measurements,** M. D. Alexandrov, B. Cairns, Columbia Univ. (USA) and NASA Goddard Institute for Space Studies (USA); A. A. Lacis, B. E. Carlson, NASA Goddard Institute for Space Studies (USA) . . . [6362-03]

11.20: **Ultraviolet aerosol optical properties retrieved during the 2006 MIRAGE-Mex experiment: initial results,** T. E. Taylor, J. R. Slusser, Colorado State Univ. (USA); A. Silva, M. Grutter, Univ. Nacional Autónoma de México (Mexico) . . . . . [6362-04]

11.40: **Aerosol climatology in Kathmandu using sunphotometry,** B. K. Bhattarai, Norwegian Univ. of Science and Technology (Norway); B. Kjeldstad, Univ. of Trondheim (Norway); T. M. Thorseth, Hogskolen i Sor-Trondelag (Norway); A. Bagheri, Norwegian Univ. of Science and Technology (Norway) . . . . . [6362-05]

Lunch Break . . . . . 12.00 to 13.20

SESSION 2

Room: C7 . . . . . Mon. 13.20 to 15.00

Satellite Retrieval of Aerosol Properties

Chair: **Paul M. Glantz**, Stockholm Univ. (Sweden)

13.20: **Increasing trend of submicron aerosol particles over East Asian waters observed in 1998-2004 by sea wide field-of-view sensor (SeaWiFS),** H. Fukushima, Tokai Univ. (Japan); L. Li, Ocean Univ. of China (China); K. Takeno, Tokai Univ. (Japan) . . . . . [6362-06]

13.40: **The Earth surface reflectance retrieval by exploiting the synergy of TERRA and AQUA MODIS data,** Y. Xue, London Metropolitan Univ. (United Kingdom) . . . . . [6362-07]

14.00: **Estimation of dust effects on AIRS radiances and retrievals,** S. G. De Souza-Machado, L. L. Strow, H. E. Motteler, S. E. Hannon, Univ. of Maryland/Baltimore County (USA) . . . . . [6362-08]

14.20: **Aerosols detection for urban air pollution monitoring,** A. Beaulant, L. Wald, École Nationale Supérieure des Mines de Paris (France) . . . . . [6362-59]

14.40: **Results of 50 year ground-based measurements in comparison with satellite remote sensing of two prominent dust emission sources located in Iran,** O. Esmaili, M. Tajrishy, Sharif University of Technology (Iran) and Environment and Water Research Center (EWRC) (Iran); P. Daneshkar Arasteh, IK International University (Iran) and Environment and Water Research Center (EWRC) (Iran) . . . . . [6362-09]

Coffee Break . . . . . 15.00 to 15.20

SESSION 3

Room: C7 . . . . . Mon. 15.20 to 17.40

Radiative Transfer

Chair: **Xu Liu**, NASA Langley Research Ctr. (USA)

15.20: **Development of a fast-forward model for IASI,** X. Liu, NASA Langley Research Ctr. (USA); P. Schluessel, EUMETSAT (Germany); D. K. Zhou, A. M. Larar, NASA Langley Research Ctr. (USA); W. L. Smith, Sr., Hampton Univ. (USA); S. A. Mango, National Oceanic and Atmospheric Administration (USA) . . . . . [6362-10]

15.40: **Atmospheric correction of airborne infrared hyperspectral images using neural networks,** S. Lesage, V. Achard, ONERA (France); A. Chedin, École Polytechnique (France); L. Poutier, ONERA (France) . . . . . [6362-11]

16.00: **Application of the opacity distribution function (ODF) technique to the Non-LTE radiative transfer in the molecular bands in planetary atmospheres,** A. A. Kutepov, A. Feofilov, NASA Goddard Space Flight Ctr. (USA); O. B. Gusev, Bergische Univ.-Gesamthochschule Wuppertal (Germany) . . . . . [6362-12]

16.20: **Hyperspectral remote sensing of aerosol plumes :a semianalytical model,** A. Alakian, R. Marion, Commissariat à l'Energie Atomique (France); X. Briottet, ONERA (France) . . . . . [6362-32]

16.40: **A New Model for Calculating Infrared Background Radiance at all altitudes including atmospheric clutter and clouds,** R. L. Sundberg, Spectral Sciences, Inc. (USA) . . . . . [6362-101]

17.00: **Radiation transfer in global heterogenic spherical system,** T. A. Sushkevich, M. V. Keldysh Institute of Applied Mathematics (Russia) [6362-16]

17.20: **Variations of solar radiation at the Earth's surface during the total solar eclipse of 29 March 2006,** M. Blumthaler, Innsbruck Medical Univ. (Austria); A. F. Bais, Aristotle Univ. of Thessaloniki (Greece); A. Webb, The Univ. of Manchester (United Kingdom); S. Kazadzis, Aristotle Univ. of Thessaloniki (Greece); R. Kift, The Univ.of Manchester (United Kingdom); N. Kouremeti, Aristotle Univ. of Thessaloniki (Greece); B. Schallhart, Innsbruck Medical Univ. (Austria) . . . . . [6362-14]

Tuesday 12 September

SESSION 4

Room: C7 . . . . . Tues. 10.40 to 12.30

Remote Sensing of Clouds

Chair: **Ping Wang**, Koninklijk Nederlands Meteorologisch Instituut (Netherlands)

10.40: **Global analysis of cloud geometrical properties using ADEOS-II / GLI data for radiation budget studies *(Invited Paper),*** M. Kuji, Nara Women's Univ. (Japan); T. Nakajima, The Univ. of Tokyo (Japan) . . . . [6362-17]

11.10: **Recent field campaigns with CERES instruments,** Z. P. Szewczyk, Science Applications International Corp. (USA); K. J. Priestley, NASA Langley Research Ctr. (USA) . . . . . [6362-18]

11-.30: **The retrieval of surface solar insolation using SMAC code with MTSAT-1R data,** J. Yeom, K. Han, Y. Park, Y. Kim, Pukyong National Univ. (South Korea) . . . . . [6362-15]

11.50: **Atmospheric heat budget estimated from Aqua satellite,** T. A. Fan, B. Lin, NASA Langley Research Ctr. (USA) . . . . . [6362-20]

12.10: **Improvement of the FRESCO O2 A-band cloud retrieval algorithm for GOME and SCIAMACHY,** P. Wang, P. Stammes, Koninklijk Nederlands Meteorologisch Instituut (Netherlands) . . . . . [6362-21]

Lunch/Exhibition Break . . . . . 12.30 to 13.40

SESSION 5

Room: C7 . . . . . Tues. 13.40 to 15.20

Middle Atmosphere

Chair: **Christopher J. Mertens**, NASA Langley Research Ctr. (USA)

13.40: **A data-driven coupled non-LTE radiation transfer and ionospheric plasma model for studying the E-region response to solar-geomagnetic storms,** C. J. Mertens, NASA Langley Research Ctr. (USA); J. C. Mast, Science Applications International Corp. (USA); J. R. Winick, Air Force Research Lab. (USA); J. M. Russell III, Hampton Univ. (USA); D. S. Evans, National Oceanic and Atmospheric Administration (USA) . . . . . [6362-22]

14.00: **Signatures of mesospheric fronts,** R. H. Picard, Air Force Research Lab. (USA); E. Cohen, ARCON Corp. (USA); E. M. Dewan, Air Force Research Lab. (USA); C. Y. She, Colorado State Univ. (USA); M. J. Taylor, Utah State University (USA); J. R. Winick, Air Force Research Lab. (USA) . . . . . [6362-25]

14.20: **Global measurements and modeling of 4.3 um NLTE using AIRS,** S. G. De Souza-Machado, L. L. Strow, H. E. Motteler, S. E. Hannon, Univ. of Maryland/Baltimore County (USA); M. Lopez-Puertas, B. Funke, Instituto de Astrofisica de Andalucia (Spain); D. P. Edwards, National Ctr. for Atmospheric Research (USA) . . . . . [6362-54]

14.40: **Radio holographic studying internal waves in the atmosphere on a global scale,** P. Alexandr, Institute of Radio-engineering and Electronics (Russia); Y. Liou, National Central Univ. (Taiwan); W. Jens, GeoForschungsZentrum Potsdam e.V. (USA); P. Alexey, Institute of Radio-engineering and Electronics (Russia); S. Torsten, GeoForschungsZentrum Potsdam e.V. (Germany); I. Kiyoshi, National Institute of Information and Communications Technology (Japan) . . . . . [6362-56]

15.00: **A microwave radiometer for the remote sensing of nitric oxide and ozone in the middle atmosphere,** P. J. Espy, British Antarctic Survey (United Kingdom); P. Hartogh, Max-Planck-Institut für Sonnensystemforschung (Germany) . . . . . [6362-75]

Coffee Break . . . . . 15.20 to 15.40

SESSION 6

Room: C7 . . . . . Tues. 15.40 to 17.20

Lidar, Meteorological Instrumentation

Chair: **Christoph Münkel**, Vaisala GmbH (Germany)

15.40: **Lidar mixing height determination during Helsinki testbed,** C. Münkel, Vaisala GmbH (Germany) . . . . . [6362-26]

16.00: **Determination of mixing layer height from ceilometer backscatter profiles,** M. de Haij, W. Wauben, H. K. Baltink, Koninklijk Nederlands Meteorologisch Instituut (Netherlands) . . . . . [6362-29]

16.20: **Observation of clouds on MIRAI in the Pacific Ocean with the millimeter-wave FM-CW radar at 95 GHz,** T. Takano, K. Futaba, H. Abe, J. Yamaguchi, A. Hirai, Y. Kawamura, Chiba Univ. (Japan); H. Kumagai, Y. Ohno, National Institute of Information and Communications Technology (Japan); T. Takamura, Chiba Univ. (Japan); Y. Nakanishi, Qingdao Scitech Co., Ltd. (Japan); N. Sugimoto, I. Mjatsui, National Institute for Environmental Studies (Japan); Y. Fujiyoshi, Hokkaido Univ. (Japan); H. Okamoto, Tohoku Univ. (Japan) . . . . . [6362-30]

16.40: **Automated backscatter lidar for PBL and troposphere measurements: experience from one-year operation,** V. Mitev, G. Martucci, R. Matthey, Observatory of Neuchâtel (Switzerland) . . . . . [6362-31]

17.00: **Polarization lidar for identifying aerosol type,** K. Sassen, Univ. of Alaska/Fairbanks (USA) . . . . . [6362-58]

Wednesday 13 September

SESSION 7

Room: C7 . . . . . Wed. 09.00 to 12.10

UV Ground-based Measurements

Chair: **Gunther J. Seckmeyer**, Univ. Hannover (Germany)

09.00: **Influence of surface reflectivity on radiation in the Antarctic environment *(Invited Paper)*,** G. Seckmeyer, Univ. Hannover (Germany); S. Wuttke, Alfred-Wegener-Institut für Polar- und Meeresforschung (Germany); I. Smolskaia, Univ. Hannover (Germany); K. Michael, Univ. of Tasmania (Australia) . . . . . [6362-33]

09.30: **International intercomparison of multiband filter radiometers in Oslo 2005,** B. J. johnsen, The Norwegian Radiation Protection Authority (Norway); B. Kjeldstad, Norwegian Univ. of Science and Technology (Norway); T. N. Aalerud, L. T. Nilsen, The Norwegian Radiation Protection Authority (Norway); J. Schreder, Calibration Measurement Software Solutions (Austria); A. Bagheri, Norwegian Univ. of Science and Technology (Norway); G. Bernhard, Biospherical Instruments Inc. (USA); B. Bhattarai, Norwegian Univ. of Science and Technology (Norway); M. Blumthaler, Innsbruck Medical Univ. (Austria); D. Bolsée, Belgian Institute for Space Aeronomy (Belgium); A. Dahlback, Univ. of Oslo (Norway); W. S. Durham, Colorado State Univ. (USA); A. A. Grimenes, The Norwegian Univ. of Life Sciences (Norway); R. Haugen, B. A. Høiskar, Norwegian Institute for Air Research (Norway); G. T. Janson, Colorado State Univ. (USA); K. Lakkala, Finnish Meteorological Institute (Finland); T. Lange, Univ. i Bergen (Norway); A. R. Marrero, Instituto Nacional de Meteorología (Spain); O. Meinander, Finnish Meteorological Institute (Finland); L. Paulsson, Swedish Radiation Protection Authority (Sweden); T. Ringstad, The Norwegian Univ. of Life Sciences (Norway); J. R. Slusser, Colorado State Univ. (USA); A. R. D. Smedley, The Univ. of Manchester (United Kingdom); J. J. Stamnes, Univ. i Bergen (Norway); C. Topaloglou, Aristotle Univ. of Thessaloniki (Greece); C. Torres, Instituto Nacional de Meteorología (Spain); A. R. Webb, The Univ. of Manchester (United Kingdom); G. Zablocki, Instytut Meteorologii i Gospodarki Wodnej (Poland); J. B. Ørbæk, Norwegian Polarinstitute (Norway) . . [6362-34]

09.50: **Long-term evaluation of the calibration of YES UVB-1 broadband radiometers of the Central UV Calibration Facility (1994-2005) and the USDA UV Monitoring Network,** K. O. Lantz, P. Disterhof, C. M. Wilson, National Oceanic and Atmospheric Administration (USA); J. R. Slusser, Colorado State Univ. (USA) . . . . . [6362-35]

10.10: **Methodology for calibrating UVB-1 broadband radiometers at El Arenosillo laboratory,** J. M. Vilaplana, Instituto Nacional de Técnica Aeroespacial (Spain); J. Gröbner, Physikalisch-Meteorologisches Observatorium Davos, World Radiation Center (Switzerland); A. Serrano, M. Antón, M. L. Cancillo, Univ. de Extremadura (Spain) . . . . . [6362-36]

Coffee Break . . . . . 10.30 to 10.50

10.50: **Quality considerations on ground based measurements of global radiation to be used for modeling UV radiation,** T. H. Sivertsen, Bioforsk (Norway) . . . . . [6362-37]

11.10: **Ship-borne measurements of UV irradiance on a north-south Atlantic transect,** S. Wuttke, S. E. D. El Naggar, T. Bluszcz, O. Schrems, Alfred-Wegener-Institut für Polar- und Meeresforschung (Germany) . [6362-38]

11.30: **Validation of ozone and aerosol retrieval methods with UV rotating shadowband spectroradiometer (RSS),** P. W. Kiedron, J. A. Schlemmer, SUNY/Univ. at Albany (USA); J. R. Slusser, Colorado State Univ. (USA); P. Disterhoft, National Oceanic and Atmospheric Administration (USA) [6362-39]

11.50: **Parametric model for determination of UVB irradiance versus cloud planar distribution,** L. Berger, ATMOS (France); D. J. Gillotay, Belgian Institute for Space Aeronomy (Belgium); C. N. Long, Pacific Northwest National Lab. (USA); T. Besnard, J. Dupont, ATMOS (France) . . . . . [6362-13]

Lunch/Exhibition Break . . . . . 12.10 to 13.30

SESSION 8

Room: C7 . . . . . Wed. 13.30 to 15.30

UV Modelling and Data Analysis

Chair: **Peter Koepke**, Ludwig-Maximilians-Univ. München (Germany)

13.30: **Use of the visibility in the radiation transfer modeling in UV range,** B. M. Lapeta, Instytut Meteorologii i Gospodarki Wodnej (Poland); Z. Ustrnul, Instytut Meteorologii i Gospodarki Wodnej (Poland) and Univ. of Silesia (Poland); A. Curylo, Instytut Meteorologii i Gospodarki Wodnej (Poland) . . . . . [6362-40]

13.50: **UV climatology from quality controlled ground-based spectral UV-measurements,** P. N. Den Outer, H. Slaper, A. Van Dijk, Rijksinstituut voor Volksgezondheld en Millieu (Netherlands); A. F. Bais, Aristotle Univ. of Thessaloniki (Greece); U. Feister, Deutscher Wetterdienst (Germany); M. Janouch, Czech Hydrometeorological Institute (Czech Republic); W. Josefsson, Swedish Meteorological and Hydrological Institute (Sweden); J. Kaurola, T. V. Koskela, Finnish Meteorological Institute (Finland) . . . . . [6362-41]

14.10: **Modeling solar UV radiation in the past: comparison of algorithms and input data,** P. Koepke, Ludwig-Maximilians-Univ. München (Germany); H. De Backer, Institut Royal Meterologique de Belgique (Belgium); A. F. Bais, Aristotle Univ. of Thessaloniki (Greece); A. Curylo, Instytut Meteorologii i Gospodarki Wodnej (Poland); K. Eerme, Tartu Observatory (Estonia); U. Feister, Deutscher Wetterdienst (Germany); B. Johnsen, The Norwegian Radiation Protection Authority (Norway); J. Junk, Univ. Trier (Germany); A. Kazantzidis, Aristotle Univ. of Thessaloniki (Greece); J. Kryscin, Institute of Geophysics (Poland); A. Lindfors, Finnish Meteorological Institute (Finland); J. A. Olseth, Univ. i Bergen (Norway); P. den Outer, Rijksinstituut voor Volksgezondheld en Millieu (Netherlands); A. Pribullova, Slovak Academy of Sciences (Slovenia); A. W. Schmalwieser, Veterinaermedizinische Univ. Wien (Austria); H. Slaper, Rijksinstituut voor Volksgezondheld en Millieu (Netherlands); H. Staiger, Deutscher Wetterdienst (Germany); J. Verdebout, Joint Research Ctr. (Italy); L. Vuilleumier, MeteoSwiss (Switzerland); P. Weihs, Univ. für Bodenkultur Wien (Austria) . . . . . [6362-42]

14.30: **Year-to-year variations of the vitamin D synthesis related UV-B radiation in Estonia in autumn and spring,** K. Eerme, U. Veismann, I. Ansko, S. Lätt, Tartu Observatory (Estonia) . . . . . [6362-43]

14.50: **Long-term erythemal UV at Abisko and Helsinki estimated using total ozone, sunshine duration, and snow depth,** A. V. Lindfors, Finnish Meteorological Institute (Finland); B. Holmgren, The Royal Swedish Academy of Sciences (Sweden); G. H. Hansen, Norwegian Institute for Air Research (Norway) . . . . . [6362-44]

15.10: **On UV climatology in Belgium from ground-based and space measurements,** D. J. Gillotay, D. Bolsee, C. Depiesse, Belgian Institute for Space Aeronomy (Belgium) . . . . . [6362-45]

Coffee Break . . . . . 15.30 to 15.50

SESSION 9

Room: C7 . . . . . Wed. 15.50 to 17.10

UV Satellite-based Retreivals

Chair: **Ralf Meerkötter**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)

15.50: **Modeling natural surface UV radiation with satellite data: examples of applications,** J. Verdebout, European Commission (Italy) . . . . . [6362-46]

16.10: **On the use of quantitative diurnal cloud information for the calculation of UV daily dose maps over Europe,** M. van Weele, R. van der A, R. Roebeling, Koninklijk Nederlands Meteorologisch Instituut (Netherlands) . . . . . [6362-47]

16.30: **The UV service of the ESA-GSE Project PROMOTE,** R. Meerkötter, T. Erbertseder, J. Kammann, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); R. Blumenthal, Berufsverband der Deutschen Dermatologen (Germany); F. Flore, E. Simeone, Flyby (Italy); G. Licitra, Agenzia Regionale per la Protezione Ambientale della Toscana (Italy); A. Tanskanen, Finnish Meteorological Institute (Finland) . . . . . [6362-48]

16.50: **Requirements for the spatial resolution, temporal resolution, and measuring uncertainties of total ozone measurements to calculate the erythemally effective UV radiation with a pre-selected accuracy,** A. W. Schmalwieser, G. Schauberger, Veterinaermedizinische Univ. Wien (Austria); M. Janouch, Czech Hydrometeorological Institute (Czech Republic); T. Erbertseder, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); G. Coetzee, South African Weather Service (South Africa); P. Weihs, Univ. für Bodenkultur Wien (Austria) . . . . . [6362-49]

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✔ **905-nm biaxial lidar ceilometer prototype,** E. Gregorio López, F. Rocadenbosch, A. Comerón, Univ. Politècnica de Catalunya (Spain) . . . . . [6362-28]

✔ **Remote Sensing of Eddy Currents Under Cloud Cover,** E. O. Sheybani, G. Javidi, Virginia State Univ. (USA) . . . . . [6362-61]

✔ **Atmospheric particles over an urban area,** S. Mukai, I. Sano, Kinki Univ. (Japan) . . . . . [6362-62]

✔ **New inversion algorithm for determination of aerozol microparticles' size distribution,** A. I. Bilyi, Ivan Franko National Univ. of L'viv (Ukraine); R. O. Bilyy, National Academy of Sciences of Ukraine (Ukraine); V. B. Getman, Ivan Franko National Univ. of L'viv (Ukraine) . . . . . [6362-63]

✔ **Aerosol retrieval based on combination use of POLDER and GLI data,** I. Sano, Kinki Univ. (Japan); Y. Okada, Kobe Univ. (Japan); S. Mukai, O. Nakashima, Kinki Univ. (Japan) . . . . . [6362-65]

✔ **A preliminary study on neural network nonlinear time series analysis of satellite remote sensing of rainstorms,** L. Xu, J. Ding, X. Deng, Chengdu Univ. of Information Technology (China) . . . . . [6362-66]

✔ **Cloud detection and height estimation through registration of DMC imagery,** D. C. Bamber, S. Mackin, P. L. Palmer, Univ. of Surrey (United Kingdom) . . . . . [6362-67]

✔ **Polysulphone and spore-film UV-dosimeters compared to two radiation transfer models and an instrument that measures the UV-index: an evaluation for a UV-dosimetry study of preschool children in Stockholm,** U. Wester, Swedish Radiation Protection Authority (Sweden) . . . . . [6362-68]

✔ **Comparison of cloudiness derived from MSG satellite data with standard surface observations: preliminary results for Poland,** B. M. Lapeta, I. Dyras, D. Serafin-Rek, Instytut Meteorologii i Gospodarki Wodnej (Poland); Z. Ustrnul, Instytut Meteorologii i Gospodarki Wodnej (Poland) and Univ. of Silesia (Poland) . . . . . [6362-70]

✔ **Study on methods of cloud identification and data recovery for MODIS data,** X. Wu, Q. Cheng, Zhejiang Gongshang Univ. (China) . . . . . [6362-71]

✔ **Influence of cloud layer dynamic in the cloud cover retrieval,** T. Besnard, M. Collet, ATMOS (France); C. N. Long, Pacific Northwest National Lab. (USA); L. Berger, ATMOS (France) . . . . . [6362-72]

✔ **Ground-based remote sensing of the atmospheric ozone over Moscow at millimeter waves,** S. B. Rozanov, S. V. Solomonov, E. P. Kropotkina, A. N. Ignatyev, A. N. Lukin, P.N. Lebedev Physical Institute (Russia) . [6362-74]

✔ **Industrial lidar sensor for cloud height and visibility detection,** S. Frey, H. Hünninger, H. Wille, JENOPTIK Laser, Optik, Systeme GmbH (Germany); M. Pesch, Technische Univ. Berlin (Germany) . . . . . [6362-76]

✔ **Incorporating weather conditions and various scatterers into volumetric radar clutter,** R. I. Kerminen, J. Jylhä, J. V. Vihonen, T. K. Ala-Kleemola, A. J. E. Visa, Tampere Univ. of Technology (Finland) . . . [6362-77]

✔ **Heterodyne detection technique using laser radiation as a possible approach for remotely senses the aerosol back scatter and wind velocity,** M. S. Edan, Mekkah Topnotch Institute (Saudi Arabia); Y. M. Fadel, Ibb Univ. (Yemen) . . . . . [6362-79]

✔ **A straightforward signal-to-noise ratio estimator for elastic/Raman lidar signals,** M. N. Md Reba, F. Rocadenbosch, M. Sicard, Univ. Politècnica de Catalunya (Spain) . . . . . [6362-80]

✔ **AIRS retrieval validation during the EAQUATE,** D. K. Zhou, NASA Langley Research Ctr. (USA); W. L. Smith, Sr., Hampton Univ. (USA) and Univ. of Wisconsin/Madison (USA); V. Cuomo, Istituto di Metodologie per l'Analisi Ambientale (Italy); J. P. Taylor, United Kingdom Meteorological Office (United Kingdom); C. D. Barnet, National Oceanic and Atmospheric Administration (USA); A. M. Larar, X. Liu, NASA Langley Research Ctr. (USA); P. Di Girolamo, Univ. degli Studi della Basilicata (Italy); G. Pappalardo, Istituto di Metodologie per l'Analisi Ambientale (Italy); S. M. Newman, C. Lee, United Kingdom Meteorological Office (United Kingdom); S. A. Mango, National Oceanic and Atmospheric Administration (USA) . . . . . [6362-81]

✔ **Analysis of pseudo-noise for IR sounder instruments in geostationary orbit,** M. Quatrevalet, European Space Agency (Netherlands) and Rhea System S.A. (Belgium); D. M. Aminou, European Space Agency (Netherlands); C. Standfuss, Noveltis (France) . . . . . [6362-84]

✔ **Estimation of UV irradiance from ancillary data and comparison with measurements at Thessaloniki, Greece (40.5oN, 23oE),** A. Kazantzidis, A. Bais, C. Meleti, Aristotle Univ. of Thessaloniki (Greece) . . . . . [6362-85]

✔ **Quality assurance of the Greek UV network,** A. Kazantzidis, A. F. Bais, C. Meleti, S. Kazadzis, Aristotle Univ. of Thessaloniki (Greece); C. S. Zerefos, National and Kapodestrian Univ. of Athens (Greece); C. Topaloglou, K. Garane, M. M. Zempila, Aristotle Univ. of Thessaloniki (Greece) . . [6362-86]

✔ **Spectral solar UV monitoring: worth it?,** T. V. Koskela, A. Heikkilä, J. Kaurola, A. V. Lindfors, A. Tanskanen, Finnish Meteorological Institute (Finland); P. den Outer, Rijksinstituut voor Volksgezondheld en Millieu (Netherlands) . . . . . [6362-87]

✔ **UV reconstruction modeling for selected European sites,** A. Curylo, Instytut Meteorologii i Gospodarki Wodnej (Poland) . . . . . [6362-88]

✔ **A first approach in measuring, modeling, and forecasting the vitamin D effective UV radiation,** A. W. Schmalwieser, G. Schauberger, Veterinaermedizinische Univ. Wien (Austria); W. B. Grant, Sunlight, Nutrition and Health Research Ctr. (USA); S. Mackin, S. Pope, Solartech, Inc. (USA) . . . . . [6362-89]

✔ **Validation of TOMS UV irradiance with Brewer ground-based measurements at southwestern Spain,** M. Antón, Univ. de Extremadura (Spain); V. E. Cachorro, Univ. de Valladolid (Spain); J. M. Vilapana, Instituto Nacional de Técnica Aeroespacial (Spain); N. A. Krotkov, Univ. of Maryland/ Baltimore (USA); A. Serrano, Univ. de Extremadura (Spain); C. Toledano, Univ. de Valladolid (Spain); B. de la Morena, Instituto Nacional de Técnica Aeroespacial (Spain); J. R. Herman, NASA Goddard Space Flight Ctr. (USA); M. L. Cancillo, Univ. de Extremadura (Spain) . . . . . [6362-90]

✔ **Calibrating six years of multiband UV measurements at Ushuaia and Marambio for model and satellite comparisons,** O. I. Meinander, Finnish Meteorological Institute (Finland); C. Torres, Instituto Nacional de Meteorología (Spain); K. Lakkala, T. Koskela, Finnish Meteorological Institute (Finland); A. Redondas, E. Cuevas, Instituto Nacional de Meteorología (Spain); G. Deferrari, Ctr. Austral de Investigaciones Cientificas (Argentina); A. Tanskanen, Finnish Meteorological Institute (Finland) . . . . . [6362-92]

✔ **Surface UV radiation monitoring at two Italian Brewer stations (Rome and Ispra): a first comparison with OMI data,** A. M. Siani, I. Ialongo, R. Giannini, G. R. Casale, M. Cacciani, Univ. degli Studi di Roma/La Sapienza (Italy) . . . . . [6362-93]

✔ **Reconstruction of daily solar UV irradiation by an artificial neural network (ANN),** U. Feister, Deutscher Wetterdienst (Germany); J. Junk, Univ. Trier (Germany) . . . . . [6362-94]

✔ **Validation of OMI UV products: first results of comparisons with two Austrian ground stations,** P. Weihs, S. Simic, H. Rieder, Univ. für Bodenkultur Wien (Austria) . . . . . [6362-95]

✔ **Exact analytical solution of 3D radiative transfer equation for remote sensing of clouds,** A. B. Gavrilovich, Instytut Fizyki (Belarus) . . . [6362-96]

✔ **Wide-band spectrally resolved measurement of the Earth's up-welling radiation with the REFIR-PAD spectroradiometer,** G. Bianchini, L. Palchetti, C. Belotti, Istituto di Fisica Applicata Nello Carrara (Italy)[6362-97]

✔ **Fog recognition using satellite information,** M. A. Pajek, Instytut Meteorologii i Gospodarki Wodnej (Poland) . . . . . [6362-98]

✔ **The use of laser radiation to study the effect of atmosphere on the FSO communication,** M. K. Al-Bokhaiti, Ibb Univ. (Yemen) . . . . . [6362-100]

✔ **Validation of the QUick Atmospheric Correction (QUAC) algorithm for VIS-SWIR multi- and hyperspectral imagery (Stand-by oral presentation),** R. L. Sundberg, Spectral Sciences, Inc. (USA) . . [6362-102]

✔ **Factors affecting UV radiation at Barrow, Alaska,** G. Bernhard, Biospherical Instruments Inc. (USA) . . . . . [6362-103]

Thursday 14 September

SESSION 10

Room: C7 . . . . . Thurs. 08.30 to 10.20

Trace Gases from the Ground

Chair: **Klaus Schäfer**, Forschungszentrum Karlsruhe GmbH (Germany)

08.30: **Highway emission study by DOAS within the Inn valley near Innsbruck *(Invited Paper)*,** K. Schäfer, H. Hoffmann, A. Krismer, Forschungszentrum Karlsruhe (Germany); J. Wittig, J. Vergeiner, F. Obleitner, Leopold-Franzens-Univ. Innsbruck (Austria) . . . . . [6362-50]

09.00: **Airport air quality studies by remote sensing,** K. Schäfer, G. Schürmann, C. Jahn, Forschungszentrum Karlsruhe GmbH (Germany); E. Flores-Jardines, Univ. Nacional Autónoma de México (Mexico); S. Utzig, H. Hoffmann, A. Krismer, S. M. Emeis, R. Steinbrecher, Forschungszentrum Karlsruhe GmbH (Germany); J. Wittig, J. Vergeiner, F. Obleitner, Leopold-Franzens-Univ. Innsbruck (Austria); C. Münkel, Vaisala GmbH (Germany) . . . . . [6362-52]

09.20: **Quantitative analysis of open-path FTIR spectra by using artificial neural networks,** S. Briz, Univ. Europea de Madrid (Spain); E. Garcia-Cuesta, I. Fernandez-Gomez, A. J. de Castro, Univ. Carlos III de Madrid (Spain) . . . . . [6362-53]

09.40: **Continuous mixing layer height monitoring by ceilometer in complex terrain,** K. Schäfer, S. M. Emeis, C. Jahn, Forschungszentrum Karlsruhe (Germany); C. Münkel, Vaisala GmbH (Germany) . . . . . [6362-27]

10.00: **Ground-based remote sensing of gas emissions from Teide volcano (Tenerife, Canary Islands, Spain) by means of optical remote sensing,** K. Weber, C. Fischer, G. van Haren, K. Bothe, S. Pisirtsidis, M. Laue, Univ. of Applied Sciences (Germany); N. M. Pérez, P. Hernández, J. Barrancos Martínez, Y. González Ramos, Institute of Technology and Renewable Energies (Spain), K. Pabel, OPSIS GmbH (Germany); M. Sosef, Boreal Europe (Netherlands) . . . . . [6362-104]

Coffee Break . . . . . 10.20 to 10.40

SESSION 11

Room: C7 . . . . . Thurs. 10.40 to 11.40

Trace Gases from Space

Chair: **Klaus Schäfer**, Forschungszentrum Karlsruhe GmbH (Germany)

10.40: **Low-cost microsatellite UV instrument suite for monitoring ozone and volcanic sulphur dioxide,** J. A. Fernandez-Saldivar, C. I. Underwood, S. Mackin, Univ. of Surrey (United Kingdom) . . . . . [6362-55]

11.00: **Validation of ozone, NO2, and aerosol products retrieved from SAGE III limb scatter measurements: application to OMPS,** D. F. Rault, NASA Langley Research Ctr. (USA); R. P. Loughman, Hampton Univ. (USA) . . . . . [6362-24]

11.20: **Climate research with the atmospheric infared sounder,** B. H. Lambrigtsen, M. T. Chahine, T. S. Pagano, Jet Propulsion Lab. (USA) [6362-57]

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SAR Image Analysis, Modelling, and Techniques XI

Conference Chairs: **Claudia Notarnicola**, Carlo Gavazzi Space (Italy); **Sune R. J. Axelsson**, SAAB Bofors Dynamics (Sweden); **Francesco Posa**, Politecnico di Bari (Italy)

Wednesday 13 September

✔ Interactive Posters—Wednesday

An interactive poster session will be held on Wednesday 18.00 to 19.30. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. An interactive poster session and reception with authors present will be held Wednesday evening from 18.00 to 19.30. Light refreshments will be served.

✔ **A new method to extract internal wave parameters from SAR imagery,** W. Huang, Second Institute of Oceanography (China) . . . . . [6363-22]

✔ **SAR image modeling of ships on sea surface,** X. Xu, Y. Wang, Y. Qin, Beihang Univ. (China) . . . . . [6363-23]

✔ **On the performance of dual polarimetric SAR detectors,** J. Chong, Z. Han, M. Zhu, Institute of Electronics (China) . . . . . [6363-24]

Thursday 14 September

Welcome and Introduction . . . . . 9.15 to 9.20

Claudia Notarnicola, Carlo Gavazzi Space (Italy); **Sune R. J. Axelsson,** SAAB Bofors Dynamics and FOI (Sweden); **Francesco Posa,** Politecnico di Bari (Italy)

SESSION 1

Room: T5 . . . . . Thurs. 09.20 to 10.20

SAR Sensors

Chair: **Francesco Posa**, Politecnico di Bari (Italy)

09.20: **Performance analysis of bistatic SAR configurations,** M. Tesauro, Univ. della Basilicata (Italy) . . . . . [6363-01]

09.40: **Ambiguity functions and noise floor suppression in random noise radar,** S. R. J. Axelsson, Saab Bofors Dynamics AB (Sweden) . . . . . [6363-02]

10.00: **Ground imaging using wavelength-resolution LORA SAR in the VHF/UHF-band,** L. M. H. Ulander, A. Gustafsson, Swedish Defence Research Agency (Sweden) . . . . . [6363-04]

Coffee Break . . . . . 10.20 to 10.40

SESSION 2

Room: T5 . . . . . Thurs. 10.40 to 12.00

SAR Land Applications

Chair: **Sune R. J. Axelsson**, Saab Bofors Dynamics AB (Sweden)

10.40: **Polarimetric SAR observables for land cover classification: analyses and comparisons,** V. Alberga, Royal Belgian Military Academy (Belgium); G. Satalino, Consiglio Nazionale delle Ricerche (Italy); D. K. Staykova, Göteborg Univ. (Sweden) . . . . . [6363-05]

11.00: **An algorithm based on Neural Networks for generating multi-temporal soil moisture maps from ENVISAT/ASAR images,** P. Pampaloni, S. Paloscia, S. Pettinato, E. Santi, Consiglio Nazionale delle Ricerche/IFAC (Italy) [6363-06]

11.20: **Generation and use of topographic features for improving the classification of the regional scale GBFM Siberia SAR mosaic,** J. Kropacek, G. De Grandi, Joint Research Ctr. (Italy) . . . . . [6363-07]

11.40: **On the comparison between soil moisture values retrieved from SAR images and ground truth point measurements,** C. Notarnicola, Carlo Gavazzi Space and Politecnico di Bari (Italy); F. Posa, Politecnico di Bari (Italy) [6363-08]

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

SESSION 3

Room: T5 . . . . . Thurs. 13.40 to 15.20

SAR Applications I

Chair: **Claudia Notarnicola**, Carlo Gavazzi Space (Italy)

13.40: **Automatic processing of interferometric SAR and the accuracy of surface deformation measurement,** T. Deguchi, M. Kato, Earth Remote Sensing Data Analysis Ctr. (Japan); H. Ackin, H. Senol, Zonguldak Karalemas Univ. (Turkey) . . . . . [6363-09]

14.00: **Impact of the surface characteristics on the generation process of INSAR and LIDAR elevation data,** G. Heidelmeyer, U. Klingauf, Technische Univ. Darmstadt (Germany) . . . . . [6363-10]

14.40: **A segment-based speckle filter for polarimetric SAR,** C. Chen, Hsing-Wu College (Taiwan); K. Chen, National Central Univ. (Taiwan) [6363-12]

15.00: **Analysis of ASAR data for geo-location accuracy and desert signatures,** K. S. Rao, H. K. Al Jassar, Kuwait Univ. (Kuwait) . . . . . [6363-13]

Coffee Break . . . . . 15.20 to 15.40

SESSION 4

Room: T5 . . . . . Thurs. 15.40 to 17.20

SAR Applications II

Chair: **Sune R. J. Axelsson**, Saab Bofors Dynamics AB (Sweden)

15.40: **Modeling the electromagnetic response of Titan's surface features observed by Cassini Radar,** D. Casarano, CNR/IRPI (Italy); C. Notarnicola, Carlo Gavazzi Space and Politecnico di Bari (Italy); B. Ventura, F. Posa, Politecnico di Bari (Italy) . . . . . [6363-14]

16.00: **Extraction of wind and surface current patterns from SAR imagery,** S. Mansor, Univ. Putra Malaysia (Malaysia) . . . . . [6363-15]

16.20: **Windowing technique in FM radar realized by FPGA for better target resolution,** V. I. Ponomaryov, E. Escamilla-Hernandez, V. Kravchenko, Instituto Politécnico Nacional (Mexico) . . . . . [6363-16]

17.00: **The diffraction gratings to reduce the tsunami waves,** T. V. Tulaikova, Institute of Geosphere's Dynamics (Russia) . . . . . [6363-18]

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Optics in Atmospheric Propagation and Adaptive Systems IX

Conference Chairs: **Anton Kohnle**, FGAN-FOM Research Institute for Optronics and Pattern Recognition (Germany); **Karin Stein**, FGAN-FOM Research Institute for Optronics and Pattern Recognition (Germany)

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

Programme Committee: **Luc R. Bissonnette**, Defence Research and Development Canada-Valcartier (Canada); **Piero Bruscaglioni**, Univ. degli Studi di Firenze (Italy); **Denis Dion, Jr.**, Defence Research and Development Canada-Valcartier (Canada); **Jesús J. Fuensalida**, Instituto de Astrofísica de Canarias (Spain); **Stephen M. D. Hammel**, Space and Naval Warfare Systems Ctr., San Diego (USA); **Vladimir P. Lukin**, Institute of Atmospheric Optics (Russia); **Sergio R. Restaino**, Naval Research Lab. (USA); **Susana Ríos Rodríguez**, Univ. de La Laguna (Spain); **Marc Séchaud**, ONERA (France); **Michael L. Shilko, Sr.**, ITT Industries, Inc. (USA); **Mikhail A. Vorontsov**, Army Research Lab. (USA)

Monday 11 September

Welcome and Introduction

Anton Kohnle, FGAN-FOM Research Institute for Optronics and Pattern Recognition (Germany)

Room: T3 . . . . . Mon. 13.05 to 13.30

Keynote Presentation

13.05: **Atmospheric propagation and system aspects,** A. Kohnle, FGAN-FOM Research Institute for Optronics and Pattern Recognition (Germany) . . . . . [6364-01]

SESSION 1

Room: T3 . . . . . Mon. 13.30 to 17.20

Characterisation of the Propagation Environment

Chair: **Karin Stein**, FGAN-FOM Research Institute for Optronics and Pattern Recognition (Germany)

13.30: **Measurements of refractive variability in the marine boundary layer in comparison with mesoscale meteorological model predictions *(Invited Paper)*,** J. Foerster, J. Riechen, Forschungsanstalt der Bundeswehr fur Wasserschall und Geophysik (Germany) . . . . . [6364-02]

14.00: **Prediction of optical path deviations under stable conditions in maritime environments,** D. Dion, Jr., Defense Research and Development Canada-Valacrtier (Canada); K. Stein, D. P. Seiffer, FGAN-FOM Research Institute for Optronics and Pattern Recognition (Germany) . . . . . [6364-03]

14.20: **Refraction effects and wavelength dependence,** J. Claverie, Ecole de Coetquidan Service (France); D. Dion, Defense Research and Development Canada-Valcartier (Canada) . . . . . [6364-04]

14.40: **Code MEDEX for predicting atmospheric aerosol extinction in the marine surface layer,** G. A. Kaloshin, Institute of Atmospheric Optics (Russia); J. J. Piazzola, Univ. de Toulon et du var (France) . . . . . [6364-08]

Coffee Break . . . . . 15.00 to 15.20

15.20: **Determination of aerosol size distribution from multiband transmissometer data in the southern Baltic Sea during the VAMPIRA trials,** A. Jong, TNO Defense, Security and Safety (Netherlands) . . . [6364-06]

15.40: **IR propagation in coastal environment - results of the VAMPIRA trial,** K. Stein, FGAN-FOM Research Institute for Optronics and Pattern Recognition (Germany); H. H. Vogel, DDRE (Denmark) . . . . . [6364-10]

16.00: **Radar propagation in coastal environments: Vampira Results,** H. Fuchs, H. Essen, S. Stanko, G. Biegel, FGAN-FHR Research Institute for High-Frequency Physics (Germany) . . . . . [6364-11]

16.20: **MATISSE: version 1.4 and future developments,** P. Simoneau, K. Caillault, S. Fauqueux, T. Huet, J. Krapez, L. Labarre, C. Malherbe, C. Miesch, ONERA (France) . . . . . [6364-05]

16.40: **TOMS AAI for ELTs Moroccan sites studies,** E. A. Siher, Cadi Ayyad Univ. (Morocco) . . . . . [6364-07]

17.00: **A precise texture-color based forest detection in urban environment,** S. Abdelmounaime, Ctr. National des Techniques Spatiales (Algeria) . . . . . [6364-09]

Tuesday 12 September

SESSION 2

Room: T3 . . . . . Tues. 08.30 to 10.40

Propagation and Imaging through Optical Turbulence

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

08.30: **Influence of photodetector response time on operation,** V. P. Lukin, V. Nosov, E. Nosov, N. N. Botugina, O. N. Emaleev, A. Torgaev, Institute of Atmospheric Optics (Russia) . . . . . [6364-12]

08.50: **Scintillation in ground-to-satellite laser link : physical approach and numerical simulation,** J. Conan, V. Michau, M. J. F. Séchaud, ONERA (France) . . . . . [6364-13]

09.10: **Propagation through shear layers *(Invited Paper)*,** O. Padé, RAFAEL Armament Development Authority Ltd. (Israel) . . . . . [6364-14]

09.40: **Turbulence statistics in littoral area,** K. R. Weiss-Wrana, FGAN-FOM Research Institute for Optronics and Pattern Recognition (Germany) [6364-15]

10.00: **Measurement of the refractive-index structure constant and its profile in the ground level atmosphere by moiré technique,** S. Rasouli, Institute for Advanced Studies in Basic Sciences (Iran); M. T. Tavassoly, Univ. of Tehran (Iran) . . . . . [6364-16]

10.20: **Characterization of compensation for nonuniform image distortions due to atmospheric turbulence,** F. V. Shugaev, E. N. Terentiev, L. S. Shtemenko, O. I. Dokukina, O. A. Ignateva, M.V. Lomonosov Moscow State Univ. (Russia) . . . . . [6364-17]

Coffee Break . . . . . 10.40 to 11.00

SESSION 3

Room: T3 . . . . . Tues. 11.00 to 12.10

Mitigation of Atmospheric Effects and Systems I

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

11.00: **Wavefront measurements and conjugation in strong speckle-modulation conditions *(Invited Paper)*,** M. A. Vorontsov, Army Research Lab. (USA) and University of Maryland, College Park (USA); V. V. Kolosov, Institute of Atmospheric Optics (Russia); A. Kohnle, FGAN-FOM Research Institute for Optronics and Pattern Recognition (Germany) . . . . . [6364-18]

11.30: **The new scheme of formation bistatic laser guide star,** V. P. Lukin, Institute of Atmospheric Optics (Russia) . . . . . [6364-19]

11.50: **Measurement of modulation transfer function (MTF) of the atmosphere in the surface layer by moiré technique,** S. Rasouli, Institute for Advanced Studies in Basic Sciences (Iran); K. Madanipour, M. T. Tavassoly, Univ. of Tehran (Iran) . . . . . [6364-20]

Lunch/Exhibition Break . . . . . 12.10 to 13.20

SESSION 4

Room: T3 . . . . . Tues. 13.20 to 15.00

Mitigation of Atmospheric Effects and Systems II

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

13.20: **The statistical foundation of chi square laser system pointing estimation,** G. W. Lukesh, S. M. Chandler, Nukove Scientific Consulting, LLC (USA) . . . . . [6364-21]

13.40: **Random fluctuations of optical signal path delay in the atmosphere,** L. Kral, I. Prochazka, K. Hamal, Czech Technical Univ. in Prague (Czech Republic) . . . . . [6364-22]

14.00: **Reconstruction of the optical field phase from phase gradient in presence of branch points,** A. V. Falits, V. A. Banakh, Institute of Atmospheric Optics (Russia) . . . . . [6364-23]

14.20: **The optical differentiation technique in wavefront sensing,** J. E. Oti, V. F. Canales, M. Perez Cagigal, P. J. Valle, Univ. de Cantabria (Spain) [6364-24]

14.40: **Optical fringe formation in Earth-based Michelson Stellar Interferometry in the presence of atmospheric turbulence,** V. Gamiz, Air Force Research Lab. (USA) . . . . . [6364-29]

Wednesday 13 September

✔ Interactive Posters—Wednesday

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✔ **The characteristic of the cracked beam spots,** Z. Feizhou, Y. Li, Institute of Applied Physics and Computational Mathematics (China) . . . . [6364-25]

✔ **Influences of thermal distortions and atmospheric turbulence on image resolution of remote sensing system and adaptive optics correction,** X. Zhang, X. Yu, J. Yan, B. Dong, C. Zhao, Beijing Institute of Technology (China) . . . . . [6364-26]

✔ **Millimeterwave propagation within the marine boundary layer in European and tropical regions,** H. Essen, H. Fuchs, T. Brehm, S. Sieger, FGAN-FHR Research Institute for High-Frequency Physics (Germany) . . . . . [6364-27]

✔ **Method of refraction accounting in radiative transfer equation for atmosphere-ocean spherical system,** A. B. Gavrilovich, Instytut Fizyki (Belarus) . . . . . [6364-28]

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Image and Signal Processing for Remote Sensing XII

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

Cochairs: **Jon A. Benediktsson**, Univ. of Iceland (Iceland); **Sebastiano B. Serpico**, Univ. degli Studi di Genova (Italy)

Programme Committee: **Luciano Alparone**, Univ. degli Studi di Firenze (Italy); **Elisabetta Binaghi**, Univ. degli Studi dell'Insurbria (Italy); **Palma N. Blonda**, Consiglio Nazionale delle Ricerche (Italy); **Francesca Bovolo**, Univ degli Studi di Trento (Italy); **Gustavo Camps-Valls**, Univ. de València (Spain); **Chi H. Chen**, Univ. of Massachusetts (USA); **David A. Clausi**, Univ. of Waterloo (Canada); **Melba M. Crawford**, The Univ. of Texas at Austin (USA); **Jacky Desachy**, Univ. des Antilles et de la Guyane (France); **Giles M. Foody**, Univ. of Southampton (United Kingdom); **Paolo Gamba**, Univ. degli Studi di Pavia (Italy); **Ryuei Nishii**, Kyushu Univ. (Japan); **John Richards**, The Australian National Univ. (Australia); **Anne S. Solberg**, Univ. of Oslo (Norway); **Graeme G. Wilkinson**, Kingston Univ. (United Kingdom); **Josiane B. Zerubia**, Institut National de Recherche en Informatique et en Automatique (France)

Wednesday 13 September

Welcome and Introduction . . . . . 8.25 to 8.30

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

SESSION 1

Room: T2 . . . . . Wed. 08.30 to 10.10

Image Analysis and Processing

Chair: **Giles M. Foody**, Univ. of Southampton (United Kingdom)

08.30: **Markov random fields for SAR image analysis and 3D reconstruction *(Invited Paper)*,** F. Tupin, École Nationale Supérieure des Télécommunications (France) . . . . . [6365-01]

09.10: **Robust detection and spectrum estimation of multiple sources from rotating-prism spectrometer images,** R. W. Deming, S. D. Higbee, D. Dwyer, M. Welser, L. I. Perlovsky, P. W. Pellegrini, Air Force Research Lab. (USA) . . . . . [6365-02]

09.30: **A Cramér-Rao lower bound analysis of noise reduction limits in blind deconvolution for pixel-based point-spread-function estimation with the use of a support constraint,** C. L. Matson, A. Haji, Air Force Research Lab. (USA) . . . . . [6365-03]

09.50: **Order statistics vector directional filters to process multichannel images,** V. I. Ponomaryov, A. Rosales-Silva, F. J. Gallegos-Funes, Instituto Politécnico Nacional (Mexico) . . . . . [6365-05]

Coffee Break . . . . . 10.10 to 10.40

SESSION 2

Room: T2 . . . . . Wed. 10.40 to 12.20

Analysis of High Geometrical Resolution Images

Chair: **Elisabetta Binaghi**, Univ. degli Studi dell'Insubria (Italy)

10.40: **Can multiresolution fusion techniques improve classification accuracy?,** L. Bruzzone, L. Carlin, Univ. degli Studi di Trento (Italy); L. Alparone, Univ. degli Studi di Firenze (Italy); S. Baronti, Istituto di Fisica Applicata Nello Carrara (Italy); A. Garzelli, F. Nencini, Univ. degli Studi di Siena (Italy) . . . . . [6365-06]

11.00: **Spatial resolution enhancement of EO-1 ALI bands,** K. G. Nikolakopoulos, Univ. of Athens (Greece) . . . . . [6365-07]

11.20: **Neural disparity computation for IKONOS stereo imagery,** E. Binaghi, I. Gallo, Univ. degli Studi dell'Insubria (Italy); A. Baraldi, Joint Research Ctr. (Italy) . . . . . [6365-08]

11.40: **Road extraction for EuroSDR contest,** C. Beumier, V. Lacroix, Royal Belgian Military Academy (Belgium) . . . . . [6365-09]

12.00: **Image empirical mode decomposition: texture analysis using image HHT,** A. Linderhed, Swedish Defence Research Agency (Sweden) . . [6365-04]

Lunch/Exhibition Break . . . . . 12.20 to 14.00

SESSION 3

Room: T2 . . . . . Wed. 14.00 to 15.20

Image Registration and Change Detection

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

14.00: **Image registration using RST-clustering and its applications in remote sensing,** A. Sibiryakov, M. Bober, Mitsubishi Electric ITE B.V. (United Kingdom) . . . . . [6365-10]

14.20: **Multitemporal change detection with kernels,** G. Camps-Valls, L. Alonso, L. Gomez-Chova, J. Calpe-Maravilla, J. F. Moreno, Univ. de València (Spain) . . . . . [6365-11]

14.40: **An adaptive split-based approach to unsupervised change detection in large-size multitemporal images,** F. Bovolo, L. Bruzzone, Univ. degli Studi di Trento (Italy) . . . . . [6365-12]

15.00: **Targeted information collection for nuclear verification: a combination of object-oriented images analysis and pixel-based change detection with very high resolution satellite data exemplified for Iranian nuclear sites,** S. Nußbaum, Forschungszentrum Juelich GmbH (Germany); I. Niemeyer, Technische Univ. Freiberg (Germany); M. J. Canty, Forschungszentrum Juelich GmbH (Germany) . . . . . [6365-13]

Coffee Break . . . . . 15.20 to 15.50

SESSION 4

Room: T2 . . . . . Wed. 15.50 to 17.30

Image Compression and Watermarking

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

15.50: **A modified band add-on spectral angle mapper (BAO-SAM) distance metrics: a new tool to evaluate lossy compression of hyperspectral imagery,** C. Lastri, B. Aiazzi, S. Baronti, Istituto di Fisica Applicata Nello Carrara (Italy); L. Alparonre, Univ. degli Studi di Firenze (Italy) . . . . . [6365-14]

16.10: **Lossless compression of hyperspectral imagery via lookup tables with predictor selection,** B. Huang, Y. Sriraja, Univ. of Wisconsin/Madison (USA) . . . . . [6365-15]

16.30: **Retrieval sensitivity based compression of hyperpectral data,** M. D. Grossberg, I. Gladkova, City College/CUNY (USA); N. R. Nalli, W. W. Wolf, L. Zhou, QSS Group, Inc. (USA); M. D. Goldberg, National Oceanic and Atmospheric Administration (USA) . . . . . [6365-16]

16.50: **Multiband semifragile watermarking for multi and hyperspectral images based on iterative tree structured vector quantization,** J. Serra, D. Megías Jiménez, J. Minguillón Alfonso, J. Herrera-Juancomarti, Univ. Oberta de Catalunya (Spain) . . . . . [6365-17]

17.10: **MST-embedded JPEG-LS: application to lossless compression of ultraspectral sounder data,** B. Huang, A. Ahuja, Univ. of Wisconsin/Madison (USA); M. D. Goldberg, National Oceanic and Atmospheric Administration (USA) . . . . . [6365-18]

✔Interactive Posters—Wednesday

An interactive poster session will be held on Wednesday 18.00 to 19.30. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. An interactive poster session and reception with authors present will be held Wednesday evening from 18.00 to 19.30. Light refreshments will be served.

✔ **Feature detection from IKONOS pan imagery based on phase congruency,** P. Xiao, X. Feng, S. Zhao, Nanjing Univ. (China) . . . . [6365-34]

✔ **Urban vegetation extraction from very high resolution satellite imagery based on fractal theory,** Y. Zeng, J. Zhang, H. Li, Chinese Academy of Surveying and Mapping (China) . . . . . [6365-35]

✔ **Wavelet-based algorithm with application in remote sensing PCA,** E. O. Sheybani, Virginia State Univ. (USA); L. Hayden, Elizabeth City State Univ. (USA); S. Sriharan, Virginia State Univ. (USA) . . . . . [6365-36]

✔ **Hybrid classification method based on spectral, spatial, and textural features for remotely sensed images,** H. Okumura, K. Arai, Saga Univ. (Japan) . . . . . [6365-37]

✔ **The evaluation of different fitness functions integrated with genetic algorithm on unsupervised classification of satellite images,** Y. F. Yang, M. Yang, T. Y. Tsai, National Chung Hsing Univ. (Taiwan) . . . . . [6365-38]

✔ **Analysis of the classification accuracy of a new MNF based feature extraction algorithm,** M. Greco, G. Corsini, M. Diani, Univ. di Pisa (Italy) . . . . . [6365-40]

✔ **Novel method for reprojection of MODIS level 1B images based on concurrent gradient search,** K. Khlopenkov, A. P. Trishchenko, Y. Luo, Canada Ctr. for Remote Sensing (Canada) . . . . . [6365-41]

✔ **An efficient approach for site-specific scenery prediction in surveillance imaging near Earth's surface,** J. Jylhä, K. Marjanen, M. O. Rantala, P. Metsäpuro, A. J. E. Visa, Tampere Univ. of Technology (Finland) . . . . . [6365-42]

✔ **A comparison of stereo matching techniques for cloud-top height retrieval,** A. Anzalone, Istituto di Astrofisica Spaziale e Fisica Cosmica (Italy); F. Isgrò, Univ. degli Studi di Napoli Federico II (Italy); D. Tegolo, Univ. degli Studi di Palermo (Italy) . . . . . [6365-45]

✔ **Quasi-optimal compression of noisy optical and radar images,** V. V. Lukin, National Aerospace Univ. (Ukraine); N. N. Ponomarenko, Nattional Aerospace Univ. (Ukraine); M. S. Zriakhov, A. A. Zelensky, National Aerospace Univ. (Ukraine); J. T. Astola, K. O. Egiazarian, Tampere Univ. of Technology (Finland) . . . . . [6365-46]

✔ **Motion compensation on synthetic aperture sonar images,** R. Heremans, Royal Belgian Military Academy (Belgium) . . . . . [6365-48]

Thursday 14 September

SESSION 5

Room: T2 . . . . . Thurs. 08.40 to 10.20

Image Classification

Chair: **Graeme G. Wilkinson**, The Univ. of Lincoln (United Kingdom)

08.40: **Issues in training SVM classifications *(Invited Paper)*,** G. M. Foody, Univ. of Southampton (United Kingdom) . . . . . [6365-19]

09.20: **Contextual unsupervised classification of remotely sensed imagery with mixels,** S. Kawaguchi, Kyushu Univ. (Japan); K. Yamazaki, Tokyo Gakugei Univ. (Japan); R. Nishii, Kyushu Univ. (Japan) . . . . . [6365-20]

09.40: **Exctraction of spatial and spectral scene statistics for hyperspectral scene simulation,** R. G. Kennett, R. L. Sundberg, J. H. Gruninger, Spectral Sciences, Inc. (USA); R. E. Haren, Air Force Research Lab. (USA) . . . . . [6365-49]

10.00: **AdaBoost with different costs for misclassification and its applications to contextual image classification,** R. Nishii, S. Kawaguchi, Kyushu Univ. (Japan) . . . . . [6365-22]

Coffee Break . . . . . 10.20 to 10.50

SESSION 6

Room: T2 . . . . . Thurs. 10.50 to 12.10

Classification and Anomaly Detection in Hyperspectral Images

Chair: **Ryuei Nishii**, Kyushu Univ. (Japan)

10.50: **Comparison of kernel-based methods for spectral signature detection and classification of hyperspectral images,** L. Capobianco, L. Carli, A. Garzelli, F. Nencini, Univ. degli Studi di Siena (Italy) . . . . . [6365-23]

11.10: **An advanced semi-supervised SVM classifier for the analysis of hyperspectral remote sensing data,** L. Bruzzone, M. Marconcini, Univ. degli Studi di Trento (Italy) . . . . . [6365-24]

11.30: **Modeling of spatial and spectral systematic noise patterns on CHRIS/PROBA hyperspectral data,** L. Gomez-Chova, L. Alonso, L. Guanter, G. Camps-Valls, J. Calpe-Maravilla, J. F. Moreno, Univ. de València (Spain) . . . . . [6365-25]

11.50: **Target detection in hyperspectral imagery using noise adjusted principal component analysis and orthogonal subspace projection,** A. Chowdhury, M. S. Alam, Univ. of South Alabama (USA) . . . . . [6365-26]

Lunch/Exhibition Break . . . . . 12.10 to 14.10

SESSION 7

Room: T2 . . . . . Thurs. 14.10 to 15.30

SAR Image Analysis

Chair: **Anne S. Solberg**, Univ. I Oslo (Norway)

14.10: **Dark formation detection using recurrent neural networks and SAR data,** K. Topouzelis, Joint Research Ctr. (Italy); V. Karathanassi, National Technical Univ. of Athens (Greece); P. Pavlakis, Hellenic Ctr. for Marine Research (Greece); D. Rokos, National Technical Univ. of Athens (Greece) . . . . . [6365-28]

14.30: **Classification methods for oil spill detection by SAR imaging,** C. Brekke, Forsvarets Forsknings Institute (Norway) and Univ. I Oslo (Norway); A. Solberg, Univ. I Oslo (Norway) . . . . . [6365-29]

14.50: **Oil spill detection using evolved neural networks,** D. N. Stathakis II, K. Topouzelis, Joint Research Ctr. (Italy) . . . . . [6365-30]

15.10: **Non-parametric image partitioning of SAR images,** G. Delyon, F. Galland, P. Réfrégier, Institut Fresnel (France) . . . . . [6365-31]

Coffee Break . . . . . 15.30 to 16.00

SESSION 8

Room: T2 . . . . . Thurs. 16.00 to 16.40

SAR and GPR Data Analysis

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

16.00: **Detection of under-water objects with satellite remote sensing,** E. O. Sheybani, Virginia State Univ. (USA); S. C. Gallegos, Naval Research Lab. (USA) . . . . . [6365-32]

16.20: **Comparison of independent-component-analysis (ICA) algorithms for GPR detection of non-metallic land mines,** F. A. Abujarad, A. S. Omar, Otto-von-Guericke-Univ. Magdeburg (Germany) . . . . . [6365-33]

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Remote Sensing for Environmental Monitoring, GIS Applications, and Geology VI

Conference Chair: **Manfred Ehlers**, Univ. Osnabrück (Germany)

Cochairs: **Hermann J. Kaufmann**, GeoForschungsZentrum Potsdam (Germany); **Ulrich Michel**, Univ. Osnabrück (Germany)

Programme Committee: **Peggy Agouris**, Univ. of Maine (USA); **Costas Armenakis**, Natural Resources Canada (Canada); **Eyal Ben-Dor**, Tel-Aviv Univ. (Israel); **Thomas Blaschke**, Paris-Lodron-Univ. Salzburg (Austria); **Tilman U. Bucher**, DLR (Germany); **Nickolas L. Faust**, Georgia Institute of Technology (USA); **Garik Gutman**, NASA Headquarters (USA); **Bernt E. Johansen**, NORUT Information Technology Ltd. (Norway); **Carsten Jürgens**, Ruhr-Univ. Bochum (Germany); **Martin Kappas**, Univ. Göttingen (Germany); **David B. Kidner**, Univ. of Glamorgan (United Kingdom); **Marguerite M. Madden**, The Univ. of Georgia (USA); **Derya Maktav**, Istanbul Technical Univ. (Turkey); **Josiane Masson**, European Commission (Italy); **Matthias S. Moeller**, Arizona State Univ. (USA); **Konstantinos G. Nikolakopoulos**, Univ. of Athens (Greece); **Michael E. Schaepman-Strub**, Wageningen Univ. (Netherlands); **Wenzhong Shi**, The Hong Kong Polytechnic Univ. (Hong Kong China); **Karl Staenz**, Canada Ctr. for Remote Sensing (Canada); **Josef Strobl**, Paris-Lodron-Univ. Salzburg (Austria); **Lars Tufte**, Federal Institute of Hydrology (Germany); **John L. van Genderen**, International Institute for Aerospace Survey (Netherlands); **Christiane H. Weber**, Univ. Louis Pasteur (France)

Wednesday 13 September

Welcome and Introduction . . . . . 8.50 to 9.00

Manfred Ehlers, Univ. Osnabrück (Germany)

SESSION 1

Room: T34-T35 . . . . . Wed. 09.00 to 10.00

Environmental Monitoring: Land I

Chair: **Manfred Ehlers**, Univ. Osnabrück (Germany)

09.00: **Progress in soil moisture estimation from remote sensing data for for agricultural drought monitoring,** Z. Qin, Chinese Academy of Agricultural Sciences (China); W. Li, Umeå Univ. (Sweden); F. Yan, M. Gao, Nanjing Univ. (China) . . . . . [6366-01]

09.20: **Effects of different vegetation indices to the spatial changes desert environment using EOS/MODIS data: a case study to Sangong inland arid ecosystem,** Z. Qin, Chinese Academy of Agricultural Sciences (China); L. Lu, Nanjing Univ. (China); C. Zhao, Xinjiang Institute of Ecology and Geography (China); W. Li, Umeå Univ. (Sweden) . . . . . [6366-02]

09.40: **Assessment of pasture degradation in Turkmenistan using remote sensing,** S. Kaplan, L. Orlovskey, D. G. Blumberg, Ben-Gurion Univ. of the Negev (Israel) . . . . . [6366-03]

Coffee Break . . . . . 10.00 to 10.20

SESSION 2

Room: T34-T35 . . . . . Wed. 10.20 to 12.00

Advances in Processing Techniques I

Chair: **Stefan Hofer**, Kayser-Threde GmbH (Germany)

10.20: **MTF measuring based on interactive live-wire edge extraction,** L. Peng, D. S. Liu, H. Fang, China Remote Sensing Satellite Ground Station (China); Z. Hui, Institute of Automation (China) . . . . . [6366-04]

10.40: **Supporting the update of maps by object-oriented classification of orthophoto,** F. P. Kressler, ARC systems research (Austria); A. Busch, Bundesamt für Kartographie und Geodäsie (Germany); M. Franzen, Bundesamt fur Eich und Vermessungswesen (Austria); K. Steinnocher, ARC systems research (Austria); A. Streilein, Federal Office of Topography (Switzerland) . . . . . [6366-05]

11.00: **Updating the 1:50.000 topographic maps using ASTER and SRTM DEM: the case of Athens, Greece,** K. G. Nikolakopoulos, Univ. of Athens (Greece); N. Chrysoulakis, Foundation for Research and Technology-Hellas (Greece) . . . . . [6366-06]

11.20: **A method for downscaling MODIS land channels to 250-m spatial resolution using adaptive regression and normalization,** A. P. Trishchenko, Y. Luo, K. V. Khlopenkov, Canada Ctr. for Remote Sensing (Canada) [6366-07]

11.40: **Assessing forest fragmentation and connectivity: a case study in the Carpathians,** K. A. Ostapowicz, Jagiellonian Univ. (Poland) and Institute of Geography and Spatial Management (Poland); C. Estreguil, Joint Research Ctr. (Italy); J. Kozak, Jagiellonian Univ. (Poland); P. Vogt, Joint Research Ctr. (Italy) . . . . . [6366-08]

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

SESSION 3

Room: T34-T35 . . . . . Wed. 13.40 to 15.00

Advances in Processing Techniques II

Chair: **Florian P. Kressler**, ARC systems research (Austria)

13.40: **Study of buried archaeological sites using vegetation indexes,** P. P. M. Merola, A. Allegrini, D. Guglietta, S. Sampieri, Consiglio Nazionale delle Ricerche (Italy) . . . . . [6366-09]

14.00: **Land use/cover classification through multiresolution segmentation and object oriented neural networks classification,** J. Rocha, Univ. de Lisboa (Portugal); J. A. Tenedório, S. Encarnação, Univ. Nova de Lisboa (Portugal); P. Morgado, Univ. de Lisboa (Portugal) . . . . . [6366-10]

14.20: **Spectral unmixing with nonnegative matrix factorization,** M. Parente, A. Zymnis, J. Skaf, Stanford Univ. (USA) . . . . . [6366-11]

14.40: **Applying Advanced and Existing Sensors in Dealing with Potential Natural Disasters,** S. Habib, NASA Goddard Space Flight Ctr. (USA) [6366-13]

Coffee Break . . . . . 15.00 to 15.20

SESSION 4

Room: T34-T35 . . . . . Wed. 15.20 to 16.40

Environmental Monitoring: New Sensors

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

15.20: **Indian remote sensing satellite Cartosat-1: technical features and data products,** M. K. Thore, Thore Electricals (India) . . . . . [6366-14]

15.40: **The EnMAP Hyperspectral Imager: an advanced optical payload for future applications in Earth observation programmes,** S. Hofer, Kayser-Threde GmbH (Germany); H. J. Kaufmann, GeoForschungsZentrum Potsdam e.V. (Germany); B. Penné, OHB-System AG (Germany); G. Schreier, DLR Standort Oberpfaffenhofen (Germany); A. Eckardt, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); H. Bach, Vista GmbH (Germany); U. C. Benz, Definiens Imaging GmbH (Germany); R. Haydn, GAF AG (Germany) . [6366-15]

16.00: **Using high-resolution multispectral imaging to map Pacific coral reefs in support of UNESCO's World Heritage Central Pacific Project,** D. Siciliano, R. C. Olsen, Naval Postgraduate School (USA) . . . . . [6366-16]

16.20: **Satellite remote sensing of the oceanic environment in China,** W. Huang, Second Institute of Oceanography (China) . . . . . [6366-17]

SESSION 5

Room: T34-T35 . . . . . Wed. 16.40 to 17.40

Geology and Hazard Monitoring

Chair: **Shahid Habib**, NASA Goddard Space Flight Ctr. (USA)

16.40: **Using remote sensing techniques in lithological discrimination and detection of gold-bearing alteration zones at Wadi Defeit Area, southeastern desert, Egypt,** M. F. Sadek, National Authority for Remote Sensing and Space Sciences (Egypt) . . . . . [6366-18]

17.00: **A Michelson interferometer for seismic wave measurement: theoretical analysis and system performances,** F. Acernese, Univ. degli Studi di Napoli Federico II (Italy); R. De Rosa, Instituto Nazionale Di Fisica Nucleare (Italy); F. Garufi, L. Milano, Univ. degli Studi di Napoli Federico II (Italy); R. Romano, F. Barone, Univ. degli Studi di Salerno (Italy) . . . . [6366-19]

17.20: **Problems related to the use of multisource multitemporal geospatial datasets for glacier volumetric change detection,** F. Savopol, Natural Resources Canada (Canada) . . . . . [6366-20]

✔ Interactive Posters—Wednesday

An interactive poster session will be held on Wednesday 18.00 to 19.30. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. An interactive poster session and reception with authors present will be held Wednesday evening from 18.00 to 19.30. Light refreshments will be served.

✔ **Identification and spatial characterization of buried remains using VHR satellite images,** R. Lasaponara, Istituto di Metodologie per l'Analisi Ambientale (Italy); N. Masini, Consiglio Nazionale delle Ricerche (Italy) . . . . . [6366-35]

✔ **Analysis of urban surface biophysical parameters from remote sensing imagery,** M. A. Zoran, National Institute of Research & Development for Optoelectronics (Romania) . . . . . [6366-36]

✔ **Multisensor image ffusion for Romanian Black Sea coastal zone analysis,** L. V. Zoran, Univ. Politehnica Bucuresti (Romania); M. A. Zoran, National Institute of Research & Development for Optoelectronics (Romania) . . . . . [6366-37]

✔ **Integrate RS and GIS: a primary study of adding remotely sensed image processing functions to ArcGIS8.3 using Matlab COM Builder and AO,** S. Zhong, IRSA, CAS (China); Y. Xue, London Metropolitan Univ. (United Kingdom) . . . . . [6366-38]

✔ **Fusion of Quickbird satellite images for vegetation monitoring in previously mined reclaimed areas,** E. Ieronimidi, S. P. Mertikas, D. Hristopoulos, Technical Univ. of Crete (Greece) . . . . . [6366-39]

✔ **Inspiration of foreign metropolis development on arable land protection in Beijing, China,** P. Gong, China Agricultural Univ. (China); Z. Chen, H. Tang, Chinese Academy of Agricultural Sciences (China) . . . . . [6366-40]

✔ **GIMS-based approach to the remote sensing of vegetation covers,** K. F. Vladimir, S. M. Anatolij, A. A. Chukhlantsev, S. P. Golovachev, V. Y. Soldatov, Institute of Radio-engineering and Electronics (Russia) . . . . . [6366-41]

✔ **Derivation of maps from remotely sensed and topographic data sources,** C. Letchumanan, Multimedia Univ. (Malaysia) . . . . . [6366-42]

✔ **Total variation of image restoration based on inverse diffusion,** L. Peng, Chinese Academy of Sciences (China); D. S. Liu, China Remote Sensing Satellite Ground Station (China); Z. Hui, Institute of Automation (China); L. Guo Qing, China Remote Sensing Satellite Ground Station (China) [6366-43]

✔ **Hybrid control and acquisition system for remote sensing systems for environmental monitoring,** F. Garufi, F. Acernese, Univ. degli Studi di Napoli Federico II (Italy); A. Boiano, Istituto Nazionale di Fisica Nucleare (Italy); R. De Rosa, Instituto Nazionale Di Fisica Nucleare (Italy); L. Milano, Univ. degli Studi di Napoli Federico II (Italy); R. Romano, F. Barone, Univ. degli Studi di Salerno (Italy) . . . . . [6366-45]

✔ **Application of remote sensing technology to agricultural tri-dimension pollution control in China,** Z. Qin, L. Zhang, Chinese Academy of Agricultural Sciences (China); W. Li, Umeå Univ. (Sweden); M. Gao, Nanjing Univ. (China) . . . . . [6366-47]

✔ **Comparative research on the landscape patterns of the arid mountain ecosystem in northwestern China,** C. Tang, Cold and Arid Regions Environmental and Engineering Research Institute (China) and Lanzhou Jiaotong Univ. (China) . . . . . [6366-48]

✔ **The topological relation model for indeterminate geographical objects based on fuzzy close-degree,** L. Yaolin, Wuhan Univ. (China) . . [6366-49]

✔ **Study on the shortest path algoritm in land trade sample grading method based on GIS,** L. Yaolin, Wuhan Univ. (China) . . . . . [6366-50]

✔ **Research of general land use planning based on SD-MOP integrated model in Huangpi District of Wuhan City,** G. Jian, Wuhan Univ. (China) . . . . . [6366-51]

✔ **A spatio-temporal data model for dynamic monitoring land use,** W. Hao, Wuhan Univ. (China) . . . . . [6366-52]

✔ **Applying GIS into the thermal resources estimation over small grids in the District of City Lasa in Tibet, China,** Y. He, Y. Hou, R. Lin, China Meteorology Academy (China) . . . . . [6366-53]

✔ **Valuation of rangeland ecosystem degradation with remote sensing technology in China,** Z. Qin, Chinese Academy of Agricultural Sciences (China); R. Wang, L. Jiang, L. Lu, Nanjing Univ. (China); W. Li, Umeå Univ. (Sweden) . . . . . [6366-54]

✔ **Comparison of LAI derived from SPOT-VEG data with MODIS LAI products in arid and semi-arid northwestern China,** H. Peng, H. Li, X. Li, Cold and Arid Regions Environmental and Engineering Research Institute (China) . . . . . [6366-56]

✔ **Using BRDF model to derive LAI in arid and semi-arid northwestern China,** H. Peng, H. Li, X. Li, Cold and Arid Regions Environmental and Engineering Research Institute (China) . . . . . [6366-57]

✔ **POS supported sparse bundle adjustment and its application,** Q. Li, Beijing Normal Univ. (China) . . . . . [6366-58]

✔ **Study on dynamic change of land desertification in the source region of the Yellow River, Qinghai Plateau by remote sensing and GIS: a case study of Maduo County,** X. Gao, Y. Wang, C. Yan, Cold and Arid Regions Environmental and Engineering Research Institute (China) . . . . . [6366-60]

✔ **Land and water resource management through remote sensing and GIS for Thoothukudi Taluk of Tamil Nadu, India,** M. Govindaraju, Bharathidsan Univ. (India) . . . . . [6366-61]

✔ **Mono-window algorithm for derivation of land surface net long-wave radiation in mountainous area,** W. Zhang, Institute of Atmospheric Physics (China) and International Institute for Earth System Science (ESSI), Nanjing University, Nanjing 210093, (China); Y. Zhu, Nanjing Univ. (China) [6366-63]

✔ **Remote sensing based on the coupled Ginzburg-Landau chains dynamics,** A. A. Berezin, Tyumen State Oil and Gas Univ. (Russia) [6366-64]

✔ **A evapotranspiration (ET) model based GIS using LANDSAT data and MODIS data with improved resolution,** Y. Shu, Y. Lei, L. Zheng, Institute of Genetics and Developmental Biology (China) . . . . . [6366-65]

✔ **Research on land degradation in arid and semi-arid region,** C. Lv, China Land Surveying and Planning Institute (China) . . . . . [6366-66]

✔ **Remote sensing of plants by the LIF method at nitrogen pollution of ground,** N. L. Fateyeva, A. V. Klimkin, Institute of Atmospheric Optics (Russia); O. V. Bender, M. S. Yamburov, Institute for Monitoring of Climatic and Ecological Systems (Russia) . . . . . [6366-67]

✔ **A new initiative of research and applications: cloud-prone and rainy areas remote sensing (CARRS),** L. Yang, H. Lin, The Chinese Univ. of Hong Kong (Hong Kong China); Y. Shao, Institute of Remote Sensing Applications (China) . . . . . [6366-68]

✔ **The use of remote sensing and GIS for monitoring the Algerian steppe degradation risk,** A. A. Bensaid, Ctr. National des Techniques Spatiales (Algeria) . . . . . [6366-70]

✔ **Application of large-scale geological hazard survey with remote sensing technology,** Y. He, China Land Surveying and Planning Institute (China); Z. Zhang, China Aero Geophysical Survey & Remote Sensing Ctr. for Land and Resources (China) . . . . . [6366-71]

✔ **Integrated remote sensing and GIS approach for delineating ground water potential zonee in GIRI catchment: Uttaranchal Pradesh, India,** O. K. Dissanayake, Univ. of Moratuwa (Sri Lanka) . . . . . [6366-72]

✔ **Monitoring grassland ecosystem degradation using EOS/MODIS data in north China,** Z. Qin, Chinese Academy of Agricultural Sciences (China); L. Jiang, L. Lu, W. Xie, Nanjing Univ. (China); W. Li, Umeå Univ. (Sweden) . . . . . [6366-75]

✔ **Development of the global cloud free data set of MODIS,** O. Yoshinari, T. Shoji, S. Yuzo, Hiroshima Institute of Technology (Japan) . . . . . [6366-76]

✔ **Applied research of wavelet transform fusion,** Y. He, China Land Surveying and Planning Institute (China) . . . . . [6366-78]

Thursday 14 September

SESSION 6

Room: T34-T35 . . . . . Thurs. 09.00 to 10.00

Environmental Monitoring: Land II

Chair: **Alexandra Chudnovsky**, Tel-Aviv Univ. (Israel)

09.00: **Environmental changes induced by dump pollution analyzed through historical orthophotos and multispectral images,** C. Notarnicola, Istituto Nazionale di Fisica Nucleare (Italy) . . . . . [6366-21]

09.20: **Using LIF method of plants for remote sensing of nitrogen and oil pollution,** N. L. Fateyeva, G. G. Matvienko, Institute of Atmospheric Optics (Russia) . . . . . [6366-23]

09.40: **Using remote sensing and GIS to integrate various environmental factors into malaria studies,** R. Ngom, A. Siegmund, Pädagogische Hochschule Heidelberg (Germany) . . . . . [6366-24]

Coffee Break . . . . . 10.00 to 10.20

SESSION 7

Room: T34-T35 . . . . . Thurs. 10.20 to 12.00

Urban Remote Sensing

Chair: **Ulrich Michel**, Univ. Osnabrück (Germany)

10.20: **Extraction of vegetation cover rate in urban areas by mixel analyses of Landsat data,** S. Takeuchi, Hiroshima Institute of Technology (Japan) . . . . . [6366-25]

10.40: **A modified change vector analysis of vegetation change detection for urban areas,** H. Yu, Y. Jia, Wuhan Univ. (China) . . . . . [6366-26]

11.00: **A GIS-based hedonic modeling of urban land value spatio-temporal patterns,** L. Yaolin, Wuhan Univ. (China) . . . . . [6366-27]

11.20: **GIS and remote sensing for 3D urban modeling by means of VRML technology,** U. Michel, Univ. Osnabrück (Germany); T. Bockmühl, Die Univ. der Bundeswehr München (Germany) . . . . . [6366-28]

11.40: **Spatial pattern of settled dust in different urban dwellings,** A. Chudnovsky, E. Ben-Dor, Tel-Aviv Univ. (Israel) . . . . . [6366-29]

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

SESSION 8

Room: T34-T35 . . . . . Thurs. 13.20 to 15.00

Image Fusion and Data Integration

Chair: **Manfred Ehlers**, Univ. Osnabrück (Germany)

13.20: **Analysis of the visual integration in the landscape of routes with low-density traffic,** M. Gil Docampo, Univ. de Santiago de Compostela (Spain); I. Cañas Guerrero, Univ. Politécnica de Madrid (Spain); A. Tobar, J. Armesto, Univ. de Santiago de Compostela (Spain) . . . . . [6366-30]

13.40: **Image classification with LiDAR and GIS-data: moving from land cover to land use,** F. P. Kressler, K. Steinnocher, ARC systems research (Austria) . . . . . [6366-31]

14.00: **Visual perception based different scale remote sensing images fusion with multiwavelet transform,** Y. Na, Xidian Univ. (China); M. Ehlers, Univ. Osnabrück (Germany); W. Yang, Xidian Univ. (China) . . . . . [6366-32]

14.20: **On image fusion and segmentation,** M. Ehlers, Univ. Osnabrück (Germany) . . . . . [6366-33]

14.40: **A preliminary simulation to study the potential of integration of LIDAR and imagery,** W. Zhang, Beijing Normal Univ. (China) and State Key Lab. of Remote Sensing Science (China) and Beijing Key Lab. for Remote Sensing of Environment and Digital Cities (China) . . . . . [6366-34]

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

Conference Chair: **Upendra N. Singh**, NASA Langley Research Ctr. (USA)

Programme Committee: **Albert Ansmann**, Leibniz-Institut für Troposphärenforschung e.V. (Germany); **Arnoud Apituley**, RIVM (Netherlands); **Andreas Behrendt**, Univ. Hohenheim (Germany); **Martin J. Endemann**, European Space Agency (Netherlands); **Pierre H. Flamant**, École Polytechnique (France); **Gilberto J. Fochesatto**, Univ. of Alaska/Fairbanks (USA); **Animesh Jha**, Univ. of Leeds (United Kingdom); **Gary W. Kamerman**, FastMetrix, Inc. (USA); **Philippe L. Keckhut**, Service d'aeronomie (France); **Gennadii G. Matvienko**, Institute of Atmospheric Optics (Russia); **Doina N. Nicolae**, National Institute of Research & Development for Optoelectronics (Romania); **Gelsomina Pappalardo**, Istituto di Metodologie per l'Analisi Ambientale (Italy); **Valentin B. Simeonov**, École Polytechnique Fédérale de Lausanne (Switzerland); **Ove K. Steinvall**, Swedish Defence Research Agency (Sweden); **David M. Tratt**, Jet Propulsion Lab. (USA); **David V. Willetts**, QinetiQ Ltd. (United Kingdom); **David M. Winker**, NASA Langley Research Ctr. (USA)

Wednesday 13 September

Welcome and Introduction . . . . . 12.55 to 13.00

Upendra N. Singh, NASA Langley Research Ctr.

SESSION 1

Room: T33 . . . . . Wed. 13.00 to 16.10

Aerosol and Cloud Observations

Chairs: **Upendra N. Singh**, NASA Langley Research Ctr. (USA); **David M. Winker**, NASA Langley Research Ctr. (USA)

13.00: **EARLINET-ASOS: programs and perspectives for the aerosol study on continental scale *(Invited Paper)*,** G. Pappalardo, Istituto di Metodologie per l'Analisi Ambientale (Italy); J. Bösenberg, Max-Planck-Institut für Meteorologie (Germany); A. Amodeo, Istituto di Metodologie per l'Analisi Ambientale (Italy); A. Ansmann, Leibniz-Institut für Troposphärenforschung e.V. (Germany); A. Apituley, Rijksinstituut voor Volksgezondheld en Millieu (Netherlands); L. A. Arboledas, Univ. de Granada (Spain); D. S. Balis, Aristotle Univ. of Thessaloniki (Greece); C. Böckmann, Univ. Potsdam (Germany); A. P. Chaikovsky, Instytut Fizyki (Belarus); A. Comeron, Univ. Politècnica de Catalunya (Spain); V. Freudenthaler, Univ. Muenchen (Germany); G. H. Hansen, Norwegian Institute for Air Research (Norway); V. Mitev, Observatoire Cantonal de Neuchâtel (Switzerland); D. N. Nicolae, National Institute of Research & Development for Optoelectronics (Romania); A. D. Papayannis, National Technical Univ. of Athens (Greece); M. R. Perrone, Univ. degli Studi di Lecce (Italy); A. Pietruczuk, Univ. Warszawski (Poland); M. Pujadas, CIEMAT (Spain); J. Putaud, Joint Research Ctr. (Italy); F. Ravetta, Univ. Pierre et Marie Curie (France); V. Rizi, Univ. degli Studi dell'Aquila (Italy); V. B. Simeonov, Ecole Polytechnique Fédérale de Lausanne (Switzerland); N. Spinelli, Univ. degli Studi di Napoli Federico II (Italy); D. V. Stoyanov, Institute of Electronics (Bulgaria); T. Trickl, Forschungszentrum Karlsruhe (Germany); M. Wiegner, Ludwig-Maximilians-Universität (Germany) . . . . . [6367-01]

13.30: **Five years of lidar ratio measurements over Potenza, Italy,** L. Mona, A. Amodeo, G. D'Amico, M. Pandolfi, G. Pappalardo, Istituto di Metodologie per l'Analisi Ambientale (Italy) . . . . . [6367-02]

13.50: **Observation and characterization of atmospheric aerosols above ALOMAR (69°N) by tropospheric lidar, sun-photometer, and VHF radar,** M. Frioud, Andøya Rocket Range (Norway); M. Gausa, Andoya Rocket Range (Norway); K. Stebel, NILU (Norway); G. H. Hansen, Norwegian Institute for Air Research (Norway); C. L. Myhre, NILU (Norway); W. Singer, R. Latteck, Leibniz-Institut fur Atmospharenphysik e.V. (Germany); A. M. de Frutos, C. Toledano, V. E. Cachorro, E. L. Rodríguez, Univ. de Valladolid (Spain) . . . . . [6367-03]

14.10: **Compact eye-safe backscatter lidar for Arctic aerosols and boundary layer studies: concept design for full Stokes polarization analysis,** G. J. Fochesatto, R. L. Collins, K. Sassen, Univ. of Alaska/Fairbanks (USA) . . . . . [6367-04]

14.30: **Observations of noctilucent clouds and temperature structure from 1-105 km by co-located lidars at 54°N,** M. Gerding, J. Höffner, M. Rauthe, F. Lübken, Univ. Rostock (Germany) . . . . . [6367-05]

14.50: **Polarization lidar sounding of tropical clouds,** P. C. S. Devara, Indian Institute of Tropical Meteorology (India) . . . . . [6367-06]

Coffee Break . . . . . 15.10 to 15.30

15.30: **Lidar and sunphotometry observations on the long-range transport of smoke and dust events,** K. B. Strawbridge, Environment Canada (Canada); S. Thulasiraman, N. T. O'Neill, Univ. of Sherbrooke (Canada); I. McKendry, The Univ. of British Columbia (Canada) . . . . . [6367-07]

15.50: **Potential and range of application of elastic backscatter lidar systems using polarization selection to minimize detected skylight noise,** S. A. Ahmed, Y. Y. Hassebo, B. M. Gross, M. Oo, F. Moshary, City College/CUNY (USA) . . . . . [6367-08]

SESSION 2

Room: T33 . . . . . Wed. 16.10 to 17.30

Raman Lidar Observations

Chairs: **Gelsomina Pappalardo**, Consiglio Nazionale delle Ricerche (Italy); **Doina N. Nicolae**, National Institute of Research & Development for Optoelectronics (Romania)

16.10: **New Raman water vapor and temperature lidar at JPL Table Mountain Facility: optimization, validations, and Sonde intercomparison,** R. A. Aspey, S. McDermid, T. Leblanc, D. Walsh, J. Howe, Jet Propulsion Lab. (USA) . . . . . [6367-09]

16.30: **High spatial and temporal resolution measurements of water vapor, temperature, and aerosol with by Raman LIDAR for turbulent observations,** V. B. Simeonov, I. Serikov, P. R. Ristori, M. M. Froidevaux, T. Dinoev, M. Parlange, H. van den Bergh, École Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [6367-10]

16.50: **Water vapor Raman lidar for meteorology,** T. Dinoev, École Polytechnique Fédérale de Lausanne (Switzerland); Y. Arshinov, S. M. Bobrovnikov, Institute of Atmospheric Optics (Russia); I. Serikov, P. R. Ristori, École Polytechnique Fédérale de Lausanne (Switzerland); B. Calpini, MeteoSwiss (Switzerland); H. van den Bergh, V. B. Simeonov, École Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [6367-11]

17.10: **Comparisons of the Raman lidar measurements of the tropospheric water vapor profiles with radiosondes, meteorological observation tower, and GPS at Tsukuba, Japan,** T. Sakai, Meteorological Research Institute (Japan) . . . . . [6367-12]

✔ Interactive Posters—Wednesday

An interactive poster session will be held on Wednesday 18.00 to 19.30. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. An interactive poster session and reception with authors present will be held Wednesday evening from 18.00 to 19.30. Light refreshments will be served.

✔ **Engineering of a water-vapour Raman elastic-backscatter lidar at the Politechnical University of Catalonia (Spain),** D. Kumar, M. Sicard, S. Tomás, C. Muñoz, F. Rocadenbosch, Univ. Politècnica de Catalunya (Spain) . . . . . [6367-13]

✔ **Aerosol extinction profile within the planetary boundary layer measured by a multiwavelength Raman lidar and ground-based in situ instruments at Gwangju, Korea,** Y. Noh, J. Kim, J. Jeong, Y. J. Kim, Gwangju Institute of Science and Technology (South Korea) . . . . [6367-32]

✔ **Measurement simulation of spatial coherence and density degree by turbulence of aerosol and CO_2 in atmospheric environment,** H. Okayama, W. Li, Chiba Univ. (Japan) . . . . . [6367-33]

✔ **Direct-detection Doppler wind lidar based on Fizeau interferometer,** L. Pu, J. Liu, T. Yu, J. Zhou, W. Chen, Shanghai Institute of Optics and Fine Mechanics (China) . . . . . [6367-34]

✔ **A compact diode-pumped injection-seeded ultraviolet laser for wind Doppler lidar,** T. Yu, J. Zhou, Shanghai Institute of Optics and Fine Mechanics (China) and Graduate School of the Chinese Academy of Sciences (China); J. Liu, J. Bi, Shanghai Institute of Optics and Fine Mechanics (China); L. Bu, Shanghai Institute of Optics and Fine Mechanics (China) and Graduate School of the Chinese Academy of Sciences (China); W. Chen, Shanghai Institute of Optics and Fine Mechanics (China) [6367-35]

✔ **Laser radiation attenuation as an approach for estimating humidity and pollution,** M. S. Edan, Mekkah Topnotch Institute (Saudi Arabia); Y. Al-Hadithi, Univ. of Ibb (Yemen) . . . . . [6367-36]

✔ **Use of lidar measurements of aerosol extinction coefficients as a part of assessing aerosol field from meteorological weather forecast models and scattering calculations,** O. K. S. Gustafsson, R. T. I. Persson, A. Hågård, Swedish Defence Research Agency (Sweden) . . . . . [6367-37]

Thursday 14 September

SESSION 3

***Joint Session with* Conference 6196, Electro-Optical Remote Sensing, part of Optics and Photonics in Defence & Security Symposium**

Room: T6 . . . . . Thurs. 08.00 to 10.40

Atmospheric Remote Sensing

Chairs: **Upendra N. Singh,** NASA Langley Research Ctr. (USA); **Gary W. Kamerman,** FastMetrix, Inc. (USA)

08.20: **Forward modeling of linear mixing in thermal IR ground leaving radiance spectra,** L. K. Balick, Los Alamos National Lab. (USA); A. R. Gillespie, Univ. of Washington (USA); M. F. McCabe, Los Alamos National Lab. (USA); A. Mushkin, Univ. of Washington (USA) . . . . . [6396-21]

08.40: **An accurate modeling, simulation, and analysis tool for predicting and estimating Raman LIDAR system performance,** R. J. Grasso, L. E. Russo, J. L. Barrett, J. E. Odhner, P. I. Egbert, BAE Systems (USA) . [6396-22]

09.00: **A new approach to the modeling of optical remote sensing systems using vortical scattering parameters,** A. Belmonte, Univ. Politècnica de Catalunya (Spain); A. Lazaro, Rovira i Virgili Univ. (Spain) . . . . . [6396-23]

09.20: **An expert lidar data analysis toolset for explosive debris plumes,** M. Pieck, J. Stephens, S. P. Brumby, P. A. Pope, R. Channell, E. R. Birnbaum, Los Alamos National Lab. (USA) . . . . . [6367-14]

09.40: **Lidar flourescent method for remote monitoring of the effects on the vegetation,** G. G. Matvienko, Institute of Atmospheric Optics (Russia); V. I. Timofeev II, Moscow State Univ. (Russia); A. I. Grishin, N. L. Fateyeva, Institute of Atmospheric Optics (Russia) . . . . . [6367-15]

10.00: **Emission spectroscopy and energy transfer in Tm^{3+}, Tm^{3+}-Ho^{3+} and Tm^{3+}-Yb^{3+} doped tellurite fibres,** B. Richards, S. Shen, A. Jha, Univ. of Leeds (United Kingdom) . . . . . [6367-16]

10.20: **Pulsed high-peak-power and single-frequency fiber laser design for LIDAR aircraft safety application,** F. Liegeois, C. Vercambre, M. Salhi, Y. Hernandez, D. Giannone, Multitel (Belgium) . . . . . [6367-17]

Coffee Break . . . . . 10.40 to 11.00

SESSION 4

Room: T6 . . . . . Thurs. 11.00 to 12.00

Differential Absorption for Gases and Chemical Composition I

Chairs: **Valentin B. Simeonov**, École Polytechnique Fédérale de Lausanne (Switzerland); **Gilberto J. Fochesatto**, Univ. of Alaska/ Fairbanks (USA)

11.00: **Water vapour emission in vegetable fuel: absorption cell measurements and detection limits of our CO_2 Dial system,** P. Gaudio, C. Bellecci, L. De Leo, M. Gelfusa, T. Lo Feudo, S. Martellucci, M. Richetta, Univ. degli Studi di Roma/Tor Vergata (Italy) . . . . . [6367-18]

11.20: **Frequency chirped differential absorption LIDAR,** A. P. Lytkine, J. Tulip, W. Jäger, Univ. of Alberta (Canada) . . . . . [6367-19]

11.40: **DSA laser measurements and atmospheric diffusion models for the estimation of the gas emission flux by spot source fields,** F. Cuccoli, L. Facheris, O. Vaselli, Univ. degli Studi di Firenze (Italy) . . . . . [6367-20]

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

SESSION 5

Room: T6 . . . . . Thurs. 13.20 to 15.40

Space and Airborne Lidar Measurements

Chair: **Gennadii G. Matvienko**, Institute of Atmospheric Optics (Russia)

13.20: **Performance and initial results from CALIOP *(Invited Paper)*,** D. M. Winker, W. H. Hunt, A. H. Omar, NASA Langley Research Ctr. (USA) [6367-21]

13.50: **Selection algorithm for the CALIPSO lidar aerosol extinction-to-backscatter ratio,** A. H. Omar, D. M. Winker, M. A. Vaughan, NASA Langley Research Ctr. (USA) . . . . . [6367-22]

14.10: **Using ICESat observations to obtain CFLOS statistics for use in the design of space-based lidars *(Invited Paper)*,** G. D. Emmitt, S. Greco, Simpson Weather Associates, Inc. (USA) . . . . . [6367-23]

14.40: **Turbulence and mountain wave conditions observed with an airborne 2-micron lidar,** E. H. Teets, Jr., NASA Dryden Flight Research Ctr. (USA) . . . . . [6367-24]

15.00: **Simulation of retrieval of wind velocity and vortex observation in a turbulent atmosphere by speckle photography,** V. A. Banakh, A. V. Falits, Institute of Atmospheric Optics (Russia); T. Halldorsson, EADS Deutschland GmbH (Germany) . . . . . [6367-25]

Coffee Break . . . . . 15.20 to 15.40

SESSION 6

Room: T6 . . . . . Thurs. 15.40 to 17.00

Differential Absorption for Gases and Chemical Composition II

Chairs: **Valentin B. Simeonov**, École Polytechnique Fédérale de Lausanne (Switzerland); **Gilberto J. Fochesatto**, Univ. of Alaska/ Fairbanks (USA)

15.40: **Boundary layer and air quality monitoring with a commercial lidar ceilometer,** C. Münkel, Vaisala GmbH (Germany) . . . . . [6367-27]

16.00: **Methodology of dimensionless multiplicative decomposition for atmospheric lidar evaluation,** R. R. Agishev, Kazan State Technical Univ. (Russia); B. M. Gross, City College/CUNY (USA); A. Comerón, Univ. Politècnica de Catalunya (Spain) . . . . . [6367-28]

16.20: **A simulation approach for airborne DIAL systems,** A. Boerner, C. Kiemle, M. Wirth, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [6367-29]

16.40: **Improving estimation accuracy of gas concentration in differential absorption lidar,** S. Yin, W. Wang, Univ. of Electronic Science and Technology of China (China) . . . . . [6367-30]

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Monday-Tuesday 11-12 September 2006 • Proceedings of SPIE Vol. 6394

Unmanned/Unattended Sensors and Sensor Networks III

Conference Chair: **Edward M. Carapezza**, DARPA and Co-chair, DoD/DoJ Joint Programme Committee Steering Group (USA)

Programme Committee: **James S. Albus**, National Institute of Standards and Technology (USA); **Grant R. Gerhart**, U.S. Army Tank-Automotive Research, Development and Engineering Ctr. (USA); **Jeffrey R. Heberley**, U.S. Army Armament Research, Development and Engineering Ctr. (USA); **Todd M. Hintz**, Space and Naval Warfare Systems Ctr., San Diego (USA); **Myron E. Hohil**, U.S. Army Research, Development and Engineering Command (USA); **Bahram Javidi**, Univ. of Connecticut (USA); **Ivan Kadar**, Interlink Systems Sciences, Inc. (USA); **Nino Srour**, Army Research Lab. (USA); **Huub A. van Hoof**, TNO (Netherlands)

Monday 11 September

Opening Remarks . . . . . 13.00 to 13.10

Edward M. Carapezza, DARPA and Co-chair, DoD/DoJ Joint Programme Committee Steering Group (USA)

Room: T2 . . . . . Mon. 13.10 to 13.50

Keynote Presentation

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

13.10: **Critical unmanned vehicle and unattended sensor technologies *(Invited Paper)*,** G. R. Gerhart, U.S. Army Tank-Automotive Research, Development and Engineering Ctr. (USA) . . . . . [6394-01]

SESSION 1

Room: T2 . . . . . Mon. 13.50 to 15.10

Unmanned Systems Technology

Chair: **Grant R. Gerhart**, U.S. Army Tank-Automotive Research, Development and Engineering Ctr. (USA)

13.50: **Coordination of mobile robots to complement sensor networks,** K. Schilling, M. Hess, M. Saska, Univ. Würzburg (Germany) . . . . . [6394-03]

14.10: **Cohort: UxV - UGS teams in support of complex operations,** B. L. Digney, Defence Research and Development Canada (Canada) . . . . [6394-04]

14.30: **A software design approach for heterogeneous systems of unattended sensors, unmanned vehicles and monitoring stations,** W. J. Smuda, U.S. Army Tank-Automotive Research, Development and Engineering Ctr. (USA) . . . . . [6394-05]

14.50: **Behavior guided UAV sensors for IED defeat,** K. Bharadwaj, Northrop Grumman Corp. (USA) . . . . . [6394-06]

Coffee Break . . . . . 15.10 to 15.30

SESSION 2

Room: T2 . . . . . Mon. 15.30 to 17.50

Unattended Sensor Systems

Chairs: **Jeffrey R. Heberley**, U.S. Army Armament Research, Development and Engineering Ctr. (USA); **Myron E. Hohil**, U.S. Army Research, Development and Engineering Command (USA); **Todd M. Hintz**, Space and Naval Warfare Systems Ctr., San Diego (USA)

15.30: **Electro-optical signature analysis for personnel detection in urban environments,** J. M. Cathcart, Georgia Institute of Technology (USA) [6394-08]

15.50: **Multifunctional self-sensing microcantilever arrays for unattended detection of chemicals, explosives, and biological agents,** J. D. Adams, B. Rogers, R. Whitten, Nevada Nanotech Systems, Inc. (USA) . . . . . [6394-09]

16.10: **Nanomechanical chemical sensors based on functionalized MEMS arrays,** P. G. Datskos, N. Lavrik, Oak Ridge National Lab. (USA); M. J. Sepaniak, P. Dutta, P. J. Chapman, The Univ. of Tennessee (USA) . . [6394-10]

16.30: **Progress on integrated multiparameter MEMS sensor,** S. Rajic, The Univ. of Tennessee (USA); W. R. Lawrence, Tesla Technologies Inc. (USA); P. G. Datskos, The Univ. of Tennessee (USA) . . . . . [6394-11]

16.50: **Sensor network parametric routing protocol simulation and test performance,** M. Nassr, A. M. Mielke, J. R. Frigo, S. Eidenbenz, M. C. Smith, A. Hansson, Los Alamos National Lab. (USA) . . . . . [6394-32]

17.10: **Field testing of new unattended small size seismic modules for detection of various targets,** A. Pakhomov, T. Goldburt, General Sensing Systems, LLC (USA) . . . . . [6394-33]

17.30: **Battery-free power for unattended ground sensors,** V. A. Moldt, Ambient Control Systems Inc. (USA); V. Acharya, M. DeJong, U.S. Army Research, Development and Engineering Command (USA) . . . . . [6394-12]

Tuesday 12 September

Room: T2 . . . . . Tues. 08.40 to 09.20

Keynote Presentation

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

08.40: **Real time automated 3D sensing, imaging and monitoring of dynamic microscopic biological events *(Invited Paper)*,** B. Javidi, I. Moon, S. Yeom, Univ. of Connecticut (USA); E. M. Carapezza, Defense Advanced Research Projects Agency (USA) . . . . . [6394-13]

SESSION 3

Room: T2 . . . . . Tues. 09.20 to 11.40

Active and Passive Image Sensing and Processing

Chair: **Bahram Javidi**, Univ. of Connecticut (USA)

09.20: **Parallelization and automation of a blind deconvolution algorithm *(Invited Paper)*,** C. L. Matson, Air Force Research Lab. (USA); K. Borelli, KJS Consulting (USA) . . . . . [6394-14]

09.40: **Orthoscopic long-focal-depth 3D integral imaging *(Invited Paper)*,** M. Martínez-Corral, R. Martínez-Cuenca, G. Saavedra, Univ. de València (Spain); B. Javidi, Univ. of Connecticut (USA) . . . . . [6394-15]

10.00: **Visible and near-infrared combination of images to produce high-security ID tags for automatic identification *(Invited Paper)*,** E. Pérez-Cabré, M. S. Millán García-Varela, Univ. Politècnica de Catalunya (Spain); B. Javidi, Univ. of Connecticut (USA) . . . . . [6394-16]

Coffee Break . . . . . 10.20 to 10.40

10.40: **High secure authentication by optical multifactor ID tags *(Invited Paper)*,** M. S. Millán García-Varela, E. Pérez-Cabré, Univ. Politècnica de Catalunya (Spain); B. Javidi, Univ. of Connecticut (USA) . . . . . [6394-17]

11.00: **Decision fusion strategy for target recognition in hyperspectral images,** M. Greco, N. Acito, G. Corsini, M. Diani, Univ. di Pisa (Italy) [6394-18]

11.20: **Introducing secure modes of operation for optical encryption *(Invited Paper)*,** B. M. Hennelly, T. J. Naughton, T. Dowling, National Univ. of Ireland/Maynooth (Ireland); B. Javidi, Univ. of Connecticut (USA) . . . [6394-19]

Lunch/Exhibition Break . . . . . 11.40 to 13.00

Room: T2 . . . . . Tues. 13.00 to 13.40

Keynote Presentation

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

13.00: **The network: a revolutionary capability for the warfighter *(Invited Paper)*,** J. A. Parmentola, U.S. Army (USA) . . . . . [6394-20]

SESSION 4

Room: T2 . . . . . Tues. 13.40 to 14.20

Sniper and Mortar Detection Technologies Session

Chairs: **Jeffrey R. Heberley**, U.S. Army Armament Research, Development and Engineering Ctr. (USA); **Myron E. Hohil**, U.S. Army Research, Development and Engineering Command (USA)

13.40: **Discriminating mortar launch/impact events utilizing acoustic sensors,** M. E. Hohil, S. V. Desai, U.S. Army Research, Development and Engineering Command (USA); A. Morcos, U.S. Army Research, Development and Engineering Ctr. (USA) . . . . . [6394-22]

14.00: **Implementation of algorithms to discriminate between chemical/biological air burst and high explosive air burst,** S. V. Desai, M. E. Hohil, U.S. Army Research, Development and Engineering Command (USA)[6394-23]

SESSION 5

Room: T2 . . . . . Tues. 14.20 to 15.20

Radar and Through-The-Wall Sensor Systems

Chairs: **Edward M. Carapezza**, Defense Advanced Research Projects Agency (USA); **Todd M. Hintz**, Space and Naval Warfare Systems Ctr., San Diego (USA)

14.20: **An innovative approach for through-wall imaging,** A. Beeri, Camero, Inc. (Israel) . . . . . [6394-24]

14.40: **Characterizing varying and heterogeneous radar land clutter: a site-specific simulation in Finnish environment,** J. Jylhä, R. I. Kerminen, J. V. Vihonen, T. K. Ala-Kleemola, A. J. E. Visa, Tampere Univ. of Technology (Finland) . . . . . [6394-25]

15.00: **Depth-of-focus (DOF) in synthetic aperture radar (SAR) imagery,** U. K. Majumder, Air Force Research Lab. (USA) . . . . . [6394-26]

Coffee Break . . . . . 15.20 to 15.40

SESSION 6

Room: T2 . . . . . Tues. 15.40 to 17.20

Visible/IR/Fiber Optic Sensor Systems

Chairs: **Edward M. Carapezza**, Defense Advanced Research Projects Agency (USA); **Todd M. Hintz**, Space and Naval Warfare Systems Ctr., San Diego (USA)

15.40: **A reconfigurable low-cost thermal imager for unattended ground sensors,** P. A. Manning, N. J. Parkinson, T. Phillips, D. A. Beale, QinetiQ Ltd. (United Kingdom) . . . . . [6394-27]

16.00: **Two-interferometer fiber optic sensor,** M. Szustakowski, M. Kondrat, W. M. Ciurapinski, Wojskowa Akademia Techniczna (Poland) . . . . . [6394-28]

16.20: **Application property of hybrid FRP reinforcing rods for sensing and self-diagnosing of concrete fracture,** S. Park, Daejeon Univ. (South Korea) . . . . . [6394-29]

16.40: **Partial polarization characterization based on the Kullback relative entropy *(Invited Paper)*,** P. Réfrégier, Institut Fresnel (France); F. Goudail, Univ. Paris-Sud II (France) . . . . . [6394-30]

17.00: **Autonomous vision networking: miniature wireless sensor networks with imaging technology,** G. Messinger, Avaak Inc. (USA) . . . . . [6394-31]

Wednesday-Thursday 13-14 September 2006 • Proceedings of SPIE Vol. 6395

Electro-Optical and Infrared Systems: Technology and Applications III

Conference Chairs: **Ronald G. Driggers**, U.S. Army Night Vision & Electronic Sensors Directorate (USA); **David A. Huckridge**, QinetiQ (United Kingdom)

Programme Committee: **Christopher C. Alexay**, StingRay Optics (USA); **Gordon A. Cain**, Octec Ltd. (United Kingdom); **David J. Clarke**, SELEX Sensors & Airborne Systems Ltd. (United Kingdom); **Stefania De Vito**, Galileo Avionica S.p.A. (Italy); **Peter N. J. Dennis**, QinetiQ (United Kingdom); **Reinhard R. Ebert**, FGAN-FOM (Germany); **Per S. Fredin**, Saab Bofors Dynamics AB (Sweden); **Norman S. Kopeika**, Ben-Gurion Univ. of the Negev (Israel); **José M. López-Alonso**, Univ. Complutense de Madrid (Spain); **John F. Parsons**, Thales Optronics Staines Ltd. (United Kingdom); **Stanley R. Rotman**, Ben-Gurion Univ. of the Negev (Israel); **Christopher W. Slinger**, QinetiQ (United Kingdom)

Wednesday 13 September

Opening Remarks . . . . . 8.30 to 8.40

Ronald G. Driggers, U.S. Army Night Vision & Electronic Sensors Directorate (USA); **David A. Huckridge,** QinetiQ (United Kingdom)

SESSION 1

Room: T3 . . . . . Wed. 08.40 to 12.10

EO and IR Systems: Technology and Applications in Scandinavia

Chairs: **Ronald G. Driggers**, U.S. Army Night Vision & Electronic Sensors Directorate (USA); **Per S. Fredin**, Saab Bofors Dynamics AB (Sweden); **Christopher W. Slinger**, QinetiQ (United Kingdom); **N. S. Kopeika**, Ben-Gurion Univ. of the Negev (Israel)

08.40: **Swedish IR and E/O system research *(Invited Paper)*,** I. G. E. Renhorn, Swedish Defence Research Agency (Sweden) . . . . . [6395-01]

09.10: **Optimisation of QWIP performance for high-temperature and low-background applications,** A. Gromov, C. Asplund, S. Smuk, H. Martijn, Acreo AB (Sweden) . . . . . [6395-02]

09.30: **MOMS: multi-optical mine detection system: project overview,** A. Linderhed, S. K. Sjökvist, O. Steinvall, D. Letalick, G. Tolt, T. R. Chevalier, S. Nyberg, H. Larsson, M. Uppsäll, D. Menning, Swedish Defence Research Agency (Sweden) . . . . . [6395-03]

09.50: **Compact multichannel optical Fourier spectrometer,** A. Manuilskiy, H. Andersson, G. Thungström, H. Nilsson, Mid Sweden Univ. (Sweden) . . . . . [6395-04]

10.10: **A compact combined polarimetric and hyperspectral imager,** T. Skauli, Norwegian Defense Research Establishment (Norway); P. E. Goa, Norwegian Defence Research Establishment (Norway); I. Baarstad, T. Løke, Norsk Elektro Optikk A/S (Norway) . . . . . [6395-42]

Coffee Break . . . . . 10.30 to 10.50

10.50: **Experimental evaluation of underwater range-gated viewing in natural waters,** M. Tulldahl, A. Andersson, A. Olsson, P. Andersson, Swedish Defence Research Agency (Sweden) . . . . . [6395-06]

11.10: **Measurements of the effect of falling snow on imaging with infrared cameras,** A. D. Van Rheenen, L. T. Heen, E. B. Madsen, E. Brendhagen, Norwegian Defense Research Establishment (Norway) . . . . . [6395-07]

11.30: **Optical signature modeling,** C. Nelsson, P. Hermansson, S. Nyberg, A. Persson, R. T. I. Persson, S. K. Sjökvist, T. R. H. Winzell, Swedish Defence Research Agency (Sweden) . . . . . [6395-08]

11.50: **Evaluation of GSIM: a simulator for missile seekers,** Å. Engvall, Saab Bofors Dynamics AB (Sweden) . . . . . [6395-09]

Lunch/Exhibition Break . . . . . 12.10 to 13.30

SESSION 2

Room: T3 . . . . . Wed. 13.30 to 16.30

Detectors

Chairs: **Peter N. J. Dennis**, QinetiQ (United Kingdom); **Stefania De Vito**, SELEX Sensors and Airborne Systems SpA (Italy); **Stanley R. Rotman**, Ben-Gurion Univ. of the Negev (Israel); **David J. Clarke**, SELEX Sensors and Airborne Systems Ltd. (United Kingdom)

13.30: **Single carbon nanotube based infrared sensors,** N. Xi, Michigan State Univ. (USA) . . . . . [6395-10]

13.50: **Optimisation of quantum dot infrared photodetectors (QDIPs) for imaging applications,** P. Aivaliotis, L. R. Wilson, E. Zibik, J. P. David, M. Hopkinson, The Univ. of Sheffield (United Kingdom); C. Groves, Univ. of Cambridge (United Kingdom) . . . . . [6395-11]

14.10: **Uncooled amorphous silicon IRFPAs with 25-μm pixel-pitch,** J. Tissot, B. Fieque, C. Trouilleau, P. Robert, A. Crastes, C. Minassian, S. Tinnes, O. Legras, ULIS (France) . . . . . [6395-12]

14.30: **IR detectors life cycle cost and reliability optimization for tactical applications,** X. Breniere, P. Tribolet, Sofradir (France) . . . . . [6395-13]

14.50: **Latest developments on MCT staring arrays,** L. Vial, F. Pistone, P. M. Tribolet, M. Vuillermet, S. Dugaleix, Sofradir (France); G. L. Destefanis, CEA-LETI (France) . . . . . [6395-14]

15.10: **LWIR HgCdTe FPA variations with epitaxial structure properties,** M. S. Nikitin, G. V. Chekanova, A. V. Kurbatov, Alpha (Russia); A. A. Drugova, V. A. Kholodnov, Institute of Radio-engineering and Electronics (Russia) . [6395-17]

Coffee Break . . . . . 15.30 to 15.50

15.50: **Albion: cost-effective 3rd generation high-performance thermal imaging in the UK,** R. K. McEwen, M. Lupton, M. Lawrence, P. Knowles, M. Wilson, SELEX Sensors and Airborne Systems Ltd. (United Kingdom); P. N. J. Dennis, QinetiQ (United Kingdom); J. F. Parsons, Thales Optronics Staines Ltd. (United Kingdom); N. T. Gordon, D. J. Lees, QinetiQ Ltd. (United Kingdom) . . . . . [6395-15]

16.10: **Demonstration of multifunctional bi-colour-avalanche gain detection in HgCdTe FPA,** J. Rothman, G. Perrais, G. L. Destefanis, J. P. Baylet, P. Castellein, J. Chamonal, CEA-LETI (France); P. M. Tribolet, Sofradir (France) . . . . . [6395-16]

SESSION 3

Room: T3 . . . . . Wed. 16.30 to 17.30

IR Targets, Transmission, and Sensor Technologies I

Chairs: **David A. Huckridge**, QinetiQ (United Kingdom); **Christopher C. Alexay**, StingRay Optics (USA); **Reinhard R. Ebert**, Forschungsfesellschaft für Angewandte Naturwissenschaften e.V. (Germany); **John F. Parsons**, Thales Optronics Staines Ltd. (United Kingdom)

16.30: **Infrared and visible combat identification marking materials,** E. S. O'Keefe, A. J. Butler, A. J. Shohet, M. Swan, QinetiQ Ltd. (United Kingdom) . . . . . [6395-18]

16.50: **Middle East desert aerosol size distribution measurements and modeling in urban, coastal, and continental regions,** S. L. Bendersky, N. S. Kopeika, Ben-Gurion Univ. of the Negev (Israel) . . . . . [6395-19]

17.10: **Aerosol size distribution measurements and modeling in urban environments for rainy atmospheric conditions,** S. L. Bendersky, N. S. Kopeika, Ben-Gurion Univ. of the Negev (Israel) . . . . . [6395-20]

✔ Interactive Posters—Wednesday

An interactive poster session will be held on Wednesday 18.00 to 19.30. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. An interactive poster session and reception with authors present will be held Wednesday evening from 18.00 to 19.30. Light refreshments will be served.

✔ **Data association for infrared search and track system,** C. Li, Xi'an Jiaotong Univ. (China) . . . . . [6395-33]

✔ **A laser imaging system for helicopter avoidance obstacle,** W. Wang, H. Yuan, Univ. of Electronic Science and Technology of China (China) [6395-34]

✔ **Anomaly gas tracking using field-portable imaging radiometric spectrometer,** E. Ohel, S. R. Rotman, Ben-Gurion Univ. of the Negev (Israel); D. G. Blumberg, Ben Gurion Univ. of the Negev (Israel); L. Sagiv, Ben-Gurion Univ. of the Negev (Israel) . . . . . [6395-35]

✔ **Using optical flow for the detection of floating mines in IR image sequences,** A. Borghgraef, M. Acheroy, Royal Belgian Military Academy (Belgium) . . . . . [6395-37]

✔ **Three-dimensional measuring method of head and eye tracking system using a single camera,** M. Nishida, K. Sakamoto, Shimane Univ. (Japan) . . . . . [6395-38]

✔ **Mobile viewer system for virtual 3D space using infrared LED point markers and camera,** K. Sakamoto, S. Taneji, Shimane Univ. (Japan) . . . . . [6395-39]

✔ **Single camera 3D measuring for finger pointing in virtual space,** H. Nakayama, K. Sakamoto, Shimane Univ. (Japan) . . . . . [6395-40]

✔ **A modified algorithm for information acquisition from satellite images,** T. M. Talal, National Authority for Remote Sensing and Space Sciences (Egypt); M. Dessoky, A. El-sayed, Minufiya Univ. (Egypt) . . . . . [6395-41]

Thursday 14 September

SESSION 4

Room: T3 . . . . . Thurs. 09.00 to 10.40

IR Targets, Transmission, and Sensor Technologies II

Chairs: **David A. Huckridge**, QinetiQ (United Kingdom); **Christopher C. Alexay**, StingRay Optics (USA); **Reinhard R. Ebert**, Forschungsfesellschaft für Angewandte Naturwissenschaften e.V. (Germany); **John F. Parsons**, Thales Optronics Staines Ltd. (United Kingdom)

09.00: **Anti-reflective sub-wavelength patterning of IR optics,** S. L. M. Habraken, D. P. G. Vandormael, J. J. D. Loicq, Ctr. Spatial de Liege and Univ. de Liège (Belgium); C. J. M. Lenaerts, D. Mawet, Univ. de Liège (Belgium) . . . . . [6395-22]

09.20: **Experimental realization of high-performance thermal imaging with a singlet and pupil plane encoding,** G. D. Muyo, A. R. Harvey, Heriot-Watt Univ. (United Kingdom); A. Singh, M. Andersson, Saab Bofors Dynamics AB (Sweden) . . . . . [6395-23]

09.40: **Results from real-time polarimetric imaging,** G. Innes, D. L. Jordan, D. Hayter, QinetiQ Ltd. (United Kingdom) . . . . . [6395-24]

10.00: **High-resolution long-range oblique IR imaging from an airborne platform,** V. Petrushevsky, El-Op Electrooptics Industries Ltd. (Israel) [6395-25]

Coffee Break . . . . . 10.20 to 10.40

SESSION 5

Room: T3 . . . . . Thurs. 10.40 to 12.40

Image Processing

Chairs: **José M. López-Alonso**, Univ. Complutense de Madrid (Spain); **Gordon A. Cain**, Octec Ltd. (United Kingdom); **David A. Huckridge**, QinetiQ (United Kingdom)

10.40: **Automatic spatial alignment of visible and infrared images,** F. M. Porikli, Mitsubishi Electric Research Labs. (USA) . . . . . [6395-27]

11.00: **Image-based prediction of thermal imaging performance,** S. Bobrov, Rafael (Israel); Y. Y. Schechner, Technion - Israel Institute of Technology (Israel) . . . . . [6395-28]

11.20: **Automatic selection of infrared image restoration techniques,** M. Lemaitre, J. Blanc-Talon, Ctr. d'Expertise Parisien (France) . . . . . [6395-29]

11.40: **Sensor data association for the Seawolf Mid-Life Update (SWMLU) Programme: an update,** M. Bernhardt, C. R. Angell, Waterfall Solutions Ltd. (United Kingdom); D. M. Patel, C. Wardell, BAE Systems plc (United Kingdom) . . . . . [6395-30]

12.00: **Small craft identification discrimination criteria (N50 and V50) for visible and infrared sensors in maritime security,** K. A. Krapels, Office of Naval Research (USA); R. Driggers, U.S. Army Night Vision & Electronic Sensors Directorate (USA) . . . . . [6395-31]

12.20: **Point target tracking in whitened IR sequence using a dynamic programming approach,** O. Nichtern, Ben-Gurion Univ. of the Negev (Israel); S. R. Rotman, Ben Gurion Univ. of the Negev (Israel) . . . . . [6395-32]

Wednesday-Thursday 13-14 September 2006 • Proceedings of SPIE Vol. 6396

Electro-Optical Remote Sensing II

Conference Chairs: **Gary W. Kamerman**, FastMetrix, Inc. (USA); **David V. Willetts**, QinetiQ Ltd. (United Kingdom); **Ove K. Steinvall**, FOI (Sweden)

Programme Committee: **Jeffrey W. Grantham**, Northrop Grumman Corp. (USA); **Robert J. Grasso**, BAE Systems (USA); **Dennis K. Killinger**, Univ. of South Florida (USA); **Vasyl V. Molebny**, National Technical Univ. of Ukraine (Ukraine); **C. Russell Philbrick**, The Pennsylvania State Univ. (USA); **Peter N. Randall**, QinetiQ Ltd. (United Kingdom); **Philippe Réfrégier**, Institut Fresnel (France); **Upendra N. Singh**, NASA Langley Research Ctr. (USA); **Monte D. Turner**, DARPA (USA); **Maria J. Yzuel**, Univ. Autònoma de Barcelona (Spain)

Wednesday 13 September

Opening Remarks . . . . . 8.25 to 8.30

Gary W. Kamerman, FastMetrix, Inc.; **David V. Willetts,** QinetiQ Ltd. (United Kingdom); **Ove K. Steinvall,** FOI (Sweden)

SESSION 1

Room: T6 . . . . . Wed. 08.30 to 10.00

Keynote Session

Chair: **Gary W. Kamerman,** FastMetrix, Inc. (USA)

08.30: **Sensor development in the Sensors Directorate of the US Air Force Research Lab. *(Invited Paper)*,** P. F. McManamon, Air Force Research Lab. (USA) . . . . . [6396-01]

09.00: **TBA *(Invited Paper)*,** M. D. Turner, Defense Advanced Research Projects Agency (USA) . . . . . [6396-02]

09.30: **TBA *(Invited Paper)*,** D. Schneider, Air Force Institute of Technology (USA) . . . . . [6396-03]

Coffee Break . . . . . 10.00 to 10.20

SESSION 2

Room: T6 . . . . . Wed. 10.20 to 11.40

Active Systems and Signatures I

Chair: **David V. Willetts,** QinetiQ Ltd. (United Kingdom)

10.20: **High-resolution LADAR sensor for autonomous vehicle collision avoidance,** R. J. Grasso, G. F. Dippel, L. E. Russo, L. E. Vigezzi, BAE Systems (USA) . . . . . [6396-04]

10.40: **Calibration of the fast range imaging camera SwissRangerTM for the use in the surveillance of the environment,** T. Kahlmann, H. Ingensand, ETH Zürich (Switzerland) . . . . . [6396-05]

11.00: **Remote concealed weapon detection in mm-wave region: active and passive,** S. Stanko, D. Nötel, M. Hägelen, F. Klöppel, J. Huck, S. Erukulla, H. Essen, H. Fuchs, FGAN-FHR (Germany) . . . . . [6396-06]

11.20: **Image quality for range-gated systems during different ranges and atmospheric conditions,** O. K. Steinvall, T. R. Chevalier, P. Andersson, M. Elmquist, Swedish Defence Research Agency (Sweden) . . . . . [6396-07]

Lunch/Exhibition Break . . . . . 11.40 to 13.20

SESSION 3

Room: T6 . . . . . Wed. 13.20 to 15.00

Active Systems and Signatures II

Chair: **Gary W. Kamerman,** FastMetrix, Inc. (USA)

Keynote Presentation

13.20: **Electro-optic remote sensing in the UK EMRS Defence Technology Centre *(Invited Paper)*,** S. S. Duncan, SELEX Sensors and Airborne Systems Ltd. (United Kingdom) . . . . . [6396-27]

14.00: **A laser radar system for range-gated viewing at 1.5 μm,** M. Elmqvist, P. Andersson, Swedish Defence Research Agency (Sweden); E. Wall, Saab Avitronics (Sweden); G. Lidö, FMV (Sweden) . . . . . [6396-10]

14.20: **Registration and change detection techniques using 3D laser scanner data from natural environments,** G. Tolt, P. Andersson, T. R. Chevalier, C. A. Grönwall, H. Larsson, A. Wiklund, Swedish Defence Research Agency (Sweden) . . . . . [6396-11]

14.40: **Contrast enhancement for target detection by means of active polarimetric and multispectral laboratory demonstrator,** M. Alouini, A. Grisard, J. Bourderionnet, D. Dolfi, Thales Research & Technology (France); F. Goudail, Univ. Paris-Sud II (USA); I. Baarstad, T. Løke, P. Kaspersen, Norsk Elektro Optikk A/S (Norway); X. Normandin, Thales Optronique (USA) [6396-12]

Coffee Break . . . . . 15.00 to 15.20

SESSION 4

Room: T6 . . . . . Wed. 15.20 to 17.00

Passive Systems and Signatures

Chair: **Ove K. Steinvall,** FOI (Sweden)

15.20: **Hyperspectral multiple approach fusion for the long-range detection of low observable objects like mines: MUF2,** P. W. Yuen, G. J. Bishop, BAE Systems plc (United Kingdom) . . . . . [6396-14]

15.40: **Texture analysis using image empirical mode decomposition,** A. Linderhed, Swedish Defence Research Agency (Sweden) . . . . . [6396-16]

16.00: **Environmental effects on the spectral properties of terrain backgrounds and objects,** J. M. Cathcart, Georgia Institute of Technology (USA) . . . . . [6396-17]

16.20: **Hemispherical radiometer for angle resolved measurement of IR scatter and radiation behaviour,** C. F. Hahlweg, H. Rothe, Helmut-Schmidt Univ. (Germany) . . . . . [6396-18]

16.40: **Wide-area monitoring using satellite imagery retrieval and mining,** I. Niemeyer, Technische Univ. Freiberg (Germany) . . . . . [6396-20]

✔ Interactive Posters—Wednesday

An interactive poster session will be held on Wednesday 18.00 to 19.30. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. An interactive poster session and reception with authors present will be held Wednesday evening from 18.00 to 19.30. Light refreshments will be served.

✔ **Pulsed and modulated CW lidar capacities intercomparison by multiplicative decomposition strategy,** R. R. Agishev, Kazan State Univ. (Russia) . . . . . [6396-24]

✔ **A numerical technique for gradient-type interface in the inverse scattering problems,** M. Razzaghi, Mississippi State Univ. (USA) [6396-25]

Thursday 14 September

SESSION 5

Joint Session with Conference 6367, Lidar Technologies, Techniques, and Measurements for Atmospheric Remote Sensing, part of Remote Sensing Europe Symposium

Room: T6 . . . . . Thurs. 08.00 to 10.40

Atmospheric Remote Sensing

Chairs: **Upendra N. Singh,** NASA Langley Research Ctr. (USA); **Gary W. Kamerman,** FastMetrix, Inc. (USA)

08.20: **Forward modeling of linear mixing in thermal IR ground leaving radiance spectra,** L. K. Balick, Los Alamos National Lab. (USA); A. R. Gillespie, Univ. of Washington (USA); M. F. McCabe, Los Alamos National Lab. (USA); A. Mushkin, Univ. of Washington (USA) . . . . . [6396-21]

08.40: **An accurate modeling, simulation, and analysis tool for predicting and estimating Raman LIDAR system performance,** R. J. Grasso, L. E. Russo, J. L. Barrett, J. E. Odhner, P. I. Egbert, BAE Systems (USA) . [6396-22]

09.00: **A new approach to the modeling of optical remote sensing systems using vortical scattering parameters,** A. Belmonte, Univ. Politècnica de Catalunya (Spain); A. Lazaro, Rovira i Virgili Univ. (Spain) . . . . . [6396-23]

09.20: **An expert lidar data analysis toolset for explosive debris plumes,** M. Pieck, J. Stephens, S. P. Brumby, P. A. Pope, R. Channell, E. R. Birnbaum, Los Alamos National Lab. (USA) . . . . . [6367-14]

09.40: **Lidar flourescent method for remote monitoring of the effects on the vegetation,** G. G. Matvienko, Institute of Atmospheric Optics (Russia); V. I. Timofeev II, Moscow State Univ. (Russia); A. I. Grishin, N. L. Fateyeva, Institute of Atmospheric Optics (Russia) . . . . . [6367-15]

10.00: **Emission spectroscopy and energy transfer in Tm^{3+}, Tm^{3+}-$Ho^{3+}$and Tm^{3+}-Yb^{3+} doped tellurite fibres,** B. Richards, S. Shen, A. Jha, Univ. of Leeds (United Kingdom) . . . . . [6367-16]

10.20: **Pulsed high-peak-power and single-frequency fiber laser design for LIDAR aircraft safety application,** F. Liegeois, C. Vercambre, M. Salhi, Y. Hernandez, D. Giannone, Multitel (Belgium) . . . . . [6367-17]

Tuesday 12 September 2006 • Proceedings of SPIE Vol. 6397

Technologies for Optical Countermeasures III

Conference Chair: **David H. Titterton**, Defence Science and Technology Lab. (United Kingdom)

Programme Committee: **Stuart S. Duncan**, SELEX Sensors and Airborne Systems Ltd. (United Kingdom); **Anton Kohnle**, FGAN-FOM (Germany); **Stephen P. McGeoch**, Thales Optronics Ltd. (United Kingdom); **Julie Poupard**, Délégation Générale pour l'Armement (France); **Mark A. Richardson**, Cranfield Univ. (United Kingdom); **H. M. Schleijpen**, TNO (Netherlands); **Sandy J. Smith**, European Office of Aerospace Research and Development (United Kingdom); **Ove K. Steinvall**, FOI (Sweden); **Mark R. Taylor**, Defence Science and Technology Organisation (Australia); **Jonathan A. C. Terry**, Univ. of St. Andrews (United Kingdom)

Tuesday 12 September

Introductory Remarks . . . . . 8.30 to 8.35

Chair: **David H. Titterton**, Defence Science and Technology Lab. (United Kingdom)

SESSION 1

Room: T6 . . . . . Tues. 08.35 to 09.20

Keynote Session

Chair: **David H. Titterton**, Defence Science and Technology Lab. (United Kingdom)

08.35: **Swedish Defensive Aids Suite (DAS) project *(Invited Paper)*,** O. Grönlund, Swedish Armed Forces (Sweden) . . . . . [6397-01]

SESSION 2

Room: T6 . . . . . Tues. 09.20 to 10.30

Fibre Laser Technology

Chair: **Mark A. Richardson**, Cranfield Univ. (United Kingdom)

09.20: **Microstructured fibres: a positive impact on defence technology? *(Invited Paper)*,** E. J. O'Driscoll, M. A. Watson, T. Delmonte, BAE Systems plc (United Kingdom); M. N. Petrovich, X. Feng, J. C. Flanagan, D. J. Richardson, Univ. of Southampton (United Kingdom) . . . . . [6397-02]

09.50: **Thulium fibre laser pumped mid-IR source,** I. Elder, D. Thorne, I. Jones, SELEX Sensors and Airborne Systems Ltd. (United Kingdom) [6397-03]

10.10: **High-power fibre-laser-pumped mid-infrared laser sources,** E. Lippert, S. Nicolas, G. Arisholm, K. Stenersen, A. S. Villanger, G. Rustad, Norwegian Defense Research Establishment (Norway) . . . . . [6397-04]

Coffee Break . . . . . 10.30 to 10.50

SESSION 3

Room: T6 . . . . . Tues. 10.50 to 11.50

Solid State Laser Technology

Chair: **Lars J. Sjöqvist**, Swedish Defence Research Agency (Sweden)

10.50: **End-pumped Q-switched Nd:YVO4 laser,** I. Elder, D. Legge, J. Beedell, SELEX Sensors and Airborne Systems Ltd. (United Kingdom) . . . . . [6397-05]

11.10: **Diode laser bars deliver > 400-W peak CW power from 800-nm to 980-nm enabling wide range of applications,** P. A. Crump, nLight Corp. (USA) . . . . . [6397-06]

11.30: **Development of 3.7-micron InAsSb DH and QW diode laser and LED sources grown by liquid phase epitaxy,** M. Yin, A. Krier, R. Jones, Lancaster Univ. (United Kingdom) . . . . . [6397-07]

Lunch/Exhibition Break . . . . . 11.50 to 13.30

SESSION 4

Room: T6 . . . . . Tues. 13.30 to 15.40

Laser Beam Steering and Effects

Chair: **H. M. A. Schleijpen**, TNO (Netherlands)

13.30: **Novel laser beam steering techniques *(Invited Paper)*,** H. D. Tholl, Diehl BGT Defence GmbH & Co. (Germany) . . . . . [6397-09]

14.00: **Experimental study of mid-IR laser beam wander close to a jet engine exhaust,** M. Henriksson, Swedish Defence Research Agency (Sweden) and Royal Institute of Technology (Sweden); L. J. Sjöqvist, O. K. S. Gustafsson, Swedish Defence Research Agency (Sweden) . . . . . [6397-11]

14.20: **Multiwavelength laser propagation experiments,** O. K. Steinvall, L. J. Sjöqvist, F. Berglund, L. Allard, T. Larsson, K. Karlsson, F. Kullander, Swedish Defence Research Agency (Sweden) . . . . . [6397-12]

14.40: **IR laser induced heating in Hg0.75Cd0.25Te,** A. Villanger, T. Brudevoll, K. Stenersen, Norwegian Defense Research Establishment (Norway) [6397-13]

15.00: **Inadvertent lasing hazards to space systems: methodology and analysis,** L. A. Ridolfi, L-3 Titan (USA) . . . . . [6397-14]

15.20: **A self-contained native fluorescence detector for measurement of organic molecules and chemicals of life,** A. I. Tsapin, Univ. of Southern California (USA); W. F. Hug, Photon Systems Inc. (USA); R. Bhartia, Jet Propulsion Lab. (USA); R. D. Reid, Photon Systems Inc. (USA) . . . . . [6397-15]

Coffee Break . . . . . 15.40 to 16.00

SESSION 5

Room: T6 . . . . . Tues. 16.00 to 17.40

Modelling and Simulation

Chair: **Ove K. Steinvall**, Swedish Defence Research Agency (Sweden)

16.00: **Imaging seeker surrogate for IRCM evaluation,** H. M. A. Schleijpen, TNO (Netherlands) . . . . . [6397-16]

16.20: **Modeling the improved protection of fast jets from the IR MANPADS threat,** M. A. Richardson, N. Tranquillino-Minerva, Cranfield Univ. (United Kingdom); B. Butters, R. Walmsley, R. Ayling, N. Millwood, Chemring Countermeasures (United Kingdom) . . . . . [6397-17]

16.40: **Quantitative optimisation of expendable countermeasures,** H. Hovland, Forsvarets Forsknings Institute (Norway) . . . . . [6397-18]

17.00: **PALMA: protection of airliners against manpads attacks,** G. Fournier, EADS CCR (France) . . . . . [6397-19]

17.20: **Modeling of EO countermeasure systems in a network perspective,** C. Wigren, Swedish Defence Research Agency (Sweden) . . . . . [6397-20]

Wednesday 13 September

✔ Interactive Posters—Wednesday

An interactive poster session will be held on Wednesday 18.00 to 19.30. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. An interactive poster session and reception with authors present will be held Wednesday evening from 18.00 to 19.30. Light refreshments will be served.

✔ **Sub-μrad laser beam tracking,** I. Buske, W. Riede, German Aerospace Ctr. (Germany) . . . . . [6397-10]

✔ **One theoretical method for designing combustor of DF chemical laser,** J. Lei, L. Lin, Z. Wang, National Univ. of Defense Technology (China) . . . . . [6397-21]

✔ **Method research on mixing measurement in DF chemical laser,** J. Lei, L. Lin, Z. Wang, National Univ. of Defense Technology (China) . . . . . [6397-22]

Monday-Wednesday 11-13 September 2006 • Proceedings of SPIE Vol. 6398

Optically-Based Biological and Chemical Detection for Defence III

Conference Chairs: **John C. Carrano**, Luminex Corp. (USA); **Arturas Zukauskas**, Vilnius Univ. (Lithuania)

Programme Committee: **Charles Collins**, Luminex Corp. (USA); **David Cullin**, ICx (USA); **Richard K. DeFreez**, ICx (USA); **Sherry Dunbar**, Luminex Corp. (USA); **Virginia E. Foot**, Defence Science and Technology Lab. (United Kingdom); **William F. Hug**, Photon Systems (USA); **Thomas H. Jeys**, MIT Lincoln Lab. (USA); **Kristin Korté**, Joint Program Executive Office for Chemical and Biological Defense (USA); **Mikael Lindgren**, Norwegian Univ. of Science and Technology (Norway); **Michael McLoughlin**, Homeland Security Advanced Research Projects Agency (USA); **Michael O'Keefe**, OSD-Chemical Biological Defense (USA); **Chandra Kumar N. Patel**, Pranalytica, Inc. (USA); **John C. Schmidt**, Northrop Grumman Corp. (USA); **David W. Sickenberger**, U.S. Army Research, Development and Engineering Command (USA); **Henryk Temkin**, DARPA (USA); **Ngai M. Wong**, Defense Threat Reduction Agency (USA)

Monday 11 September

Introduction . . . . . 10.30 to 10.40

Chair: **John C. Carrano**, Luminex Corp.

SESSION 1

Room: T1 . . . . . Mon. 10.40 to 12.40

Keynote Session

Chair: **John C. Carrano**, Luminex Corp. (USA)

10.40: **Future directions in chemical and biological detection *(Invited Paper)*,** E. C. Wack, S. Lennon, C. Wilhide, R. Floyd, R. Newton, Joint Program Executive Office for Chemical and Biological Defense (USA) . . . . . [6398-01]

11.20: **C/B detection strategy *(Invited Paper)*,** M. McLoughlin, HSARPA (USA) . . . . . [6398-02]

12.00: **Development of biological agent detectors for a range of threat scenarios *(Invited Paper)*,** T. H. Jeys, MIT Lincoln Lab. (USA) . [6398-03]

Lunch Break . . . . . 12.40 to 13.50

SESSION 2

Room: T1 . . . . . Mon. 13.50 to 15.50

Signatures, Scenarios, and Standards

Chair: **Michael McLoughlin**, HSARPA (USA)

13.50: **CBS3: Phase II report *(Invited Paper)*,** M. Munley, Booz Allen Hamilton (USA) . . . . . [6398-04]

14.20: **Scenario modeling *(Invited Paper)*,** M. Shatz, MIT Lincoln Lab. (USA) . . . . . [6398-05]

14.50: **Fluorescence excitation-emission maps database of biological agents,** M. Wlodarski, M. Kaliszewski, M. Kwasny, K. Kopczynski, Z. Zawadzki, Z. Mierczyk, J. Mlynczak, Military Univ. of Technology (Poland); E. Trafny, M. Szpakowska, The General Karol Kaczkowski Military Institute of Hygiene & Epidemiology (Poland) . . . . . [6398-06]

15.10: **Integrated network solutions for CBRN detection,** S. M. Maurer, L. Gilbert, Lockheed Martin Co. (USA) . . . . . [6398-43]

15.30: **A rugged early-warning spectroscopic system for real-time environment water monitoring,** B. Ling, M. Zeifman, Migma Systems, Inc. (USA) . . . . . [6398-08]

Coffee Break . . . . . 15.50 to 16.10

SESSION 3

Room: T1 . . . . . Mon. 16.10 to 17.40

Biological Sensor Systems I

Chair: **Edward C. Wack**, Joint Program Executive Office-Chemical and Biological Defense Command (USA)

16.10: **Overview of compact, rapid-point detection for BWA *(Invited Paper)*,** A. V. Nurmikko, Brown Univ. (USA) . . . . . [6398-09]

16.40: **Experimental performance of a novel aerosol sorting and deposition system for bio-threat sensing applications,** T. A. Pletcher, J. McGinn, D. Keller, Sarnoff Corp. (USA); V. Sivaprakasam, A. L. Huston, J. D. Eversole, Naval Research Lab. (USA) . . . . . [6398-10]

17.00: **A compact aerosol sensor and spectroscopic sorting with UV LEDs,** K. M. Davitt, Y. Song, W. R. Patterson III, A. V. Nurmikko, Brown Univ. (USA); Y. Pan, R. K. Chang, M. Gherasimova, J. Han, Yale Univ. (USA); P. J. Cobler, P. D. Butler, V. Palermo, Vtech Engineering Corp. (USA) . . . . . [6398-11]

17.20: **Terahertz imaging for biological detection *(Invited Paper)*,** R. M. Woodward, HT Consultants Ltd. (United Kingdom) . . . . . [6398-12]

Tuesday 12 September

SESSION 4

Room: T1 . . . . . Tues. 08.30 to 12.20

Biological Sensor Systems II

Chair: **Mikael Lindgren**, Swedish Defence Research Agency (Sweden)

08.30: **Integration of optical CBRNE technologies with ICX technologies *(Invited Paper)*,** D. W. Cullin, ICx Technologies Inc. (USA) . . . . . [6398-13]

09.00: **Biological aerosol detection with the tactical biological (TAC-BIO) detector,** A. Poldmae, J. B. Cabalo, M. De Lucia, F. Narayanan, D. W. Sickenberger, U.S. Army Research, Development and Engineering Command (USA) . . . . . [6398-14]

09.20: **Spectral detection of ultraviolet laser induced fluorescence from individual bio-aerosol particles,** P. Jonsson, F. Kullander, C. Vahlberg, Swedish Defence Research Agency (Sweden); M. Tiihonen, KTH - Royal Institute of Technology (Sweden); P. Wästerby, T. Tjärnhage, Swedish Defence Research Agency (Sweden); M. Lindgren, Swedish Defence Research Agency (Sweden) and Norwegian Univ. of Science and Technology (Norway) [6398-15]

09.40: **Optical chamber design for aerosol particle fluorescent measurements,** A. Rostedt, M. Putkiranta, M. Marjamäki, J. Keskinen, Tampere Univ. of Technology (Finland); K. Janka, R. Reinivaara, L. Holma, Dekati Ltd. (Finland) . . . . . [6398-16]

10.00: **Low-cost sensor network for bioaerosol detection,** C. J. Call, E. L. Merrill, S. Albanna, R. K. DeFreez, MesoSystems Technology, Inc. (USA) . . . . . [6398-17]

Coffee Break . . . . . 10.20 to 10.40

10.40: **Rapid agent aerosol detector breadboard,** W. D. Herzog, J. D. Hybl, D. Tardiff, P. C. Patel, R. H. Hoffeld, S. M. Tysk, W. F. DiNatale, A. Norige, G. Molnar, A. Sanchez-Rubio, MIT Lincoln Lab. (USA); V. Sivaprakasam, A. L. Huston, J. D. Eversole, Naval Research Lab. (USA) . . . . . [6398-29]

11.00: **Microfluidics-based integrated airborne pathogen detection systems,** M. A. Northrup, Microfluidic Systems Inc. (USA) . . . . . [6398-19]

11.20: **Real-time detection of aerolsolized biological threat agents,** A. Castro, Los Alamos National Lab. (USA) . . . . . [6398-20]

11.40: **Stroboscopic technique for measurement of fluorescence lifetimes of bacteria, fungi, and biological interferents,** M. Wlodarski, M. Kwasny, K. Kopczynski, Military Univ. of Technology (Poland) . . . . . [6398-21]

12.00: **A self-contained native fluorescence detector for measurement of organic molecules and chemicals of life,** A. I. Tsapin, Jet Propulsion Lab. (USA); W. F. Hug, Photon Systems, Inc. (USA); R. Bhartia, Jet Propulsion Lab. (USA); R. D. Reid, Photon Systems, Inc. (USA) . . . . . [6398-40]

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

SESSION 5

Room: T1 . . . . . Tues. 13.40 to 15.10

Biological Agent Confirmatory Sensors

Chair: **Chandra Kumar N. Patel**, Pranalytica, Inc. (USA)

13.40: **Detection of infectious agents by xMAP multiplexed suspension array technology *(Invited Paper)*,** S. A. Dunbar, Luminex Corp. (USA) . . . . . [6398-22]

14.10: **Development of an integrated detection and identification system for airborne biological agents,** M. B. Tabacco, Smiths Detection (USA); J. Lewington, Smiths Detection (United Kingdom) . . . . . [6398-23]

14.30: **Novel device for multiplexed microsphere-based biological threat detection,** A. R. Schilffarth, W. Deicher, Luminex Corp. (USA) . . . . . [6398-24]

14.50: **UV imaging of biochips: limitations of contrast,** J. Reverchon, C. Meyer, S. Cassette, Thales Research & Technology (France) . . . . . [6398-25]

Coffee Break . . . . . 15.10 to 15.30

SESSION 6

Room: T1 . . . . . Tues. 15.30 to 17.20

Chemical and Explosives Sensors

Chair: **Arturas Zukauskas**, Vilnius Univ. (Lithuania)

15.30: **Micromachined chemiluminescent system for improvised explosives device detection *(Invited Paper)*,** Y. S. Park, D. P. Neikirk, E. V. Anslyn, The Univ. of Texas at Austin (USA) . . . . . [6398-26]

16.00: **QC-LPAS: demonstration of a multichannel photoacoustic laser spectrometer in the long-wave infrared based on quantum cascade lasers and quartz tuning forks,** M. D. Wojcik, Pacific Northwest National Lab. (USA) . . . . . [6398-27]

16.20: **Performance of the FIRST: a long-wave infrared hyperspectral imaging sensor,** M. Chamberland, V. Farley, A. J. Villemaire, A. Vallières, Telops, Inc. (Canada); J. Legault, Telops USA, Inc. (USA) . . . . . [6398-28]

16.40: **The problem's solving of optical-acoustic spectroscopy with means of net modeling,** A. Erofeev, Consultant (USA) . . . . . [6398-30]

17.00: **In-depth study of aerosol conditions in a public facility,** K. Creek, P. Gray, N. Doggett, Los Alamos National Lab. (USA) . . . . . [6398-44]

Wednesday 13 September

Wednesday 13 September . . . . . 8.30 to 12.00

Special Workshop

From Concepts to Commercialization: How to Turn Proto types into Profits

You are invited to attend this new and unique event. This workshop will feature respected leaders in industry teaching on topics spanning project management, technology roadmaping, R&D budget strategies, product development techniques, and commercialization strategies.

Sponsored by Luminex

The Workshop is free to all symposium participants.

Lunch/Exhibition Break . . . . . 12.00 to 13.10

SESSION 8

Room: T1 . . . . . Wed. 13.10 to 15.40

Devices

Chair: **John C. Carrano**, Luminex Corp. (USA)

13.10: **Device challenges for C/B detection *(Invited Paper)*,** M. Wraback, Army Research Lab. (USA) . . . . . [6398-31]

13.40: **III-nitride based deep-ultraviolet light sources *(Invited Paper)*,** R. Gaska, Sensor Electronic Technology, Inc. (USA) . . . . . [6398-32]

14.10: **Optimization of a UV light-emitting diode based fluorescence-phase sensor *(Invited Paper)*,** A. Zukauskas, N. Kurilcik, P. Vitta, S. Jursenas, E. Bakiene, Vilnius Univ. (Lithuania); R. Gaska, Sensor Electronic Technology, Inc. (USA) . . . . . [6398-33]

14.40: **Deep-ultraviolet photodetectors grown by gas source molecular beam epitaxy on sapphire and AlGaN/sapphire substrates,** M. Holtz, V. Kuryatkov, D. Y. Song, B. Borisov, S. A. Nikishin, Texas Tech Univ. (USA); A. S. Usikov, V. A. Dmitriev, Technologies and Devices International, Inc. (USA); Y. Kudryavtsev, R. Asamoza, Ctr. de Investigación y de Estudios Avanzados (Mexico) . . . . . [6398-34]

15.00: **Widely tunable pulsed UV source for laser-induced fluorescence of bioaerosols,** G. Feugnet, A. Grisard, E. Lallier, Thales Research & Technology (France) . . . . . [6398-41]

15.20: **Novel multiwavelength UV laser development for biosensing applications,** S. F. LeBoeuf, T. Tolliver, W. Huber, S. Tandon, J. Balch, GE Global Research (USA) . . . . . [6398-42]

Coffee Break . . . . . 15.40 to 16.00

SESSION 9

Room: T1 . . . . . Wed. 16.00 to 17.40

Molecular Detection

Chair: **Virginia E. Foot**, Defence Science and Technology Lab. (United Kingdom)

16.00: **Confocal data acquisition for digital quantification using amplified single molecule detection *(Invited Paper)*,** J. Melin, J. Jarvius, J. Göransson, J. Stenberg, F. K. Nikolajeff, M. Nilsson, Uppsala Univ. (Sweden) . . . [6398-35]

16.30: **Optically based Grippe viruses detection based on liquid crystals,** M. G. Tomilin, S.I. Vavilov State Optical Institute (Russia); S. C. Stafeev, St.-Petersburg State Univ. of Information Technologies, Mechanics and Optics (Russia); A. Stepanova, St. Petersburg R&D Institute of Grippe RAMS (Russia) . . . . . [6398-36]

16.50: **Monitoring the aggregation pathways of human transthyretin (TTR) and human carbonic anydrase II (HCA II) by time-resolved fluorescence,** F. Stabo-Eeg, Norwegian Univ. of Science and Technology (Norway); K. Sörgjerd, Linköpings Univ. (USA); S. Moparthi, U. Carlsson, Linköpings Univ. (Sweden); P. Hammarström, Linköping Univ. (Sweden); M. Lindgren, Norges Teknisk-Naturvitenskapelige Univ. (Norway) . . . . . [6398-38]

17.10: **Method for the recognition of maintenance of urine salts *(Invited Paper)*,** I. H. Yarynovska, Ivan Franko National Univ. of L'viv (Ukraine) [6398-39]

Wednesday 13 September 2006 • Proceedings of SPIE Vol. 6399

Advanced Free-Space Optical Communication Techniques and Applications III

Conference Chair: **Lars J. Sjöqvist**, Swedish Defence Research Agency (Sweden)

Programme Committee: **Shlomi Arnon**, Ben-Gurion Univ. of the Negev (Israel); **Aniceto Belmonte**, Technical University of Catalonia (Spain); **Charmaine Gilbreath**, Naval Research Laboratory, NRL (USA); **Leslie C. Laycock**, BAE Systems plc (United Kingdom); **Jerome Loicq**, Ctr Spatial de Liège and Univ. de Liège (Belgium); **Bertrand Noharet**, Acreo AB (Sweden); **Andrew M. Scott**, QinetiQ Ltd. (United Kingdom); **Harald Weinfurter**, Ludwig-Maximilians-Univ. München (Germany)

Wednesday 13 September

Opening Remarks . . . . . 9.00 to 9.10

Chair: **Lars J. Sjöqvist**, Swedish Defence Research Agency (Sweden)

SESSION 1

Room: T4 . . . . . Wed. 09.10 to 10.40

Application and Technologies I

Chair: **Leslie C. Laycock**, BAE Systems (United Kingdom)

09.10: **Preliminary analysis of IR free-space communications *(Invited Paper)*,** A. Nedelcu, L. Morvan, M. Alouini, P. F. Bois, J. Pocholle, D. Dolfi, Thales Research & Technology (France); C. Faugeras, S. Laurent, C. Sirtori, Univ. Paris VII (France) . . . . . [6399A-30]

09.40: **Free-space optical nodes applicable to simultaneous ring and mesh networks,** S. V. Kartalopoulos, Univ. of Oklahoma (USA) . . . . . [6399A-02]

10.00: **A distributed sensing system for detection of contaminants in the ocean,** D. Kedar, S. Arnon, Ben-Gurion Univ. of the Negev (Israel) [6399A-03]

10.20: **Anticorrelation polarization dynamics in VCSELs,** Y. Hong, K. A. Shore, Prifysgol Cymru Bangor (United Kingdom) . . . . . [6399A-04]

Coffee Break . . . . . 10.40 to 11.00

SESSION 2

Room: T4 . . . . . Wed. 11.00 to 12.20

Atmospheric Effects and Compensation Techniques

Chair: **Shlomi Arnon**, Ben-Gurion Univ. of the Negev (Israel)

11.00: **Performance evaluation of an adaptive optics free-space laser communications system from simulation of beam propagation,** A. Belmonte, A. Rodríguez, F. Dios, A. Comerón, Univ. Politècnica de Catalunya (Spain) . . . . . [6399A-05]

11.20: **Effects of turbulence on a combined 1550-nm retro reflective and a low-intensity single-path 850-nm optical communication link,** F. Kullander, P. Jonsson, L. Sjöqvist, Swedish Defence Research Agency (Sweden) . . . . . [6399A-06]

11.40: **Fade statistics for Gaussian beam waves in moderate-to-strong turbulence,** F. E. Strömqvist Vetelino, C. Y. Young, L. C. Andrews, Univ. of Central Florida (USA) . . . . . [6399A-07]

12.00: **Optical communications with femtosecond lasers,** D. R. Alexander, Univ. of Nebraska/Lincoln (USA) . . . . . [6399A-08]

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

SESSION 3

Room: T4 . . . . . Wed. 13.40 to 15.20

Application and Technologies II

Chair: **Lars J. Sjöqvist**, Swedish Defence Research Agency (Sweden)

13.40: **Freespace photonics and laser communications at U.S. Naval Research Laboratory *(Invited Paper)*,** G. C. Gilbreath, Naval Research Lab. (USA) . . . . . [6399A-09]

14.10: **Multiple quantum well surface normal modulators for free-space optical communication links *(Invited Paper)*,** Q. Wang, B. Noharet, S. Junique, S. Almqvist, D. Ågren, D. Zhang, J. Y. Andersson, Acreo AB (Sweden) . . . . . [6399A-10]

14.40: **Improved robustness and capacity in MRR optical communication links,** J. G. J. Rantakokko, Swedish Defence Research Agency (Sweden) . . . . . [6399A-11]

15.00: **Mid-infrared diode lasers for free-space optical communications,** M. Yin, T. Krier, S. Krier, R. Jones, P. Carrington, Lancaster Univ. (United Kingdom) . . . . . [6399A-12]

Coffee Break . . . . . 15.20 to 15.40

SESSION 4

Room: T4 . . . . . Wed. 15.40 to 17.10

Quantum Cryptography

Chair: **Bertrand Noharet**, Acreo AB (Sweden)

15.40: **Free-space secure key exchange from 1 m to 1000 km *(Invited Paper)*,** J. G. Rarity, M. S. Godfrey, A. M. Lynch, J. L. Duligall, Univ. of Bristol (United Kingdom) . . . . . [6399A-13]

16.10: **Single-photon correlations for secure communication,** D. Ljunggren, M. Tengner, S. Sauge, J. Waldebäck, A. Karlsson, Kungliga Tekniska Högskolan (Sweden) . . . . . [6399A-14]

16.30: **Free-space quantum key distribution over 144 km,** M. Fürst, H. Weier, T. Schmitt-Manderbach, Ludwig-Maximilians-Univ. München (Germany); R. Ursin, F. Tiefenbacher, T. Scheidl, M. Lindenthal, B. Blauensteiner, T. Jennewein, Univ. Wien (Austria); P. Trojek, Ludwig-Maximilians-Univ. München (Germany); J. M. Perdigues, Z. Sodnik, European Space Agency (Netherlands); C. Barbieri, Univ. degli Studi di Padova (Italy); J. G. Rarity, Univ. of Bristol (United Kingdom); A. Zeilinger, Univ. Wien (Austria); H. Weinfurter, Ludwig-Maximilians-Univ. München (Germany) . . . . . [6399A-15]

16.50: **Security aspects of the authentication used in quantum key growing,** J. Cederlöf, J. Larsson, Linköpings Univ. (Sweden) . . . . [6399A-16]

✔ Interactive Posters—Wednesday

An interactive poster session will be held on Wednesday 18.00 to 19.30. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. An interactive poster session and reception with authors present will be held Wednesday evening from 18.00 to 19.30. Light refreshments will be served.

✔ **Analysis and comparison of various free-space optical receiver configurations,** A. Prokes, O. Wilfert, Brno Univ. of Technology (Czech Republic) . . . . . [6399A-17]

✔ **Free-space quantum cryptography for metropolitan areas,** M. Fürst, Ludwig-Maximilians-Univ. München (Germany); T. Schmitt-Manderbach, Ludwig-Maximilians-Univ. München (Germany) and MPQ Garching (Germany); H. Weier, I. Ordavo, Ludwig-Maximilians-Univ. München (Germany); H. Weinfurter, Ludwig-Maximilians-Univ. München (Germany) and MPQ Garching (Germany) . . . . . [6399A-18]

Tuesday 12 September 2006 • Proceedings of SPIE Vol. 6399

Photonic Components and Architectures for Microwave Systems and Displays II

Conference Chair: **Rebecca Wilson**, QinetiQ Ltd. (United Kingdom)

Cochair: **Thomas J. Merlet**, Thales (France)

Programme Committee: **Tibor Berceli**, Budapest Univ. of Technology and Economics (Hungary); **Béatrice Cabon**, École Nationale Supérieure d'Electronique et de Radioélectricité de Grenoble (France); **William A. Crossland**, Univ. of Cambridge (United Kingdom); **Didier J. Decoster**, Univ. des Sciences et Technologies de Lille (France); **Daniel Dolfi**, Thales Research and Technology (France); **John C. Jones**, QinetiQ (United Kingdom); **Steven R. Jost**, BAE Systems plc (USA); **Chris R. Lawrence**, QinetiQ Ltd. (United Kingdom); **Keith L. Lewis**, QinetiQ Ltd. (United Kingdom); **Javier Marti**, Univ. Politècnica de València (Spain); **Maurice Stanley**, QinetiQ (United Kingdom); **Mauro Varasi**, Crisel Instruments, srl (Italy)

Tuesday 12 September

Opening Remarks

Rebecca Wilson, Qinteiq Ltd. (United Kingdom); **Thomas J. Merlet,** Thase Group (France)

SESSION 5

Room: T34-T35 . . . . . Tues. 15.30 to 17.30

Microwave Systems and Displays

Chairs: **Rebecca A. Wilson**, QinetiQ (United Kingdom); **Thomas J. Merlet**, Thales Group (France)

Wednesday 13 September

✔ Interactive Posters—Wednesday

An interactive poster session will be held on Wednesday 18.00 to 19.30. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. An interactive poster session and reception with authors present will be held Wednesday evening from 18.00 to 19.30. Light refreshments will be served.

Conference of Related Interest:

Femtosecond Phenomena and Nonlinear Optics, 6400

Tuesday, 12 September 10.30 to 15.00

Femtosecond Phenomena and Nonlinear Optics

Conference Chairs: **Sean M. Kirkpatrick**, The Univ. of Georgia (USA); **Razvan Stoian**, Univ. Jean Monnet Saint-Etienne/LTSI (France)

Programme Committee: **Philippe Bado**, Translume (USA); **Christopher D. Brewer**, Air Force Research Lab. (USA); **William M. Dennis**, The Univ. of Georgia (USA); **Emmanuelle Marquis**, Thales Laser SA (France); **Jerome V. Moloney**, The Univ. of Arizona (USA); **Eric P. Mottay**, Amplitude Systemes (France); **Thomas R. Nelson**, Sandia National Labs. (USA); **Javier Solis**, Institute of Optics (Spain)

Monday 11 September

Opening Remarks . . . . . 10.30 to 10.40

Sean M. Kirkpatrick, The Univ. of Georgia (USA); **Razvan Stoian,** Univ. Jean Monnet Saint-Etienne/LTSI (France)

SESSION 1

Room: T34-T35 . . . . . Mon. 10.40 to 12.30

Micromachining and Microfabrication I

Chair: **Philippe Bado**, Translume Inc. (USA)

10.40: **Femtosecond laser microfabrication of 3D structures in Foturan glass *(Invited Paper)*,** Y. Cheng, Univ. of Missouri/Rolla (USA) and The Institute of Physical and Chemical Research (Japan); K. Sugioka, K. Midorikawa, The Institute of Physical and Chemical Research (Japan); Z. Xu, Shanghai Institute of Optics and Fine Mechanics (China) . . . . . [6400-01]

11.10: **Microfluidic sorting system based on optical waveguide integration created by femtosecond laser micromachining,** J. A. Squier, R. Applegate, Colorado School of Mines (USA); T. Vestad, J. S. Oakey, MetaFluidics, Inc. (USA); D. W. M. Marr, Colorado School of Mines (USA); P. Bado, Translume Inc. (USA) . . . . . [6400-02]

11.30: **Femtosecond laser micromachining: applications in photonic device fabrication and laser joining *(Invited Paper)*,** W. Watanabe, National Institute of Advanced Industrial Science and Technology (Japan) and Osaka Univ. (Japan); J. Nishii, National Institute of Advanced Industrial Science and Technology (Japan) . . . . . [6400-03]

12.00: **Monolithic multifunctional integration in fused silica using femtosecond laser: a technology platform for all-optical microsystems *(Invited Paper)*,** Y. Bellouard, Technische Univ. Eindhoven (Netherlands) . . . . . [6400-04]

Lunch Break . . . . . 12.30 to 13.40

SESSION 2

Room: T34-T35 . . . . . Mon. 13.40 to 15.40

Micromachining and Microfabrication II

Chair: **Javier Solis**, Consejo Superior de Investigaciones Científicas (Spain)

13.40: **Three-dimensional laser microfabrication *(Invited Paper)*,** S. Juodkazis, H. Misawa, Hokkaido Univ. (Japan) . . . . . [6400-05]

14.10: **Transversal waveguides with symmetric cross sections generated at large depths (>7-mm) in SiO2 with femtosecond laser pulses,** V. Diez-Blanco, J. Siegel, J. Solis, Consejo Superior de Investigaciones Científicas (Spain) . . . . . [6400-06]

14.30: **Holey fibre delivered radiation for laser curing and trimming of direct write components,** T. Delmonte, S. Raja, G. Simpson, J. McDonald, E. J. O'Driscoll, BAE Systems plc (United Kingdom); J. C. Flanagan, J. R. Hayes, M. N. Petrovich, V. Finazzi, F. Polletti, D. J. Richardson, Univ. of Southampton (United Kingdom); D. P. Hand, Heriot Watt Univ. (United Kingdom) . . [6400-07]

14.50: **Nonlinear laser-induced damage and absorptance effects in dielectric coatings by using ultrashort pulses,** K. Starke, M. Jupé, H. Mädebach, M. Lappschies, D. Ristau, A. Ostendorf, Laser Zentrum Hannover e.V. (Germany) . . . . . [6400-08]

15.10: **Femtosecond-laser writing of 3D photonic crystals in polymer *(Invited Paper)*,** M. Gu, Swinburne Univ. of Technology (Australia) . . [6400-09]

Coffee Break . . . . . 15.40 to 16.00

SESSION 3

Room: T34-T35 . . . . . Mon. 16.00 to 17.20

Micro- and Nanotechnologies

Chairs: **Christopher D. Brewer**, Air Force Research Lab. (USA); **Thomas R. Nelson**, Sandia National Labs. (USA)

16.00: **Rewritable nanogratings in fused silica by focused femtosecond laser for secure data storage application *(Invited Paper)*,** R. S. Taylor, C. Hnatovsky, E. S. Simova, J. Liu, D. M. Rayner, P. B. Corkum, National Research Council Canada (Canada) . . . . . [6400-10]

16.30: **Limits of ultrafast nanomachining: bubble dynamics and acoustics,** A. J. Hunt, K. Ke, S. Lee, Univ. of Michigan (USA) . . . . . [6400-11]

16.50: **Femtosecond laser nanoprocessing using near-infrared nanojoule pulses at MHz repetition frequency *(Invited Paper)*,** K. König, R. LeHarzic, H. Schuck, D. Sauer, T. Velten, Fraunhofer-Institut für Biomedizinische Technik (Germany) . . . . . [6400-12]

Tuesday 12 September

SESSION 4

Room: T34-T35 . . . . . Tues. 08.30 to 10.10

Advanced Laser Sources and Beam Delivery Systems I

Chair: **Eric P. Mottay**, Amplitude Systemes (France)

08.30: **New Yb-doped crystals for high-power and ultrashort lasers *(Invited Paper)*,** F. P. Druon, J. Boudeile, Y. Zaouter, M. Hanna, F. Balembois, P. M. Georges, Univ. Paris-Sud II (France); J. Petit, P. Goldner, B. Viana, École Nationale Supérieure de Chimie de Paris (France) . . . . . [6400-16]

09.00: **High-energy diode-pumped femtosecond oscillator with up to 1-μJ pulse energy at 9-MHz pulse repetition rate,** C. Honninger, E. Mottay, Amplitude Systemes (France) . . . . . [6400-17]

09.20: **Canadian TeraWatt portable laser,** M. Chateauneuf, J. Dubois, Defence Research and Development Canada (Canada) . . . . . [6400-18]

09.40: **Femtosecond-laser-encoded distributed-feedback color center laser in lithium fluoride single crystal *(Invited Paper)*,** K. Kawamura, Tokyo Institute of Technology (Japan); T. Kurobori, Kanazawa Univ. (Japan); M. Hirano, H. Hosono, Tokyo Institute of Technology (Japan) . . . . . [6400-19]

Coffee Break . . . . . 10.10 to 10.40

SESSION 5

Room: T34-T35 . . . . . Tues. 10.40 to 11.50

Advanced Laser Sources and Beam Delivery Systems II

Chair: **Emmanuel Marquis**, Thales Laser SA (France)

10.40: **Applications of adaptive optics correction procedures *(Invited Paper)*,** T. Wilson, Univ. of Oxford (United Kingdom) . . . . . [6400-13]

11.10: **Parallel drilling of inkjet nozzle plate using a picosecond laser and a diffractive optical beam splitter,** X. Liu, Panasonic Technologies Co. (USA) . . . . . [6400-14]

11.30: **Programmable focal spot shaping of amplified femtosecond laser pulses and their application to micromachining,** N. Huot, N. Sanner, E. Audouard, Univ. Jean Monnet Saint-Etienne (France) . . . . . [6400-15]

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

SESSION 6

Room: T34-T35 . . . . . Tues. 13.10 to 14.40

Propagation: Modeling and Simulation/Remote Sensing

Chairs: **William M. Dennis**, The Univ. of Georgia (USA); **Jerome V. Moloney**, College of Optical Sciences/The Univ. of Arizona (USA)

13.10: **Breakdown of envelope approximations and third-harmonic generation in femtosecond pulses propagating in gases *(Invited Paper)*,** M. Kolesik, The Univ. of Arizona (USA); E. M. Wright, J. V. Moloney, College of Optical Sciences/The Univ. of Arizona (USA) . . . . . [6400-20]

13.40: **Propagation of high-intensity laser pulses in the atmosphere *(Invited Paper)*,** N. Lascoux, R. Ackermann, E. Salmon, J. Kasparian, P. Béjot, Univ. Claude Bernard Lyon 1 (France); J. Extermann, L. Bonacina, J. Wolf, Univ. de Genève (Switzerland); K. Stelmaszczyk, P. Rohwetter, S. Li, A. Lindinger, L. Woste, Freie Univ. Berlin (Germany); N. Blanchot, O. Bonville, A. C. L. Boscheron, P. Canal, M. Castaldi, O. Hartmann, C. Lepage, L. Marmande, E. Mazataud, G. Mennerat, L. Patissou, D. Raffestin, CEA Cesta (France); S. Champeaux, L. Bergé, C. Guet, Commissariat a l'Energie Atomique (France) . . . . . [6400-21]

14.10: **Femtosecond pump-probe depletion to sort biological from background urban particles *(Invited Paper)*,** V. M. Boutou, L. Guyon, C. Bonnet, Univ. Claude Bernard Lyon 1 (France); M. Roth, H. Rabitz, Princeton Univ. (USA); F. Courvoisier, J. Wolf, Univ. de Genève (Switzerland) . . [6400-23]

Wednesday 13 September

✔Interactive Posters—Wednesday

An interactive poster session will be held on Wednesday 18.00 to 19.30. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. An interactive poster session and reception with authors present will be held Wednesday evening from 18.00 to 19.30. Light refreshments will be served.

✔ **Cross-correlation technique for determination of temporal profile of terahertz pulses,** D. L. Hovhannisyan, Yerevan State Univ. (Armenia) . . . . . [6400-24]

✔ **Computational modeling of near-infrared radiation generation by femtosecond laser pulse of a few optical cycles,** D. L. Hovhannisyan, Yerevan State Univ. (Armenia) . . . . . [6400-25]

Conference of Related Interest:

Photonic Components and Architectures of Microwave Systems and Displays II, 6399B

Session on Microwave Systems and Displays, Tuesday, 12 September 15.30 to 17.50

Optical Materials in Defence Systems Technology III

Conference Chairs: **James G. Grote**, Air Force Research Lab. (USA); **Francois Kajzar**, CEA Saclay (France); **Mikael Lindgren**, Norwegian Univ. of Science and Technology (Norway)

Wednesday 13 September

✔ Interactive Posters—Wednesday

An interactive poster session will be held on Wednesday 18.00 to 19.30. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. An interactive poster session and reception with authors present will be held Wednesday evening from 18.00 to 19.30. Light refreshments will be served.

✔ **Enhanced luminescence from InAs/GaAs quantum dots,** P. O. Holtz, Linköpings Univ. (Sweden) . . . . . [6401-18]

✔ **Two-photon absorption and luminescence of some novel thiophenyl Pt(II)-ethynyl derivatives,** E. Glimsdal, Norges Teknisk-Naturvitenskapelige Univ. (Norway); M. Carlsson, B. Eliasson, Umeå Univ. (Sweden); M. Lindgren, Norges Teknisk-Naturvitenskapelige Univ. (Norway) . . . [6401-19]

✔ **Theory of singlet oxygen emission photosensitized by porphyrins,** B. F. Minaev, Norges Teknisk-Naturvitenskapelige Univ. (Norway) . . . . [6401-20]

✔ **Microwave properties of thermochromic metal oxide surfaces,** J. Ousback, H. M. Kariis, Swedish Defence Research Agency (Sweden) . . . . . [6401-21]

✔ **Method for the recognition of maintenance of urine salts,** I. H. Yarynovska, A. I. Bilyi, R. O. Bilyy, O. Bordun, Ivan Franko National Univ. of L'viv (Ukraine) . . . . . [6401-22]

✔ **High signal-to-noise ratio quantum well bolometer materials,** S. G. E. Wissmar, L. Höglund, J. Y. Andersson, C. Vieider, S. Savage, P. Ericsson, Acreo AB (Sweden) . . . . . [6401-23]

✔ **Gradient optics of dielectric nanofilms (stand-by oral presentation),** A. B. Shvartsburg, Russian Academy of Sciences (Russia) . . . . . [6401-24]

Thursday 14 September

Introduction . . . . . 8.00 to 8.10

Chairs: **James G. Grote**, Air Force Research Lab.; **Francois Kajzar**, CEA Saclay (France); **Mikael Lindgren**, Norwegian Univ. of Science and Technology (Norway)

SESSION 1

Room: T4 . . . . . Thurs. 08.10 to 10.00

Photonic Materials for Security and Defence

Chair: **James G. Grote**, Air Force Research Lab. (USA)

Keynote

08.10: **Materials R&D as enablers for quantum leaps in photonics device development and performance *(Invited Paper)*,** L. Thylén, Kungliga Tekniska Högskolan (Sweden) . . . . . [6401-01]

08.50: **Organic components for optical devices: fabrication and characterization *(Invited Paper)*,** A. F. Fort, J. Bombenger, S. Klein, A. Barsella, L. Mager, D. Gindre, K. D. Dorkenoo, Institut de Physique et Chimie des Matériaux de Strasbourg (France) . . . . . [6401-02]

09.20: **Multiphysics modeling of optical materials,** H. Ågren, Kungliga Tekniska Högskolan (Sweden) . . . . . [6401-03]

09.40: **DFT study of excited states and phosphorescence of platinum(II) acetylides,** B. F. Minaev, Norges Teknisk-Naturvitenskapelige Univ. (Norway); E. Jansson, Kungliga Tekniska Högskolan (Sweden); M. Lindgren, Norges Teknisk-Naturvitenskapelige Univ. (Norway) . . . . . [6401-04]

Coffee Break . . . . . 10.00 to 10.30

SESSION 2

Room: T4 . . . . . Thurs. 10.30 to 12.10

Biopolymer Photonics

Chair: **Francois Kajzar**, CEA Saclay (France)

10.30: **Lessons from biology: sensing, locomotion, and catalysis *(Invited Paper)*,** M. O. Stone, Air Force Research Lab. (USA) . . . . . [6401-05]

11.00: **Optical properties of deoxyribonucleic acid (DNA) polymer host *(Invited Paper)*,** A. Samoc, M. J. Samoc, The Australian National Univ. (Australia); J. G. Grote, Air Force Research Lab. (USA); A. Miniewicz, Politechnika Wroclawska (Poland); B. Luther-Davies, The Australian National Univ. (Australia) . . . . . [6401-06]

11.30: **Bio-organic light-emitting diodes based on deoxyribonucleic acid biopolymer electron blocking layer,** J. G. Grote, Air Force Research Lab. (USA) . . . . . [6401-07]

11.50: **Development and performance of an all-DNA-based electro-optic waveguide modulator,** E. M. Heckman, Anteon Corp. (USA); P. P. Yaney, Univ. of Dayton (USA); J. G. Grote, F. K. Hopkins, Air Force Research Lab. (USA) . . . . . [6401-08]

Lunch/Exhibition Break . . . . . 12.10 to 13.30

SESSION 3

Room: T4 . . . . . Thurs. 13.30 to 15.00

Nanostructures and Quantum Dots

Chair: **Mikael Lindgren**, Norwegian Univ. of Science and Technology (Norway)

13.30: **Quantum dots-in-a-well infrared photodetectors for long-wavelength infrared detection *(Invited Paper)*,** L. Höglund, Acreo AB (Sweden); P. O. Holtz, Linköpings Univ. (Sweden); C. Asplund, Q. Wang, S. Almqvist, E. Petrini, H. Malm, J. Borglind, Acreo AB (Sweden); H. Pettersson, Halmstad Univ. (Sweden); J. Y. Andersson, Acreo AB (Sweden) . . . . [6401-09]

14.00: **Formation and properties of isoporous membranes composed of polymer semiconductors *(Invited Paper)*,** G. Vamvounis, D. Nyström, P. Antoni, Kungliga Tekniska Högskolan (Sweden); M. Lindgren, Norges Teknisk-Naturvitenskapelige Univ. (Norway); E. Malmström, A. Hult, Kungliga Tekniska Högskolan (Sweden) . . . . . [6401-10]

14.30: **Photophysics of fullerene-containing nanostructures *(Invited Paper)*,** N. V. Kamanina, S.I. Vavilov State Optical Institute (Russia) . [6401-11]

Coffee Break . . . . . 15.00 to 15.30

SESSION 4

Room: T4 . . . . . Thurs. 15.30 to 17.40

Multiphoton Excitations and Optical Limiting

Chair: **James G. Grote**, Air Force Research Lab. (USA)

15.30: **Tuning of the optical limiting in the visible range by multiphoton absorption *(Invited Paper)*,** J. Nicoud, L. Gehringer, P. Masson, Univ. Louis Pasteur (France); P. L. Baldeck, Y. Morel, Univ. Joseph Fourier (France) . . . . . [6401-12]

16.00: **Hybrid materials for optical limiting applications *(Invited Paper)*,** S. Parola, R. Zieba, C. Desroches, F. Chaput, Univ. Claude Bernard Lyon 1 (France); E. Malmström, Kungliga Tekniska Högskolan (Sweden); M. Lindgren, Norges Teknisk-Naturvitenskapelige Univ. (Norway); B. Eliasson, Umeå Univ. (Sweden); C. Lopes, Swedish Defence Research Agency (Sweden) . [6401-13]

16.30: **Styrylpyridine derivatives as lego building blocks for electroluminescence and two-photon processes *(Invited Paper)*,** A. Attias, D. Kréher, F. Mathevet, Univ. Pierre et Marie Curie (France); N. Lemaitre, B. Geffroy, CEA Saclay (France); P. L. Baldeck, Univ. Joseph Fourier (France) . . . . . [6401-14]

16.30: **Molecular engineering for two-photon absorption *(Invited Paper)*,** C. Barsu, C. Girardot, A. Picot, Y. Bretonnière, G. Lemercier, O. Maury, C. Andraud, École Normale Supérieure de Lyon (France); J. Bernard, T. Huault, P. L. Baldeck, Univ. Joseph Fourier (France) . . . . . [6401-15]

17.00: **Nonlinear optical properties of selected rotaxanes,** F. Kajzar, CEA Saclay (France); R. Czaplicki, O. Krupka, I. Rau, B. Sahraoui, Univ. d'Angers (France); J. Cavanas, D. Leigh, Univ. of Edinburgh (United Kingdom) [6401-16]

17.20: **Triazole-containing platinum acetylides for optical power limiting in sensor protection,** E. Malmström, R. M. Westlund, Kungliga Tekniska Högskolan (Sweden); C. Hawker, Univ. of California/Santa Barbara (USA); M. Lindgren, Norges Teknisk-Naturvitenskapelige Univ. (Norway); P. Norman, Linköpings Univ. (Sweden); A. Eriksson, C. Lopes, Swedish Defence Research Agency (Sweden); E. Glimsdal, Norges Teknisk-Naturvitenskapelige Univ. (Norway) . . . . . [6401-17]

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Optics and Photonics for Counter-Terrorism and Crime-Fighting

Conference Chair: **Colin Lewis**, Ministry of Defence SA/SD (United Kingdom)

Cochair: **Gari P. Owen**, Ministry of Defence SA/SD (United Kingdom)

Programme Committee: **John M. Bagshaw**, BAE Systems plc (United Kingdom); **Richard Bowden**, Univ. of Surrey (United Kingdom); **Howard J. Cummins**, HMGCC (United Kingdom); **Tim P. Donaldson**, Ministry of Defence SA/SD (United Kingdom); **Brian E. Foulger**, Defence Science and Technology Lab. (United Kingdom); **Shaogang Gong**, Queen Mary Univ. of London (United Kingdom); **Matthew R. Hogbin**, Home Office Scientific Development Branch (United Kingdom); **Harbinder S. Rana**, Defence Science and Technology Lab. (United Kingdom); **K. Alan Shore**, Univ. of Wales (United Kingdom); **Sören A. Svensson**, Swedish Defence Research Agency (Sweden)

Monday 11 September

Introductory Remarks . . . . . 10.30 to 10.50

Chair: **Colin Lewis**, Ministry of Defence (United Kingdom)

SESSION 1

Room: T4 . . . . . Mon. 10.50 to 11.30

General

Chair: **Colin Lewis**, Ministry of Defence (United Kingdom)

10.50: **Cognitive manoeuvre: getting inside the mindset of the terrorist and isurgents,** D. R. Sloggett, LogicaCMG (United Kingdom) . . . . . [6402-01]

11.10: **International evaluation collaboration: developing and managing infrastructure for research and development programs,** R. J. Bowers, J. Garofolo, National Institute of Standards and Technology (USA); D. E. Moellman, SRI International (USA) . . . . . [6402-02]

Lunch Break . . . . . 11.30 to 12.50

SESSION 2

Room: T4 . . . . . Mon. 13.00 to 14.40

Smart Surveillance

Chair: **Colin Lewis**, Ministry of Defence (United Kingdom)

13.00: **Classification of human interaction from a distance using salient body behaviour modeling,** H. S. Hung, S. Gong, Queen Mary Univ. of London (United Kingdom) . . . . . [6402-03]

13.20: **Image fusion technology for security and surveillance applications,** M. I. Smith, T. Riley, D. L. Hickman, J. P. Heather, Waterfall Solutions Ltd. (United Kingdom); D. J. Dwyer, Octec Ltd. (United Kingdom) . . . . . [6402-04]

13.40: **Lip-reading enhancement for law enforcement,** B. J. Theobald, R. W. Harvey, S. J. Cox, Univ. of East Anglia Norwich (United Kingdom); C. Lewis, G. Owen, Ministry of Defence (United Kingdom) . . . . . [6402-06]

14.00: **Latest electro-optic and photonic devices for security and military applications,** A. R. Jha, JHA Technical Consulting Services (USA) . . [6402-07]

14.20: **Countering laser pointer threats to road safety,** S. A. Svensson, C. Lopes, S. Björkert, Swedish Defence Research Agency (Sweden) . . [6402-08]

SESSION 3

Room: T4 . . . . . Mon. 14.40 to 15.20

Information Transmission

Chair: **Gari Owen**, Ministry of Defence (United Kingdom)

14.40: **Optical network security: countermeasures in view of attacks,** S. V. Kartalopoulos, Univ. of Oklahoma (USA) . . . . . [6402-09]

15.00: **Message extraction mechanism in optical chaos communications using injection-locked semiconductor lasers,** A. Murakami, K. A. Shore, Prifysgol Cymru Bangor (United Kingdom) . . . . . [6402-10]

Coffee Break . . . . . 15.20 to 15.50

Panel Discussion . . . . . Mon. 15.50 to 18.00

Smart Surveillance: What have we achieved and where are we going?

Chair: **Dennis E. Moellman,** Disruptive Technologies Office (USA)

Moderator: **Colin Lewis, Gari P. Owen,** Ministry of Defence SA/SD (United Kingdom)

Tuesday 12 September

SESSION 4

Room: T4 . . . . . Tues. 08.10 to 10.20

Detection of Illicit Materials

Chair: **Tim P. Donaldson**, Ministry of Defence (United Kingdom)

08.10: **Broadband terahertz spectroscopy for security applications,** A. G. Davies, E. H. Linfield, A. D. Burnett, W. Fan, P. Upadhya, J. Cunningham, Univ. of Leeds (United Kingdom); T. Munshi, H. G. M. Edwards, J. Kendrick, Univ. of Bradford (United Kingdom) . . . . . [6402-11]

08.30: **Compact and coherent source of widely tunable THz radiation,** T. J. Edwards, D. Walsh, D. J. M. Stothard, M. B. Spurr, Univ. of St. Andrews (United Kingdom); P. G. Browne, Macquarie Univ. (Australia); C. F. Rae, M. H. Dunn, Univ. of St. Andrews (United Kingdom) . . . . . [6402-12]

08.50: **Millimetre-wave and terahertz technology for the detection of concealed threats: a review *(Invited Paper)*,** M. C. Kemp, Iconal Technology Ltd. (United Kingdom) . . . . . [6402-13]

09.20: **Through-the-wall high-resolution imaging of a human and experimental characterization of the transmission of wall materials,** S. Nilsson, A. Jänis, Swedish Defence Research Agency (Sweden); M. Gustafsson, J. Kjellgren, A. Sume, Swedish Research Defence Agency (Sweden) . . . . . [6402-14]

09.40: **New ways in creating pixelgram images,** R. I. Malureanu, Istituto Nazionale per la Fisica della Materia (Italy) and Univ. degli Studi di Lecce (Italy); E. M. Di Fabrizio, Istituto Nazionale per la Fisica della Materia (Italy) and Univ. degli studi Magna Græcia di Catanzaro (Italy) . . . . . [6402-15]

10.00: **Quantum Cascade Lasers (QCL) in homeland security applications,** E. Normand, Cascade Technologies Ltd. (United Kingdom) . . . . . [6402-28]

Coffee Break . . . . . 10.20 to 10.40

SESSION 5

Room: T4 . . . . . Tues. 10.40 to 12.20

Forensic Methods I

Chair: **Brian E. Foulger**, Defence Science and Technology Lab. (United Kingdom)

10.40: **Imaging techniques in digital forensic investigation: a study using neural networks,** G. B. Williams, Univ. of East London (United Kingdom) . . . . . [6402-16]

11.00: **Raman and infrared techniques for fighting drug-related crime: a preliminary assessment,** S. Valussi, M. Underhill, The Forensic Science Service (United Kingdom) . . . . . [6402-17]

11.20: **Enhancing forensic science with spectroscopic imaging,** S. G. Kazarian, C. Ricci, Imperial College London (United Kingdom) . . . . . [6402-18]

11.40: **New type counterfight laser marked label,** P. D. Yankov, Sofia Univ. St. Kliment Ohridski (Bulgaria) . . . . . [6402-19]

12.00: **Distance detection using Raman scattering: a new tagging technology,** W. E. Smith, A. McCabe, G. McNay, Univ. of Strathclyde (United Kingdom); N. C. Shand, B. E. Foulger, Defence Science and Technology Lab. (United Kingdom) . . . . . [6402-20]

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

SESSION 6

Room: T4 . . . . . Tues. 13.40 to 15.00

Forensic Methods II

Chair: **Brian E. Foulger**, Defence Science and Technology Lab. (United Kingdom)

13.40: **Tackling field-portable Raman spectroscopy of real-World samples,** N. C. Shand, Defence Science and Technology Lab. (United Kingdom) . . . . . [6402-21]

14.00: **Identification of artificial fingerprints using optical coherence tomography technique,** K. V. Larin, Y. Cheng, Univ. of Houston (USA) . . . . . [6402-22]

14.20: **Multistream face recognition on dedicated mobile devices for crime fighting,** S. A. Jassim, H. Sellahewa, Univ. of Buckingham (United Kingdom) . . . . . [6402-23]

14.40: **Full-field optical coherence tomography used for security and document identity,** S. Chang, S. S. Sherif, C. Flueraru, National Research Council Canada (Canada) . . . . . [6402-24]

Wednesday 13 September

✔ Interactive Posters—Wednesday

An interactive poster session will be held on Wednesday 18.00 to 19.30. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. An interactive poster session and reception with authors present will be held Wednesday evening from 18.00 to 19.30. Light refreshments will be served.

✔ **Optical visual cryptography based on the phase characteristics of spatial light modulator,** S. Yi, Electronics and Telecommunications Research Institute (South Korea) . . . . . [6402-26]

✔ **FTIR spectroscopic imaging for the identification of concealed drugs residue particles and fingerprints,** C. Ricci, S. G. Kazarian, A. K. L. Chan, Imperial College London (United Kingdom) . . . . . [6402-27]

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Optics/Photonic in Security & Defence Participants

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Registration Hours

Sunday, 10 September . . . . . 15.00 - 17.00 hrs.
Monday, 11 September . . . . . 7.30 - 17.00 hrs.
Tuesday, 12 September . . . . . 8.00 - 17.00 hrs.
Wednesday, 13 September . . . . . 8.00 - 17.00 hrs.
Thursday, 14 September. . . . . 8.00 - 16.00 hrs.

Exhibition Hours

Tuesday, 12 September . . . . . 10.00 - 17.00 hrs.
Wednesday, 13 September . . . . . 10.00 - 17.00 hrs.
Thursday, 14 September . . . . . 10.00 - 16.00 hrs.

Tea/Coffee and Lunch Breaks

Breaks will be in the registration/exhibition area. See the individual conference programme for times.

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