SPIE Europe
Security+Defence

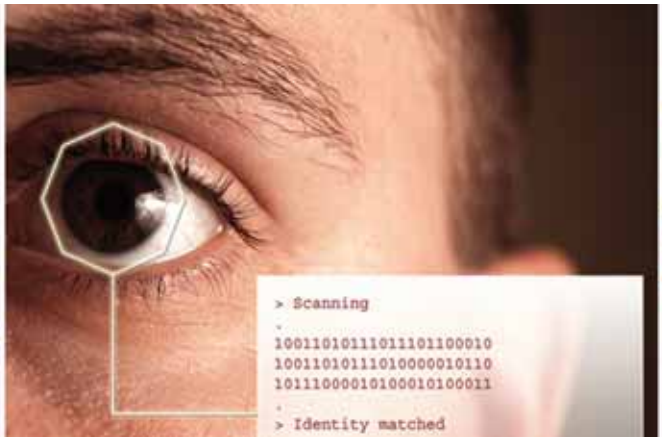
and

SPIE Europe
Remote Sensing

Technical Programme

Conferences: 17–20 September 2007
Exhibition: 18–20 September 2007

Palazzo degli Affari Conference Centre
Florence, Italy



SPIE Europe

Welcome!

Conferences: 17–20 September 2007
Exhibition: 18–20 September 2007

Palazzo degli Affari Conference Centre
Florence, Italy

SPIE Europe Security+Defence

David H. Titterton, Defence Science and Technology Lab. (United Kingdom)
2007 Symposium Chair

Stefania De Vito, Galileo Avionica S.p.A. (Italy)
2007 Symposium Co-Chair

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EMRSDTC Electro Magnetic Remote Sensing Defence Technology Centre

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European Office of Aerospace R&D

SJOF

[dstl]

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.

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SPIE Europe Remote Sensing

Guido D'Urso,
Univ. di Napoli Federico II (Italy)
2007 Symposium Chair

Steven P. Neeck, NASA Headquarters (USA)
2007 Symposium Co-Chair

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

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Optics/Photonics in Security + Defence Technical Conferences

Conf. 6736 **Unmanned/Unattended Sensors and Sensor Networks IV** *7*

Conf. 6737 **Electro-Optical and Infrared Systems: Technology and Applications** *9*

Conf. 6738 **Technologies for Optical Counter Measures** *11*

Conf. 6739A **Electro-Optical Remote Sensing, Photonic Technologies and their Applications** *12*

Conf. 6739B **Optically Based Biological and Chemical Detection for Defence** . . *14*

Conf. 6740 **Optical Materials in Defence Systems Technology** *15*

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Remote Sensing Technical Conferences

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Conf. 6744A **Sensors, Systems, and Next-Generation Satellites** *25*

Conf. 6744B **Global Earth Observing System of Systems, Implementation Strategies and Applications** *28*

Conf. 6745 **Remote Sensing of Clouds and the Atmosphere** *29*

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Conf. 6747 **Optics in Atmospheric Propagation and Adaptive Systems** *33*

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Participants *44*

Conference Daily Schedule

Monday 17 September	Tuesday 18 September	Wednesday 19 September	Thursday 20 September
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Welcome Reception, 18.00 to 20.00, p.3	Tuesday, 10.00 to 17.00	Wednesday, 10.00 to 17.00	Thursday, 10.00 to 16.00
	Poster Session, 18.00 to 19.30, p.3	**Women in Optics Dinner,** p.3	
Optics/Photonics in Security & Defence Conferences			
		6736 **Unmanned/Unattended Sensors and Sensor Networks IV** *(Carapezza)* p.7	
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Remote Sensing Conferences			
	6743 **Remote Sensing of the Ocean, Sea Ice, and Large Water Regions 2007** *(Bostater, Mertikas, Neyt, Vélez-Reyes)* p. 24	6742 **Remote Sensing for Agriculture, Ecosystems, and Hydrology** *(Neale, Owe, D'Urso)* p. 22	
	6744A **Sensors, Systems, and Next-generation Satellites** *(Meynart, Neeck, Shimoda)* p. 25		
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	6750 **Lidar Technologies, Techniques, and Measurements for Atmospheric Remote Sensing** *(Singh)* p. 41		

Plenary Session

Room 2c

(See page 4 for more details)

9:00 to 9:10 **Welcome and Introduction**

9:10 to 9:55 **Electro-optics for Security: Infancy of a Mature Technology, Giancarlo Grasso,** Executive Vice President and Chief Technical Officer, Finmeccanica Spa President of Galileo Avionica SpA, Italy

10:35 to 11:20 **Next Half Century in Space, Giovanni F. Bignami,** Director, Italian Space Agency, Italy

11:20 to 12:05 **Title To Be Announced, Michael Freilich,** NASA Headquarters, Director, Earth Science Division, Mission Directorate, USA

Welcome Reception

Ground Floor

Monday 17 September . . . . . 18.00 to 20.00
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

Wednesday 19 September
An informal networking opportunity for Women in Optics will be held on Wednesday, 19 September. Location to be announced at registration on site. Please register at the onsite registration desk for this event.

Poster Session

Tuesday 18 September . . . . . 18:00 to 19:30
Poster presenters can begin to post their papers at 10:00 on Tuesday. 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.

Organising Committees

Optics/Photonics in Security + Defence Organising Committee

Edward M. Carapezza, DARPA and Co-chair, DoD/DoJ Joint Programme Committee Steering Group (USA)
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Stefania De Vito, Galileo Avionica S.p.A. (Italy)
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David H. Titterton, Defence Science and Technology Lab. (United Kingdom)
Arturas Zukauskas, Vilnius Univ. (Lithuania)

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Adolfo Comerón, Univ. Politècnica de Catalunya (Spain)
Guido D'Urso, Univ. di Napoli Federico II (Italy)
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Gelsomina Pappalardo, Consiglio Nazionale delle Ricerche (Italy)
Francesco Posa, Politecnico di Bari (Italy)
Klaus Schäfer, Forschungszentrum Karlsruhe (Germany)
Haruhisa Shimoda, Japan Aerospace Exploration Agency (Japan)
Upendra N. Singh, NASA Langley Research Ctr. (USA)
James R. Slusser, Colorado State Univ. (USA)
Karin Stein, FGAN-FOM (Germany)
Miguel Vélez-Reyes, Univ. de Puerto Rico Mayagüez (Puerto Rico)

Monday 17 September, Room 2c

Welcome and Introduction

9:00 to 9:10

Symposium Chairs

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

Stefania De Vito, Galileo Avionica S.p.A. , (Italy)

9:10 to 9:55

Electro-optics for Security: Infancy of a Mature Technology

Giancarlo Grasso, Executive Vice President and Chief Technical Officer, Finmeccanica Spa President of Galileo Avionica SpA, Italy

Abstract: The technologies of optics and electo-optics have been developed and used by mankind all along its evolution. These technologies may therefore be defined mature and are today present in many applications we use in our daily life. The shock of terrorism has induced a wide range of new demands and expectations in many areas, but primarly on electro-optics. A synthetic and somehow partial overview of today's most significant problems to which electro-optics may provide innovative solutions is proposed.

Biography: Executive Vice President, Finmeccanica Spa Chief Technical Officer, Finmeccanica Spa President of Galileo Avionica SpA; CEO Selex SAS spa Chief of the Italian Delegation at N.I.A.G. Doctorate Degree in Electronical Engineering, Summa cum Laude, University of Rome, 1963. Adjunct Professor; Electrical and Electronic Department, University of Rome "La Sapienza"

Monday 17 September, Room 2c

Welcome and Introduction

10.25 to 10:35

Symposium Chairs
Guido D'Urso, Univ. di Napoli Federico II (Italy)
Steven P. Neeck, NASA Headquarters (USA)

10:35 to 11:20

Next Half Century in Space

Giovanni F. Bignami, Director, Italian Space Agency, Italy

Abstract: not available

Biography: Since his thesis work in Occhialini's group, **Giovanni Fabrizio Bignami** has been doing space research, taking part in its milestone development in Italy, Europe and the U.S.

Design, development and scientific exploitation of space missions by Giovanni Fabrizio Bignami started in the early ESA satellites in the late sixties (TD programme), and continued with NASA's SAS-2, ESA's COS-B and many other missions.

From 1987 to 1997 he was Principal Investigator of the EPIC instrument aboard ESA's XMM. From 1970 to 1990 he was staff scientist at the Italian CNR and from 1990 to 1997 he was full professor of Physics. Since 1997 he is full professor of Astronomy. He is now on leave from the IUSS (Istituto Universitario Studi Superiori) of Pavia. From 1997 to 2002 he has been Director of Science at the Italian Space Agency, where he designed the programme of small scientific missions, at presently successfully started with the all-Italian Agile mission.

In the period 2003-2006 he was Director of the Centre d'Etude Spatiale des Rayonnements at Toulouse (France), a joint laboratory of the French CNRS and the University of Tolouse for space astrophyisics and planetology. He has also served (2001-2003) on the CNRS Comitè Scientifique and (2004-2006) on the CNES Comitè d'Evaluation de la Recherche et de la Exploration Spatiale.

Giovanni Bignami was Chair of ESA's Space Science Advisory Committee from 2004 to 2007. The last Italian to be called in such a position before GFB had been professor Edoardo Amaldi, in 1984. For ESA, in 2005-2006, he coordinated the "Cosmic Vision 2015-2025" plan for the future of European Space Science. GFB is a member of the Academia dei Lincei, of the Academia Europea and of the International Academy of Astronautics.

In 1993 GFB was awarded the Bruno Rossi prize of the American Astronomical Society (first Italian). In 2002 he won the Royal Society/ COSPAR "Massey Award"(first Italian) "for leadership in space research". In 2004 he was awarded the four-yearly Astronomy Prize of the Italian Ministry for Culture, and in 2006 the Lacchini Prize for his public outreach activities. In 2000 he was nominated "Officier de l'Ordre National du Mérite" and in 2006 "Officer de la Legion d'Honneur" for his scientific merits.

He has published over 150 papers in journals and has an intense multimedia activity dedicated to the presentation of science to the public as well as to opinion making in science policy. GFB is a contributor to "Nature" and "Science" on a variety of topics, including history of science and scientists, form Galileo to Fermi. A strong believer in presenting science to a wide audience, he also contributes to Italian, French and US magazines and Encyclopaedias, and has participated to TV series (for RAI and for ESA/Euronews). He has authored two space science documentaries, "Project 242" on the human exploration of Mars, and "Bravo!BeppoSAX" on the Italian Space Agency mission dedicated to his mentor, G. Occhialini. The first biography of this great Italian scientist was written by Giovanni Fabrizio Bignami for the Memories of the Royal Society.

GFB has written four books: "Against the Donning of the Gown" Unaluna, Milan 2002). It is the first translation into English of the 301-line poem by Galileo Galilei "Contro il Portar la Toga" (Monobooks, Londra, 2000); "La Storia nello Spazio" (Mursia, Milano, 2001); "Explorer l'Espace pour Remonter le Temps"(Odile Jacob, Paris, 2006); "L'Esplorazione dello spazio" (Il Mulino, Bologna, 2006).

11:20 to 12:05

Michael Freilich, NASA Headquarters, Director, Earth Science Division, Mission Directorate, USA

Abstract: not available

Biography: **Michael H. Freilich** is the Director of the Earth Science Division, in the Science Mission Directorate at NASA Headquarters. Prior to coming to NASA, he was a Professor and Associate Dean in the College of Oceanic and Atmospheric Sciences at Oregon State University. He received BS degrees in Physics (Honors) and Chemistry from Haverford College in 1975 and a Ph.D. in Oceanography from Scripps Institution of Oceanography (Univ. of CA., San Diego) in 1982. From 1983-1991 he was a Member of the Technical Staff at the Jet Propulsion Laboratory.

Dr. Freilich's research focuses on the determination, validation, and geophysical analysis of ocean surface wind velocity measured by satellite-borne microwave radar and radiometer instruments. He has developed scatterometer and altimeter wind model functions, as well as innovative validation techniques for accurately quantifying the accuracy of spaceborne environmental measurements.

Dr. Freilich served as the NSCAT Project Scientist from 1983-1991 and as the Mission Principal Investigator for NSCAT from 1992-1997. Until he relinquished his project posts to join NASA HQ, he was the Mission PI for QuikSCAT (launched in June, 1999) and SeaWinds/ADEOS-2 (launched in December, 2002). He was the team leader of the NASA Ocean Vector Winds Science Team and is a member of the QuikSCAT, SeaWinds, and Terra/AMSR Validation Teams, as well as the NASDA (Japanese Space Agency) ADEOS-2 Science Team.

Dr. Freilich has served on many NASA, National Research Council (NRC), and research community advisory and steering groups, including the WOCE Science Steering Committee, the NASA EOS Science Executive Committee, the NRC Ocean Studies Board, and several NASA data system review committees. He chaired the NRC Committee on Earth Studies, and served on the NRC Space Studies Board and the Committee on NASA/NOAA Transition from Research to Operations.

His honors include the JPL Director's Research Achievement Award (1988), the NASA Public Service Medal (1999), and the American Meteorological Society's Verner E. Suomi Award (2004), as well as several NASA Group Achievement awards. Freilich was named a Fellow of the American Meteorological Society in 2004.

Freilich's non-scientific passions include nature photography and soccer refereeing at the youth, high school, and adult levels.

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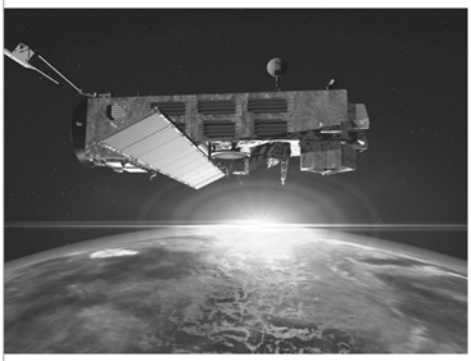
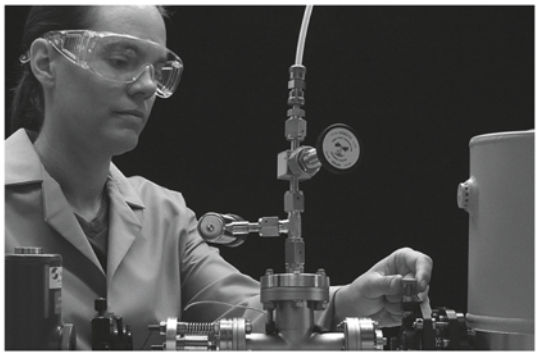


Innovation at Work

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8–11 September 2008
Imperial College
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Tuesday-Thursday 18-20 September 2007 • Proceedings of SPIE Vol. 6736

Unmanned/Unattended Sensors and Sensor Networks IV

Conference Chair: **Edward M. Carapezza**, Defense Advanced Research Projects Agency (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 & Naval Warfare Systems Command SPAWARSYSCEN (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); **Lars Sjökvist**, Swedish Defence Research Agency (Sweden); **Nino Srour**, Army Research Lab. (USA); **Huub A. van Hoof**, TNO (Netherlands)

Tuesday 18 September

Opening Remarks

Keynote Session . . . . . 13.00 to 13.40

Informationally connected sensor networks *(Invited Paper)*, P. K. Khosla, Carnegie Mellon Univ. (USA) . . . . . [6736-01]

SESSION 1

Room: 2a . . . . . Tues. 13.40 to 16.40

Unmanned System Technology

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

13.40: **Sensor deployment on unmanned ground vehicles,** G. R. Gerhart, U.S. Army Tank-Automotive Research, Development and Engineering Ctr. (USA) . . . . . [6736-02]

14.00: **Integrated multi-sensor package (IMSP) for unmanned vehicle operations,** E. C. Crow, Jr., K. M. Reichard, C. M. Rogan, J. Callen, The Pennsylvania State Univ. (USA) . . . . . [6736-03]

14.20: **Simulation of convoy of unmanned vehicles using agent based modeling,** S. Sharma, H. Singh, Wayne State Univ. (USA); G. R. Gerhart, U.S. Army Tank-Automotive Research, Development and Engineering Ctr. (USA) . . . . . [6736-04]

14.40: **On the reliability of a convoy of unmanned intelligent vehicles and their collaboration and coordination,** H. Singh, L. Hua, Wayne State Univ. (USA); G. R. Gerhart, U.S. Army Tank-Automotive Research, Development and Engineering Ctr. (USA) . . . . . [6736-05]

15.00: **Algorithms and evaluation framework for uninhabited vehicles,** M. Bernhardt, C. R. Angell, Waterfall Solutions Ltd. (United Kingdom); P. K. Kimber, SELEX Sensors and Airborne Systems Ltd. (United Kingdom) . . . . . [6736-06]

Coffee Break . . . . . 15.20 to 15.40

15.40: **Bio-inspired motion planning algorithms for autonomous robots facilitating greater plasticity for security applications,** S. V. Desai, U.S. Army Research, Development and Engineering Command (USA); Y. Guo, Stevens Institute of Technology (USA); M. E. Hohil, U.S. Army Research, Development and Engineering Command (USA) . . . . . [6736-07]

16.00: **Biomimetic approach for coordination algorithms utilized in distributed multi-robot systems,** Y. Meng, Stevens Institute of Technology (USA); M. E. Hohil, S. V. Desai, U.S. Army Research, Development and Engineering Command (USA); J. Gan, Stevens Institute of Technology (USA) . . . . . [6736-08]

16.20: **An architecture to allow hybrid autonomous and teleoperated control of ODIS T2,** S. T. Hunt, Wayne State Univ. (USA) and Turing Associates, Inc. (USA); Y. Li, Wayne State Univ. (USA); G. Witus, Turing Associates, Inc. (USA); R. D. Ellis, G. Auner, A. Cao, A. K. Pandya, Wayne State Univ. (USA) . . . . . [6736-09]

SESSION 2

Room: 2a . . . . . Tues. 16.40 to 17.40

Laser/Fibre Optic Sensor Systems

Chair: **Todd M. Hintz**, Space & Naval Warfare Systems Command SPAWARSYSCEN (USA)

16.40: **Autonomous laser accelerometer for platforms and systems,** B. V. Melkoumian, Baghron Co. (Russia) . . . . . [6736-10]

17.00: **Preparation and characterization WDM technique for linear disturbance localization in fibre optical sensor,** M. Zyczkowski, W. M. Ciurapinski, M. Szustakowski, Wojskowa Akademia Techniczna (Poland) . . . . . [6736-11]

17.20: **Classical theory of autonomous laser accelerometer,** B. V. Melkoumian, Baghron Co. (Russia) . . . . . [6736-12]

✔ Posters-Tuesday

All registered symposium attendees are invited to attend the interactive poster session. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway on the Ground Floor of the Convention Ctr. An interactive poster session and reception with authors present will be held on Tuesday 18.00 to 19.30. Light refreshments will be served.

✔ **Generalized ambiguity function in the linear canonical transform domain and optical systems,** Y. M. Kozlovskii, Institute for Condensed Matter Physics (Ukraine) . . . . . [6736-45]

✔ **Application of Bessel beams to wireless optical communications,** O. Wilfert, Z. Kolka, Brno Univ. of Technology (Czech Republic); Z. Bouchal, V. Kollarova, R. Celechovsky, T. Medrik, Univ. Palackého V Olomouci (Czech Republic) . . . . . [6736-46]

✔ **Improving free space optical communication security using femtosecond laser pulses,** P. A. Maák, A. Barócsi, L. Jakab, P. I. Richter, Budapest Univ. of Technology and Economics (Hungary) . . . . . [6736-47]

Wednesday 19 September

SESSION 3

Room: 2a . . . . . Wed. 08.30 to 10.10

Sensor Networks: Future Technology Challenges

Chairs: **Edward M. Carapezza**, Univ. of Connecticut (USA); **Todd M. Hintz**, Space & Naval Warfare Systems Command SPAWARSYSCEN (USA)

08.30: **Sensor networks: future technology challenges *(Invited Paper)*,** J. A. Parmentola, U.S. Army (USA) . . . . . [6736-13]

09.10: **Miniature, low-cost unattended sensors and networks for ocean and coastal monitoring,** A. Bargnesi, US Navy, Naval Underwater Warfare Ctr. (USA); E. M. Carapezza, B. Javidi, Univ. of Connecticut (USA) . . . . . [6736-14]

09.30: **Failure prediction for satellite monitoring systems using Bayesian networks,** S. Bottone, C. J. Stanek, DataPath, Inc. (USA); M. Spivack, Univ. of Cambridge (USA); M. O'Sullivan, San Diego State Univ. (USA); J. Rosalia, DataPath, Inc. (USA) . . . . . [6736-15]

09.50: **Renewable energy for sustainable ocean sensors and platforms,** E. M. Carapezza, A. Fagri, T. M. Molter, Univ. of Connecticut (USA) . . . [6736-16]

Coffee Break . . . . . 10.10 to 10.30

SESSION 4

Room: 2a . . . . . Wed. 10.30 to 12.00

Sniper & Mortar Detection Technologies

Chair: **Myron E. Hohil**, U.S. Army Research, Development and Engineering Command (USA)

10.30: **Seismic augmentation of acoustic monitoring of mortar fire,** T. S. Anderson, U.S. Army Engineer Research and Development Ctr. (USA) . . . . . [6736-17]

10.50: **Mortar and artillery variant classification by exploiting characteristics of the acoustic signature,** S. V. Desai, M. E. Hohil, A. Morcos, U.S. Army Research, Development and Engineering Command (USA) . . . . . [6736-18]

11.10: **An algorithm suite to provide detection, localization, and identification of potential chemical/biological threats resulting from airburst events on the move,** S. V. Desai, M. E. Hohil, B. U. Peltzer, A. Morcos, U.S. Army Research, Development and Engineering Command (USA) . . . . . [6736-19]

11.30: **Multi-frame filtering techniques for the detection and recognition of moving objects *(Invited Paper)*,** A. Mahalanobis, J. C. Perez, Lockheed Martin Missiles and Fire Control (USA) . . . . . [6736-49]

Lunch Break . . . . . 12.00 to 13.10

SESSION 5

Room: 2a . . . . . Wed. 13.10 to 15.30

Security and Perimeter Detection Systems

Chairs: **Todd M. Hintz**, Space & Naval Warfare Systems Command SPAWARSYSCEN (USA); **Edward M. Carapezza**, Univ. of Connecticut (USA)

13.10: **Cargo identification algorithms enabling unmanned unattended inspection at high throughput portals,** A. L. Chalmers, American Science and Engineering, Inc. (USA) . . . . . [6736-21]

13.30: **Area protection network (APN): a concept for autonomous perimeter surveillance and protection including a demonstrator,** P. J. B. Lindquist, Saab Bofors Dynamics AB (Sweden) . . . . . [6736-22]

13.50: **Towards detection of marine vehicles on horizon from buoy camera,** S. Fefilatyev, D. Goldgof, L. Langebrake, Univ. of South Florida (USA) . . . . . [6736-23]

14.10: **A multi-sensor approach for coastal surveillance,** B. van den Broek, B. van den Broek, J. C. van den Heuvel, P. B. W. Schwering, TNO (Netherlands) . . . . . [6736-24]

14.30: **Trends in optoelectronic security sensors,** M. Szustakowski, W. Ciurapinski, M. Zyczkowski, N. Palka, Wojskowa Akademia Techniczna (Poland) . . . . . [6736-25]

14.50: **Consistent detection and identification of individuals in a large camera network,** J. M. Orwell, V. Leung, S. Velastin, A. Colombo, Kingston Univ. (United Kingdom) . . . . . [6736-26]

15.10: **3D as a foundation for intelligent underwater autonomous mine countermeasures systems,** M. P. Strand, Naval Surface Warfare Ctr. (USA) . . . . . [6736-27]

Coffee Break . . . . . 15.30 to 15.50

SESSION 6

Room: 2a . . . . . Wed. 15.50 to 18.10

Unattended Sensor Technologies

Chairs: **Myron E. Hohil**, U.S. Army Research, Development and Engineering Command (USA); **Todd M. Hintz**, Space & Naval Warfare Systems Command SPAWARSYSCEN (USA)

15.50: **A methodology for analyzing an acoustic scene in sensor arrays,** M. E. Hohil, S. Quoraishee, U.S. Army Research, Development and Engineering Command (USA); H. Man, Stevens Institute of Technology (USA); S. V. Desai, U.S. Army Research, Development and Engineering Command (USA) . . . . . [6736-28]

16.10: **Novel optical sensor system for ocean monitoring,** J. Butman, Coherent, Inc. (USA); E. M. Carapezza, B. Javidi, Univ. of Connecticut (USA) . . . . . [6736-29]

16.30: **Surface acoustic wave sensors for detection of ccl3no2 and HCN,** C. Viespe, C. Grigoriu, D. Dragulinescu, C. Blanaru, C. Sima, National Institute for Lasers, Plasma and Radiation Physics (Romania); O. D. Iancu, I. Cristea, N. Grosu, Univ. Politehnica Bucuresti (Romania); C. N. Toader, M. S. Mihalcea, NBC Defense and Ecology (Romania) . . . . . [6736-30]

16.50: **Zero False Alarm Seismic Detection and Identification Systems,** T. Goldburt, A. Pakhomov, General Sensing Systems LLC (USA) . . . [6736-31]

17.10: **Changing Requirements and Solutions for Unattended Ground Sensors,** G. Prado, SenTech Inc. (USA) . . . . . [6736-32]

17.30: **Nanomechanical chemical sensors based on functionalized MEMS arrays,** S. Rajic, Oak Ridge National Lab. (USA) . . . . . [6736-33]

17.50: **Wide-angle laser rangefinder,** P. D. Yankov, Univ. of Sofia (Bulgaria) . . . . . [6736-50]

Thursday 20 September

SESSION 7

Room: 2a . . . . . Thurs. 08.30 to 10.30

Active & Passive Image Sensing & Processing

Chairs: **Bahram Javidi**, Univ. of Connecticut (USA); **Todd M. Hintz**, Space & Naval Warfare Systems Command SPAWARSYSCEN (USA)

08.30: **Local track repair for video tracking on small UAVs,** S. P. DelMarco, M. Antone, A. Reiter, BAE Systems Advanced Information Technologies (USA); T. Jenkins, Air Force Research Lab. (USA) . . . . . [6736-34]

08.50: **Increasing the depth of field of imaging systems with numerically optimized phase masks,** Y. Frauel, Univ. Nacional Autónoma de México (Mexico); A. Castro, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) . . . . . [6736-35]

09.10: **Imaging and phase measurement of 3D objects at 10.6 microns by digital *(Invited Paper)*,** P. Ferraro, S. Grilli, L. Miccio, P. Buahbassuah, R. Meucci, S. De Nicola, Istituto Nazionale di Ottica Applicata (Italy) . . [6736-36]

09.40: **Integral imaging with increased depth of field by using phase masks *(Invited Paper)*,** A. Castro, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Y. Frauel, Univ. Nacional Autónoma de México (Mexico); B. Javidi, Univ. of Connecticut (USA) . . . . . [6736-37]

10.10: **Super-resolution enhancement of flash ladar range data,** G. Rosenbush, Univ. of Maryland/College Park (USA); T. Hong, National Institute of Standards and Technology (USA); R. D. Eastman, Loyola College in Maryland (USA) . . . . . [6736-38]

Coffee Break . . . . . 10.30 to 10.50

SESSION 8

Room: 2a . . . . . Thurs. 10.50 to 12.50

Advanced Free-Space Optical Communication Techniques and Applications

Chair: **Vincent A. Handerek**, BAE Systems plc (United Kingdom)

10.50: **Data harvesting using optical wireless communication,** D. Kedar, S. Arnon, Ben-Gurion Univ. of the Negev (Israel) . . . . . [6736-39]

11.10: **Ground to survey aerostatic platform bidirectional free space optical link,** F. J. López Hernández, M. A. Geday, A. Carrasco-Casado, G. del Campo, Univ. Politécnica de Madrid (Spain); P. Munuera, Ingenieria y Servicios Aeroespaciales (Spain) . . . . . [6736-40]

11.30: **High-speed information systems,** A. R. Pirich, C. B. Pirich, ACP Consulting (USA) . . . . . [6736-41]

11.50: **Spaceborne fiber coupled diode laser pump modules for intersatellite communications,** M. Traub, H. Plum, H. Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany); T. Schwander, Tesat-Spacecom GmbH & Co. KG (Germany) . . . . . [6736-42]

12.10: **A high-speed modulated retro-reflector communication link with a transmissive modulator in a cat's eye optics arrangement,** J. Öhgren, F. Kullander, L. J. Sjöqvist, Swedish Defence Research Agency (Sweden); K. Wang, Q. Wang, S. Junique, S. Almqvist, B. Noharet, Acreo AB (Sweden) . . . . . [6736-43]

12.30: **Phase compensation considerations on coherent, free-space laser communications system,** A. M. Belmonte, A. Rodríguez, F. Dios, A. Comerón, Univ. Politécnica de Cataluña (Spain) . . . . . [6736-44]

Wednesday-Thursday 19-20 September 2007 • Proceedings of SPIE Vol. 6737

Electro-Optical and Infrared Systems: Technology and Applications

Conference Chairs: **David A. Huckridge**, QinetiQ Ltd. (United Kingdom); **Reinhard R. Ebert**, FGAN-FOM Research Institute for Optronics and Pattern Recognition (Germany)

Programme Committee: **Christopher C. Alexay**, Chris Alexay Optical Design (USA); **Jan Y. Andersson**, Acreo AB (Sweden); **Gordon A. Cain**, Octec Ltd. (United Kingdom); **David J. Clarke**, SELEX Sensors and Airborne Systems Ltd. (United Kingdom); **Stefania De Vito**, Galileo Avionica S.p.A. (Italy); **Peter N. J. Dennis**, QinetiQ Ltd. (United Kingdom); **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 (USA); **Christopher W. Slinger**, QinetiQ (United Kingdom)

Tuesday 18 September

✔ Posters-Tuesday

All registered symposium attendees are invited to attend the interactive poster session. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway on the Ground Floor of the Convention Ctr. An interactive poster session and reception with authors present will be held on Tuesday 18.00 to 19.30. Light refreshments will be served.

✔ **Infrared device for defence based on polycrystalline silicon,** D. Milovzorov, Fluens Technology Group Ltd. (Russia) . . . . . [6737-44]

✔ **Optical nonlinear switches based on nanocrystalline silicon,** D. Milovzorov, Fluens Technology Group Ltd. (Russia) . . . . . [6737-45]

✔ **Securing information using multi-lock single-step digital holography,** C. Chang, Ming Dao Univ. (Taiwan) . . . . . [6737-46]

✔ **Implementation for temporal noise identification using adaptive threshold of infrared imaging system,** I. Lim, Samsung Thales, Ltd. (South Korea) . . . . . [6737-47]

Wednesday 19 September

Opening Remarks . . . . . 8.25 to 8.30

David A. Huckridge, QinetiQ Ltd. (United Kingdom); **Reinhard R. Ebert,** FGAN-FOM Research Institute for Optronics and Pattern Recognition (Germany)

SESSION 1

Room: B2 . . . . . Wed. 08.30 to 12.40

Sensor Systems

Chairs: **Reinhard R. Ebert**, Forschungsgesellschaft für Angewandte Naturwissenschaften e.V. (Germany); **David A. Huckridge**, QinetiQ Ltd. (United Kingdom); **Per S. Fredin**, Saab Bofors Dynamics AB (Sweden); **Stefania De Vito**, SELEX Sensors and Airborne Systems SpA (Italy)

08.30: **Ranging and three-dimensional imaging using time-correlated single-photon counting *(Invited Paper)*,** G. S. Buller, A. M. Wallace, A. McCarthy, Heriot-Watt Univ. (United Kingdom); R. Lamb, SELEX Sensors and Airborne Systems Ltd. (United Kingdom) . . . . . [6737-01]

09.00: **IR-dual-band-camera demonstrator: experimental assessment, practical applications,** U. Adomeit, R. R. Ebert, Forschungsfesellschaft für Angewandte Naturwissenschaften e.V. (Germany) . . . . . [6737-02]

09.20: **New 3-5 micron wavelength range hyperspectral imager for ground and airborne use based on a single-element interferometer,** D. Cabib, A. Gil, R. A. Buckwald, CI Systems (Israel) Ltd. (Israel) . . . . . [6737-03]

09.40: **Near to mid-infrared, broadly tunable, active hyperspectral imaging system for the detection of gaseous and liquid species,** D. J. M. Stothard, C. F. Rae, M. Ross, M. H. Dunn, Univ. of St. Andrews (United Kingdom) . . . . . [6737-04]

10.00: **ERICA PLUS: compact MWIR camera with 20x step zoom optics and advanced processing,** A. Porta, P. Lavacchini, M. Olivieri, D. Torrini, Galileo Avionica S.p.A. (Italy) . . . . . [6737-05]

Coffee Break . . . . . 10.20 to 10.40

10.40: **Electro-optics technology for a new generation of military and law enforcement small equipment,** C. Giunti, A. Cocchi, R. Bardazzi, L. Calamai, E. Torniai, M. Maestrini, M. Livi, M. Sabatini, N. Santini, C. Toccafondi, Galileo Avionica S.p.A. (Italy) . . . . . [6737-06]

11.00: **Performance of compact intensified camera unit (ICU) with autogating based on video signal,** A. W. de Groot, P. Linotte, D. van Veen, M. de Witte, Photonis-DEP B.V. (Netherlands); N. Laurent, Photonis S.A.S. (France); J. van Spijker, Photonis-DEP B.V. (Netherlands) . . . . . [6737-07]

11.20: **Multi-aperture imaging device for airborne platforms,** L. C. Laycock, V. A. Handerek, BAE Systems plc (United Kingdom) . . . . . [6737-08]

11.40: **Hadamard camera for 3D imaging,** E. Romasew, H. D. Tholl, J. Barenz, Diehl BGT Defence GmbH & Co. KG (Germany) . . . . . [6737-09]

12.00: **IR system to provide effective IR countermeasure (IRCM) capability to ward off threats posed by shoulder-fired missiles (SFMs),** A. R. Jha, JHA Technical Consulting Services (USA) . . . . . [6737-10]

12.20: **Focus-free NVG development,** G. Bennett, Georgia Institute of Technology (USA) . . . . . [6737-48]

Lunch Break . . . . . 12.40 to 14.00

SESSION 2

Room: B2 . . . . . Wed. 14.00 to 18.00

Components, Modelling, Calibration and Phenomenology

Chairs: **Norman S. Kopeika**, Ben-Gurion Univ. of the Negev (Israel); **Christopher C. Alexay**, StingRay Optics, LLC (USA); **David J. Clarke**, SELEX Sensors and Airborne Systems Ltd. (United Kingdom); **Christopher W. Slinger**, QinetiQ Ltd. (United Kingdom)

13.00: **Coded aperture systems as nonconventional, lensless imagers for the visible and infrared,** C. W. Slinger, N. Gordon, M. McNie, D. Payne, K. Ridley, M. Strens, G. De Villiers, R. A. Wilson, QinetiQ Ltd. (United Kingdom) . . . . . [6737-11]

14.20: **Low-cost wavefront coding using coma and a denoising-based deconvolution,** C. Dorronsoro, Imatrics Image Technologies (Spain); J. A. Guerrero-Colon, Imatrics Image Technologies (Spain) and Univ. de Granada (Spain); M. de la Fuente, J. M. Infante, Indra Sistemas (Spain); J. Portilla, Instituto de Optica (Spain) and Consejo Superior de Investigaciones Cientificas (Spain) . . . . . [6737-12]

14.40: **Wideband protection filter: single filter for laser damage preventing at wide wavelength range,** A. Donval, B. A. Nemet, M. Oron, R. Oron, R. Shvartzer, KiloLambda Technologies, Ltd. (Israel); L. Singer, IMOD-SIBAT (Israel); C. Reshef, Ministry of Defence IDF (Israel); B. Eberle, H. Bürsing, R. R. Ebert, Forschungsfesellschaft für Angewandte Naturwissenschaften e.V. (Germany) . . . . . [6737-14]

15.00: **Validation of a target acquisition model for active imagers using perception experiments,** F. Lapaz, L. Canevet, Delegation Generale Pour L'Armament (France) . . . . . [6737-15]

Coffee Break . . . . . 15.20 to 15.40

15.40: **Properties of light reflected from road signs in active imaging for driving safety,** A. Halstuch, Y. Yitzhaky, Ben-Gurion Univ. of the Negev (Israel) . . . . . [6737-16]

16.00: **Evolution of test and evaluation of infrared missile warning systems,** S. A. Holloway, ESL Defence Ltd. (United Kingdom) . . . . . [6737-17]

16.20: **Cooperative target identification marking materials for thermal infrared, near infrared and visible sensing,** E. S. O'Keefe, QinetiQ Ltd. (United Kingdom) . . . . . [6737-18]

16.40: **Design and analysis of MEMS-based optical sensor for monitoring density level changes in fluid solution,** A. Rahman, Polytechnic Univ. (USA) . . . . . [6737-19]

17.00: **Slant-path atmospheric MTF,** A. Zilberman, E. Golbraikh, N. S. Kopeika, Ben-Gurion Univ. of the Negev (Israel) . . . . . [6737-20]

17.20: **Uniform calibration of night vision goggles and test sets,** G. P. Eppeldauer, National Institute of Standards and Technology (USA) . . [6737-21]

17.40: **Human visual performance of a dual band I2/IR sniper scope,** P. S. Paicopolis, Army Research Lab. (USA); J. G. Hixson, U.S. Army Night Vision & Electronic Sensors Directorate (USA); V. Noseck, Battelle Memorial Institute (USA) . . . . . [6737-22]

Thursday 20 September

SESSION 3

Room: B2 . . . . . Thurs. 08.30 to 11.10

Signal and Image Processing

Chairs: **Gordon A. Cain**, Octec Ltd. (United Kingdom); **Ronald G. Driggers**, U.S. Army Night Vision & Electronic Sensors Directorate (USA); **John E. Parsons, Jr.**, IBM Corp. (USA); **Jose A. Alonso**, Instituto de Ciencia de Materiales de Madrid (Spain)

08.30: **Effects of image restoration on automatic acquisition of moving objects in thermal video sequences degraded by the atmosphere,** O. Haik, Y. Yitzhaky, Ben-Gurion Univ. of the Negev (Israel) . . . . . [6737-23]

08.50: **Methods for the visualization of high dynamic range IR images,** F. Branchitta, M. Diani, G. Corsini, Univ. di Pisa (Italy); A. Porta, Galileo Avionica S.p.A. (Italy); M. Romagnoli, Galileo Avionica S.p.A. (USA) . . . . . [6737-24]

09.10: **Automatic focusing techniques for IR sensors,** A. Masini, M. Diani, G. Corsini, Univ. di Pisa (Italy); A. Porta, M. Romagnoli, Galileo Avionica S.p.A. (Italy) . . . . . [6737-25]

09.30: **Image segmentation based on level set method,** Y. Ouyang, X. Qi, Q. Zhang, Institute of Optics and Electronics (China) . . . . . [6737-26]

09.50: **PowerPC-based system for tracking in infrared image sequences,** J. Lee, C. Park, J. Lee, Samsung Thales, Ltd. (South Korea) . . . . . [6737-27]

Coffee Break . . . . . 10.10 to 10.30

10.30: **Naval target classification by fusion of IR and EO sensors,** F. Lapierre, Royal Belgian Military Academy (Belgium); R. Croci, R. Di Stefano, A. Farina, SELEX Sistemi Integrati S.p.A. (Italy); F. Gini, S. Giompapa, Univ. di Pisa (Italy); A. Graziano, SELEX Sistemi Integrati S.p.A. (Italy) . . . . . [6737-28]

SESSION 4

Room: B2 . . . . . Thurs. 10.50 to 12.10

Detector Technology I

Chairs: **Reinhard R. Ebert**, Forschungsgesellschaft für Angewandte Naturwissenschaften e.V. (Germany); **David A. Huckridge**, QinetiQ Ltd. (United Kingdom); **Peter N. J. Dennis**, QinetiQ Ltd. (United Kingdom)

10.50: **BIRD640: SCD's high sensitivity VGA VOx μ-bolometer detector,** A. R. Fraenkel, U. Mizrahi, L. Bikov, A. Giladi, A. Adin, N. Shiloah, E. Malkinson, T. Czyzewski, Y. Sinai, A. Amsterdam, SemiConductor Devices (Israel) . . . . . [6737-33]

11.10: **Optimisation of a Geiger mode avalanche photodiode imaging pixel based on a hybrid bulk SOI CMOS process,** N. G. Coakley, A. M. Moloney, A. T. Schwarzbacher, Dublin Institute of Technology (Ireland) . . . . . [6737-30]

11.30: **A novel SWIR detector with an ultra-high internal gain and negligible excess noise,** H. Mohseni, O. G. Memis, A. Katsnelson, S. Kong, Northwestern Univ. (USA) . . . . . [6737-31]

11.50: **Linear array ZnTe/Si heterojunction photodetector for laser detection and imaging applications,** R. A. Ismail, Univ. of Technology (Iraq) . . . . . [6737-32]

Lunch Break . . . . . 12.10 to 13.30

SESSION 5

Room: B2 . . . . . Thurs. 13.30 to 16.20

Detector Technology II

Chairs: **Reinhard R. Ebert**, Forschungsgesellschaft für Angewandte Naturwissenschaften e.V. (Germany); **David A. Huckridge**, QinetiQ Ltd. (United Kingdom); **Peter N. J. Dennis**, QinetiQ Ltd. (United Kingdom)

13.30: **Compact uncooled amorphous silicon 160x120 IRFPA with 25 μm pixel-pitch for large volume applications,** J. Tissot, O. Legras, C. Trouilleau, B. Fieque, S. Tinnes, C. Minassian, ULIS (France); J. Yon, Lab. d'Electronique de Technologie de l'Information (France) . . . . . [6737-34]

13.50: **Wavelength-selective infrared detectors,** D. P. Neikirk, J. Jung, The Univ. of Texas at Austin (USA) . . . . . [6737-35]

14.10: **A decade of developments of biologically inspired sensory information processing *(Invited Paper)*,** P. L. McCarley, Air Force Research Lab. (USA) . . . . . [6737-36]

14.40: **Efficient readout for carbon nanotube (CNT)-based IR detectors,** N. Xi, Michigan State Univ. (USA) . . . . . [6737-38]

15.00: **Model based on-chip 13bits ADC design dedicated to uncooled infrared focal plane arrays,** B. Dupont, P. Robert, ULIS (France) . . [6737-39]

Coffee Break . . . . . 15.20 to 15.40

15.40: **Latest developments in MCT infrared staring arrays at Sofradir,** M. Vuillermet, F. Pistone, A. Manissadjian, Sofradir (France) . . . . . [6737-40]

16.00: **Simulation of MWIR and LWIR photodiodes based on n+-p and p-n junctions formed in HgCdTe heterostructures,** M. S. Nikitin, G. V. Chekanova, Alpha (Russia); A. A. Drugova, V. A. Kholodnov, Institute of Radio-engineering and Electronics (Russia) . . . . . [6737-42]

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Technologies for Optical Countermeasures

Conference Chairs: **David H. Titterton**, Defence Science and Technology Lab. (United Kingdom); **Mark A. Richardson**, Cranfield Univ. (United Kingdom)

Programme Committee: **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); **Sandy J. Smith**, European Office of Aerospace Research and Development (United Kingdom); **Ove K. Steinvall**, Swedish Defence Research Agency (Sweden); **Mark R. Taylor**, Defence Science and Technology Organisation (Australia); **Jonathan A. Terry**, Univ. of St. Andrews (United Kingdom); **Hans D. Tholl**, Diehl BGT Defence GmbH & Co. (Germany)

Monday 17 September

Opening Remarks . . . . . 13.20 to 13.30

David H. Titterton, Defence Science and Technology Lab. (United Kingdom); **Mark A. Richardson,** Cranfield Univ. (United Kingdom)

Keynote Presentation . . . . . 13.30 to 14.20

Progress on the development of high-power solid-state lasers for directed energy applications *(Invited Paper)*, M. Neice, High Energy Laser Joint Technology Office (USA) . . . . . [6738-01]

SESSION 1

Room: B2 . . . . . Mon. 14.20 to 15.30

Laser Systems I

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

14.20: **The development and application of photonic technology in infrared and electro-optic countermeasures *(Invited Paper)*,** L. Cooke, BAE Systems plc (United Kingdom) . . . . . [6738-02]

14.50: **High average power thulium fibre laser pumped mid-IR source,** I. Elder, SELEX Sensors and Airborne Systems Ltd. (United Kingdom) . . . . . [6738-03]

15.10: **Tandem OPO system for mid-infrared generation using quasi phase-matching and volume Bragg grating,** M. Henriksson, Swedish Defence Research Agency (Sweden) and Royal Institute of Technology (Sweden); L. J. Sjöqvist, Swedish Defence Research Agency (Sweden); M. Tiihonen, V. Pasiskevicius, F. Laurell, Kungliga Tekniska Högskolan (Sweden) . . . . . [6738-04]

Coffee Break . . . . . 15.30 to 16.00

SESSION 2

Room: B2 . . . . . Mon. 16.00 to 17.30

Laser Systems II

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

16.00: **High performance optically-pumped antimonide lasers operating in the 2.5-9 μm wavelength range *(Invited Paper)*,** R. Kaspi, A. P. Ongstad, G. C. Dente, M. L. Tilton, D. M. Gianardi, Jr., J. R. Chavez, Air Force Research Lab. (USA) . . . . . [6738-05]

16.30: **High-brightness 2-to-5 μm semiconductor lasers,** M. Rattunde, F. Fuchs, C. Mann, Q. Yang, N. Schulz, M. T. Kelemen, K. Koehler, J. Schmitz, G. Kaufel, W. Bronner, J. Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) . . . . . [6738-06]

16.50: **Mid-infrared InAsSbP/InAsSb quantum well laser diodes,** M. Yin, A. Krier, Lancaster Univ. (United Kingdom) . . . . . [6738-07]

17.10: **Monolithic high brightness diode lasers - results and developments at FBH,** G. Erbert, F. Bugge, J. Fricke, K. Paschke, H. Wenzel, G. Tränkle, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) . . . . [6738-08]

Tuesday 18 September

SESSION 3

Room: B2 . . . . . Tues. 09.00 to 10.30

Laser Systems III

Chair: **Ric H. M. A. Schleijpen**, TNO (Netherlands)

09.00: **High power semiconductor laser sources for defence and security: a review of current technology *(Invited Paper)*,** J. Bell, nLight Corp. (USA) . . . . . [6738-09]

09.30: **A 2μm-pump-laser-based DIRCM system,** W. Bohn, G. Renz, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [6738-10]

09.50: **Development of a compact laser source for airborne countermeasures,** A. Godard, M. Lefebvre, ONERA (France); S. A. Said Hassani, P. Galtier, Ctr. National de la Recherche Scientifique (France) . . . . . [6738-11]

10.10: **High power and efficient far infrared ZnGeP2-based optical parametric oscillator,** E. Lippert, G. Rustad, Norwegian Defense Research Establishment (Norway); K. Stenersen, Norwegian Defence Research Establishment (Norway) . . . . . [6738-12]

Coffee Break . . . . . 10.30 to 11.00

SESSION 4

Room: B2 . . . . . Tues. 11.00 to 12.10

Beam Steering

Chair: **Hans D. Tholl**, Diehl BGT Defence GmbH & Co. KG (Germany)

11.00: **Phased array beam steering using fibre lasers *(Invited Paper)*,** A. M. Scott, QinetiQ Ltd. (United Kingdom) . . . . . [6738-13]

11.30: **A real-time sub-μrad laser beam tracking system,** I. Buske, W. Riede, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [6738-14]

11.50: **Adaptive Laser Beam Steering with Micro-Optical Arrays,** M. Rungenhagen, H. D. Tholl, Diehl BGT Defence GmbH & Co. KG (Germany) . . . . . [6738-15]

Lunch Break . . . . . 12.10 to 13.50

SESSION 5

Room: B2 . . . . . Tues. 13.50 to 15.00

General Countermeasures I

Chair: **Ove K. Steinvall**, Swedish Defence Research Agency (Sweden)

13.50: **Anatomy of the MANPAD *(Invited Paper)*,** M. A. Richardson, Cranfield Univ. (United Kingdom) . . . . . [6738-16]

14.20: **The European project CASAM for the protection of commercial airliners in flight,** J. Vergnolle, Sagem SA (France) . . . . . [6738-17]

14.40: **Assessment of laser-dazzling effects on TV-cameras by means of pattern recognition algorithms,** A. Durécu, P. Bourdon, ONERA (France); H. Bürsing, Forschungsfesellschaft für Angewandte Naturwissenschaften e.V. (Germany); J. Dellinger, N. Duchateau, Institut d'Optique (France); B. Eberle, Forschungsfesellschaft für Angewandte Naturwissenschaften e.V. (Germany); O. Vasseur, ONERA (France) . . . . . [6738-19]

Coffee Break . . . . . 15.00 to 15.30

SESSION 6

Room: B2 . . . . . Tues. 15.30 to 17.40

General Countermeasures II

Chairs: **Brian Butters**, Chemring Countermeasures (United Kingdom); **Mark A. Richardson**, Cranfield Univ. (United Kingdom)

15.30: **Progress and development in fibre laser technology *(Invited Paper)*,** R. Horley, Southampton Photonics, Inc. (United Kingdom); S. Norman, M. N. Zervas, SPI Lasers plc (United Kingdom) . . . . . [6738-20]

16.00: **Laser-dazzling effects on TV-cameras: analysis of dazzling effects and experimental parameters weight assessment,** A. Durécu, P. Bourdon, O. Vasseur, ONERA (France) . . . . . [6738-21]

16.20: **Helicopters on the asymmetric battlefield: challenges for photonics,** J. Heikell, Helsinki Univ. of Technology (Finland) . . . . . [6738-22]

16.40: **Time of flight range profiling using time-correlated single photon counting,** L. J. Sjöqvist, M. Henriksson, P. Jonsson, O. K. Steinvall, Swedish Defence Research Agency (Sweden) . . . . . [6738-23]

17.00: **Laser dazzling of infrared focal plane arrays,** R. H. M. A. Schleijpen, J. C. van den Heuvel, A. L. Mieremet, TNO (Netherlands) . . . . . [6738-24]

17.20: **Infrared smoke modelling in CounterSim,** R. H. Walmsley, B. Butters, Chemring Countermeasures (United Kingdom) . . . . . [6738-25]

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Electro-Optical Remote Sensing, Photonic Technologies and their Applications

Conference Chairs: **Gary W. Kamerman**, FastMetrix, Inc. (USA); **Ove K. Steinvall**, Swedish Defence Research Agency (Sweden); **Keith L. Lewis**, Electromagnetic Remote Sensing Defence Technology Ctr. (United Kingdom); **Keith A. Krapels**, Office of Naval Research (USA)

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); **Monte D. Turner**, DARPA (USA); **Maria J. Yzuel**, Univ. Autònoma de Barcelona (Spain)

Tuesday 18 September

✔ Posters-Tuesday

All registered symposium attendees are invited to attend the interactive poster session. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway on the Ground Floor of the Convention Ctr. An interactive poster session and reception with authors present will be held on Tuesday 18.00 to 19.30. Light refreshments will be served.

✔ **Space analysis and detection of changes for follow-up of the sand-vegetation components in the Mecheria, Algeria, area,** I. Haddouche, Univ. Abou Bekr Belkaid Tlemcen (Algeria) . . . . . [6739-32]

Wednesday 19 September

Opening Remarks . . . . . 8.50 to 9.00

Gary W. Kamerman, FastMetrix, Inc. (USA)

SESSION 1

Room: B3 . . . . . Wed. 09.00 to 12.00

Detection of Explosives, Hazardous Materials and Mines

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

09.00: **Battlefield innovation: a case study of remote sensor development,** J. A. Orson, National Reconnaissance Office (USA); T. N. Hague, U.S. Air Force Academy (USA) . . . . . [6739-01]

09.20: **Laser-based spectroscopy for standoff explosives detection,** M. L. Gaft, L. Nagli, Laser Detect Systems, Ltd. (Israel) . . . . . [6739-02]

09.40: **Remote sensing of hazardous materials by using mid-infrared quantum cascade lasers,** F. Fuchs, C. Wild, B. Kirn, C. Mann, Q. Yang, W. Bronner, B. Raynor, K. Koehler, J. Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) . . . . . [6739-03]

10.00: **Detection of mine-like objects in high-resolution aerial images,** A. Zhuravlev, S. Ivashov, V. Razevig, Bauman Moscow State Technical Univ. (Russia) . . . . . [6739-04]

Coffee Break . . . . . 10.20 to 10.40

10.40: **Lidar for shallow underwater target detection,** M. Tulldahl, M. Pettersson, Swedish Defence Research Agency (Sweden) . . . . . [6739-05]

11.00: **Theoretical and experimental analysis of an equivalent model for the investigation of shallow landmines with acoustic methods,** L. Capineri, A. Bulletti, G. Borgioli, P. Falorni, L. F. Masotti, S. Valentini, M. Calzolai, Univ. degli Studi di Firenze (Italy); C. Windsor, United Kingdom Atomic Energy Authority (United Kingdom) . . . . . [6739-06]

11.20: **Mid IR-fiber spectroscopy in 2-17μm range,** V. G. Artiouchenko, Fibre Photonics Ltd (United Kingdom); A. Bocharnikov, G. Colquhoun, C. A. Leach, Fibre Photonics Ltd. (United Kingdom); V. Lobachov, T. Sakharova, D. Savitskij, General Physics Institute (Russia) . . . . . [6739-07]

11.40: **Adaptive photodetectors using wide-gap photorefractive sillenite crystals for vibration monitoring,** I. A. Sokolov, M. A. Bryushinin, A.F. Ioffe Physico-Technical Institute (Russia) . . . . . [6739-08]

Lunch Break . . . . . 12.00 to 14.00

SESSION 2

Room: B3 . . . . . Wed. 14.20 to 16.40

3D Imaging and Tracking

Chair: **Ove K. Steinvall**, Swedish Defence Research Agency (Sweden)

14.20: **Waveform analysis of lidar data for targets in cluttered environments,** G. Tolt, H. Larsson, Swedish Defence Research Agency (Sweden) . . . . . [6739-10]

14.40: **Restoration algorithm and system performance evaluation for active imaging systems,** J. Gilles, Club Laser et Procédés (France) . . . . . [6739-11]

15.00: **Short-range detection and ranging of fast-moving objects,** R. Oron, Y. Leitner, V. Palatnik, KiloLambda Technologies, Ltd. (Israel) . . . . . [6739-12]

Coffee Break . . . . . 15.20 to 15.40

15.40: **Planning of a multiple sensor system for human activities space: aspects of iso-disparity surface,** J. Chen, S. Khatibi, W. Kulesza, Högskolan I Kalmar (Sweden) . . . . . [6739-13]

16.00: **Lightweight compact optical correlator for spacecraft docking,** A. Bergeron, P. Bourqui, Institut National d'Optique (Canada); B. Harnisch, European Space Agency (Netherlands) . . . . . [6739-14]

16.20: **Coherent ladar 3D imaging with S3,** J. R. Buck, A. Malm, A. Zakel, B. Krause, B. Tiemann, Lockheed Martin Coherent Technologies (USA) . . . . . [6739-15]

SESSION 3

Room: B3 . . . . . Wed. 16.40 to 17.40

Passive Imaging

Chair: **Ove K. Steinvall**, Swedish Defence Research Agency (Sweden)

16.40: **The application of hyperspectral remote sensing in classification and mapping of the marshland aggressive plant cattail, typha latifolia,** G. Liu, J. Allen, Clemson Univ. (USA); G. Kleppel, SUNY/Univ. at Albany (USA); J. Parkey, C. E. Campbell, Clemson Univ. (USA); K. Lu, Towson Univ. (USA) . . . . . [6739-16]

17.00: **Optical characterization of small surface targets,** P. B. W. Schwering, TNO (Netherlands) . . . . . [6739-17]

17.20: **Influence of Saharan dust on astronomical observation,** E. A. Siher, Faculty of Sciences & Techniques, Beni Mellal (Morocco) . . . . . [6739-18]

Thursday 20 September

SESSION 4

Room: B3 . . . . . Thurs. 08.30 to 10.30

EO Sensing, Microwave Photonics and the EMRS DTC

Chair: **Keith L. Lewis**, Electromagnetic Remote Sensing Defence Technology Ctr. (United Kingdom)

08.30: **Challenges in military remote sensing *(Invited Paper)*,** K. L. Lewis, Electromagnetic Remote Sensing Defence Technology Ctr. (United Kingdom) . . . . . [6739-23]

09.00: **Exploitation of EO Technologies from the EMRS DTC *(Invited Paper)*,** I. Clark, SELEX Sensors and Airborne Systems Ltd. (United Kingdom) . . . . . [6739-19]

09.30: **Hybrid optoelectronic vector matrix multipliers using guided-wave and micro-optic components,** V. A. Handerek, L. C. Laycock, A. G. McCarthy, BAE Systems plc (United Kingdom) . . . . . [6739-20]

09.50: **A novel wavelength division multiplexed system architecture for high resolution sampling and digitisation of broadband microwave signals,** J. M. Heaton, Filtronic Compound Semiconductors Ltd. (United Kingdom); P. Jiang, Univ. of Cambridge (United Kingdom); D. Gotch, R. Fawley, Filtronic Components Ltd. (United Kingdom); Y. Zhou, S. Clements, Filtronic Compound Semiconductors Ltd. (United Kingdom); I. H. White, Univ. of Cambridge (United Kingdom); R. Lang, Filtronic Components Ltd. (United Kingdom) . . . . . [6739-21]

10.10: **Fibre laser based ultra low phase noise LO generation for future radar,** M. J. Staniforth, ESL Defence Ltd. (United Kingdom) . . . . . [6739-22]

Coffee Break . . . . . 10.30 to 10.50

SESSION 5

Room: B3 . . . . . Thurs. 10.50 to 12.40

Passive Millimetre-Wave and Terahertz Imaging and Technology I

Chair: **Keith A. Krapels**, Office of Naval Research (USA)

10.50: **Glow discharge detector (GDD) for terahertz and millimeter wave radiation detection and imaging,** A. Abromovich, The College of Judea and Samaria (Israel); D. Rozban, N. S. Kopeika, Ben-Gurion Univ. of the Negev (Israel) . . . . . [6739-29]

11.10: **Sparse aperture detection and imaging of millimeter sources via optical image-plane interferometry *(Invited Paper)*,** I. Biswas, C. A. Schuetz, R. D. Martin, D. W. Prather, Univ. of Delaware (USA); M. S. Mirotznik, The Catholic Univ. of America (USA) . . . . . [6739-54]

11.40: **Enhancing millimeter-wave data by adapting visible-range image processing techniques *(Invited Paper)*,** F. E. Ortiz, E. J. Kelmelis, P. F. Curt, EM Photonics, Inc. (USA); K. A. Krapels, Office of Naval Research (USA); D. W. Prather, EM Photonics, Inc. (USA) . . . . . [6739-55]

12.10: **Sparse aperture millimeter-wave imaging using optical detection and correlation techniques *(Invited Paper)*,** C. A. Schuetz, J. Samluk, C. Chen, D. W. Prather, Univ. of Delaware (USA) . . . . . [6739-56]

Lunch Break . . . . . 12.40 to 13.40

SESSION 6

Room: B3 . . . . . Thurs. 13.40 to 15.20

Passive Millimetre-Wave and Terahertz Imaging and Technology II

Chair: **Keith A. Krapels**, Office of Naval Research (USA)

13.40: **Electronic scanning for passive millimetre wave imaging,** N. A. Salmon, QinetiQ Ltd. (United Kingdom) . . . . . [6739-24]

14.00: **Stand-off detection with a heterodyne receiver at 0.8 THz,** H. Hübers, A. D. Semenov, H. Richter, A. Smirnov, U. Böttger, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [6739-26]

14.20: **Development of high power HBV multipliers for millimeter wave applications,** J. Stake, Chalmers Tekniska Högskola (Sweden) and Wasa Millimeter Wave AB (Sweden); T. Bryllert, Chalmers Tekniska Högskola (Sweden) and Chalmers Tekniska Högskola (Sweden); J. Vukusic, Chalmers Tekniska Högskola (Sweden) and Wasa Millimeter Wave AB (Sweden) . . . . . [6739-27]

14.40: **Terahertz heterodyne focal plane and imaging array,** S. Cherednichenko, V. Drakinskiy, Chalmers Tekniska Högskola (Sweden); H. Hübers, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); J. Krieg, Observatoire de Paris (France) . . . . . [6739-28]

15.00: **Tunable THz quantum cascade lasers with external cavity,** J. Xu, L. Mahler, R. Green, A. Tredicucci, F. Beltram, Scuola Normale Superiore di Pisa (Italy); D. B. Fenner, Epion Corp. (USA); J. Hensley, M. G. Allen, Physical Sciences Inc. (USA); H. E. Beere, D. A. Ritchie, Univ. of Cambridge (United Kingdom) . . . . . [6739-30]

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Optically Based Biological and Chemical Detection for Defence

Conference Chairs: **John C. Carrano**, Luminex Corp. (USA); **Arturas Zukauskas**, Vilnius Univ. (Lithuania)

Programme Committee: **Charles J. Collins**, Luminex Corp. (USA); **David W. Cullin**, ICx Technologies Inc. (USA); **Richard K. DeFreez**, ICx Technologies, Inc. (USA); **Sherry A. Dunbar**, Luminex Corp. (USA); **Virginia E. Foot**, Defence Science and Technology Lab. (United Kingdom); **William F. Hug**, Photon Systems, Inc. (USA); **Thomas H. Jeys**, MIT Lincoln Lab. (USA); **Mikael Lindgren**, Norwegian Univ. of Science and Technology (Norway); **Michael McLoughlin**, U.S. Department of Homeland Security (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)

Tuesday 18 September

Opening Remarks . . . . . 8.30 to 8.40

John C. Carrano, Luminex Corp. (USA)

SESSION 6

Room: B3 . . . . . Tues. 08.40 to 10.00

Bioaerosol Sensing I

Chair: **John C. Carrano**, Luminex Corp. (USA)

08.40: **Microfluidics-based integrated airborne pathogen detection systems *(Invited Paper)*,** M. A. Northrup, Microfluidic Systems (USA) . . . . . [6739-34]

09.20: **UK small scale UVLIF lidar for stand-off airborne BW detection,** K. L. Baxter, V. E. Foot, S. J. Barrington, M. J. Castle, Defence Science and Technology Lab. (United Kingdom) . . . . . [6739-36]

09.40: **Recent Advances in the Development of a Novel Aerosol Sorting and Deposition System for Bio-threat Sensing Applications,** T. A. Pletcher, Sarnoff Corp. (USA) . . . . . [6739-37]

Coffee Break . . . . . 09.50 to 10.20

SESSION 7

Room: B3 . . . . . Tues. 10.30 to 11.50

Bioaerosol Sensing II

Chair: **Arturas Zukauskas**, Vilnius Univ. (Lithuania)

10.30: **A study of aerosol particle sorting to provide enriched samples for improved bio-threat analysis,** J. T. McGinn, T. A. Pletcher, D. Keller, Sarnoff Corp. (USA); V. Sivaprakasam, A. L. Huston, J. D. Eversole, Naval Research Lab. (USA) . . . . . [6739-40]

10.50: **Performance analysis for stand-off biological warfare agent detection,** O. K. Steinvall, P. Jonsson, F. Kullander, Swedish Defence Research Agency (Sweden) . . . . . [6739-41]

11.10: **LBAS: Low Cost Biological Aerosol Sensor,** R. K. DeFreez, ICx Mesosystems (USA) . . . . . [6739-57]

11.30: **Construction of an optical particle counter with sub- and super-micron counting capability,** R. J. Greaney, O. I. J. Ryan, C. D. O'Dowd, S. G. Jennings, National Univ. of Ireland/Galway (Ireland) . . . . . [6739-58]

Lunch Break . . . . . 11.50 to 13.30

SESSION 8

Room: B3 . . . . . Tues. 13.30 to 15.30

Chemical Sensing

Chair: **John C. Carrano**, Luminex Corp. (USA)

13.30: **Advanced applications to security of IR smart microbolometers *(Invited Paper)*,** C. Corsi, Consorzio C.A.R.S.O. (Italy); N. Liberatore, Consorzio C.R.E.O. (Italy); S. Mengali, Consorzio C.A.R.S.O. (Italy); R. Viola, Consorzio C.R.E.O. (Italy) . . . . . [6739-42]

14.00: **Resonant chemical surveillance tags *(Invited Paper)*,** D. P. Neikirk, Y. S. Park, The Univ. of Texas at Austin (USA) . . . . . [6739-43]

14.30: **Fibre optic system for detection of uranyl ions in the solution phase,** N. W. Hayes, C. J. Tremlett, A. M. Shaw, EvanesCo Ltd. (United Kingdom); P. J. Melfi, J. L. Sessler, The Univ. of Texas at Austin (USA) . . . . . [6739-44]

14.50: **Chemical agent detection and identification with a hyperspectral imaging infrared Sensor,** V. Farley, M. Chamberland, P. Lagueux, A. Vallières, A. J. Villemaire, J. Giroux, Telops, Inc. (Canada) . . . . . [6739-45]

15.10: **Printed photonics for lab-on-chip applications,** R. Pieler, E. Füreder, M. Sonnleitner, NANOIDENT Technologies AG (Austria) . . . . . [6739-46]

Coffee Break . . . . . 15.30 to 15.50

SESSION 9

Room: B3 . . . . . Tues. 15.50 to 17.50

Novel Approaches in Chem-/Bio- Sensing

Chair: **Arturas Zukauskas**, Vilnius Univ. (Lithuania)

15.50: **New photonic molecular immobilization technology and its use for nanolabeling, ultra-sensitive microarray sensing technology and new biomarkers discovery *(Invited Paper)*,** S. B. Petersen, M. T. C. A. Neves-Petersen, M. Duroux, E. Skovsen, L. Duroux, Aalborg Univ. (Denmark) . . . . . [6739-47]

16.20: **High-performance GaN and AlxGa1-xN ultraviolet avalanche photodiodes grown by MOCVD on bulk III-N substrates *(Invited Paper)*,** R. D. Dupuis, D. Yoo, J. B. Limb, J. Ryou, Y. Zhang, S. Shen, P. D. Yoder, Georgia Institute of Technology (USA) . . . . . [6739-48]

16.50: **Novel interference film sensor for meet degradation,** M. Bauer, F. Pittner, N. Ibrisimovic, Vienna Univ. (Austria) . . . . . [6739-49]

17.10: **Optical sensor array platform based on polymer electronic devices,** M. M. Koetse, H. F. M. Schoo, P. A. Rensing, R. B. A. Sharpe, G. T. van Heck, B. Allard, TNO (Netherlands); R. De Zwart, R. J. Houben, E. Enting, TNO Science and Industry (Netherlands); S. J. F. van Veen, TNO (Netherlands) . . . . . [6739-50]

17.30: **Combination of a Biological sensor using light emitting bacteria and a UV Spectrometer probe for Homeland Security and Drinking Water Safety,** J. W. Appels, microLAN B.V. (Netherlands) . . . . . [6739-51]

✔ Posters-Tuesday

All registered symposium attendees are invited to attend the interactive poster session. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway on the Ground Floor of the Convention Ctr. An interactive poster session and reception with authors present will be held on Tuesday 18.00 to 19.30. Light refreshments will be served.

✔ **New optical cylindrical microresonators,** Y. K. Gun'ko, The Univ. of Dublin, Trinity College (Ireland) . . . . . [6739-52]

✔ **Chemical warfare and industrial agents detection and identification by LIBS and CRDS,** A. Pailloux, I. Debecker, Commissariat à l'Energie Atomique (France); D. Romanini, M. Triki, M. Chenevier, Univ. Joseph Fourier (France) . . . . . [6739-53]

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Optical Materials in Defence Systems Technology

Conference Chairs: **James G. Grote**, Air Force Research Lab. (USA); **Francois Kajzar**, Univ. d'Angers (France); **Mikael Lindgren**, Norwegian Univ. of Science and Technology (Norway)

Cochair: **Giovanna Cecchi**, National Research Council of Italy (Italy)

Monday 17 September

Opening Remarks

James G. Grote, Air Force Research Lab. (USA); **Francois Kajzar,** CEA Saclay (France); **Mikael Lindgren,** Norwegian Univ. of Science and Technology (Norway)

SESSION 1

Room: B2 . . . . . Mon. 13.00 to 17.35

NLO Materials and Applications in Defence

Chair: **James G. Grote**, Air Force Research Lab. (USA)

Keynote

13.00: **Tailored molecular systems for efficient thin films second harmonic generation *(Invited Paper)*,** R. Zamboni, S. Caria, M. Murgia, Istituto per lo Studio dei Materiali Nanostrutturati (Italy) . . . . . [6740-01]

Keynote

13.30: **New electrooptic polymer configurations for high frequency modulators and digital signal processing applications *(Invited Paper)*,** H. R. Fetterman, B. Seo, B. J. Bortnik, S. K. Kim, Univ. of California/Los Angeles (USA) . . . . . [6740-02]

14.00: **Engineering and performances of pi conjugated polymers for all optical switching applications *(Invited Paper)*,** I. Rău, POLITEHNICA University of Bucharest (Romania); F. Kajzar, Univ. d'Angers (France); P. Armatys, J. Niziol, P. Chollet, Commissariat à l'Energie Atomique (France) . . . . . [6740-03]

14.25: **Nonlinear absorption by two-photon absorption in the visible and at telecommunication wavelengths *(Invited Paper)*,** C. Girardot, C. Andraud, P. Bouit, C. Barsu, Y. Bretonnière, G. Lemercier, O. Maury, Ecole normale supérieure de Lyon (France); P. L. Baldeck, Univ. Joseph Fourier (France); K. Kamada, National Institute of Advanced Industrial Science and Technology (Japan); B. Cao, D. Riehl, Delegation Generale Pour L'Armament (France); G. Wetzel, P. Feneyrou, Thales Research & Technology (France) . . . . [6740-04]

14.50: **Rotational contribution to cubic susceptibility of rotaxanes and catenanes in solution,** F. Kajzar, Univ. d'Angers (France); I. Rău, POLITEHNICA University of Bucharest (Romania); R. Czaplicki, A. Humeau, J. Luc, O. Krupka, B. Sahraoui, Univ. d'Angers (France) . . . . . [6740-05]

15.10: **Model kinetics of surface relief gratings formation in organic thin films: a Monte Carlo study *(Invited Paper)*,** A. C. Mitus, G. Pawlik, Politechnika Wroclawska (Poland); B. Sahraoui, F. Kajzar, Univ. d'Angers (France) . . . . . [6740-06]

Coffee Break . . . . . 15.35 to 15.55

15.55: **Broadband optical limiting of covalently fullerene-functionalized carbon nanotubes,** B. Cao, D. Riehl, A. Piret, Delegation Generale Pour L'Armament (France); J. A. Delaire, Ecole normale supérieure de Cachan (France); T. Bark, E. Doris, Commissariat à l'Energie Atomique (France) . . . . . [6740-08]

16.15: **Walk-off correction in biaxial crystals,** H. Lee, H. E. Meissner, Onyx Optics Inc. (USA) . . . . . [6740-09]

16.35: **Cubic effects in doped DNA systems,** F. Kajzar, Univ. d'Angers (France); B. J. Derkowska, Univ. Mikolaja Kopernika (Poland); A. El-Ghayoury, O. Krupka, Univ. d'Angers (France); I. Rău, POLITEHNICA University of Bucharest (Romania); B. Sahraoui, Univ. d'Angers (France); J. G. Grote, Air Force Research Lab. (USA) . . . . . [6740-11]

16.55: **Space-and-time current spectroscopy of wide-gap semiconductors,** I. A. Sokolov, M. A. Bryushinin, A.F. Ioffe Physico-Technical Institute (Russia) . . . . . [6740-12]

17.15: **Anisotropy of photoconductivity and nonlinear effect in GaSe,** M. Karimi, A. A. Moghaddam Saray, Islamic Azad Univ. (Iran) . . . . . [6740-13]

Tuesday 18 September

SESSION 2

Room: B2 . . . . . Tues. 08.35 to 10.00

Biopolymer Photonics

Chair: **Mikael Lindgren**, Norwegian Univ. of Science and Technology (Norway)

Keynote

08.35: **Learning from Mother Nature: DNA and other natural materials for biophotonics *(Invited Paper)*,** A. J. Steckl, Univ. of Cincinnati (USA) . . . . . [6740-14]

Keynote

09.05: **Biopolymer photonics *(Invited Paper)*,** F. Omenetto, Tufts Univ. (USA) . . . . . [6740-15]

09.35: **Bio-organic materials for electronic and photonic applications *(Invited Paper)*,** J. G. Grote, Air Force Research Lab. (USA) . . . . . [6740-16]

Coffee Break . . . . . 10.00 to 10.20

SESSION 3

Room: B2 . . . . . Tues. 10.20 to 12.00

Photonic Materials for Security and Defence

Chair: **Francois Kajzar**, Univ. d'Angers (France)

10.20: **Tunable wavelength VCSEL quantum cascade lasers for chemical sensors in the 3-6 micron spectral region,** A. Christou, C. Zhang, Univ. of Maryland/College Park (USA) . . . . . [6740-18]

10.40: **Fabrication of midwave infrared InAs photodiodes with reduced surface leakage current,** C. H. Tan, The Univ. of Sheffield (United Kingdom) . . . . . [6740-20]

11.00: **Thick orientation-patterned gallium arsenide (OP-GaAs) for mid-infrared laser sources,** D. Faye, E. Lallier, A. Grisard, B. P. Gerard, Thales Research & Technology (France) . . . . . [6740-22]

11.20: **The effects of monolayer thickness and sheet doping density on dark current and noise current in quantum dot infrared photodetectors,** C. H. Tan, The Univ. of Sheffield (United Kingdom); C. L. T. M. Souye, University of Sheffield (United Kingdom); P. Vines, J. P. David, M. Hopkinson, Univ. of Sheffield (United Kingdom); L. R. Wilson, P. Aivaliotis, The Univ. of Sheffield (United Kingdom) . . . . . [6740-23]

11.40: **Simulation of a small Si plate oxidation in a cwCO2 lase light,** S. Balint, A. M. Balint, R. Szabo, West Univ. of Timisoara (Romania) . . . [6740-24]

✔ Posters-Tuesday

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✔ **Advances in mid-infrared GaSb-based lasers,** G. L. Belenky, L. Shterengas, D. V. Donetsky, S. Suchalkin, M. V. Kisin, Stony Brook Univ. (USA) . . . . . [6740-19]

✔ **Photo-physical properties and OPL of novel thiophenyl containing arylalkynyl Pt(II) compounds,** E. Glimsdal, Norges Teknisk-Naturvitenskapelige Univ. (Norway); M. Carlsson, B. Eliasson, Umeå Univ. (Sweden); M. Lindgren, Norges Teknisk-Naturvitenskapelige Univ. (Norway) . . . . . [6740-25]

✔ **Al2-X MeX (WO4)3 single crystal growth, Me =Sc, Y, Ga and In, as a new tunable laser media,** D. Ivanova, V. Nikiolov, P. Peshev, Institute of General and Inorganic Chemistry (USA) . . . . . [6740-26]

Wednesday-Thursday, 19-20 September 2007 • Proceedings of SPIE Vol. 6741

Optics and Photonics for Counter-Terrorism and Crime-Fighting

Conference Chair: **Colin Lewis**, Ministry of Defence SA/SD (United Kingdom)

Cochairs: **Brian E. Foulger**, Ministry of Defence SA/SD (United Kingdom); **Michael C. Kemp**, Iconal Technology Ltd. (United Kingdom); **Gari Owen**, Ministry of Defence SA/SD (United Kingdom)

Programme Committee: **Ben Addley**, Ministry of Defence SA/SD (United Kingdom); **David Barrett**, QinetiQ (United Kingdom); **Robert Bower**, Ministry of Defence (United Kingdom); **Howard J. Cummins**, HMGCC (United Kingdom); **Shaogang Gong**, Queen Mary Univ. of London (United Kingdom); **Dennis E. Moellman**, Disruptive Technology Office (USA); **Sean Ralph**, Ministry of Defence (United Kingdom); **K. A. Shore**, Univ. of Wales, Bangor (United Kingdom); **Moira I. Smith**, Waterfall Solutions Ltd. (United Kingdom); **Silvia Valussi**, The Forensic Science Service (United Kingdom)

Tuesday 18 September

✔ Posters-Tuesday

All registered symposium attendees are invited to attend the interactive poster session. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway on the Ground Floor of the Convention Ctr. An interactive poster session and reception with authors present will be held on Tuesday 18.00 to 19.30. Light refreshments will be served.

✔ **Secure OFDM communications based on hashing algorithms,** D. Blasi, P. Campisi, A. Neri, Univ. degli Studi di Roma Tre (Italy) . . . . . [6741-37]

✔ **Imaging of space with impulse illumination of scenes,** M. Piszczek, K. Rutyna, M. Szustakowski, Wojskowa Akademia Techniczna (Poland) . . . . . [6741-38]

Wednesday 19 September

Introductory Remarks . . . . . 08.30 to 08.40

Colin Lewis, Ministry of Defence SA/SD (United Kingdom)

SESSION 1

Room: B1 . . . . . Wed. 08.40 to 09.40

Human Factors

Chair: **Colin Lewis**, Ministry of Defence (United Kingdom)

08.40: **Threat image projection in CCTV,** N. Thomas, B. Baker, Home Office Scientific Development Branch (United Kingdom) . . . . . [6741-01]

09.00: **Holistic video detection,** S. Gong, Queen Mary Univ. of London (United Kingdom) . . . . . [6741-39]

09.20: **Stand-off detection of explosives and chemical agents using broadly tunable external-cavity quantum cascade lasers (EC-QCLs),** E. Takeuchi, Daylight Solutions Inc. (USA) . . . . . [6741-40]

SESSION 2

Room: B1 . . . . . Wed. 09.40 to 12.50

Surveillance and Imaging I

Chair: **Howard J. Cummins**, Her Majesty's Government Communications Ctr. (United Kingdom)

09.40: **Multi-camera tracking: UK government requirements,** P. D. Hosmer, Home Office Scientific Development Branch (United Kingdom) . . . . [6741-04]

10.00: **Smart cruise control: UAV sensor operator intent estimation and its application,** H. Cheng, D. Butler, Sarnoff Corp. (USA) . . . . . [6741-05]

Coffee Break . . . . . 10.20 to 10.50

10.50: **Tracking moving objects across non-overlapping cameras,** I. Cohen, Y. Ma, B. Miller, Honeywell Technology (USA) . . . . . [6741-06]

11.10: **Video scene assessment with an unattended sensor network,** S. Guler, intuVision, Inc. (USA) . . . . . [6741-07]

11.30: **A baseline algorithm for face detection and tracking in video,** R. Kasturi, D. B. Goldgof, P. Soundararajan, V. Manohar, V. Korzhova, M. Boonstra, Univ. of South Florida (USA); R. J. Bowers, J. Garofolo, National Institute of Standards and Technology (USA) . . . . . [6741-12]

11.50: **Detection and tracking of humans in urban environments for visual surveillance,** R. Nevatia, Univ. of Southern California (USA) . . . . . [6741-09]

12.10: **Real-time object recognition by the photoanisotropic copies,** B. N. Kilosanidze, G. A. Kakauridze, Institute of Cybernetics (Georgia) . . . [6741-10]

12.30: **VideoQuest: an advanced aerial video exploitation and management system,** H. Cheng, D. Butler, Sarnoff Corp. (USA) . . . [6741-11]

Lunch Break . . . . . 12.50 to 14.10

SESSION 3

Room: B1 . . . . . Wed. 14.10 to 15.00

Biometrics I

Chair: **Brian E. Foulger**, Ministry of Defence SA/SD (United Kingdom)

14.10: **Recent advances in the physical, optical, and chemical visualization of latent prints *(Invited Paper)*,** A. A. Cantu, Independent Scientific Consultant (USA) . . . . . [6741-13]

14.40: **Scene segmentation from multi-spectral imagery to aid automatic human gait recognition,** D. A. C. Pearce, J. M. Nothard, C. Harvey, K. Smart, J. Hargreaves, QinetiQ Ltd. (United Kingdom) . . . . . [6741-15]

Coffee Break . . . . . 15.00 to 15.30

Panel Discussion . . . . . 15.30 to 17.10

Intelligent surveillance. Why is it still not being used widely?

Moderator: **Dennis Moellman,** DTO, USA

Thursday 20 September

SESSION 4

Room: B1 . . . . . Thurs. 08.30 to 10.10

Biometrics II

Chair: **Brian E. Foulger**, Ministry of Defence SA/SD (United Kingdom)

08.30: **Video face recognition against a watch list,** J. Abbas, T. S. Huang, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [6741-16]

08.50: **Biometric identification of non-compliant subjects at range,** I. M. Firth, LogicaCMG (United Kingdom) . . . . . [6741-17]

09.10: **Iris-based authentication system with template protection and renewability,** C. Ercole, P. Campisi, A. Neri, Univ. degli Studi di Roma Tre (Italy) . . . . . [6741-18]

09.30: **Signature-based authentication system using watermarking in the ridgelet domain,** E. Maiorana, P. Campisi, A. Neri, Univ. degli Studi Roma Tre (Italy) . . . . . [6741-19]

09.50: **Remote physiological assessment using laser doppler vibrometry,** J. W. Rohrbaugh, J. A. Stern, E. J. Sirevaag, W. D. Richard, S. Kristjansson, Washington Univ. (USA); J. A. O'Sullivan, Washington Univ. in St. Louis (USA) . . . . . [6741-20]

Coffee Break . . . . . 10.10 to 10.40

SESSION 5

Room: B1 . . . . . Thurs. 10.40 to 12.20

Security and Communication

Chair: **K. A. Shore**, Prifysgol Cymru Bangor (United Kingdom)

10.40: **Photo-luminescent quantum-dots used for security identification,** S. Chang, K. Yu, J. Liu, National Research Council Canada (Canada) . . . . . [6741-21]

11.00: **Optical digital chaos cryptography,** A. Arenas-Pingarrón, A. P. Gonzalez-Marcos, J. A. Martin-Pereda, Univ. Politécnica de Madrid (Spain) . . . . . [6741-23]

11.20: **Optical encryption and encrypted holographic storage using phase-only data pages,** P. Koppa, T. Sarkadi, F. Ujhelyi, J. Reményi, G. Erdei, E. Lóricz, Budapest Univ. of Technology and Economics (Hungary) . . . . . [6741-24]

11.40: **Theory of dispersion-managed solitons,** M. F. S. Ferreira, Univ. de Aveiro (Portugal) . . . . . [6741-25]

12.00: **A new type protection system,** B. N. Kilosanidze, G. A. Kakauridze, Institute of Cybernetics (Georgia) . . . . . [6741-26]

Lunch Break . . . . . 12.40 to 13.30

SESSION 6

Room: B1 . . . . . Thurs. 13.40 to 15.00

Detection

Chair: **Michael C. Kemp**, Iconal Technology Ltd. (United Kingdom)

13.40: **Quantum cascade laser-based screening portal for the detection of explosive precursors *(Invited Paper)*,** E. L. Normand, Cascade Technologies Ltd. (United Kingdom) . . . . . [6741-27]

14.10: **Raman detection of illicit materials using portable equipment *(Invited Paper)*,** W. E. Smith, Univ. of Strathclyde (United Kingdom) . . . . . [6741-28]

14.40: **Diffuse reflection imaging at terahertz frequencies for security applications,** P. Dean, S. P. Khanna, S. Chakraborty, M. Lachab, E. H. Linfield, A. G. Davies, Univ. of Leeds (United Kingdom) . . . . . [6741-29]

Coffee Break . . . . . 15.00 to 15.30

SESSION 7

Room: B1 . . . . . Thurs. 15.30 to 17.10

Multi-sensor Techniques

Chair: **Robert Bower**, Ministry of Defence (United Kingdom)

15.30: **Fenestration obscuration techniques,** M. Smalley, Security Services Group (United Kingdom) . . . . . [6741-30]

15.50: **Covert optically-scanning enhanced zoom pinhole lens technology,** H. S. Rana, Defence Science and Technology Lab. (United Kingdom) [6741-31]

16.10: **Spectral Vision Research (SVIR) for homeland security applications,** P. W. Yuen, Cranfield Univ. (United Kingdom) . . . . . [6741-32]

16.30: **Integrated multi-sensor perimeter detection systems,** P. Fretwell, P. J. Kent, D. Barrett, QinetiQ Ltd. (United Kingdom) . . . . . [6741-33]

16.50: **Implementing advanced image processing technology in sensor systems for security and surveillance,** D. L. Hickman, M. I. Smith, Waterfall Solutions Ltd. (United Kingdom); P. K. Kimber, SELEX Sensors and Airborne Systems Ltd. (United Kingdom) . . . . . [6741-34]

Closing Remarks

Colin Lewis, Ministry of Defence SA/SD (United Kingdom)

Brian E. Foulger, Ministry of Defence SA/SD (United Kingdom); **Michael C. Kemp,** Iconal Technology Ltd. (United Kingdom); **Gari Owen,** Ministry of Defence SA/SD (United Kingdom)

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Remote Sensing for Agriculture, Ecosystems, and Hydrology

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

Tuesday 18 September

✔ Posters-Tuesday

All registered symposium attendees are invited to attend the interactive poster session. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway on the Ground Floor of the Convention Ctr. An interactive poster session and reception with authors present will be held on Tuesday 18.00 to 19.30. Light refreshments will be served.

✔ **Climate changes impact the surface albedo of a forest ecosystem based on MODIS satellite data,** M. A. Zoran, National Institute of Research & Development for Optoelectronics (Romania) . . . . . [6742-12]

✔ **Integration of satellite-based energy balance with simulation models applied to irrigation management at an irrigation scheme of southern Spain,** C. Santos, I. Lorite, Instituto de Investigación y Formación Agraria y Pesquera (Spain); M. Tasumi, Univ. of Miyazaki (Japan); R. G. Allen, Univ. of Idaho (USA); P. Gavilan, Instituto de Investigación y Formación Agraria y Pesquera (Spain); E. Fereres, Univ. of Córdoba (Spain) . . . . . [6742-43]

✔ **Using MODIS/NDVI imagery for the validation and calibration of a live vegetation moisture content model,** P. M. Fiorucci, F. F. Rosso, F. M. Gaetani, R. M. Minciardi, Ctr. di Ricerca Interuniv. in Monitoraggio Ambientale (Italy) . . . . . [6742-44]

✔ **Analysis of surface biophysical parameters of urban system derived from satellite data,** M. A. Zoran, National Institute of Research & Development for Optoelectronics (Romania); C. H. Weber, Univ. Louis Pasteur (France) . . . . . [6742-45]

✔ **MODIS and Landsat TM data image fusion based on improved resolution method: assessing the quality of resulting NDVI images,** J. Park, Chungbuk National Univ. (South Korea); S. La, SUNDOSOFT, Inc. (South Korea) . . . . . [6742-46]

✔ **Estimating land surface evapotranspiration from ASTER data using a novel approach,** Y. Liu, Y. Yamaguchi, T. Hiyama, Nagoya Univ. (Japan) . . . . . [6742-47]

✔ **Satellite multispectral fuel type mapping by using neural nets,** R. Coluzzi, I. di Donna, Univ. degli Studi della Basilicata (Italy) . . . [6742-48]

✔ **Correlation analysis of simulated MODIS vegetation indices and the red edge and rice agricultural parameter,** Q. Cheng, X. Wu, Zhejiang Gongshang Univ. (China) . . . . . [6742-49]

✔ **Application of reflectance spectra of two-layer leaf systems to chlorophyll estimation in crops,** T. Kazantsev, S. M. Kochubey, Institute of Plant Physiology and Genetics (Ukraine); V. Donets, Public Enterprise Plant Arsenal (Ukraine) . . . . . [6742-50]

✔ **A new approach to evaluate the performance of agricultural ecosystem using MODIS remote sensing data in China,** Z. Qin, M. Gao, J. Qiu, H. Tang, Chinese Academy of Agricultural Sciences (China) . . . . . [6742-51]

✔ **Land surface temperature retrieval from MODIS data for agricultural drought monitoring in China,** Z. Qin, M. Gao, J. Qiu, H. Tang, Chinese Academy of Agricultural Sciences (China) . . . . . [6742-52]

✔ **Snow mapping for water resource management using MODIS satellite data in Northern Xinjiang Basin, China,** H. Pei, Nanjing Univ. (China); Z. Qin, Chinese Academy of Agricultural Sciences (China) . . . . . [6742-53]

✔ **Validating the MODIS LAI product by scaling up LAI measurements at a VALERI alpine meadow site, China,** M. Ma, Cold and Arid Regions Environmental and Engineering Research Institute (China); F. Veroustraete, Flemish Institute for Technological Research (Belgium); L. Lu, X. Li, Cold and Arid Regions Environmental and Engineering Research Institute (China); R. Ceulemans, Univ. Antwerpen (Belgium); J. Bogaert, Univ. Libre de Bruxelles (Belgium); C. Huang, T. Che, Cold and Arid Regions Environmental and Engineering Research Institute (China); Q. Dong, Flemish Institute for Technological Research (Belgium) . . . . . [6742-54]

✔ **Managing grain protein content by remote sensing in winter wheat,** W. Huang, National Engineering Research Ctr. for Information Technology (China) . . . . . [6742-55]

✔ **A based-on support vector machine (SVM) downscaling approach for evapotranspiration retrieved from MODIS, Landset TM and ASTER remote sensed image,** D. Zhao, Nanjing Univ. (China) and Institute of Atmospheric Physics (China); W. Zhang, Institute of Atmospheric Physics (China) . . . . . [6742-56]

✔ **The spatiotemporal analysis of snow depth on Qinghai-Tibet Plateau based on passive microwave remotely-sensed data,** T. Che, X. Li, R. Jin, Cold and Arid Regions Environmental and Engineering Research Institute (China); R. L. Armstrong, T. Zhang, Univ. of Colorado/Boulder (USA) . . . . . [6742-57]

✔ **Precipitation controlled the greening trend in northwest China from 1982-2003,** M. Ma, Cold and Arid Regions Environmental and Engineering Research Institute (China); X. Wang, Cold and Arid Regions Environmental and Engineering Research Institute (USA); Y. Song, Cold and Arid Regions Environmental and Engineering Research Institute (China) . . . . . [6742-58]

✔ **Becoming a near-infrared-sensitive aerial archaeologist,** G. J. Verhoeven, Univ. Gent (Belgium) . . . . . [6742-60]

✔ **The use of satellite remote sensing and GIS for assisting flood risk assessment: a case study of Agriokalamin Catchment area in Paphos-Cyprus,** D. G. Hadjimitsis, Cyprus University of Technology (Cyprus) . . . . . [6742-61]

✔ **Recognition of high risk regions of Malaria incidence using 7ETM+ data,** A. Ahmadian, M. J. Valadan Zoej, M. R. Mobasheri, K.N.Toosi Univ. of Technology (Iran); Y. Rezai, K.N. Toosi Univ. of Technology (Iran) . [6742-62]

Wednesday 19 September

Opening Remarks . . . . . 08.55 to 9.00

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

SESSION 1

Room: 2b . . . . . Wed. 09.00 to 10.00

Opening Session: RS for Agriculture, Ecosystems, and Hydrology

Chairs: **Christopher M. U. Neale**, Utah State Univ. (USA); **Manfred Owe**, NASA Goddard Space Flight Ctr. (USA); **Guido D'Urso**, Univ. degli Studi di Napoli Federico II (Italy); **Rosa Lasaponara**, Istituto di Metodologie per l'Analisi Ambientale (Italy); **Richard A. M. de Jeu**, Vrije Univ. Amsterdam (Netherlands)

09.00: **Integrating earth observation data in hydrological runoff models,** R. A. M. de Jeu, H. Beck, T. R. H. Holmes, H. de Moel, J. Aerts, Vrije Univ. Amsterdam (Netherlands); J. van de Vegte, Koninklijk Nederlands Meteorologisch Instituut (Netherlands); M. Owe, NASA Goddard Space Flight Ctr. (USA) . . . . . [6742-01]

09.20: **Integration of ground and satellite data to simulate forest carbon budget on regional scale,** F. Maselli, M. Chiesi, Consiglio Nazionale delle Ricerche (Italy); M. Moriondo, Univ. degli Studi di Firenze (Italy); L. Fibbi, Consiglio Nazionale delle Ricerche (Italy); M. Bindi, Univ. degli Studi di Firenze (Italy); S. W. Running, The Univ. of Montana (USA) . . . . . [6742-02]

09.40: **Evaluation of the surface of objects by use of Minnaert constants,** H. Okayama, C. Li, Chiba Univ. (Japan) . . . . . [6742-03]

Coffee Break . . . . . 10.00 to 10.20

SESSION 2

Room: 2b . . . . . Wed. 10.20 to 12.00

Fire Risk Assessment, Monitoring, and Recovery

Chair: **Rosa Lasaponara**, Istituto di Metodologie per l'Analisi Ambientale (Italy)

10.20: **Satellite-based fire danger estimation for winter fire occurrence,** A. Lanorte, Istituto di Metodologie per l'Analisi Ambientale (Italy); I. di Donna, Univ. degli Studi della Basilicata (Italy) . . . . . [6742-04]

10.40: **Retrieval of canopy moisture content for dynamic fire risk assessment using simulated MODIS bands,** C. Maffei, Mediterranean Agency for Remote Sensing (Italy); A. P. Leone, Istituto per i Sistemi Agricoli e Forestali del Mediterraneo (Italy); G. Meoli, Mediterranean Agency for Remote Sensing (Italy); G. Calabrò, Istituto per i Sistemi Agricoli e Forestali del Mediterraneo (Italy); M. Menenti, Istituto per i Sistemi Agricoli e Forestali del Mediterraneo (Italy) and Univ. Louis Pasteur (France) . . . . . [6742-05]

11.00: **ESA activities related to fire: ATSR World Fire Atlas, GlobCarbon, RISK-EOS,** O. Arino, European Space Agency/ESRIN (Italy); M. Paganini, Consultant (Italy) . . . . . [6742-06]

11.20: **Detection of small fire-affected areas by satellite data in Tuscany region,** C. Conese, Institute of Biometerology (Italy); R. Carla, National Research Council of Italy (Italy); L. Bonara, Istituto di Biometeorologia (Italy) . . . . . [6742-07]

11.40: **Estimating fire-induced variability in vegetation covers by using SPOT-VGT time series,** R. Lasaponara, A. Lanorte, L. Telesca, Istituto di Metodologie per l'Analisi Ambientale (Italy) . . . . . [6742-08]

Lunch Break . . . . . 12.00 to 13.40

SESSION 3

Room: 2b . . . . . Wed. 13.40 to 15.00

Evapotranspiration and Energy Balance

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

13.40: **A novel approach for satellite retrieval of surface evapotranspiration,** Y. Liu, Nagoya Univ. (Japan) . . . . . [6742-10]

14.00: **Potential errors in the application of thermal-based energy balance models with coarse resolution data,** W. P. Kustas, N. Agam, M. Anderson, F. Li, U.S. Dept. of Agriculture (USA) . . . . . [6742-11]

14.20: **A hybrid approach for estimating spatial evapotranspiration from satellite imagery,** C. M. U. Neale, Utah State Univ. (USA); M. P. González Dugo, Instituto de Investigación y Formación Agraria y Pesquera (Spain); L. Mateos, Instituto de Agricultura Sostenible (Spain); W. P. Kustas, U.S. Dept. of Agriculture (USA) . . . . . [6742-13]

14.40: **29 year climatology of satellite derived global land surface moisture,** M. Owe, R. de Jeu, T. Holmes, NASA Goddard Space Flight Ctr. (USA) . . . . . [6742-63]

Coffee Break . . . . . 15.00 to 15.20

SESSION 4

Room: 2b . . . . . Wed. 15.20 to 17.20

Canopy and Soils Spectra and Structure

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

15.20: **Soil moisture content of composite rough surfaces based on a variational technique to distinguish between the larger and smaller scale surface spectral density functions,** E. Bahar, Univ. of Nebraska/Lincoln (USA) . . . . . [6742-15]

16.00: **Parameterization and sensitivity analyses of an analytical irradiance radiative transfer model for plant canopies: implications for ecosystem monitoring needs,** C. R. Hall, Dynamac Corp. (USA); C. R. Bostater, Jr., Florida Institute of Technology (USA) . . . . . [6742-17]

16.20: **Analysis of the attenuation in soils and water content in remote sensing in-situ surveying,** V. Pérez-Gracia, L. G. Pujades, R. González-Drigo, D. Di Capua, Univ. Politecnica de Cataluña (Spain) . . . . . [6742-19]

16.40: **Vegetation canopy structural and physical variability based on radiometric and laser analysis,** J. R. Dim, K. Kajiwara, Y. Honda, Chiba Univ. (Japan) . . . . . [6742-20]

17.00: **Investigating structural-spectral interactions in managed, even-aged eucalyptus plantations using lidar and multi-spectral high resolution data,** J. A. van Aardt, W. Roberts, Council for Scientific and Industrial Research (South Africa) . . . . . [6742-21]

Thursday 20 September

SESSION 5

Room: 2b . . . . . Thurs. 08.30 to 12.00

Crop and Vegetation Monitoring

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

08.30: **Potential use of MODIS imagery for operational crop yield assessment *(Invited Paper)*,** P. C. Doraiswamy, U.S. Dept. of Agriculture (USA); B. Akhmedov, Science Systems and Applications, Inc. (USA); A. Stern, U.S. Dept. of Agriculture (USA) . . . . . [6742-22]

09.00: **Evaluation of different physical based methods for retrieving crop characteristics by using high resolution airborne data,** K. Richter, Univ. für Bodenkultur Wien (Austria); F. Vuolo, Ariespace s.r.l. (Italy); G. D'Urso, Univ. degli Studi di Napoli Federico II (Italy) . . . . . [6742-23]

09.20: **Crop yield monitoring based on a photosynthetic sterility model using NDVI and daily meteorological data,** D. Kaneko, Matsue National College of Technology (Japan) . . . . . [6742-24]

09.40: **Spectral radiance characteristics and vegetation indices of crops in relation to growth stages and leaf area index,** H. N. Das, India Meteorological Dept. (India) . . . . . [6742-25]

Coffee Break . . . . . 10.00 to 10.20

10.20: **Geostatistical analysis of tree-size distributions in the Southern Kalahari, obtained from remotely-sensed data,** A. Moustakas, A. Chorti, D. T. Hristopulos, Technical Univ. of Crete (Greece) . . . . . [6742-26]

10.40: **Spatial vegetation variation patterns in southern Italy as detected by AVHRR and MODIS observations,** G. Quarta, D. Conte, G. Marra, F. F. Parmiggiani, Istituto di Scienze dell'Atmosfera e del Clima (Italy) . . . [6742-27]

11.00: **Effects of spectral resolution and signal/noise ratio in the retrieval of solar-induced chlorophyll fluorescence and reflectance by passive remote sensing in the oxygen absorption bands,** L. Palombi, G. Agati, G. Cecchi, D. Lognoli, V. Raimondi, G. Toci, Istituto di Fisica Applicata Nello Carrara (Italy) . . . . . [6742-28]

11.20: **Ecosystem productivity and dynamics issued from multispectral and hyperspectral satellite imagery,** A. Kyparissis, N. Markos, S. Stagakis, E. Levizou, Univ. of Ioannina (Greece); O. Sykioti, National Observatory of Athens (Greece) . . . . . [6742-29]

11.40: **Crop type classification by Hyperion data and MTMF algorithm,** H. Fahimnejad, S. R. Soofbaf, A. Alimohammadi, M. J. Valadan Zouj, K.N. Toosi Univ. of Technology (Iran) . . . . . [6742-30]

Lunch Break . . . . . 12.00 to 13.40

SESSION 6

Room: 2b . . . . . Thurs. 13.40 to 15.00

Satellite and Airborne Systems for Monitoring and Change Detection I

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

13.40: **Integrating temporal and spectral information from low-resolution MODIS and high-resolution optical satellite images: two Hungarian case studies,** D. Kristof, D. Neidert, Z. Nagy, K. Pinter, Szent István Univ. (Hungary) . . . . . [6742-31]

14.00: **EO-1 Hyperion and ALI bands simulation to Landat 7 ETM+ bands and comparison,** K. G. Nikolakopoulos, Institute of Geology & Mineral Exploration (Greece); G. A. Skianis, D. A. Vaiopoulos, Univ. of Athens (Greece) . . . . . [6742-32]

14.20: **Fish habitat characterization and quantification using lidar and conventional topographic information in river survey,** M. Marchamalo Sacristán, Univ. Politécnica de Madrid (Spain) and Hydrobiology Research Group, Univ. Politécnica de Madrid (Spain); M. Bejarano, D. García de Jalón, R. Martínez Marín, Univ. Politécnica de Madrid (Spain) . . . . . [6742-34]

14.40: **Use of airborne hyperspectral imagery to investigate the influence of soil nitrogen supplies and variable fertilization to winter wheat growth,** X. Song, Beijing Academy of Agriculture and Forestry Sciences (China) and National Engineering Research Ctr. for Information Technology (China); G. Yan, Beijing Normal Univ. (China); J. Wang, L. Liu, National Engineering Research Ctr. for Information Technology (China); X. Xue, C. Li, W. Huang, Beijing Academy of Agriculture and Forestry Sciences (China) . . . . . [6742-36]

Coffee Break . . . . . 15.00 to 15.20

SESSION 7

Room: 2b . . . . . Thurs. 15.20 to 17.00

Satellite and Airborne Systems for Monitoring and Change Detection II

Chair: **Richard A. M. de Jeu**, Vrije Univ. Amsterdam (Netherlands)

15.20: **Irrigation mapping for agricultural drought monitoring in north China plain using MODIS remote sensing data,** H. Tang, Z. Qin, M. Gao, J. Qiu, Chinese Academy of Agricultural Sciences (China) . . . . . [6742-38]

15.40: **Spatial scale transferring study on leaf area index retrieval by using remotely sensed data,** W. Zhang, Regional Ctr. for Temperate East Asia (China); S. Zhong, S. Hu, Nanjing Univ. (China) . . . . . [6742-40]

16.00: **Real-time monitoring of growth and biophysical properties of crops in millimeter and optical ranges,** Y. V. Savenko, V. I. Vodotovka, National Technical Univ. of Ukraine (Ukraine) . . . . . [6742-41]

16.20: **Assessment of crop yield estimation methods by using satellite imagery and ground observation,** S. Shafian, M. R. Mobasheri, K.N. Toosi Univ. of Technology (Iran) . . . . . [6742-42]

16.40: **Optimal land use/cover classification using remote sensing imagery for hydrological modeling in a Himalayan watershed,** S. Saran, Indian Institute of Remote Sensing (India); G. Sterk, Wageningen Univ. (Netherlands); S. Kumar, A. Bharti, Indian Institute of Remote Sensing (India) . . . . . [6742-64]

Monday-Tuesday 17-18 September 2007 • Proceedings of SPIE Vol. 6743

Remote Sensing of the Ocean, Sea Ice, and Large Water Regions 2007

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

Monday 17 September

Welcome and Introduction . . . . . 13.30 to 13.40

Xavier Neyt, Royal Belgian Military Academy (Belgium)

SESSION 1

Room: 3a . . . . . Mon. 13.40 to 15.30

Sensing the Wind Roughened Air-Sea Interface

Chairs: **Karine Caillault**, ONERA (France); **Stelios P. Mertikas**, Technical Univ. of Crete (Greece)

13.40: **Multiresolution optical properties of rough sea surface in infrared,** K. Caillault, S. Fauqueux, ONERA (France); C. Bourlier, Univ. de Nantes (France); P. Simoneau, L. Labarre, ONERA (France) . . . . . [6743-01]

14.00: **Remote polarization measurements of the air-sea interface,** G. D. Gilbert, J. S. Schoonmaker, I. M. Petrosyuk, Y. Podobna, Advanced Coherent Technologies LLC (USA); J. J. Dirbas, PAR Government Systems Corp. (USA) . . . . . [6743-02]

14.20: **Absolute calibration results for the radar satellite altimeters from the Eastern Mediterranean GAVDOS project,** S. P. Mertikas, Technical Univ. of Crete (Greece); E. C. Pavlis, Univ. of Maryland/Baltimore County (USA) . . . . . [6743-03]

14.40: **Cramer-RAO lower bounds for sinusoidal models from Topex/Poseidon data in the Indian Ocean,** M. Arias Ballesteros, J. J. Alonso del Rosario, P. Villares-Durán, J. Gómez-Enri, M. Catalán Pérez-Urquiola, I. Labrador Costero, C. Medina, Univ. de Cádiz (Spain) . . . . . [6743-04]

15.00: **High resolution multispectral photogrammetric imagery: enhancement, interpretation and evaluations *(Invited Paper)*,** A. C. Roberts, C. R. Bostater, Jr., T. Becker, Simon Fraser Univ. (Canada) . [6743-05]

Coffee Break . . . . . 15.30 to 15.50

SESSION 2

Room: 3a . . . . . Mon. 15.50 to 17.00

Active and Passive Sensing of the Water Column and Bottom Feature Analysis

Chairs: **Stefania Salviato**, Istituto di Scienze Marine (Italy); **Miguel Velez-Reyes**, Univ. de Puerto Rico Mayagüez (USA)

15.50: **Impact of scattering and absorption of photosynthetic pigments on fluorescence retrieval algorithms for coastal waters,** S. Ahmed, A. Gilerson, J. Zhou, S. Hlaing, I. Ioannou, W. Jerez, B. M. Gross, F. Moshary, City College/CUNY (USA) . . . . . [6743-06]

16.10: **A physics-based approach to deriving optical water quality parameter concentrations from hyperspectral satellite data: a case study of Sacca di Goro, Italy,** S. Salviato, J. Barbaro, F. Braga, Istituto di Scienze Marine (Italy) . . . . . [6743-08]

16.30: **Subsurface unmixing with application to underwater classification *(Invited Paper)*,** M. Vélez-Reyes, Univ. de Puerto Rico Mayagüez (USA) . . . . . [6743-09]

Tuesday 18 September

SESSION 3

Room: 3a . . . . . Tues. 08.50 to 10.30

Coastal Island & Shallow Water Remote Sensing

Chairs: **Ana M. Martins**, Univ. dos Açores (Portugal); **Carlton R. Hall**, Dynamac Corp. (USA)

08.50: **Sea surface temperature (AVHRR) and ocean colour (MODIS) seasonal and interannual variability in the Macaronesian islands of Azores, Madeira and Canarias *(Invited Paper)*,** A. M. Martins, Univ. dos Açores (Portugal); A. S. B. Amorim, Regional Directorate of Fisheries of Madeira (Portugal); M. P. Figueiredo, Univ. dos Açores (Portugal); R. J. Souza, Regional Directorate of Fisheries of Madeira (Portugal); A. P. Mendonça, I. L. Bashmachnikov, Univ. dos Açores (Portugal); D. S. Carvalho, Regional Directorate of Fisheries of Madeira (Portugal) . . . . . [6743-11]

09.20: **Comparing airborne high resolution hyperspectral imagery with aerial photgrammetric imagery for mapping submerged features in coastal shallow waters *(Invited Paper)*,** C. R. Hall, Dynamac Corp. (USA); C. R. Bostater, Jr., Florida Institute of Technology (USA) . . . . . [6743-12]

09.50: **Comparison of airborne hyperspectral and photo images with synthetic images,** C. R. Bostater, Jr., Florida Institute of Technology (USA) . . . . . [6743-13]

10.10: **Integrated coastal zone management plan and coastal zone information system for Udupi Coast, west coast of India,** G. S. Dwarakish, S. A. Vinay, D. M. Shetty, J. B. Pai, K. Mahaganesh, National Institute of Technology Karnataka (India); U. Natesan, Anna Univ. (India) . . . . . [6743-14]

Coffee Break . . . . . 10.10 to 10.30

SESSION 4

Room: 3a . . . . . Tues. 10.30 to 11.30

Satellite and In-Situ Studies of China Coastal Waters

Chairs: **Charles R. Bostater, Jr.**, Florida Institute of Technology (USA); **Xavier Neyt**, Royal Belgian Military Academy (Belgium)

10.30: **The quasi-analytical algorithm of ocean inherent optical properties using two reference wavelengths,** D. Pan, B. Yan, T. Mao, X. He, State Oceanic Administration (China) . . . . . [6743-15]

10.50: **The effect of aerosol scattering on the ocean color polarization correction,** X. He, T. Mao, D. Pan, State Oceanic Administration (China); Z. Hao, Nanjing Univ. of Information Science & Technology (China) . [6743-16]

11.10: **The spectral absorption coefficient model of phytoplankton in the coastal ocean,** Z. Mao, State Oceanic Administration (China) . . . . . [6743-17]

✔ Posters-Tuesday

All registered symposium attendees are invited to attend the interactive poster session. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway on the Ground Floor of the Convention Ctr. An interactive poster session and reception with authors present will be held on Tuesday 18.00 to 19.30. Light refreshments will be served.

✔ **Retrieval of atmospheric water content based on AISA+ data,** Q. Cheng, D. Pan, D. Wang, J. Chen, T. Mao, State Oceanic Administration (China) . . . . . [6743-18]

✔ **Optical model for the water characterization of the highly turbid water of the Winam Gulf (Victoria Lake),** F. Santini, R. M. Cavalli, Istituto sull'Inquinamento Atmosferico (Italy); A. Palombo, S. Pignatti, Istituto di Metodologie per l'Analisi Ambientale (Italy) . . . . . [6743-19]

✔ **Preliminary results of atmospheric correction of a marine airborne multi-spectrum scanner (MAMS): case study in Chinese East Sea,** D. Wang, D. Pan, T. Mao, J. Chen, State Oceanic Administration (China) . . . . . [6743-20]

✔ **Wind field retrieval under high wind conditions by combined scatterometer and radiometer data,** J. Zou, Q. Zhu, J. Chen, Y. Ding, State Oceanic Administration (China); Z. Chen, Zhejiang Univ. (China); M. Lin, National Satellite Ocean Application Service (China) . . . . . [6743-21]

✔ **Interannual water level variations in Lake Izabal, Guatemala, Centroamerica, using radar altimetry, and its relationship with oceanographic features,** C. Medina, M. Arias Ballesteros, J. Gómez-Enri, J. J. Alonso del Rosario, P. Villares-Durán, M. Catalán Pérez-Urquiola, Univ. de Cádiz (Spain) . . . . . [6743-22]

✔ **Estimation of seawater optical parameters in the northern Tyrrhenian Sea,** F. Maselli, Istituto di Biometeorologia (Italy); L. Massi, Univ. degli Studi di Firenze (Italy); C. Santini, Istituto di Biometeorologia (Italy); M. Pieri, Lab. per la Meteorologia e la Modellistica Ambientale (Italy) . . . . . [6743-23]

✔ **Polarization of scattered solar radiation in the atmosphere-ocean spherical system in conditions of wind-water surface interaction,** A. B. Gavrilovich, Instytut Fizyki (Belarus) . . . . . [6743-24]

✔ **Ocean color atmospheric correction over the coastal region with multi-viewing satellite data,** Y. Mitomi, Remote Sensing Technology Ctr. of Japan (Japan) . . . . . [6743-25]

✔ **Water pollution analysis from Lidar investigations on Romanian Black Sea coast,** J. G. Vasilescu, G. Pavelescu, L. Belegante, National Institute of Research & Development for Optoelectronics (Romania); C. Strechie, National Institute for Marine Geology and Geo-Ecology (Romania); S. M. Babichenko, A. Lisin, AS Laser Diagnostics Instruments (Estonia) [6743-26]

Conference 6744A • Room: 2c

Monday-Thursday 17-20 September 2007 • Proceedings of SPIE Vol. 6744

Sensors, Systems, and Next-generation Satellites

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

Programme Committee: **Olivier Saint-Pe**, EADS Astrium (France); **Philippe M. Teillet**, Canada Ctr. for Remote Sensing (Canada)

Monday 17 September

Opening Remarks . . . . . 13.30 to 13.40

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

SESSION 1

Room: 2c . . . . . Mon. 13.40 to 15.20

European Missions I

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

13.40: **The third cycle of Earth explorers core missions,** P. Bensi, J. Bézy, C. Lin, J. Langen, M. Davidson, M. Berger, H. Rebhan, P. Ingmann, P. Silvestrin, European Space Agency (Netherlands) . . . . . [6744-01]

14.00: **Sentinel-1 ESA's new European SAR mission,** E. Attema, M. Davidson, N. Floury, G. Levrini, B. Rommen, European Space Agency (Netherlands); P. Snoeij, Dutch Space B.V. (Netherlands) . . . . . [6744-02]

14.20: **ADM-Aeolus follow-on missions,** M. J. Endemann, W. Veith, P. Dubock, European Space Research and Technology Ctr. (Netherlands); D. Morancais, F. Fabre, EADS Astrium (France); R. Wimmer, P. McGoldrick, EADS Astrium Ltd. (United Kingdom) . . . . . [6744-03]

14.40: **Definition of mission requirements for the follow-on EUMETSAT polar system,** P. L. Phillips, P. Schluessel, C. J. Accadia, J. J. W. Wilson, A. Perez-Albiñana, S. Banfi, EUMETSAT (Germany) . . . . . [6744-04]

15.00: **Meteosat third generation, phase A, optical payload consolidation,** D. M. A. Aminou, H. Stark, European Space Agency (Netherlands); R. Stuhlmann, A. R. Rodriguez, EUMETSAT (Germany) . . . . . [6744-05]

Coffee Break . . . . . 15.20 to 15.40

SESSION 2

Room: 2c . . . . . Mon. 15.40 to 17.00

European Missions II

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

15.40: **The German Earth observation programme: building on the success of TerraSAR-X and RapidEye,** P. Schaadt, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [6744-06]

16.00: **New optical sensor systems for high-resolution satellite, airborne and terrestrial imaging systems,** A. Eckardt, A. Börner, F. Lehmann, U. Dombrowski, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [6744-07]

16.20: **TROPOMI: solar backscatter satellite instrument for air quality and climate,** J. de Vries, E. C. Laan, Dutch Space B.V. (Netherlands); R. W. M. Hoogeveen, R. T. Jongma, I. Aben, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands); H. Visser, E. C. Boslooper, TNO (Netherlands); H. K. Saari, VTT Optical Instruments (Finland); M. R. Dobber, P. Veefkind, Q. Kleipool, P. F. Levelt, Koninklijk Nederlands Meteorologisch Instituut (Netherlands) . . . . . [6744-08]

16.40: **The microwave humidity sounder (MHS): in-orbit performance assessment,** R. Bonsignori, EUMETSAT (Germany) . . . . . [6744-10]

Tuesday 18 September

SESSION 3

Room: 2c . . . . . Tues. 08.30 to 10.30

Japanese Missions I

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

08.30: **Overview of Japanese Earth observation programs,** H. Shimoda, Japan Aerospace Exploration Agency (Japan) . . . . . [6744-11]

08.50: **Application of ASTER data to hazard evaluation with an example of damage evaluation of the landslide in Pakistan,** H. Watanabe, National Institute for Environmental Studies (Japan) . . . . . [6744-12]

09.10: **Accuracy assessments of standard products of ALOS optical instruments and their high level products,** T. Tadono, M. Shimada, Japan Aerospace Exploration Agency (Japan); J. Takaku, S. Kawamoto, Remote Sensing Technology Ctr. of Japan (Japan) . . . . . [6744-13]

09.30: **Greenhouse gases observing satellite (GOSAT) sensor and satellite system,** T. Hamazaki, Japan Aerospace Exploration Agency (Japan) . . . . . [6744-14]

09.50: **Retrieval performance of GOSAT thermal infrared FTS sensor for measuring gas concentrations and cloud properties,** R. Imasu, N. Saitoh, Y. Niwa, The Univ. of Tokyo (Japan) . . . . . [6744-15]

10.10: **Calibration plan of GOSAT sensors,** K. Shiomi, Japan Aerospace Exploration Agency (Japan) . . . . . [6744-16]

Coffee Break . . . . . 10.30 to 10.50

SESSION 4

Room: 2c . . . . . Tues. 10.50 to 13.10

Japanese Missions II

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

10.50: **Development of GOSAT ground data system at NIES and the data processing strategy,** H. Watanabe, T. Yokota, T. Matsunaga, K. Hiraki, H. Ishihara, National Institute for Environmental Studies (Japan) . . . . [6744-17]

11.10: **Development of the DPR algorithms and products for GPM,** S. Shimizu, R. Oki, M. Kachi, H. Hanado, M. Kojima, Japan Aerospace Exploration Agency (Japan); T. Iguchi, National Institute of Information and Communications Technology (Japan); K. Nakamura, Nagoya Univ. (Japan) . . . . . [6744-18]

11.30: **Five years of AMSR-E monitoring and successive GCOM-W1/ AMSR2 instrument,** K. Imaoka, M. Kachi, A. Shibata, M. Kasahara, Y. Iida, Y. Tange, K. Nakagawa, H. Shimoda, Japan Aerospace Exploration Agency (Japan) . . . . . [6744-19]

11.50: **A study on the possibility of land vegetation observation with SGLI/ GCOM-C,** Y. Honda, Chiba Univ. (Japan) and SORST-JST (Japan); M. Moriyama, Nagasaki Univ. (Japan); A. Ono, Japan Aerospace Exploration Agency (Japan) . . . . . [6744-20]

12.10: **Design challenge on forthcoming SGLI boarded on GCOM-C,** H. Masaru, NEC TOSHIBA Space Systems, Ltd. (Japan); K. Tanaka, Y. Okamura, Japan Aerospace Exploration Agency (Japan); T. Amano, K. Shiratama, NEC TOSHIBA Space Systems, Ltd. (Japan) . . . . . [6744-21]

12.30: **Japanese cloud profiling radar for EarthCARE,** T. Kimura, Japan Aerospace Exploration Agency (Japan); H. Kumagai, National Institute of Information and Communications Technology (Japan) . . . . . [6744-22]

12.50: **Cloud observations from future Japanese satellite missions,** T. Y. Nakajima, H. Ishida, Tokai Univ. (Japan); T. Nakajima, The Univ. of Tokyo (Japan); H. Shimoda, Tokai Univ. (Japan) . . . . . [6744-23]

Lunch Break . . . . . 13.10 to 14.20

SESSION 5

Room: 2c . . . . . Tues. 14.20 to 16.20

US Missions

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

14.20: **NASA's Earth science flight programs,** S. P. Neeck, T. F. Hammer, NASA Headquarters (USA) . . . . . [6744-24]

14.40: **OSTM (Ocean Surface Topography Mission), moving ocean altimetry towards an operational climate measurement,** P. V. Vaze, Jet Propulsion Lab. (USA); J. Perbos, Ctr. National d'Études Spatiales (France); M. A. Abid, S. Brown, A. R. Dorsey, A. Kitiyakara, Jet Propulsion Lab. (USA) . . . . . [6744-25]

15.00: **Advanced remote-sensing imaging emission spectrometer (ARIES): an instrument concept for a next-generation imager/sounder,** T. S. Pagano, M. T. Chahine, F. G. O'Callaghan, Jet Propulsion Lab. (USA) . . . . . [6744-26]

Coffee Break . . . . . 15.20 to 15.40

15.40: **A high-spectral resolution solid state infrared spectrometer for atmospheric air quality measurement,** A. E. Roche, J. B. Kumer, J. L. Mergenthaler, R. L. Rairden, Lockheed Martin Advanced Technology Ctr. (USA) . . . . . [6744-27]

16.20: **Global precipitation measurement preliminary design,** S. P. Neeck, R. K. Kakar, NASA Headquarters (USA); A. A. Azarbarzin, A. Y. Hou, NASA Goddard Space Flight Ctr. (USA) . . . . . [6744-28]

SESSION 6

Room: 2c . . . . . Tues. 16.20 to 17.40

Focal Plane Technologies I

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

16.20: **COBRA monolithic CMOS image sensors family: linear, multilinear and 2D devices answering space applications,** O. Saint-Pe, EADS Astrium (France) . . . . . [6744-30]

16.40: **Dynamic range optimisation of CMOS image sensors dedicated to space applications,** P. Martin-Gonthier, P. Magnan, F. Corbiere, L. Boucher, M. Estribeau, N. Huger, C. Engel, Ecole Nationale Supérieure de l'Aéronautique et de l'Espace (France) . . . . . [6744-31]

17.00: **Active pixel sensors: the sensor of choice for future space applications?,** J. Leijtens, TNO (Netherlands) . . . . . [6744-32]

17.20: **Infrared sensors for Earth observation missions,** A. P. Ashcroft, SELEX Sensors and Airborne Systems Ltd. (United Kingdom) . . . . . [6744-93]

✔ Posters-Tuesday

All registered symposium attendees are invited to attend the interactive poster session. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway on the Ground Floor of the Convention Ctr. An interactive poster session and reception with authors present will be held on Tuesday 18.00 to 19.30. Light refreshments will be served.

✔ **ECSIM: the simulator framework for EarthCARE,** R. Voors, Koninklijk Nederlands Meteorologisch Instituut (Netherlands); D. Donovan, Koninklijk Nederlands Meteorologisch Instituut (USA); J. Acarreta, R. Moyano, F. Pirondini, J. Ramos, DEIMOS Space S.L. (Spain); M. Eisinger, R. Franco, D. Lajas, T. Wehr, European Space Agency (Netherlands) . . . . . [6744-69]

✔ **Analysis of the relation between compression method and for performance enhancement of multi-spectral camera (MSC) image data,** S. Yong, Korea Aerospace Research Institute (South Korea); S. Ra, Chungnam National Univ. (South Korea) . . . . . [6744-71]

✔ **An approach for retrieval of atmospheric trace gases CO2, CH4 and CO from the future Canadian micro earth observation satellite (MEOS),** A. P. Trishchenko, K. V. Khlopenkov, S. Wang, Canada Ctr. for Remote Sensing (Canada); R. V. Kruzelecky, W. Jamroz, MPB Communications Inc. (Canada); G. Kroupnik, Canadian Space Agency (Canada) . . . . . [6744-72]

✔ **Spatial synchronization in space-borne/air-borne hybrid bi-static SAR,** P. Zhou, Y. Pi, Z. Han, L. Fan, Univ. of Electronic Science and Technology of China (China) . . . . . [6744-73]

✔ **High precision spaceborne accelerometer for measuring extra low liner accelerations,** P. O. Demyanenko, Y. V. Savenko, Kiev Polytechnic Univ. (Ukraine) . . . . . [6744-74]

✔ **Overview of laboratory testing results for an imaging Fabry-Perot interferometer,** A. M. Larar, W. B. Cook, M. A. Flood, NASA Langley Research Ctr. (USA); E. Burcher, Swales Aerospace (USA); C. Boyer, NASA Langley Research Ctr. (USA); J. J. Puschell, Raytheon Space and Airborne Systems (USA) . . . . . [6744-75]

Wednesday 19 September

SESSION 7

Room: 2c . . . . . Wed. 08.30 to 12.30

Focal Plane Technologies II

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

08.30: **Development of a multichannel 10240-pixel TDI CCD,** P. Vu, S. W. Mims, Fairchild Imaging (USA) . . . . . [6744-33]

08.50: **Next Ofeq focal plane array,** E. R. Yacoby, Y. Cohen, Elbit Systems Electro-Optics ELOP Ltd. (Israel) . . . . . [6744-34]

09.10: **Versatile 1024x256 SWIR-HgCdTe hyperspectral imaging sensor for applications with low photon fluxes and high framerates,** M. Haiml, H. Bitterlich, A. Erni, M. Finck, K. C. Hofmann, H. Lutz, M. Mai, H. Nothaft, I. Rühlich, J. C. Wendler, R. Wollrab, J. Ziegler, AIM Infrarot-Module GmbH (Germany) . . . . . [6744-35]

09.30: **Monolithically-integrated near-infrared InGaAs and mid-infrared QWIP detector array,** S. V. Bandara, S. D. Gunapala, J. K. Liu, Jet Propulsion Lab. (USA) . . . . . [6744-36]

09.50: **Focal plane arrays from UV up to VLWIR,** E. M. Costard, J. Truffer, O. Huet, L. Dua, A. Nedelcu, J. Robo, X. Marcadet, N. Brèire de l'Isle, Thales Research & Technology (France); H. Facoetti, Thomson-CSF (France); P. F. Bois, Thales Research & Technology (France) . . . . . [6744-37]

Coffee Break . . . . . 10.10 to 10.30

10.30: **Latest development for space applications at Sofradir,** P. Chorier, P. M. Tribolet, Sofradir (France) . . . . . [6744-76]

10.50: **Development of a long wave infrared detector for the SGLI instrument,** A. Dariel, P. Chorier, N. Reeb, B. Terrier, M. Vuillermet, P. M. Tribolet, Sofradir (France) . . . . . [6744-38]

11.10: **Radiation tolerance analysis of IASI infrared detectors in the 3.4-15.5 μm spectral range,** F. Bernard, H. Geoffray, D. Blumstein, O. Gilard, Ctr. National d'Études Spatiales (France); D. Coppens, Noveltis SA (France); F. Cayla, SISCLE (France) . . . . . [6744-39]

11.30: **Latest pulse tube coolers developments of air liquide for space,** J. Buquet, T. Trollier, J. Tanchon, G. Aigouy, A. Ravex, P. Crespi, Air Liquide (France) . . . . . [6744-40]

11.50: **Large format delta-doped silicon imagers with high QE in the UV/optical/NIR for remote observations,** S. Nikzad, M. E. Hoenk, J. Blacksberg, T. J. Jones, Jet Propulsion Lab. (USA); S. E. Holland, Lawrence Berkeley National Lab. (USA) . . . . . [6744-41]

12.10: **AlGaN-based focal plane arrays for selective UV imaging at 310nm and 280nm and route toward deep UV imaging,** J. Reverchon, J. Robo, J. Truffer, Thales Research & Technology (France); J. Duboz, Consultant (France) . . . . . [6744-94]

Lunch Break . . . . . 12.30 to 13.40

SESSION 8

Room: 2c . . . . . Wed. 13.40 to 16.00

Sensing Technologies I

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

13.40: **MIBS: past, present and future,** J. Leijtens, A. J. Court, E. van der Meche, B. de Goeij, TNO (Netherlands) . . . . . [6744-42]

14.00: **Tests and qualification activities for the GOSAT interferometer flight model,** L. E. Lévesque, M. A. Soucy, L. M. Moreau, F. Doyon, D. Duquette, ABB Inc. (Canada); J. Tanii, NEC TOSHIBA Space Systems, Ltd. (Japan) . . . . . [6744-43]

14.20: **A generic interferometer design for the next generation weather sounders on GEO satellites,** F. Grandmont, J. G. Giroux, M. A. Soucy, H. L. Buijs, ABB Inc. (Canada) . . . . . [6744-44]

14.40: **A multispectral 10-metre resolution camera for earth observation,** K. F. Middleton, Rutherford Appleton Lab. (United Kingdom) . . . . . [6744-45]

15.00: **A small imaging spectrometer for a microsatellite STSAT-3,** J. H. Lee, Kongju National Univ. (South Korea); T. S. Chang, Korea Advanced Institute of Science and Technology (South Korea); K. I. Kang, Korea Advanced Institute of Science And Technology (South Korea); S. W. Rhee, Korea Aerospace Research Institute (South Korea) . . . . . [6744-46]

15.20: **Preliminary study on Earth observation sensor from geostationary Earth orbit,** Y. Y. Yui, H. Imai, Y. Tange, T. Kimura, Japan Aerospace Exploration Agency (Japan) . . . . . [6744-60]

15.40: **Sorption cooling: a valid extension to passive coolers in space missions,** J. Doornink, Dutch Space B.V. (Netherlands); J. Burger, Marcel ter Brake, Univ. of Twente (Netherlands) . . . . . [6744-95]

Coffee Break . . . . . 16.00 to 16.20

SESSION 9

Room: 2c . . . . . Wed. 16.00 to 18.00

Calibration I

Chair: **Philippe M. Teillet**, Canada Ctr. for Remote Sensing (Canada)

16.20: **Radiometric calibration status of Landsat-7 and Landsat-5,** J. A. Barsi, Science Systems and Applications, Inc. (USA); B. L. Markham, NASA Goddard Space Flight Ctr. (USA) . . . . . [6744-47]

16.40: **An overview of Aqua MODIS after five years of on-orbit operation and calibration,** W. L. Barnes, Univ. of Maryland/Baltimore (USA); X. Xiong, NASA Goddard Space Flight Ctr. (USA) . . . . . [6744-48]

17.00: **Applications and results of MODIS lunar observations,** X. Xiong, NASA Goddard Space Flight Ctr. (USA); J. Sun, Science Systems and Applications, Inc. (USA); W. L. Barnes, Univ. of Maryland/Baltimore (USA) . . . . . [6744-49]

17.20: **On-orbit monitoring of MODIS thermal emissive bands response versus scan angle,** X. Xiong, NASA Goddard Space Flight Ctr. (USA); A. Wu, Science Systems and Applications, Inc. (USA); W. L. Barnes, B. W. Guenther, Univ. of Maryland/Baltimore (USA) . . . . . [6744-50]

17.40: **The aerospace imaging interferometer ALISEO: further improvements of calibration methods and assessment of interferometer response,** A. Barducci, Istituto di Fisica Applicata Nello Carrara (Italy); F. Castagnoli, Consiglio Nazionale delle Ricerche (Italy); D. Guzzi, P. Marcoionni, I. Pippi, Istituto di Fisica Applicata Nello Carrara (Italy) . [6744-52]

Thursday 20 September

SESSION 10

Room: 2c . . . . . Thurs. 08.50 to 10.30

Calibration II

Chair: **Philippe M. Teillet**, Canada Ctr. for Remote Sensing (Canada)

08.50: **Modeling spectral effects in Earth-observing satellite instruments,** R. A. Barnes, Science Applications International Corp. (USA); J. J. Butler, NASA Goddard Space Flight Ctr. (USA) . . . . . [6744-53]

09.10: **Scattered light characterization and correction algorithm for hyperspectral remote sensing imaging systems,** K. R. Lykke, S. W. Brown, R. R. Bousquet, Y. Zong, National Institute of Standards and Technology (USA); G. Meister, Futuretech Corp. (USA); R. A. Barnes, NASA Goddard Space Flight Ctr. (USA) . . . . . [6744-54]

09.30: **The marine optical buoy (MOBY) radiometric calibration and uncertainty budget for ocean color satellite sensor vicarious calibration,** S. W. Brown, B. C. Johnson, National Institute of Standards and Technology (USA); M. Feinholz, S. Flora, M. Yarbrough, D. Peters, Moss Landing Marine Labs. (USA); K. J. Voss, Univ. of Miami (USA); J. L. Mueller, San Diego State Univ. (USA); D. K. Clark, Marine Optical Consulting (USA) . . . . . [6744-56]

09.50: **Summary of calibration and validation for KOMPSAT-2,** D. Lee, Korea Aerospace Research Institute (South Korea) . . . . . [6744-57]

10.10: **Radiometric calibration and validation for KOMPSAT-2,** D. Lee, Korea Aerospace Research Institute (USA) . . . . . [6744-58]

Coffee Break . . . . . 10.30 to 10.50

SESSION 11

Room: 2c . . . . . Thurs. 10.50 to 11.50

Sensing Technologies II

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

10.50: **MEDUSA: an ultra-lightweight multi-spectral camera for a HALE UAV,** T. Van Achteren, B. Delauré, Flemish Institute for Technological Research (Belgium) . . . . . [6744-59]

11.10: **MIMA, a miniaturized spectrometer Fourier infrared spectrometer for Mars ground exploration: part I, concept and expected performance,** G. Bellucci, Consiglio Nazionale delle Ricerche (Italy); S. Fonti, Univ. degli Studi di Lecce (Italy); B. Saggin, Politecnico di Milano (Italy); D. Biondi, P. Cerulli, Consiglio Nazionale delle Ricerche (Italy); E. A. Alberti, Politecnico di Milano (Italy); G. Marzo, Univ. degli Studi di Lecce (Italy); F. Altieri, L. Zasova, Consiglio Nazionale delle Ricerche (Italy) . . . . . [6744-61]

11.30: **MIMA a miniaturised Fourier spectrometer for Mars ground exploration: part II optical design,** S. Fonti, G. Marzo, R. Politi, Univ. degli Studi di Lecce (Italy); G. Bellucci, Consiglio Nazionale delle Ricerche (Italy); B. Saggin, Politecnico di Milano (Italy) . . . . . [6744-62]

Lunch Break . . . . . 11.50 to 13.30

SESSION 12

Room: 2c . . . . . Thurs. 13.30 to 15.30

Sensing Technologies III

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

13.30: **MIMA, a miniaturised infrared spectrometer for Mars ground exploration: part III, thermomechanical design,** B. Saggin, E. A. Alberti, L. Comolli, M. Tarabini, Politecnico di Milano (Italy); G. Bellucci, Consiglio Nazionale delle Ricerche (Italy); S. Fonti, Univ. degli Studi di Lecce (Italy) . . . . . [6744-63]

13.50: **Breadboarding activities of the TROPOMI-SWIR module,** R. W. M. Hoogeveen, R. T. Jongma, P. J. J. Tol, A. M. S. Gloudemans, I. Aben, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands); J. de Vries, Dutch Space B.V. (Netherlands); H. Visser, E. C. Boslooper, TNO (Netherlands); M. R. Dobber, P. F. Levelt, Koninklijk Nederlands Meteorologisch Instituut (Netherlands) . . . . . [6744-64]

14.10: **Balloon-borne heterodyne stratospheric limb sounder TELIS ready for flight,** R. W. M. Hoogeveen, P. A. Yagoubov, G. de Lange, A. A. J. de Lange, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands); V. P. Koshelets, Institute of Radio Engineering and Electronics (Russia); B. N. Ellison, Rutherford Appleton Lab. (United Kingdom); M. Birk, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [6744-65]

14.30: **Performance of the imaging spectral signature instrument (ISSI) breadboard,** U. Kantojärvi, H. K. Saari, K. Viherkanto, VTT (Finland); E. Herrala, Specim Spectral Imaging Ltd. (Finland); B. Harnisch, European Space Agency (Netherlands) . . . . . [6744-66]

14.50: **Spatial heterodyne spectrometer for FLEX,** A. D. Scott, COM DEV International Ltd. (Canada) and York Univ. (Canada); A. Bell, COM DEV International Ltd. (Canada) . . . . . [6744-67]

15.10: **The initial checkout of multi-spectral camera (MSC) system,** S. Yong, H. Choi, Korea Aerospace Research Institute (South Korea); S. Ra, Chungnam National Univ. (South Korea) . . . . . [6744-68]

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Global Earth Observing System of Systems, Implementation Strategies and Applications

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

Programme Committee: **Stephen D. Ambrose**, NASA Headquarters (USA); **Harold Annegarn**, Univ. of Johannesburg (South Africa); **Josef Aschbacher**, Joint Research Ctr./ESA (Italy); **Ayman El-Dessouki**, National Authority for Remote Sensing and Space Sciences (Egypt); **Diego Fernandez-Prieto**, European Space Agency (Italy); **Mario Hernandez**, United Nations Educational, Scientific and Cultural Organization (France); **Steve Iris**, Canadian Space Agency (Canada); **Roger L. King**, Mississippi State Univ. (USA); **Mansoor Malik**, National Univ. of Sciences and Technology (Pakistan); **Dimitar P. Ouzounov**, NASA Goddard Space Flight Ctr. (USA); **Imran Saloojee**, Group on Earth Observations (Switzerland); **Ramesh P. Singh**, Indian Institute of Technology/Kanpur (India); **Si-Chee Tsay**, NASA Goddard Space Flight Ctr. (USA); **Tsehaie Woldai**, International Institute for Geo-Information Science and Earth Observation (Netherlands)

Tuesday 18 September

✔ Posters-Tuesday

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✔ **Characterization and modeling of an improved method of phase detection scheme for displacement optic sensors,** N. N. Puscas, Univ. Politehnica Bucuresti (Romania); H. W. Gnewuch, A. G. Podoleanu, D. A. Jackson, Univ. of Kent (United Kingdom) . . . . . [6744-96]

Thursday 20 September

Opening Remarks

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

SESSION 13

Room: 3c . . . . . Thurs. 08.30 to 10.20

Constellations

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

08.30: **CEOS constellations: space agency response to GEOSS *(Invited Paper),*** B. Ryan, U.S. Geological Survey (USA); S. Briggs, European Space Agency (USA); T. Inada, Japan Aerospace Exploration Agency (Japan); D. Vidal-Madjar, Ctr. National d'Études Spatiales (France); S. Ward, Symbios Communications (Australia); C. Ishida, Japan Aerospace Exploration Agency (Japan) . . . . . [6744-77]

09.00: **The CEOS constellation for land surface imaging,** G. B. Bailey, U.S. Geological Survey (USA); M. Berger, European Space Agency (Netherlands); H. Jeanjean, Ctr. National d'Études Spatiales (France); K. P. Gallo, U.S. Geological Survey (USA) . . . . . [6744-78]

09.20: **The CEOS constellation for ocean surface topography,** S. Wilson, National Oceanic and Atmospheric Administration (USA); F. Parisot, EUMETSAT (Germany) . . . . . [6744-79]

09.40: **The CEOS atmospheric composition constellation: an example of an integrated Earth observing system for GEOSS,** E. Hilsenrath, NASA Headquarters (USA); J. Langen, European Space Agency (Netherlands) . . . . . [6744-80]

10.00: **CEOS precipitation constellation,** S. P. Neeck, NASA Headquarters (USA); R. Oki, Japan Aerospace Exploration Agency (Japan) . . . . . [6744-81]

Coffee Break . . . . . 10.20 to 10.40

SESSION 14

Room: 3c . . . . . Thurs. 10.40 to 13.10

Sustainable Development

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

10.40: **Semantics-enabled knowledge management for global Earth observation system of systems,** R. L. King, Mississippi State Univ (USA); S. S. Durbha, Y. Ling, N. H. Younan, Mississippi State Univ. (USA) . . . . [6744-82]

11.00: **Multi-sensor approach to address sustainable development *(Invited Paper),*** S. Habib, NASA Goddard Space Flight Ctr. (USA) . . . . . [6744-83]

11.30: **Multi-sensor web system for natural hazard applications *(Invited Paper),*** D. P. Ouzounov, S. Habib, NASA Goddard Space Flight Ctr. (USA); G. Cervone, George Mason Univ. (USA); F. S. Policelli, NASA Goddard Space Flight Ctr. (USA) . . . . . [6744-84]

12.00: **Use of remote sensing for decision support in Africa *(Invited Paper),*** F. S. Policelli, NASA Goddard Space Flight Ctr. (USA); M. Brown, Science Systems and Applications, Inc. (USA) . . . . . [6744-85]

12.30: **COSMO-SkyMed program: an advanced dual-use asset for Earth observation,** G. Valentini, A. Coletta, Agenzia Spaziale Italiana (Italy); G. Angino, Alcatel Alenia Space (Italy); F. Battazza, F. Caltagirone, Agenzia Spaziale Italiana (Italy); F. Impagniatiello, Alcatel Alenia Space (Italy); A. Capuzi, Agenzia Spaziale Italiana (Italy); S. Fagioli, Alcatel Alenia Space (Italy); R. Leonardi, Ministro Della Difesa (Italy) . . . . . [6744-86]

12.50: **TIGER: supporting the development of water information systems and services in Africa, African water management with EO,** F. Palazzo, L. Ghaye, European Space Agency (Italy); S. Iris, Canadian Space Agency (Canada); A. Lipponen, United Nations Educational, Scientific and Cultural Organization (France) . . . . . [6744-87]

Lunch Break . . . . . 13.10 to 14.20

SESSION 15

Room: 3c . . . . . Thurs. 14.20 to 16.20

Advanced Sensors and Measurements

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

14.20: **Dissemination and exploitation of grids in Earth science,** W. J. Som de Cerff, Koninklijk Nederlands Meteorologisch Instituut (Netherlands); M. Petitdidier, M. Lonjaret, Ctr. National de la Recherche Scientifique (France); L. Fusco, European Space Agency (Italy); L. Hluchy, Institute of Informatics (Slovak Republic) . . . . . [6744-88]

14.40: **Analysis of terrain data based on satellite imagery for aviation purposes,** B. Eilmus, G. Heidelmeyer, U. Klingauf, Technische Univ. Darmstadt (Germany) . . . . . [6744-89]

15.00: **The increase of the efficiency of research tools of active radio and optical sensing,** V. G. Oshlakov, T. Eremina, Institute of Atmospheric Optics (Russia) . . . . . [6744-90]

Coffee Break . . . . . 15.00 to 15.40

15.40: **The drawing of snow information in north Xinjiang based on MODIS data and its application,** P. Huan, Nanjing Univ. (China); S. Fang, Xinjiang Univ. (China) . . . . . [6744-91]

16.00: **Pump-laser-induced multi-structure photoprocesses of the near-lying singlet- and triplet-excited states in geteroaromatic molecules,** A. E. Obukhov, Moscow Mining Institute (Russia) . . . . . [6744-92]

16.20: **Detection of hydrocarbons using hyperspectral satellite imagery,** M. R. Mehdi, National Univ. of Science and Technology (Pakistan); S. S. Butt, LMKR (Pakistan) . . . . . [6744-97]

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Remote Sensing of Clouds and the Atmosphere

Conference Chairs: **Adolfo Comerón**, Univ. Politècnica de Catalunya (Spain); **Klaus Schäfer**, Forschungszentrum Karlsruhe GmbH (Germany); **James R. Slusser**, Colorado State Univ. (USA); **Richard H. Picard**, Air Force Research Lab. (USA)

Programme Committee: **Aldo Amodeo**, Istituto di Metodologie per l'Analisi Ambientale Potenza (Italy); **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); **Nicolaos I. Sifakis**, National Observatory of Athens (Greece); **Michiel van Weele**, Koninklijk Nederlands Meteorologisch Instituut (Netherlands); **Konradin Weber**, Fachhochschule Düsseldorf (Germany)

Monday 17 September

Opening Remarks . . . . . 13.00 to 13.20

Adolfo Comerón, Univ. Politècnica de Catalunya (Spain); **Klaus Schäfer,** Forschungszentrum Karlsruhe GmbH (Germany); **James R. Slusser,** Colorado State Univ. (USA); **Richard H. Picard,** Air Force Research Lab. (USA)

SESSION 1

Room: 4a . . . . . Mon. 13.20 to 17.00

Remote Sensing of Aerosols, Trace Gases, and Meteorological Parameters

Chair: **James R. Slusser**, Colorado State Univ. (USA)

13.20: **Carbon dioxide retrieval from reflected sunlight spectra in the presence of cirrus cloud: model studies,** A. I. Bril, S. Oshchepkov, T. Yokota, National Institute for Environmental Studies (Japan) . . . . . [6745-01]

13.40: **Ozone depletion in the Austral spring from UV micro-satellite instrument,** J. A. Fernandez-Saldivar, C. I. Underwood, Univ. of Surrey (United Kingdom); S. Mackin, Surrey Satellite Technology Ltd. (United Kingdom) . . . . . [6745-02]

14.00: **Accomplishments of the atmospheric infrared sounder (AIRS) and the need for higher spatial resolution in the future,** T. S. Pagano, M. T. Chahine, H. H. G. Aumann, Jet Propulsion Lab. (USA) . . . . . [6745-03]

14.20: **Aerosol robotic network (AERONET) activity within the framework of the International Polar Year,** A. Smirnov, Univ. of Maryland/Baltimore (USA); B. N. Holben, NASA Goddard Space Flight Ctr. (USA); N. T. O'Neill, Univ. de Sherbrooke (Canada); M. V. Panchenko, Institute of Atmospheric Optics (Russia); M. Sorokin, Science Systems and Applications, Inc. (USA); P. Sobolewski, Institute of Geophysics (Poland); S. M. Sakerin, Institute of Atmospheric Optics (Russia); V. F. Radionov, Arctic and Antarctic Research Institute (Russia); R. Wagener, Brookhaven National Lab. (USA); B. R. Bojkov, Univ. of Maryland/Baltimore (USA); T. Zielinski, Institute of Oceanology (Poland); T. F. Eck, Univ. of Maryland/Baltimore (USA); A. Sinyuk, I. Slutsker, D. Giles, Science Systems and Applications, Inc. (USA) . . . . . [6745-05]

14.40: **Aerosol characterization in Morocco with AERONET and intercomparison with satellite data: TOMS, MODIS and MISR,** B. Aziza, B. Zouhair, Cadi Ayyad Univ. (Morocco) . . . . . [6745-06]

Coffee Break . . . . . 15.00 to 15.20

15.20: **Remote sensing for site selection of the European extremely large telescope (E-ELT),** H. Kurlandczyk, M. S. Sarazin, European Southern Observatory (Germany) . . . . . [6745-07]

15.40: **Use of satellite data for astronomical site characterization,** A. M. Varela, Instituto de Astrofísica de Canarias (Spain) . . . . . [6745-08]

16.00: **Stratospheric and upper tropospheric aerosol retrieval from limb scatter signals,** D. F. Rault, NASA Langley Research Ctr. (USA); R. P. Loughman, Hampton Univ. (USA) . . . . . [6745-09]

16.20: **Optimal estimation applied to the retrieval of aerosol load using MSG/SEVIRI observations,** S. Wagner, Y. Govaerts, A. Lattanzio, P. Watts, EUMETSAT (Germany) . . . . . [6745-10]

16.40: **Dust aerosol optical depth retrieval over desert surface, using the SEVIRI window channels,** B. De Paepe, Vrije Univ. Brussel (Belgium); S. Dewitte, Royal Meteorological Institute of Belgium (Belgium) . . . . . [6745-11]

Tuesday 18 September

SESSION 2

Room: 4a . . . . . Tues. 09.00 to 11.40

Remote Sensing of Clouds

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

09.00: **Experimental studies of infrared scattering and polarization properties of crystalline clouds to improve atmospheric models for remote sensing of Earth's atmosphere from space,** T. W. Humpherys, Utah State Univ. (USA); V. N. Ivanov, G. Yaskevich, Scientific and Production Association Typhoon (Russia); J. DeVore, A. T. Stair, Jr., Visidyne, Inc. (USA); J. Watson, The Aerospace Corp. (USA); I. Schiller, Visidyne, Inc. (USA); D. V. Chvanov, V. Privalsky, Utah State Univ. (USA) . . . . . [6745-12]

09.20: **Cloud top height estimation using simulated METEOSAT-8 radiance,** R. Borde, EUMETSAT (Germany); P. Dubuisson, Univ. du Littoral Côte d'Opale (France) . . . . . [6745-13]

09.40: **An assessment of the on-orbit performance of the CALIPSO wide field camera,** M. C. Pitts, L. W. Thomason, Y. Hu, D. M. Winker, NASA Langley Research Ctr. (USA) . . . . . [6745-14]

Coffee Break . . . . . 10.00 to 10.20

10.20: **Sensitivity of passive measurements in VIS, SWIR and TIR to cirrus microphysical vertical profile: application to cloud remote sensing from MODIS,** B. Marchant, G. Brogniez, J. Riedi, L. C. Labonnote, Univ. des Sciences et Technologies de Lille (France); P. Dubuisson, Univ. du Littoral Côte d'Opale (France) . . . . . [6745-15]

10.40: **Optical characteristics of cirrus clouds at a mid-latitude EARLINET station,** E. Giannakaki, D. S. Balis, Aristotle Univ. of Thessaloniki (Greece); V. Amiridis, National Observatory of Athens (Greece); S. Kazadzis, Aristotle Univ. of Thessaloniki (Greece) . . . . . [6745-16]

11.00: **Retrieval of cloud optical parameters from data of reflected radiance multiangle observation,** I. N. Melnikova, St. Petersburg State Univ. (Russia) and Russian Hydrometeorological Univ. (Russia); A. V. Vasilyev, St. Petersburg State Univ. (Russia); N. V. Konovalov, M.V. Keldysh Institute of Applied Mathematics (Russia) . . . . . [6745-17]

11.20: **Breaking the relations between the scales of scattering theory for main cloud components,** I. N. Melnikova, St. Petersburg State Univ. (Russia) . . . . . [6745-18]

Lunch Break . . . . . 11.40 to 13.00

SESSION 3

Room: 4a . . . . . Tues. 13.00 to 17.00

Lidar, Radar, and Passive (Microwave, Infrared, Visible, and UV) Atmospheric Measurement Techniques

Chair: **Adolfo Comerón**, Univ. Politécnica de Cataluña (Spain)

13.00: **Applications based on ROSA onboard OCEANSAT_2 space mission,** F. Vespe, V. De Cosmo, Agenzia Spaziale Italiana (Italy); A. Zin, Alenia Alcatel Space (Italy) . . . . . [6745-20]

13.20: **A proposed solar UV-B radiometer calibration method: trial using diffuse solar irradiance,** S. Takeshita, M. Sasaki, Tokai Univ. (Japan)[6745-21]

13.40: **Long-term monitoring of layering of lower atmosphere in urban environment by ceilometer,** K. Schäfer, S. M. Emeis, C. Jahn, C. Münsterer, Forschungszentrum Karlsruhe (Germany); C. Münkel, Vaisala GmbH (Germany) . . . . . [6745-22]

14.00: **Validation of a high resolution circulation model by lidar measurements of water vapour mixing ratio profiles in the area of Naples,** F. Maria Grazia, Univ. Federico II of Naples (Italy); F. Rossella, Univ. degli Studi dell'Aquila (Italy); P. Gianluca, S. Nicola, Univ. Federico II of Naples (Italy); W. Xuan, Consiglio Nazionale delle Ricerche (Italy) . . . . . [6745-23]

14.20: **A European research infrastructure for aerosol study on a continental scale: EARLINET-ASOS,** A. Amodeo, G. Pappalardo, Consiglio Nazionale delle Ricerche (Italy); J. Bösenberg, Max-Planck-Institut für Meteorologie (Germany); A. Ansmann, Leibniz-Institut für Troposphärenforschung e.V. (Germany); A. Apituley, Rijksinstituut voor Volksgezondheid en Milieu (Netherlands); L. Alados-Arboledas, Univ. de Granada (Spain); D. S. Balis, Aristotle Univ. of Thessaloniki (Greece); C. Böckmann, Univ. Potsdam (Germany); A. P. Chaikovsky, B.I. Stepanov Institute of Physics (Belarus); A. Comeron, Univ. Politecnica de Cataluña (Spain); V. Freudenthaler, Ludwig-Maximilians-Univ. München (Germany); G. H. Hansen, Norwegian Institute for Air Research (Norway); V. Mitev, Observatoire Cantonal de Neuchâtel (Switzerland); D. 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, Institute of Geophysics (Poland); M. Pujadas, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (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-Univ. München (Germany) . . . . . [6745-24]

14.40: **Improvement of broadband radiance to flux conversion by using the synergy between active and passive remote sensing instruments,** C. Domenech, E. Lopez-Baeza, Univ. de València (Spain); D. Donovan, Koninklijk Nederlands Meteorologisch Instituut (Netherlands); M. Bouvet, European Space Agency (Netherlands); H. Barker, Meteorological Service of Canada (Canada) . . . . . [6745-25]

Coffee Break . . . . . 15.00 to 15.20

15.20: **Multi-sensor aerosol data fusion: can it be done online?,** G. Leptoukh, NASA Goddard Space Flight Ctr. (USA) . . . . . [6745-26]

15.40: **Statistical approach to validation of satellite atmospheric retrievals,** N. S. Pougatchev, G. E. Bingham, Utah State Univ. (USA); K. St. Germain, D. Seidel, National Oceanic and Atmospheric Administration (USA); F. H. Berger, Deutscher Wetterdienst (Germany) . . . . . [6745-27]

16.00: **The GERB Edition 1 products SEVIRI scene identification,** A. Ipe, C. P. Bertrand, N. Clerbaux, S. Dewitte, L. Gonzalez, Royal Meteorological Institute of Belgium (Belgium) . . . . . [6745-28]

16.20: **Integrated cloud-aerosol-radiation product using CERES, MODIS, CALIPSO and CloudSat data,** S. Sun-Mack, Science Applications International Corp. (USA); B. A. Wielicki, P. Minnis, NASA Langley Research Ctr. (USA); S. Gibson, Y. Chen, Science Applications International Corp. (USA) . . . . . [6745-29]

16.40: **The slow mode of the CERES scanning radiometers,** Z. P. Szewczyk, Science Applications International Corp. (USA) . . . . . [6745-30]

✔ Posters-Tuesday

All registered symposium attendees are invited to attend the interactive poster session. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway on the Ground Floor of the Convention Ctr. An interactive poster session and reception with authors present will be held on Tuesday 18.00 to 19.30. Light refreshments will be served.

Remote Sensing of Clouds

✔ **Study on methods of cloud identification and data recovery for MODIS data,** X. Wu, Q. Cheng, Zhejiang Gongshang Univ. (China) . . . . . [6745-52]

✔ **Joint airborne IASI validation experiment (JAIVEx) cirrus cloud property intercomparison,** D. H. DeSlover, R. E. Holz, H. E. Revercomb, D. H. Turner, Univ. of Wisconsin/Madison (USA); D. K. Zhou, NASA Langley Research Ctr. (USA); W. L. Smith, Sr., Hampton Univ. (USA) . . . . . [6745-53]

✔ **Cloud climatology in the Canary Islands region using NOAA-AVHRR data,** A. González, A. Cerdeña, J. C. Pérez, A. Díaz, Univ. de La Laguna (Spain) . . . . . [6745-54]

✔ **Automatic detection of clouds and shadows on SPOT/HRVIR images: application to the images of the African Monsoon Multidisciplinary Analysis (AMMA) project,** C. André, Institut Pierre Simon Laplace (France); S. Le Hégarat-Mascle, Univ. Paris-Sud (France) . . . . . [6745-55]

✔ **Cloud factor estimation for insolation using satellite data,** K. Han, J. Yeom, Y. Kim, Y. Shu, Pukyong National Univ. (South Korea) . . . . [6745-56]

Radiative Transfer

✔ **Retrieval of spectral emissivity and surface temperature from airborne infrared hyperspectral sensor, using neural network and spectral smoothness approaches,** V. Achard, S. Lesage, L. Poutier, ONERA (France) . . . . . [6745-57]

✔ **A semianalytic Monte Carlo code for modelling lidar measurements,** E. Palazzi, Consiglio Nazionale delle Ricerche (Italy); I. K. Kostadinov, Consiglio Nazionale delle Ricerche (Italy) and Bulgarian Academy of Science (Bulgaria); F. Ravegnani, A. Petritoli, Consiglio Nazionale delle Ricerche (Italy); D. Bortoli, Consiglio Nazionale delle Ricerche (Italy) and Geophysics Ctr. of Evora (Portugal); G. Giovanelli, Consiglio Nazionale delle Ricerche (Italy) . . . . . [6745-58]

✔ **Studying clouds and the Earth's radiation balance using CERES and MISR data products,** N. A. Ritchey, Science Systems and Applications, Inc. (USA) and NASA Langley Research Ctr. (USA); M. T. Ferebee, NASA Langley Research Ctr. (USA) . . . . . [6745-59]

✔ **Evaluation of adjacency effect for MIVIS airborne images,** C. Bassani, R. M. Cavalli, Istituto sull'Inquinamento Atmosferico (Italy); S. Pignatti, Istituto di Metodologie per l'Analisi Ambientale (Italy); F. Santini, Istituto sull'Inquinamento Atmosferico (Italy) . . . . . [6745-60]

✔ **Far-infrared spectrally resolved broadband emission of the atmosphere from Monte Morello and Monte Gomito, near Florence,** G. Bianchini, L. Palchetti, A. Baglioni, S. Del Bianco, Istituto di Fisica Applicata Nello Carrara (Italy) . . . . . [6745-61]

Remote Sensing of Aerosols, Trace Gases, and Meteorological Parameters

✔ **Retrieval of atmospheric water content based on AISA data,** Q. Cheng, Zhejiang Gongshang Univ. (China) . . . . . [6745-63]

✔ **An aerosol optical thickness retrieval algorithm for MSG data over land: applications in the Mediterranean area,** L. Guerrieri, S. Corradini, S. Pugnaghi, R. Santangelo, Univ. degli Studi di Modena e Reggio Emilia (Italy) . . . . . [6745-64]

✔ **Stratospheric ozone and nitrogen dioxide total column and vertical profiles in southern Portugal during 2004-2006,** D. Bortoli, A. M. Silva, Univ. de Évora (Portugal); G. Giovanelli, Consiglio Nazionale delle Ricerche (Italy) . . . . . [6745-65]

✔ **Fine mode aerosols on a global scale,** I. Sano, S. Mukai, Kinki Univ. (Japan); M. Mukai, The Univ. of Tokyo (Japan) . . . . . [6745-66]

✔ **Aerosol optical properties variation on different mountain sites in Italy,** G. Pavese, Istituto di Metodologie per l'Analisi Ambientale (Italy); F. Esposito, L. Leone, R. Restieri, M. Calvello, G. Grieco, G. Masiello, C. Serio, Univ. degli Studi della Basilicata (Italy) . . . . . [6745-67]

✔ **The influence of aerosols on tropospheric ozone production,** J. R. Slusser, C. Corr, S. Kreidenweis, Colorado State Univ. (USA) . . . . [6745-68]

Remote Sensing of Emission Sources, Exhausts, and Fires

✔ **Evaluation of air quality from space,** S. Mukai, I. Sano, Kinki Univ. (Japan); M. Mukai, The Univ. of Tokyo (Japan) . . . . . [6745-69]

✔ **Multiple axis DOAS measurements for the retrieval of NO2 and O3 vertical profiles in the Presidential Estate of Caste Porziano, Rome,** E. Palazzi, A. Petritoli, F. Ravegnani, I. K. Kostadinov, Consiglio Nazionale delle Ricerche (Italy); D. Bortoli, Consiglio Nazionale delle Ricerche (Italy) and Geophysics Ctr. of Evora (Portugal); S. Masieri, G. Giovanelli, Consiglio Nazionale delle Ricerche (Italy) . . . . . [6745-70]

✔ **Measurement and analysis of aerosol optical thickness over the East China Sea,** X. Deng, Nanjing Univ. of Information Science and Technology (China); D. Pan, State Oceanic Administration (China); Z. Sun, Nanjing Univ. of Information Science and Technology (China); X. He, State Oceanic Administration (China); Z. Hao, Nanjing Univ. of Information Science and Technology (China) . . . . . [6745-71]

✔ **Air pollution monitoring using the open path technique,** L. Belegante, National Institute of Research & Development for Optoelectronics (Romania); D. Zisu, National Research and Development Institute for Environmental Protection (Romania); I. Ionel, Politehnica Univ. Timisoara (Romania); D. N. Nicolae, National Institute of Research & Development for Optoelectronics (Romania) . . . . . [6745-72]

✔ **Influence of urban aerosol pollution to radiative forcing,** A. V. Nemuc, C. L. Talianu, National Institute of Research & Development for Optoelectronics (Romania); S. Stefan, Univ. din Bucuresti (Romania) . . . . . [6745-73]

✔ **Satellite estimated cloud radiative forcing in the presence of aerosol events over the south of Portugal,** D. Santos, M. J. T. Costa, Univ. de Évora (Portugal) and Consultant (Portugal); D. Bortoli, Univ. de Évora (Portugal) and Institute of Atmospheric Sciences and Climate (Italy); A. M. Silva, Univ. de Évora (Portugal) and Consultant (Portugal) . . . . . [6745-74]

✔ **Analysis of measurements taken by a ceilometer installed in southern Portugal,** M. J. T. Costa, Univ. de Évora (Portugal) and Consultant (Portugal); D. Bortoli, V. Costa, Univ. de Évora (Portugal); A. M. Silva, Univ. de Évora (Portugal) and Consultant (Portugal); F. Wagner, S. Pereira, Univ. de Évora (Portugal); J. L. Guerrero-Rascado, L. Alados-Arboledas, Univ. de Granada (Spain) . . . . . [6745-75]

Lidar, Radar, and Passive (Microwave, Infrared, Visible, and UV) Atmospheric Measurement Techniques

✔ **Lidar measurements for the short-term forecast of meteorological stability,** J. Polkanov, B.I. Stepanov Institute of Physics (Belarus) [6745-77]

Wednesday 19 September

SESSION 4

Room: 4a . . . . . Wed. 09.00 to 12.00

Radiative Transfer

Chair: **Richard H. Picard**, Air Force Research Lab. (USA)

09.00: **Influence of atmospheric profiles variations on airborne infrared limb observations,** C. Malherbe, P. Chervet, C. Lavigne, ONERA (France) . . . . . [6745-31]

09.20: **An atmospheric correction iterative method for very high resolution aerospace imaging spectrometers,** A. Barducci, D. Guzzi, P. Marcoionni, I. Pippi, Istituto di Fisica Applicata Nello Carrara (Italy) . . . . . [6745-32]

09.40: **Characterization of tropical atmosphere through wide-band emission spectra acquired by a balloon-borne uncooled FTS spectroradiometer,** G. Bianchini, B. Carli, U. Cortesi, L. Palchetti, Istituto di Fisica Applicata Nello Carrara (Italy) . . . . . [6745-33]

Coffee Break . . . . . 10.00 to 10.20

10.20: **Extension of Chandrasekhar's formula to a non-homogeneous Lambertian surface and comparison with the 6S formulation,** A. Sei, Northrop Grumman Space Technology (USA) . . . . . [6745-34]

10.40: **Analysis of adjacency effects for two Lambertian half-spaces,** A. Sei, Northrop Grumman Space Technology (USA) . . . . . [6745-35]

11.00: **Retrieval of minor constituents in a cloudy atmosphere with remote sensing millimeter wave measurements,** S. Del Bianco, G. Bianchini, M. Gai, L. Santurri, Istituto di Fisica Applicata Nello Carrara (Italy); C. Cecchi-Pestellini, Osservatorio Astronomico di Cagliari (Italy); B. M. Dinelli, Consiglio Nazionale delle Ricerche (Italy); B. Carli, Istituto di Fisica Applicata Nello Carrara (Italy) . . . . . [6745-36]

11.20: **Analytical determination of the atmosphere-scattered radiation polarization degree for the sake of polarized remote sensing,** V. P. Budak, S. V. Korkin, Moscow Power Engineering Institute Technical Univ. (Russia) . . . . . [6745-37]

11.40: **Exact analytical solution of 3D radiative transfer equation in problem of remote sensing,** A. B. Gavrilovich, B.I. Stepanov Institute of Physics (Belarus) . . . . . [6745-38]

Lunch Break . . . . . 12.00 to 13.20

SESSION 5

Room: 4a . . . . . Wed. 13.20 to 15.00

Remote Sensing of the Middle and Upper Atmosphere

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

13.20: **Anisotropic refractive index fluctuations spectrum in the stratosphere sensed from balloon-borne observations of stellar scintillation,** C. Robert, J. Conan, V. Michau, ONERA (France); J. Renard, C. Robert, F. Dalaudier, Ctr. National de la Recherche Scientifique (France) . . . . . [6745-39]

13.40: **Empirical storm-time correction to the international reference ionosphere model E-region electron and ion density parameterizations using observations from TIMED/SABER,** C. J. Mertens, NASA Langley Research Ctr. (USA) . . . . . [6745-41]

14.00: **A new model for calculating infrared background radiance at all altitudes including atmospheric clutter and clouds,** J. W. Duff, R. Panfili, L. S. Bernstein, Spectral Sciences, Inc. (USA); J. H. Brown, Air Force Research Lab. (USA) . . . . . [6745-42]

14.20: **Contributions of the OH airglow to space object irradiance,** J. H. Gruninger, J. W. Duff, Spectral Sciences, Inc. (USA); J. H. Brown, Air Force Research Lab. (USA) . . . . . [6745-43]

14.40: **TIMED/SABER limb measurements of OH Meinel emission at 1.6 and 2.0 micrometer: global behavior and interannual variability,** J. R. Winick, R. H. Picard, Air Force Research Lab. (USA); P. P. Wintersteiner, ARCON Corp. (USA); D. Esplin, M. J. Taylor, Utah State Univ. (USA); I. Azeem, Embry-Riddle Aeronautical Univ. (USA); M. G. Mlynczak, NASA Langley Research Ctr. (USA); J. M. Russell III, Hampton Univ. (USA) . . . . . [6745-44]

Coffee Break . . . . . 15.00 to 15.20

SESSION 6

Room: 4a . . . . . Wed. 15.20 to 18.00

Remote Sensing of Emission Sources, Exhausts, and Fires

Chair: **Aldo Amodeo**, Consiglio Nazionale delle Ricerche (Italy)

15.20: **Budapest airport air quality long-term studies by remote sensing with DOAS and FTIR with focus upon runway emissions,** K. Schäfer, G. Schürmann, C. Jahn, C. Matuse, H. Hoffmann, Forschungszentrum Karlsruhe (Germany); S. Torok, V. Groma, KFKI Atomic Energy Research Institute (Hungary) . . . . . [6745-45]

15.40: **Mexico City airport air quality study by remote sensing with passive FTIR,** K. Schäfer, E. Flores-Jardines, C. Jahn, Forschungszentrum Karlsruhe (Germany) . . . . . [6745-46]

16.00: **Atmospheric aerosol characterization during Saharan dust outbreaks at Napoli EARLINET station,** G. Pisani, Univ. degli Studi di Napoli Federico II (Italy) and Consultant (Italy); M. Armenante, Istituto Nazionale di Fisica Nucleare (Italy); M. G. Frontoso, N. Spinelli, X. Wang, Univ. degli Studi di Napoli Federico II (Italy) and Consultant (Italy) . . . . . [6745-47]

16.20: **Evolution study of smoke backscattering coefficients in a cell by means of a compact mobile Nd:Yag lidar system,** C. Bellecci, Univ. degli Studi di Roma/Tor Vergata (Italy); L. De Leo, CRATI s.c.r.l. (Italy); P. Gaudio, M. Gelfusa, Univ. degli Studi di Roma/Tor Vergata (Italy); T. Lo Feudo, CRATI s.c.r.l. (Italy); S. Martellucci, M. Richetta, Univ. degli Studi di Roma/Tor Vergata (Italy) . . . . . [6745-48]

16.40: **Properties of fire smoke in east Europe measured by remote sensing methods,** A. Pietruczuk, Institute of Geophysics (Poland); A. P. Chaikovsky, B.I. Stepanov Institute of Physics (Belarus) . . . . . [6745-49]

17.00: **Diurnal radiative forcing of biomass burning aerosols over Africa from merged GERB and SEVIRI data,** C. P. Bertrand, A. Ipe, L. Gonzalez, G. Casanova, N. Clerbaux, D. Caprion, S. Dewitte, Royal Meteorological Institute of Belgium (Belgium) . . . . . [6745-50]

17.20: **Comparisons of satellite-derived aerosol optical depth over a variety of sites in the Southern Balkan region as an indicator of local air quality,** M. E. Koukouli, S. Kazadzis, D. S. Balis, Aristotle Univ. of Thessaloniki (Greece); C. Ichoku, NASA Goddard Space Flight Ctr. (USA); V. Amiridis, National Observatory of Athens (Greece) . . . . . [6745-51]

17.40: **Hazard related to anomalous emissions of endogenous gas in the Rome region: estimation of CO2 and H2S air concentration and soil flux by TDL and accumulation chambers,** K. Weber, Fachhochschule Düsseldorf (Germany); F. Barberi, Univ. Roma Tre (Italy); J. Barrancos Martìnez, ITER (Spain); M.-L. Carapezza, INGV Sezione ROMA1 (Italy); C. Fisher, Fachhochschule Univ. (Germany); N. Pérez Rodrìguez, INGV Sezione ROMA1 (Italy); M. Ranaldi, T. Ricci, L. Tarchini, Univ. Roma Tre (Italy) . . . . . [6745-78]

SAR Image Analysis, Modeling, and Techniques

Conference Chairs: **Claudia Notarnicola**, Politecnico di Bari, Dip. Interateneo di Fisica (Italy); **Francesco Posa**, Politecnico di Bari (Italy)

Tuesday 18 September

Opening Remarks . . . . . 08.30 to 08.40

Claudia Notarnicola, Politecnico di Bari, Dip. Interateneo di Fisica (Italy); **Francesco Posa,** Politecnico di Bari (Italy)

Keynote Presentation . . . . . 08.40 to 09.10

Cassini altimeter data meet fractals *(Invited Paper)*, G. Franceschetti, Univ. of Napoli Federico II (Italy); A. Iodice, D. Riccio, Univ. di Napoli Federico II (Italy) . . . . . [6746-01]

SESSION 1

Room: 2b . . . . . Tues. 09.10 to 10.10

SAR Sensors and Processing

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

09.10: **Processing of TerraSAR-X payload data: first results,** H. Breit, DLR Standort Oberpfaffenhofen (Germany); U. Balss, Technische Univ. München (Germany); R. Bamler, DLR Standort Oberpfaffenhofen (Germany) . . [6746-02]

09.30: **RADARSAT-2: earth observation data for the canadian government,** D. A. De Lisle, Canadian Space Agency (Canada) . . . . . [6746-03]

09.50: **Phase characterization of PolSAR images,** M. M. S. Soccorsi, M. P. Datcu, DLR Standort Oberpfaffenhofen (Germany) . . . . . [6746-04]

Coffee Break . . . . . 10.10 to 10.30

SESSION 2

Room: 2b . . . . . Tues. 10.30 to 12.10

SAR Applications I

Chair: **Claudia Notarnicola**, Politecnico di Bari, Dip. Interateneo di Fisica (Italy)

10.30: **Soil moisture maps of agricultural soils from ENVISAT/ASAR images: an attempt to correct the surface roughness effects,** E. Santi, M. Brogioni, S. Paloscia, P. Pampaloni, S. Pettinato, Istituto di Fisica Applicata Nello Carrara (Italy) . . . . . [6746-05]

10.50: **ICA decomposition of HR SAR images: application to urban structures recognition,** H. Chaabouni, M. P. Datcu, DLR Standort Oberpfaffenhofen (Germany) . . . . . [6746-06]

11.10: **An information-theoretic feature for identifying changes in multitemporal SAR images: an evaluation for the detection of flooded areas,** B. Aiazzi, Istituto di Fisica Applicata Nello Carrara (Italy); L. Alparone, Univ. degli Studi di Firenze (Italy); S. Baronti, Istituto di Fisica Applicata Nello Carrara (Italy); T. Moramarco, C. Pandolfo, M. Stelluti, Istituto di Ricerca per la Protezione Idrogeologica (Italy) . . . . . [6746-07]

11.30: **Inferring Titan's surface features by means of Bayesian inversion algorithm applied to radar data,** B. Ventura, Politecnico di Bari (Italy); D. Casarano, CNR-IRPI (Italy); C. Notarnicola, Politecnico di Bari, Dip. Interateneo di Fisica (Italy); M. A. Janssen, Jet Propulsion Lab. (USA); F. Posa, Politecnico di Bari (Italy) . . . . . [6746-08]

11.50: **Multibaseline interferometric SAR at millimeterwaves,** H. W. Essen, T. Brehm, FGAN-FHR (Germany); S. Boehmsdorff, WTD 52 (Germany) . . . . . [6746-09]

Lunch Break . . . . . 12.10 to 14.00

SESSION 3

Room: 2b . . . . . Tues. 14.00 to 15.20

SAR Applications II

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

14.00: **Velocity estimation of slow moving targets in AT-InSAR systems,** V. Pascazio, Univ. degli Studi di Napoli Parthenope (Italy); G. Schirinzi, Univ. degli Studi di Cassino (Italy); A. Budillon, Univ. degli Studi di Napoli Parthenope (Italy) . . . . . [6746-10]

14.20: **Combination of X, C and L band SAR images for retrieval of surface parameters,** C. Notarnicola, F. Posa, Politecnico di Bari, Dip. Interateneo di Fisica (Italy) . . . . . [6746-11]

14.40: **Evaluating SRTM and ASTER DEM accuracy for the broader area of Sparti, Greece,** K. G. Nikolakopoulos, P. I. Tsombos, A. Zervakou, Institute of Geology & Mineral Exploration (Greece) . . . . . [6746-12]

15.00: **Land subsidence monitoring using InSAR and GPS,** S. H. Hosseini, M. J. Valadan Zoej, M. R. Mobasheri, K.N.Toosi Univ. of Technology (Iran); M. Dehghani, K.N. Toosi Univ. of Technology (Iran) . . . . . [6746-27]

Coffee Break . . . . . 15.20 to 15.40

SESSION 4

Room: 2b . . . . . Tues. 15.40 to 16.40

SAR Processing

Chair: **Claudia Notarnicola**, Politecnico di Bari, Dip. Interateneo di Fisica (Italy)

15.40: **Phase information contained in meter-scale SAR images,** M. P. Datcu, G. Schwarz, M. M. S. Soccorsi, H. Chaabouni, DLR Standort Oberpfaffenhofen (Germany) . . . . . [6746-14]

16.00: **The case of PIMS: image information mining in an SAR data ground segment,** G. Schwarz, A. De Miguel, M. P. Datcu, DLR Standort Oberpfaffenhofen (Germany) . . . . . [6746-15]

16.20: **Improvement in SAR image maximum likelihood classification using adaptive stack filters,** M. E. Buemi, M. E. Mejail, M. J. Gambini, J. C. Jacobo, Univ. de Buenos Aires (Argentina) . . . . . [6746-16]

✔ Posters-Tuesday

All registered symposium attendees are invited to attend the interactive poster session. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway on the Ground Floor of the Convention Ctr. An interactive poster session and reception with authors present will be held on Tuesday 18.00 to 19.30. Light refreshments will be served.

✔ **SAR simulation system based windows HPC cluster,** H. Guo, National Univ. of Defense Technology (China) . . . . . [6746-17]

✔ **A spotlight SAR imaging algorithm based on fractional Fourier transform,** M. Yin, Y. Pi, Z. Han, L. Fan, Univ. of Electronic Science and Technology of China (China) . . . . . [6746-20]

✔ **SAR image coregistration based on nonstationary scatterers,** J. Wang, Y. Pi, Univ. of Electronic Science and Technology of China (China) . . . . . [6746-21]

✔ **A new parallel subaperture algorithm for high-resolution SAR imaging,** X. Liu, Y. Pi, Univ. of Electronic Science and Technology of China (China); C. Leng, China Academy of Launch Vehicle Technology (China); Z. Han, L. Fan, Univ. of Electronic Science and Technology of China (China) . . . . . [6746-22]

✔ **The target detection of SAR based on the corrected clutter position estimation,** C. Leng, H. Chen, Y. Ning, China Academy of Launch Vehicle Technology (China) . . . . . [6746-23]

✔ **Resolution improvement in both azimuthal and range directions with repeat-pass spaceborne SAR,** Y. Zhang, Ctr. for Space Science and Applied Research (China); X. Shi, Ctr. for Space Science and Applied Research (China) and Graduate Univ. of the Chinese Academy of Sciences (China); J. Jiang, Ctr. for Space Science and Applied Research (China) . . . . . [6746-24]

✔ **A novel edge detection operator in SAR image,** W. Li, Northwestern Polytechnical Univ. (China) . . . . . [6746-25]

Monday-Tuesday 17-18 September 2007 • Proceedings of SPIE Vol. 6747

Optics in Atmospheric Propagation and Adaptive Systems

Conference Chairs: **Karin Stein**, FGAN-FOM Research Institute for Optronics and Pattern Recognition (Germany); **Anton Kohnle**, FGAN-FOM Research Institute for Optronics and Pattern Recognition (Germany); **John D. Gonglewski**, Air Force Research Lab. (USA)

Programme Committee: **David C. Dayton**, Applied Technology Associates (USA); **Denis Dion, Jr.**, Defence Research and Development Canada-Valcartier (Canada); **Stephen M. 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); **Jennifer C. Ricklin**, DARPA/ATO (USA); **Marc J. F. Séchaud**, ONERA (France); **Michael L. Shilko, Sr.**, ITT Industries, Inc. (USA); **Mikhail A. Vorontsov**, Army Research Lab. (USA)

Monday 17 September

Introduction . . . . . 13.30 to 13.50

A. Kohnle, FGAN-FOM (Germany)

Atmospheric system adaption

Advances in detector technology for imaging and advances in image processing pose additional pressure on system adaption with respect to atmospheric constraints. Problems are discussed for specific imaging systems working from UV to IR. Methods for compensation of atmospheric effects are outlined.

SESSION 1

Room: B1 . . . . . Mon. 14.00 to 17.10

Propagation in the Marine Boundary Layer

Chair: **Karin Stein**, FGAN-FOM (Germany)

14.00: **Millimeterwave propagation over sea in tropical regions,** H. W. Essen, H. Fuchs, FGAN-FHR (Germany); J. Foerster, Forschungsanstalt der Bundeswehr fur Wasserschall und Geophysik (Germany) . . . . . [6747-01]

14.20: **Prediction of IR transmission in a coastal Baltic environment: comparison of model predictions and measurements,** D. Dion, Jr., Defense Research Establishment Valcartier Canada (Canada); L. Gardenal, Nurun, Inc. (Canada); H. H. Vogel, Danish Defense Research Establishment (Denmark) . . . . . [6747-02]

14.40: **Refraction effects under atmospheric stable conditions in coastal environments,** J. Claverie, Ecoles de Coëtquidan (France); D. Dion, Jr., Defense Research Establishment Valcartier Canada (Canada); K. Stein, Forschungsgesellschaft für Angewandte Naturwissenschaften e.V. (Germany) . . . . . [6747-03]

Coffee Break . . . . . 15.00 to 15.30

15.30: **The SAPPHIRE trial: investigations on angular deviation caused by refraction,** K. Stein, D. P. Seiffer, FGAN-FOM (Germany) . . . . . [6747-04]

15.50: **Measurements of IR propagation in the marine boundary layer in warm and humid atmospheric conditions,** L. T. Heen, E. B. Madsen, P. Steenfeldt-Foss, K. Wikan, H. Fonnum, A. D. van Rheenen, E. Brendhagen, B. M. Almklov, Norwegian Defence Research Establishment (Norway) . . . . . [6747-05]

16.10: **Refraction measurements and modeling over the Chesapeake Bay during the NATO (TG51) SAPPHIRE trials, June 2006,** A. N. de Jong, P. J. Fritz, TNO (Netherlands) . . . . . [6747-06]

16.30: **Measurements of the vertical radiance profile using infrared sensors,** A. D. van Rheenen, Norwegian Defense Research Establishment (Norway); E. Brendhagen, L. T. Heen, E. B. Madsen, Norwegian Defence Research Establishment (Norway); H. Fonnum, P. Steenfeldt-Foss, K. Wikan, B. M. Almklov, Norwegian Defense Research Establishment (Norway) . . . . . [6747-07]

16.50: **Measurements of the relative intensity of ship exhaust gas as a function of distance to infrared sensors,** A. D. van Rheenen, E. Brendhagen, L. T. Heen, E. B. Madsen, H. Fonnum, P. Steenfeldt-Foss, K. Wikan, B. M. Almklov, Norwegian Defense Research Establishment (Norway) . . . . [6747-08]

Tuesday 18 September

SESSION 2

Room: B1 . . . . . Tues. 08.30 to 11.10

Propagation through Atmospheric Turbulence

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

08.30: **Atmospheric models to analyze and predict the optical turbulence *(Invited Paper),*** S. Cheinet, Institut Franco-Allemand de Recherches de Saint-Louis (France); P. Siebesma, Koninklijk Nederlands Meteorologisch Instituut (Netherlands) . . . . . [6747-09]

09.00: **Scintillation index analysis of optical plane wave propagating through non-Kolmogorov strong turbulence,** I. Toselli, Politecnico di Torino (Italy); L. C. Andrews, R. L. Phillips, Univ. of Central Florida (USA); V. Ferrero, Politecnico di Torino (Italy) . . . . . [6747-10]

09.20: **Statistical turbulence vertical profiles at the Roque de los Muchachos Observatory and Teide Observatory,** B. M. García-Lorenzo, Instituto de Astrofísica de Canarias (Spain) . . . . . [6747-11]

09.40: **Impact of turbulence on the measurement of CC&D materials in desert area,** K. R. Weiss-Wrana, A. Malaplate, Forschungsgesellschaft für Angewandte Naturwissenschaften e.V. (Germany) . . . . . [6747-13]

Coffee Break . . . . . 10.00 to 10.30

10.30: **Optimization of the mixing ratio of ice crystal shapes in cirrus clouds for atmospheric point spread function modeling,** I. Muguet, ONERA (France) and Univ. de Rouen (France); P. Chervet, ONERA (France); C. Rozé, Univ. de Rouen (France) . . . . . [6747-14]

10.50: **Simulation of high-intensive tubular pulsed beam propagation in air,** O. Khasanov, O. Fedotova, T. Smirnova, Y. Petukh, Institute of Solid State and Semiconductor Physics NASB (Belarus): A. Sukhorukov, Moscow State Univ. (Russia) . . . . . [6747-34]

SESSION 3

Room: B1 . . . . . Tues. 11.10 to 12.50

Adaptive Systems I

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

11.10: **Shift estimation and non-uniformity in sequences of scene images,** D. C. Dayton, Applied Technology Associates (USA); J. D. Gonglewski, Air Force Research Lab. (USA) . . . . . [6747-15]

11.30: **Design of a Shack Hartmann wavefront sensor using extended source in the infrared,** C. Robert, B. Fleury, ONERA (France); S. Magli, L. Vial, Sofradir (France); J. Conan, V. Michau, ONERA (France) . . . . . [6747-16]

11.50: **Evaluation and progress in the development of an adaptive optics system for ground object observation,** G. Marchi, R. Weiss, Forschungsgesellschaft für Angewandte Naturwissenschaften e.V. (Germany) . . . . . [6747-17]

12.10: **Cross-wind profiling based on the scattered wave scintillations in a telescope focus,** V. A. Banakh, D. A. Marakasov, Institute of Atmospheric Optics (Russia); M. A. Vorontsov, Army Research Lab. (USA) . . . . . [6747-19]

12.30: **On the problem of beam focusing in the turbulent atmosphere,** F. V. Shugaev, E. N. Terentiev, L. S. Shtemenko, O. A. Nikolaeva, T. A. Pavlova, O. I. Dokukina, M.V. Lomonosov Moscow State Univ. (Russia) . . . . . [6747-18]

Lunch Break . . . . . 12.50 to 14.10

SESSION 4

Room: B1 . . . . . Tues. 14.10 to 15.50

Adaptive Systems II

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

14.10: **Effect of phase fluctuations on propagation of vortex beams,** P. A. Konyaev, V. P. Lukin, V. A. Sennikov, Institute of Atmospheric Optics (Russia) . . . . . [6747-20]

14.30: **New LGS for large aperture telescope,** L. A. Bol'basova, V. P. Lukin, Institute of Atmospheric Optics (Russia) . . . . . [6747-21]

14.50: **Singular phase dynamics in vortical optical beam,** O. V. Tikhomirova, V. P. Aksenov, Institute of Atmospheric Optics (Russia) . . . . . [6747-22]

15.10: **Modelling of powerful light pulse propagation in air under backscattering conditions,** O. K. Khasanov, T. V. Smirnova, O. M. Fedotova, Institute of Solid State and Semiconductor Physics (Belarus); A. P. Sukhorukov, M.V. Lomonosov Moscow State Univ. (Russia) . . . . . [6747-23]

15.30: **Wavefront sensing of an optical vortex and its correction with the help of a bimorph mirror,** F. A. Starikov, RFNC-VNIIEF (Russia); V. P. Aksenov, Adopt, Ltd. (Russia); I. V. Izmailov, F. Y. Kanev, Institute of Atmospheric Optics (Russia); G. G. Kochemasov, BIOFIL Ltd. (Russia); A. V. Kudryashov, Adopt Ltd. (Russia); S. M. Kulikov, RFNC-VNIIEF (Russia); Y. I. Malakhov, International Science & Technology Ctr. (Russia); N. V. Maslov, A. N. Manachinsky, A. V. Ogorodnikov, S. A. Sukharev, RFNC-VNIIEF (Russia) . . . . . [6747-32]

✔ Posters-Tuesday

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✔ **Determination of evaporation duct heights by an inverse method,** H. W. Essen, H. Fuchs, FGAN-FHR (Germany); J. Foerster, Forschungsanstalt der Bundeswehr fur Wasserschall und Geophysik (Germany); V. Fabbro, R. Duvenois, ONERA (France); C. Bourlier, J. Saillard, Univ. de Nantes (France) . . . . . [6747-24]

✔ **Forecast of the optical turbulence in the marine surface layer based on the products of the numerical weather prediction model,** Y. Li, F. Dai, Institute of Applied Physics and Computational Mathematics (China) . . . . . [6747-25]

✔ **Determination of the velocity vector of turbulence layers from G-SCIDAR observations using an algorithm based on wavelet transforms,** B. M. García-Lorenzo, Instituto de Astrofísica de Canarias (Spain) . . . . . [6747-26]

✔ **Atmospheric turbulence profiling at the Teide Observatory: comparison and calibration of SODAR and SCIDAR measurements,** B. M. García-Lorenzo, Instituto de Astrofísica de Canarias (Spain) . . . . . [6747-27]

✔ **Dome-seeing subtraction from G-SCIDAR measurements,** B. M. García-Lorenzo, Instituto de Astrofísica de Canarias (Spain) . . . . . [6747-28]

✔ **Adaptive optics system prototype for the automatic control of geometrical fluctuations in a laser beam in air,** S. Grasso, Univ. degli Studi di Roma Tre (Italy); F. Acernese, R. Romano, F. Barone, Univ. degli Studi di Salerno (Italy) . . . . . [6747-29]

✔ **The hybrid Shack-Hartmann/G-SCIDAR instrument,** M. d. l. A. Rodriguez Hernandez, J. M. Delgado, Instituto de Astrofisica de Canarias (Spain); J. Jimenez Fuensalida, instituto de Astrofisica de Canarias (Spain); B. M. García-Lorenzo, Instituto de Astrofísica de Canarias (Spain); E. Hernandez, Instituto de Astrofisica de Canarias (USA); C. K. Hoegemann, H. Vazquez Ramio, Instituto de Astrofisica de Canarias (Spain) . . . . . [6747-30]

✔ **Measurements of transmission in the visible and the IR in the coastal Baltic environment,** D. Dion, Defense Research Establishment Valcartier Canada (Canada); L. Gardenal, Nurun, Inc. (Canada); H. H. Vogel, Danish Defense Research Establishment (Denmark); Y. Hurtaud, Ctr. d'Expertise Parisien (France); B. Pezery, CTSN (France); K. Stein, Forschungsgesellschaft für Angewandte Naturwissenschaften e.V. (Germany); A. N. de Jong, TNO (Netherlands); D. Tsintikidis, Space and Naval Warfare Systems Ctr., San Diego (USA); J. L. Forand, Defence Research and Development Canada (Canada) . . . . . [6747-31]

Tuesday-Thursday 18-20 September 2007 • Proceedings of SPIE Vol. 6748

Image and Signal Processing for Remote Sensing

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'Insubria (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**, Purdue Univ. (USA); **Jacky Desachy**, Univ. des Antilles et de la Guyane (France); **Giles M. Foody**, The Univ. of Nottingham (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. I Oslo (Norway); **Graeme G. Wilkinson**, The Univ. of Lincoln (United Kingdom); **Josiane B. Zerubia**, Institut National de Recherche en Informatique et en Automatique (France)

Tuesday 18 September

Opening Remarks . . . . . 13.40 to 13.50

SESSION 1

Room: 3a . . . . . Tues. 13.50 to 15.10

Image Analysis

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

13.50: **An adaptive PCA-based approach to pan-sharpening,** V. P. Shah, N. H. Younan, R. L. King, Mississippi State Univ. (USA) . . . . . [6748-01]

14.10: **TBA**

14.30: **Superresolution techniques for remote sensing applications,** P. B. Kempeneers, Vlaamse Instelling voor Technologisch Onderzoek (Belgium); J. C. Chan, Vrije Univ. Brussel (Belgium); S. Debacker, Univ. Antwerpen (Belgium); L. Bertels, Vlaamse Instelling voor Technologisch Onderzoek (Belgium); F. Canters, Vrije Univ. Brussel (Belgium); P. Scheunders, Univ. Antwerpen (Belgium) . . . . . [6748-03]

14.50: **A multiscale joint segmentation technique for multitemporal and multisource remote sensing images,** L. Galli, D. Passaro, S. Avolio, Advanced Computer Systems S.p.A. (Italy) . . . . . [6748-04]

Coffee Break . . . . . 15.10 to 15.40

SESSION 2

Room: 3a . . . . . Tues. 15.40 to 17.20

Multitemporal Image Analysis and Change Detection

Chair: **Allan A. Nielsen**, Danmarks Tekniske Univ. (Denmark)

15.40: **Multiscale unsupervised change detection by Markov random fields and wavelet transforms,** S. B. Serpico, G. Moser, E. Angiati, Univ. degli Studi di Genova (Italy) . . . . . [6748-05]

16.00: **An adaptive parcel-based technique robust to registration noise for change detection in multitemporal VHR images,** F. Bovolo, L. Bruzzone, S. Marchesi, Univ. degli Studi di Trento (Italy) . . . . . [6748-06]

16.20: **Radiometric normalization of high spatial resolution multitemporal imagery: a comparison between relative and absolute correction methods,** M. El Hajj, A. Bégué, Maison de la teledetection (France) . [6748-07]

16.40: **Investigation of alternative iteration schemes for the IR-MAD algorithm,** M. J. Canty, Forschungszentrum Juelich GmbH (Germany); A. A. Nielsen, Danmarks Tekniske Univ. (Denmark) . . . . . [6748-08]

17.00: **An unsupervised method for maximum margin change vector analysis,** F. Bovolo, Univ. degli Studi di Trento (Italy); G. Camps-Valls, Univ. de València (Spain); L. Bruzzone, Univ. degli Studi di Trento (Italy) . . . . . [6748-09]

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✔ **Segmentation of multi-look fully polarimetric SAR images based on Wishart distribution and MRF,** Y. Wu, K. Ji, W. Yu, Y. Su, National Univ. of Defense Technology (China) . . . . . [6748-38]

✔ **A new algorithm for filling the depressions in massive DEM data,** J. Xu, Institute of Atmospheric Physics (China) . . . . . [6748-42]

✔ **A new algorithm to determine flow direction using grid digital elevation models and its application in computing topographical index,** J. Xu, Institute of Atmospheric Physics (China) . . . . . [6748-43]

✔ **Unsupervised SAR images change detection with hidden Markov chains on a sliding window,** Z. Bouyahia, The Univ. of Manouba (Tunisia); S. Derrode, Ecole Nationale Superieure (France); F. Ghorbel, The Univ. of Manouba (Tunisia) . . . . . [6748-44]

✔ **Fuzzy pairwise Markov chain and copulas for non-Gaussian image segmentation,** S. Derrode, Institut Fresnel (France); C. Carincotte, Multitel (Belgium); S. Bourennane, Institut Fresnel (France) . . . . . [6748-45]

✔ **Reduced false alarm automatic detection of clouds and shadows on SPOT images using simultaneous estimation,** S. Le Hegarat-Mascle, Institut d'Electronique Fondamentale (France) and Univ. Paris Sud (France); C. Andre, Institut Pierre Simon Laplace (France) . . . . . [6748-46]

✔ **Water wake extraction from air photos based on orientation Fourier spectrum,** H. Wang, D. Pan, Y. Ding, X. He, State Oceanic Administration (China) . . . . . [6748-48]

✔ **Hyperpectral image compression using KLT and adaptive directional wavelet transform,** J. Wu, Xidian Univ. (China) . . . . . [6748-49]

✔ **A new target association algorithm based on invariant features in remote sensing images,** L. Lei, Y. Su, Z. Li, National Univ. of Defense Technology (China) . . . . . [6748-50]

✔ **A hybrid classification method using spectral, spatial and textural features for remotely sensed images based on morphological filtering,** H. Okumura, M. Yamaura, K. Arai, Saga Univ. (Japan) . . . . . [6748-51]

✔ **Data fusion of multisensor spaceborne imageries based on 3D discrete wavelet scheme,** H. Yoo, Seoul National Univ. (South Korea); K. Lee, Hansung Univ. (South Korea); B. Kwon, Seoul National Univ. (South Korea) [6748-52]

✔ **Feature extraction on multiscale geometric features for classification of remote sensing images from urban areas,** R. Bellens, L. Martinez-Fonte, Univ. Gent (Belgium); J. Cheung-Wai Chan, Vrije Univ. Brussel (Belgium); S. Gautama, Univ. Gent (Belgium) . . . . . [6748-53]

✔ **Contribution of Landsat ETM+ thermal band for land cover classification using SMAP and ML algorithms: case study, Eastern Carpathians,** A. Ehsani, F. Quiel, Kungliga Tekniska Högskolan (Sweden) . . . . . [6748-54]

✔ **Topographic studies of archaeological areas by remotely sensed images,** P. P. M. Merola, D. Guglietta, S. Sampieri, A. Allegrini, Consiglio Nazionale delle Ricerche (Italy) . . . . . [6748-55]

✔ **Landform identification using neural network self-organizing map and SRTM data: case study, Eastern Carpathians,** A. Ehsani, F. Quiel, Kungliga Tekniska Högskolan (Sweden) . . . . . [6748-56]

✔ **Improved minimal inter-quantile distance method for blind estimation of noise variance in images,** V. V. Lukin, S. K. Abramov, National Aerospace Univ. (Ukraine); K. O. Egiazarian, J. T. Astola, Tampere Univ. of Technology (Finland); B. Vozel, K. Chehdi, Univ. de Rennes I (France) . . . . . [6748-57]

✔ **Time frequency analysis for radar interferogram denoising,** H. Fattahi, M. J. Valadan Zouj, M. R. Mobasheri, M. Dehghani, K.N. Toosi Univ. of Technology (Iran) . . . . . [6748-59]

✔ **Using empirical mode decomposition and wavelet analysis to study the optical turbulence record over 0.6 km horizontal paths,** M. P. Chang, J. Rosado, Univ. de Puerto Rico Mayagüez (USA) . . . . . [6748-60]

✔ **Classification of motion-blurred images using circular moments,** C. Toxqui-Quitl, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); A. Padilla-Vivanco, Univ. Politécnica de Tulancingo (Mexico); F. S. Granados-Agustin, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) . . . . . [6748-61]

✔ **Practical lessons learned in deploying quick reaction remote sensing technologies,** J. A. Orson, National Reconnaissance Office (USA); T. Hague, U.S. Air Force Academy (USA) . . . . . [6748-62]

✔ **Study on the spectral transmission characteristics of MWIR through the atmosphere,** J. Choi, T. Kim, Chung-Ang Univ. (South Korea) . . . [6748-63]

✔ **KOMPSAT-2 direct sensor modeling and geometric calibration/validation,** D. C. Seo, Korea Aerospace Research Institute (South Korea) . . . [6748-64]

✔ **NUC algorithm of KOMPSAT-2 in on-board relative radiometric calibration,** J. Song, Korea Aerospace Research Institute (South Korea) . . . . . [6748-65]

✔ **The georeferencing errors of satellite data in remote sensing applications,** E. Alecu, National Meteorological Administration (Romania) . . . . . [6748-66]

Wednesday 19 September

SESSION 3

Room: 3a . . . . . Wed. 08.30 to 10.10

Hyperspectral Data Analysis and Classification I

Chair: **Roger L. King**, Mississippi State Univ. (USA)

08.30: **Recent developments and future directions in hyperspectral data classification *(Invited Paper)*,** A. J. Plaza, Univ. de Extremadura (Spain) . . . . . [6748-10]

09.10: **Introducing training and parameter tuning for KOSP classification of hyperspectral images,** L. Capobianco, L. Carli, F. Nencini, A. Garzelli, Univ. degli Studi di Siena (Italy) . . . . . [6748-11]

09.30: **On the role of spectral resolution and classifier complexity in the analysis of hyperspectral images of forest areas,** L. Bruzzone, Univ. degli Studi di Trento (Italy); M. Dalponte, Univ. degli Studi di Trento (Italy) and Ctr. di Ecologia Alpina (Italy); D. Gianelle, Ctr. di Ecologia Alpina (Italy) . . . . [6748-12]

09.50: **An assessment on the effectiveness of pre-segmentation of hyperspectral imagery to support various system trade analyses,** S. T. Kacenjar, P. North, M. Hoffberg, Lockheed Martin Corp. (USA) . . . . . [6748-13]

Coffee Break . . . . . 10.10 to 10.40

SESSION 4

Room: 3a . . . . . Wed. 10.40 to 12.20

Anomaly and Target Detection in Hyperspectral Images

Chair: **José M. P. Nascimento**, Instituto Superior Técnico (Portugal)

10.40: **Comparative analysis of hyperspectral anomaly detection strategies on a new high spatial and spectral resolution data set,** S. Matteoli, F. Carnesecchi, M. Diani, G. Corsini, Univ. of Pisa (Italy); L. Chiarantini, Galileo Avionica SpA (Italy) . . . . . [6748-14]

11.00: **Blind hyperspectral unmixing,** J. M. P. Nascimento, J. M. Bioucas-Dias, Instituto Superior Técnico (Portugal) . . . . . [6748-15]

11.20: **Hyperspectral clutter, phenomenology, and detection algorithms,** M. Bernhardt, C. A. Steer, Waterfall Solutions Ltd. (United Kingdom) . . . . . [6748-16]

11.40: **Correlated-k based fast, accurate bandpass radiance and transmittance calculations for hyperspectral and multispectral scenes,** P. K. Acharya, R. Panfili, A. Berk, S. M. Adler-Golden, Spectral Sciences, Inc. (USA); A. Wetmore, R. C. Shirkey, Army Research Lab. (USA) . . . . . [6748-17]

12.00: **Non-negative factorization of non-negative matrices,** J. H. Gruninger, Spectral Sciences, Inc. (USA) . . . . . [6748-18]

Lunch Break . . . . . 12.00 to 13.50

SESSION 5

Room: 3a . . . . . Wed. 13.50 to 15.10

Estimation and Regression of Biophysical Parameters

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

13.50: **Automatic land and sea surface temperature estimation from remote sensing data,** S. B. Serpico, G. Moser, Univ. degli Studi di Genova (Italy) . . . . . [6748-19]

14.10: **Moisture effects removal on soil spectra,** F. Tavin, A. Minghelli-Roman, Univ. de Bourgogne (France); S. Mathieu, Alcatel Alenia Space (France); W. Liu, Institute of Urban Meteorology (China); F. Baret, Institut National de la Recherche Agronomique (France); P. Gouton, Univ. de Bourgogne (France) . . . . . [6748-20]

14.30: **TBA**

14.50: **Image-based method for estimating signal-noise to ratio (SNR) in remotely-sensed data,** A. Asmat, Univ. of Southampton (United Kingdom); G. M. Foody, The Univ. of Nottingham (United Kingdom); P. Atkinson, Univ. of Southampton (United Kingdom) . . . . . [6748-22]

Coffee Break . . . . . 15.10 to 16.00

SESSION 6

Room: 3a . . . . . Wed. 15.40 to 16.20

Data Compression

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

15.40: **Interband distortion allocation in loss compression of hyperpectral imagery,** S. Baronti, C. Lastri, B. Aiazzi, Istituto di Fisica Applicata Nello Carrara (Italy); L. Alparone, Univ. degli Studi di Firenze (Italy) . . . . . [6748-23]

16.00: **Interactive decoding for the CCSDS recommendation for image data compression,** F. Garcia-Vilchez, J. Serra-Sagristà, A. Zabala, X. Pons, Univ. Autònoma de Barcelona (Spain) . . . . . [6748-24]

Thursday 20 September

SESSION 7

Room: 3a . . . . . Thurs. 08.30 to 10.30

Hyperspectral Data Analysis and Classification II

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

08.30: **Robust classification of hyperspectral images *(Invited Paper)*,** A. S. Solberg, Univ. I Oslo (Norway) . . . . . [6748-26]

09.10: **Investigation of an ensemble framework for classification of hyperspectral remote sensing data with nearly equal spectral response classes,** M. Zortea, S. B. Serpico, Univ. of Genoa (Italy) . . . . . [6748-27]

09.30: **Assessment of quality parameters for a new generation hyperspectral imager,** B. Aiazzi, Istituto di Fisica Applicata Nello Carrara (Italy); L. Alparone, Univ. degli Studi di Firenze (Italy); A. Barducci, S. Baronti, D. Guzzi, I. Pippi, P. Marcoionni, M. Selva, Istituto di Fisica Applicata Nello Carrara (Italy) . . . . . [6748-28]

09.50: **Efficient regularized LDA for hyperspectral image classification,** T. V. Bandos, Univ. de València (Spain); L. Bruzzone, Univ. degli Studi di Trento (Italy); G. Camps-Valls, Univ. de València (Spain) . . . . . [6748-29]

10.10: **Co-registration of hyperspectral bands,** Z. Figov, K. Wolowelsky, N. Goldberg, RAFAEL Armament Development Authority Ltd. (Israel) . . [6748-30]

Coffee Break . . . . . 10.30 to 11.00

SESSION 8

Room: 3a . . . . . Thurs. 11.00 to 12.20

Data Classification

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

11.00: **Genetic algorithms in estimating optimal neural network topologies for the classification of remotely sensed images,** D. N. Stathakis, Joint Research Ctr. (Italy) . . . . . [6748-31]

11.20: **Automatic snow extent extraction in alpine environments: short and medium term 2000-2006 analysis,** G. Lisini, P. Gamba, E. Merlin, F. Riva, Univ. degli Studi di Pavia (Italy) . . . . . [6748-32]

11.40: **Information sources fusion approach in forest stand classification,** Z. Ben Dhiaf, Univ. de Tunis (Tunisia) and The Univ. of the Antilles and Guyana (France); J. Desachy, The Univ. of the Antilles and Guyana (France); A. Hamouda, Univ. de Tunis (Tunisia) . . . . . [6748-33]

12.00: **Land cover characterization through parametric modeling of intra-annual reflectance time series: a comparative study with MERIS data,** H. M. Carrão, Instituto Geográfico Portugês (Portugal) and Institute of Statistics and Information Management (Portugal); P. J. Sequeira Goncalves, Ecole normale supérieure de Lyon (France); M. R. Caetano, Instituto Geográfico Portugês (Portugal) . . . . . [6748-34]

Lunch Break . . . . . 12.20 to 14.00

SESSION 9

Room: 3a . . . . . Thurs. 14.00 to 15.00

SAR, LIDAR, and GPR

Chair: **Sebastiano B. Serpico**, Univ. of Genoa (Italy)

14.00: **A novel ship identification system based on polarimetric ASAR data,** G. Panagopoulos, Univ. of Patras (Greece); V. Tsagaris, Univ. of Patras (Greece) and Aratos Technologies (Greece); V. Anastassopoulos, Univ. of Patras (Greece) . . . . . [6748-35]

14.20: **Fusion of AIS and SAR data for maritime surveillance,** S. P. Coraluppi, NATO Undersea Research Ctr. (Italy) . . . . . [6748-36]

14.40: **Coherent change detection and classification in synthetic aperture radar imagery using canonical correlation analysis,** M. R. Azimi-Sadjadi, S. K. Srinivasan, Colorado State Univ. (USA) . . . . . [6748-67]

Coffee Break . . . . . 15.00 to 15.30

SESSION 10

Room: 3a . . . . . Thurs. 15.30 to 16.30

Geometric and Radiometric Corrections

Chair: **Demetris N. Stathakis**, Joint Research Ctr. (Italy)

15.30: **High accurate geometric correction for NOAA AVHRR data considering the variation of elevation effect,** A. N. Van, Y. Aoki, Shibaura Institute of Technology (Japan) . . . . . [6748-39]

15.50: **GIFTS SM EDU Level 1B algorithms,** J. Tian, M. J. Gazarik, R. A. Reisse, D. G. Johnson, NASA Langley Research Ctr. (USA) . . . . . [6748-40]

16.10: **Disturbances and their corrections in space observation with GOSAT Fourier transform spectrometer,** T. Aoki, T. Yokota, National Institute for Environmental Studies (Japan); G. Inoue, Nagoya Univ. (Japan); K. Nobuta, A. Kotani, Fujitsu FIP Corp. (Japan) . . . . . [6748-41]

Monday-Thursday 17-20 September 2007 • Proceedings of SPIE Vol. 6749

Remote Sensing for Environmental Monitoring, GIS Applications, and Geology

Conference Chairs: **Manfred Ehlers**, Institute for Geoinformatics and Remote Sensing, Univ. Osnabrück (Germany); **Ulrich Michel**, Institute for Geoinformatics and Remote Sensing, Univ. Osnabrück (Germany)

Cochair: **Hermann J. Kaufmann**, GeoForschungsZentrum Potsdam e.V. (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**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (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**, Gesellschaft für wissenschaftliche Datenverarbeitu (Germany); **Rosa Lasaponara**, Istituto di Metodologie per l'Analisi Ambientale (Italy); **Marguerite M. Madden**, The Univ. of Georgia (USA); **Derya Maktav**, Istanbul Technical Univ. (Turkey); **Nicola Masini**, Consiglio Nazionale delle Ricerche (Italy); **Josiane Masson**, European Commission (Italy); **Matthias S. Möller**, Arizona State Univ. (USA); **Konstantinos G. Nikolakopoulos**, Univ. of Athens (Greece); **Florian Savopol**, Natural Resources Canada (Canada); **Michael E. Schaepman-Strub**, Wageningen Univ. (Netherlands); **Wenzhong Shi**, The Hong Kong Polytechnic Univ. (Hong Kong China); **Karl Staenz**, Univ. of Lethbridge (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)

Monday 17 September

Opening Remarks . . . . . 13.45 to 13.50

Manfred Ehlers, Institute for Geoinformatics and Remote Sensing, Univ. Osnabrück (Germany); **Ulrich Michel,** Institute for Geoinformatics and Remote Sensing, Univ. Osnabrück (Germany)

SESSION 1

Room: 3b . . . . . Mon. 13.50 to 15.20

Remote Sensing and Archaeology I

Chair: **Rosa Lasaponara**, Istituto di Metodologie per l'Analisi Ambientale (Italy)

13.50: **From space to place or from site to landscape? Mind the gap! *(Invited Paper),*** S. R. L. Campana, Univ. degli Studi di Siena (Italy) . [6749-01]

14.20: **Techniques for improving the detection of archaeological features from satellite imagery,** A. R. Beck, Univ. of Leeds (United Kingdom); G. Philip, Durham Univ. (United Kingdom) . . . . . [6749-02]

14.40: **Remote sensing and archaeological survey in the Hierapolis of Phrygia territory, Turkey,** G. Scardozzi, Consiglio Nazionale delle Ricerche (Italy) . . . . . [6749-03]

15.00: **Best practice approaches for applying satellite imagery for landscape archaeological applications: a case study around the World Heritage Site of Sanchi, India,** A. R. Beck, Univ. of Leeds (United Kingdom); J. Shaw, Univ. College London (United Kingdom) . . . . . [6749-04]

Coffee Break . . . . . 15.20 to 15.50

SESSION 2

Room: 3b . . . . . Mon. 15.50 to 17.30

Remote Sensing and Archaeology II

Chairs: **Stefano R. L. Campana**, Univ. degli Studi di Siena (Italy); **Nicola Masini**, Consiglio Nazionale delle Ricerche (Italy)

15.50: **Reconstructing the archaeological landscape of Southern Dobrogea: integrating imagery,** I. A. Oltean, W. S. Hanson, Univ. of Glasgow (United Kingdom) . . . . . [6749-05]

16.10: **On the use of satellite Quickbird imagery in archaeological context,** R. Lasaponara, Istituto di Metodologie per l'Analisi Ambientale (Italy); N. Masini, Consiglio Nazionale delle Ricerche (Italy) . . . . . [6749-06]

16.30: **Finding archaeological cropmarks: a hyperspectral approach,** A. Aqdus, W. S. Hanson, J. Drummond, Univ. of Glasgow (United Kingdom) . . . . . [6749-07]

16.50: **Undercanopy archaeology using airborne laser scanner to overcome the Mediterranean vegetation,** S. R. L. Campana, Univ. degli Studi di Siena (Italy); D. Donoghue, N. Galiatsatos, Univ. of Durham (United Kingdom) . . . . . [6749-08]

17.10: **The effect of pixel resolution and spectral characteristics on the extraction of archaeological features from very high-resolution remote sensing imagery: Sagalassos, southwest Turkey,** V. L. De Laet, E. Paulissen, Katholieke Univ. Leuven (Belgium); K. Meuleman, Flemish Institute for Technological Research (Belgium); M. Waelkens, Katholieke Univ. Leuven (Belgium) . . . . . [6749-09]

Tuesday 18 September

SESSION 3

Room: 3b . . . . . Tues. 08.30 to 10.30

Environmental Monitoring I

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

08.30: **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) . . . . . [6749-10]

08.50: **Evaluation of spatial interpolators in the framework of a geographical information system: a case study using oceanographic data,** D. Kitsiou, T. E. Nitis, M. N. Kostopoulou, N. Maravelakis, G. Maneas, Univ. of the Aegean (Greece) . . . . . [6749-11]

09.10: **Ship traffic monitoring using satellite SAR images in combination with AIS reports,** D. J. Weydahl, R. Olsen, Norwegian Defense Research Establishment (Norway) . . . . . [6749-12]

09.30: **Long-term monitoring of sea-based oil pollution in the European seas,** G. Ferraro, S. Meyer-Roux, O. Muellenhoff, D. Tarchi, K. Topouzelis, Joint Research Ctr. (Italy) . . . . . [6749-13]

09.50: **Remote sensing and GIS application for impact evaluation of watershed development programme,** S. N. Das, A. K. Barman, Indian Agricultural Research Institute (India) . . . . . [6749-14]

10.10: **Regional ecological risk assessment by remote in Bosten Lake,** W. Liu, Xinjiang Univ. (China) . . . . . [6749-15]

Coffee Break . . . . . 10.30 to 11.00

SESSION 4

Room: 3b . . . . . Tues. 11.00 to 12.00

Environmental Monitoring II

Chair: **Matthias S. Möller**, Univ. Bonn (Germany)

11.00: **Remote sending and GIS for land-use planning in industrial and urban areas,** A. Marino, M. Ciucci, M. Mariani, A. Moccaldi, Istituto Superiore per la Prevenzione e la Sicurezza del Lavoro (Italy) . . . . . [6749-16]

11.20: **Mountain pine beetle detection, monitoring and modeling: enhancement, interpretation and evaluation of airborne imagery,** A. C. Roberts, C. Bone, S. Dragicevic, J. Northrup, Simon Fraser Univ. (Canada) . . . [6749-17]

11.40: **Landslide susceptibility analysis using an artificial neural network model,** S. Mansor, B. Pradhan, Univ. Putra Malaysia (Malaysia) . . . . [6749-18]

Lunch Break . . . . . 12.00 to 13.40

SESSION 5

Room: 3b . . . . . Tues. 13.40 to 14.20

Environmental Monitoring III

Chair: **A. R. Beck,** Univ. of Leeds (United Kingdom)

13.40: **Space oil spills atlas of the offshore United Arab Emirates,** S. M. Issa, United Arab Emirates Univ. (United Arab Emirates) . . . . . [6749-21]

14.00: **Soil erosion extraction and the key factors in complex topographical region,** J. Pan, Chongqing Jiaotong Univ. (China) . . [6749-22]

Stand-by Oral Presentation

Multi-temporal satellite observation of Pirotan Island (Marine National Park, Gulf of Kachchh, Jamnagar, India) monitoring using remote sensing, S. Chavan, GEER Foundation (India); S. Sharma, Space Applications Centre (ISRO) (India) . . . . . [6749-123]

SESSION 6

Room: 3b . . . . . Tues. 14.20 to 15.40

Processing Methodologies I

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

14.20: **MoZis: mobile zoo information system,** U. Michel, Univ. Osnabrück (Germany) . . . . . [6749-23]

14.40: **Contents correlation and genetic algorithms-based remote sensing images fusion,** Y. Na, Xidian Univ. (China); M. Ehlers, Univ. Osnabrück (Germany); H. Ji, L. Shi, Xidian Univ. (China) . . . . . [6749-24]

15.00: **Resolution enhancement of hyperion hyperspectral data using Ikonos multispectral data,** E. M. Winter, Technical Research Associates, Inc. (USA); M. E. Winter, Univ. of Hawaii at Manoa (USA); S. G. Beaven, Space Computer Corp. (USA); A. J. Ratkowski, Air Force Research Lab. (USA) . . . . . [6749-25]

15.20: **Fusion of MODIS land channels to produce Canada-wide time series of surface albedo at 250m and 10-day intervals for climate change and terrestrial monitoring applications,** A. P. Trishchenko, Y. Luo, K. V. Khlopenkov, W. M. Park, Canada Ctr. for Remote Sensing (Canada) . . . . . [6749-26]

Coffee Break . . . . . 15.40 to 16.10

SESSION 7

Room: 3b . . . . . Tues. 16.10 to 17.10

Urban Remote Sensing I

Chair: **I. A. Oltean,** Univ. of Glasgow (United Kingdom)

16.10: **Change detection in urban scenes by fusion of SAR and hyperspectral data,** D. C. J. Borghys, M. Shimoni, C. Perneel, Royal Belgian Military Academy (Belgium) . . . . . [6749-27]

16.30: **Analysis of polarimetric SAR response from man-made objects in an urban area.,** D. J. Weydahl, Norwegian Defense Research Establishment (Norway) . . . . . [6749-28]

16.50: **Geospatial intelligence about urban areas using SAR,** B. van den Broek, R. J. Dekker, TNO (Netherlands) . . . . . [6749-29]

✔ Posters-Tuesday

All registered symposium attendees are invited to attend the interactive poster session. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway on the Ground Floor of the Convention Ctr. An interactive poster session and reception with authors present will be held on Tuesday 18.00 to 19.30. Light refreshments will be served.

✔ **Analysis of urban heat island effect by remote sensing satellite data,** M. A. Zoran, National Institute of Research & Development for Optoelectronics (Romania) . . . . . [6749-37]

✔ **Laser-Scanner and GIS instruments to analize, validate and prevent the hydro-geologic risk: applied example in Pordenone's urban area, Friuli-Venezia Giulia region, Italy,** M. Maso, A. Rosina, F. Baldan, T. Busa, M. Carone, R. Costantino, N. Randelli, Univ. Iuav di Venezia (Italy) . . [6749-66]

✔ **Comparison of the performances of middle-resolution multi-spectral images for vegetation cover rate extraction based on mixture,** Y. Suga, Hiroshima Institute of Technology (Japan); T. Konishi, Computer Aided Design & Information Ctr. (Japan); S. Takeuchi, Hiroshima Institute of Technology (Japan) . . . . . [6749-67]

✔ **A distance variable to simulate the urban population,** X. Wang, M. Ma, Cold and Arid Regions Environmental and Engineering Research Institute (China) . . . . . [6749-69]

✔ **Contribution of the data thematic mapper to the fracturation of the region of Ain Témouchent, Low Tafna: relationship between the failles and the eruptive centers,** S. A. Ahmed Zine Eddine, Ctr. National des Techniques Spatiales (Algeria) . . . . . [6749-70]

✔ **Analysis of key issues about the selection methods of suitable scales in monitoring land use in the Tarim River Basin, Xinjiang, China,** J. Zhao, X. Chen, A. Bao, Xinjiang Institute of Ecology and Geography (China); Y. Duan, Xinjiang Management Bureau of Tarim River (China) . . . . . [6749-71]

✔ **Landscape pattern and process of modern oasis in Xinjiang, China,** J. Huang, Y. Lin, S. Dong, Xinjiang Institute of Ecology and Geography (China) . . . . . [6749-72]

✔ **A comparative study of urban expansion on Hong Kong and Macao special administrative region in the past three decades,** F. Mu, Institute of Remote Sensing Applications (China) . . . . . [6749-73]

✔ **Synthetic generation of airport familiarization using geo information systems,** N. Zimmer, M. Launer, J. Schiefele, Jeppesen GmbH (Germany) . . . . . [6749-74]

✔ **Analysis of wetland landscape change in Sheyang Lake region,** C. Ke, Nanjing Univ. (China) . . . . . [6749-75]

✔ **Photoswitchable surfaces: a new approach to chemical sensing,** A. Radu, S. Scarmagnani, R. H. Byrne, C. Slater, N. Alhashimy, D. Diamond, Dublin City Univ. (Ireland) . . . . . [6749-76]

✔ **Rice crop growth monitoring using ENVISAT-1/ASAR AP mode,** T. Konishi, Computer Aided Design & Information Ctr. (Japan); Y. Suga, Hiroshima Institute of Technology (Japan); S. Omatu, Osaka Prefecture Univ. (Japan); S. Takeuchi, K. Asonuma, Hiroshima Institute of Technology (Japan) . . . . . [6749-77]

✔ **Landuse transformation and ecosystem health assessment from 1986 to 2005 in Zhejiang coastal zone,** Z. Chen, State Oceanic Administration (China) and Zhejiang Univ. (China); Z. Mao, J. Chen, Q. Zhu, J. Zou, State Oceanic Administration (China) . . . . . [6749-78]

✔ **Ion-selective electrodes as detector systems autonomous environmental sensing devices,** T. Radu, A. Radu, D. Diamond, Dublin City Univ. (Ireland) . . . . . [6749-79]

✔ **Remote sensing of agro-droughts in Guangdong Province of China using MODIS satellite data,** M. Gao, Chinese Academy of Agricultural Sciences (China); X. Zhou, H. Zhang, Guangzhou Geographic Institute (China); H. Tang, Z. Qin, Chinese Academy of Agricultural Sciences (China) . . . . . [6749-80]

✔ **Retrieving spatial-temporal variation of land surface temperature in Tibet Plateau of China for the years 2005-2006 from MODIS satellite data,** M. Gao, H. Tang, Z. Qin, Chinese Academy of Agricultural Sciences (China); H. Pei, Nanjing Univ. (China); J. Qiu, Chinese Academy of Agricultural Sciences (China) . . . . . [6749-81]

✔ **Mapping vegetation cover variation of grassland ecosystem for desertification monitoring in Hulunber region of Inner Mongolia, China,** Y. Zhu, Nanjing Univ. (China); H. Tang, Z. Qin, Chinese Academy of Agricultural Sciences (China); X. Lei, Nanjing Univ. (China); B. Xu, Chinese Academy of Agricultural Sciences (China) . . . . . [6749-82]

✔ **Land-use and land-cover changes affect local and regional climates in Piracicaba, Brazil,** P. P. Coltri, S. Freitas, Instituto Nacional de Pesquisas Espaciais (Brazil); V. A. Demetrio, Univ. de São Paulo (Brazil); N. J. Ferreira, Instituto Nacional de Pesquisas Espaciais (Brazil) . . . . . [6749-83]

✔ **Monitoring vegetation growth in the grassland of China using MODIS satellite data,** B. Xu, X. Yang, Z. Qin, Chinese Academy of Agricultural Sciences (China) . . . . . [6749-84]

✔ **The application of GIS in the regionalization of plastic and sunlight greenhouse,** F. Guan, R. Wei, Meteorological Institute of Hebei Province (China) . . . . . [6749-85]

✔ **Coupling relationship of land surface temperature, impervious surface area and normalized difference vegetation index for urban heat island using remote sensing,** X. Wu, Q. Cheng, Zhejiang Gongshang Univ. (China) . . . . . [6749-86]

✔ **Urban applications of multi-typed space-borne imageries using standard mobile 3D open graphic API,** K. Lee, Hansung Univ. (South Korea) . . . . . [6749-87]

✔ **A threshold method for coastal line feature extraction from satellite imagery,** L. V. I. Zoran, C. Golovanov, Univ. Politehnica Bucuresti (Romania); M. A. Zoran, National Institute of Research & Development for Optoelectronics (Romania) . . . . . [6749-88]

✔ **Analysis of hyperspectral data for lithological identification using support vector machines,** A. M. N. Ahmed, M. A. E. Farag, M. A. Yahia, H. H. Ramadan, M. S. Abd Elwahab, Ain Shams Univ. (Egypt) . . . [6749-90]

✔ **A WebGIS system on the base of satellite data processing system for marine application,** G. Fang, D. Wang, H. Huang, J. Chen, State Oceanic Administration (China) . . . . . [6749-91]

✔ **Ring structure characteristics of South Ordos Basin and its control factors in the deep,** F. Yang, Shandong Univ. of Science and Technology (China) . . . . . [6749-92]

✔ **Consideration of grazing treatments for aboveground biomass estimation from MODIS data in Inner Mongolia of China,** W. Tao, B. Xu, X. Yang, Z. Qin, Chinese Academy of Agricultural Sciences (China)[6749-93]

✔ **Remote sensing data of sparse crown assimilation using GORT and LSMM model in Tarim River Basin, Xinjiang, China,** G. Jiapaer, X. Chen, Xinjiang Institute of Ecology and Geography (China); S. Liu, Beijing Normal Univ. (China) . . . . . [6749-94]

✔ **An application of the VIC-3L hgdrological model for Lake Poyang Basin based on remote sensing,** S. Huang, Meteorological Research Institute of Jiangxi Province (China) . . . . . [6749-95]

✔ **A meteorological assessment method of ecological quality based on remote sensing and GIS,** S. Huang, Meteorological Research Institute of Jiangxi Province (China) . . . . . [6749-96]

✔ **Scale effect of geological environment monitoring,** Z. Zhou, Hohai Univ. (China) . . . . . [6749-97]

✔ **Environmental monitoring and data sharing,** Z. Zhou, Hohai Univ. (China) . . . . . [6749-98]

✔ **Characteristics of the GPR field pattern antennas,** V. Pérez-Gracia, R. González-Drigo, D. Di Capua, L. G. Pujades, Univ. Politecnica de Cataluña (Spain) . . . . . [6749-99]

✔ **Experimental analysis of the resolution is shallow GPR survey,** V. Pérez-Gracia, R. González-Drigo, D. Di Capua, L. G. Pujades, Univ. Politecnica de Cataluña (Spain) . . . . . [6749-100]

✔ **Morphotectonics in the broader area of Athens using Aster epipolar imagery,** M. Foumelis, I. Fountoulis, Univ. of Athens (Greece); I. Parcharidis, Harokopio Univ. of Athens (Greece) . . . . . [6749-101]

✔ **Hybrid control and data acquisition system for geographically sensors for environmental monitoring,** F. Garufi, Univ. degli Studi di Napoli Federico II (Italy); A. Boiano, Istituto Nazionale di Fisica Nucleare (Italy); F. Acernese, Univ. degli Studi di Salerno (Italy); R. De Rosa, Univ. degli Studi di Napoli Federico II (Italy); R. Romano, F. Barone, Univ. degli Studi di Salerno (Italy) . . . . . [6749-102]

✔ **Laser interferometric sensor for seismic wave velocity measurement,** F. Acernese, Univ. degli Studi di Salerno (Italy); R. De Rosa, F. Garufi, Univ. degli Studi di Napoli Federico II (Italy); R. Romano, F. Barone, Univ. degli Studi di Salerno (Italy) . . . . . [6749-103]

✔ **Average coherence image-derived observations over an urban area: the case of Athens,** I. Parcharidis, Harokopio Univ. of Athens (Greece); M. Foumelis, Univ. of Athens (Greece); P. Kourkouli, Harokopio Univ. of Athens (Greece) . . . . . [6749-104]

✔ **An approach for GIS-based statistical landslide susceptibility zonation: a case study in the northern part of El Salvador,** V. Kopackova, J. Sebesta, Czech Geological Survey (Czech Republic) . . . . . [6749-105]

✔ **Monitoring water coastline thermal anomalies by remotely-sensed data,** S. Sampieri, A. Allegrini, D. Guglietta, E. Mercuri, P. P. M. Merola, Consiglio Nazionale delle Ricerche (Italy) . . . . . [6749-106]

✔ **Change detection analysis of multi-temporal images in Naples area,** D. Guglietta, P. P. M. Merola, S. Sampieri, A. Allegrini, Consiglio Nazionale delle Ricerche (Italy) . . . . . [6749-108]

✔ **Thematic maps production for emergency management purposes: the ITHACA project,** F. Perez, A. Ajmar, F. Disabato, Politecnico di Torino (Italy) . . . . . [6749-109]

✔ **Roughness effects on thermal-infrared emissivities estimated from remotely-sensed images,** A. Mushkin, I. Danilina, A. R. Gillespie, Univ. of Washington (USA); L. K. Balick, M. F. McCabe, Los Alamos National Lab. (USA) . . . . . [6749-110]

✔ **On the use of data fusion tecniques for improving satellite QuickBird capabablity for archaeological prospection,** R. Lasaponara, A. Lanorte, R. Coluzzi, Istituto di Metodologie per l'Analisi Ambientale (Italy); N. Masini, Consiglio Nazionale delle Ricerche (Italy) . . . . . [6749-111]

✔ **Accurate pose and location estimation of digital camera using urban building natural features,** W. Xie, Old Dominion Univ. (USA) . . . [6749-112]

✔ **Camera calibration with long focal length using building natural features,** W. Xie, G. Zhou, Old Dominion Univ. (USA) . . . . . [6749-113]

✔ **Indexes for assessing the spectral range more sensitive to the detection of buried structures,** R. M. Cavalli, L. Fusilli, Istituto sull'Inquinamento Atmosferico (Italy); A. Palombo, Istituto di Metodologie per l'Analisi Ambientale (Italy); S. Pascucci, F. Santini, Istituto sull'Inquinamento Atmosferico (Italy) . . . . . [6749-115]

✔ **Retrieving vegetation cover types in the complex natural ecosystem of the Pollino National Park (south Italy) through hyperion data,** L. Fusilli, C. Bassani, S. Pascucci, Istituto sull'Inquinamento Atmosferico (Italy); S. Pignatti, Istituto di Metodologie per l'Analisi Ambientale (Italy) . . [6749-116]

✔ **Virtual Huanghe River system: framework and technology,** H. Lu, Institute of Geographical Sciences and Natural Resources Research (China); G. Liu, Henan Univ. (China) . . . . . [6749-117]

✔ **Strategies of remote sensing monitoring of changes in NATURA 2000 sites: a practical assessment in coastal mountains of NW Iberian Peninsula,** R. A. Diaz Varela, P. Ramil Rego, S. Calvo Iglesias, Univ. de Santiago de Compostela (Spain) . . . . . [6749-118]

✔ **Gas concentration detection based on Kalman filtering theory,** Z. Bi, F. Fan, Zhejiang Univ. (China) . . . . . [6749-119]

✔ **Study on simulating spatial distribution and varying patterns of population in Urumqi, China,** X. Chen, Xinjiang Institute of Ecology and Geography (China) . . . . . [6749-120]

✔ **Application of CIRILLO, a new atmospheric correction tool on Castel Porziano Beach (CPB),** M. Musacchio, S. Amici, M. Silvestri, Istituto Nazionale di Geofisica e Vulcanologia (Italy); S. Teggi, Univ. degli Studi di Modena e Reggio Emilia (Italy); M. F. Buongiorno, Istituto Nazionale di Geofisica (Italy); M. A. Sgavetti, S. Silenzi, S. Devoti, Univ. degli Studi di Parma (Italy) . . . . . [6749-121]

✔ **The application of the covariance matrix statistical method for removing atmospheric effects intended for environmental applications,** D. G. Hadjimitsis, Cyprus Institute of Technology (Cyprus); C. R. Clayton, Univ. of Southampton (United Kingdom) . . . . . [6749-122]

Wednesday 19 September

SESSION 8

Room: 3b . . . . . Wed. 09.20 to 10.20

Urban Remote Sensing II

Chair: **Sherif El Ghazali**, Information Technology Institute (Egypt)

09.20: **Detection and feature extraction of bridges in airborne and spaceborne SAR image data,** K. Schulz, A. Thiele, E. Cadario, U. Thoennessen, H. Gross, H. Hammer, Forschungsgesellschaft für Angewandte Naturwissenschaften e.V. (Germany); U. Soergel, Leibniz Univ. Hannover (Germany) . . . . . [6749-31]

09.40: **Evaluation of a hyperspectral scanner allowing for deterioration status assessment of asbestos-cement roofing sheets,** S. Pascucci, C. Bassani, L. Fusilli, Istituto sull'Inquinamento Atmosferico (Italy); A. Palombo, Istituto di Metodologie per l'Analisi Ambientale (Italy) . . . . . [6749-32]

10.00: **The construction of as-built digital urbanscape: from building components to a city,** N. Shih, National Taiwan Univ. of Science and Technology (Taiwan) . . . . . [6749-33]

Coffee Break . . . . . 10.20 to 10.40

SESSION 9

Room: 3b . . . . . Wed. 10.40 to 11.40

Urban Remote Sensing III

Chair: **Karsten Schulz**, Forschungsgesellschaft für Angewandte Naturwissenschaften e.V. (Germany)

10.40: **Monitoring informal settlements from high resolution satellite data using an object-based approach,** T. Blaschke, I. Georg, Paris-Lodron-Univ. Salzburg (Austria); P. Hofmann, Leibniz Univ. Hannover (Germany) . . [6749-34]

11.00: **Accessing climate model input parameters from various remote sensing sources for the city of Beijing,** M. S. Möller, T. Blaschke, Univ. Salzburg (Austria) and Univ. Bonn (Germany) . . . . . [6749-35]

11.20: **The effect of land-cover change on the urban heat island phenomenon: Greater Cairo case study,** S. El Ghazali, Information Technology Institute (Egypt); A. Shakweer, Information and Decision Support Ctr. (Egypt); A. A. Darwish, Information Technology Institute (Egypt) . [6749-36]

Lunch Break . . . . . 11.40 to 13.40

SESSION 10

Room: 3b . . . . . Wed. 13.40 to 15.00

Processing Methodologies II

Chair: **Tilman U. Bucher**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)

13.40: **Atmospheric data access for the geospatial user community,** J. van de Vegte, W. J. Som de Cerff, Koninklijk Nederlands Meteorologisch Instituut (Netherlands); R. M. van Hees, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands); M. E. Schaepman-Strub, M. Hoogerwerf, Wageningen Univ. (Netherlands); B. Domenico, Univ. Corp. for Atmospheric Research (USA); S. Nativi, Consiglio Nazionale delle Ricerche (Italy); O. Wilhelmi, Univ. Corp. for Atmospheric Research (USA) . . . . . [6749-38]

14.00: **Obtaining information from imagery using object-based feature extraction,** C. Darnel, ITT Visual Information Solutions (USA) . . . . . [6749-39]

14.20: **Change detection for updates of vector database through region-based classification of VHR satellite data,** A. P. Carleer, E. Wolff, Univ. Libre de Bruxelles (Belgium) . . . . . [6749-40]

14.40: **Individual object delineation revising cadastral boundaries by means of VHSR data,** S. S. Lang, D. Tiede, D. Hoelbling, Univ. Salzburg (Austria); M. Moeller, Austrian Academy of Sciences (Austria) . . . . . [6749-41]

Coffee Break . . . . . 15.00 to 15.30

SESSION 11

Room: 3b . . . . . Wed. 15.30 to 16.50

Processing Methodologies III

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

15.30: **Hyperion and CBERS satellite image classification intercomparison for Cerrado and agricultural mapping,** A. M. Filippi, C. Brannstrom, D. M. Cairns, D. Kim, Texas A&M Univ. (USA) . . . . . [6749-43]

15.50: **Model and measurements of linear mixing in thermal IR,** L. K. Balick, M. F. McCabe, W. B. Clodius, C. A. Jeffery, J. Theiler, Los Alamos National Lab. (USA); A. R. Gillespie, A. Mushkin, I. Danilina, Univ. of Washington (USA) . . . . . [6749-44]

16.10: **Unimixing and mapping of alteration zones using EO-1 hyperion data in Erongo, Namibia,** M. M. Oskouei, W. Busch, Technische Univ. Clausthal (Germany) . . . . . [6749-45]

16.30: **An integration of ASTER and Landsat imagery for remote sensing based geological interpretation, NW Iran,** K. Martínek, Charles Univ. in Prague (Czech Republic); V. Kopackova, V. Metelka, Czech Geological Survey (Czech Republic) . . . . . [6749-46]

Thursday 20 September

SESSION 12

Room: 3b . . . . . Thurs. 08.40 to 10.20

Sensors and Platforms I

Chair: **Rainer H. Speck**, DLR Standort Oberpfaffenhofen (Germany)

08.40: **Removing long-term errors from AVHRR-based brightness temperature (BT),** M. Z. Rahman, L. M. Roytman, City College/CUNY (USA); F. N. Kogan, National Oceanic and Atmospheric Administration (USA) . [6749-47]

09.00: **Implications of JPEG2000 lossy compression on multiple regression modeling,** A. Zabala, X. Pons, F. Aulí-Llinàs, J. Serra-Sagristà, Univ. Autònoma de Barcelona (Spain) . . . . . [6749-48]

09.20: **Algorithm development for land surface temperature measurement from GOES-R satellite,** Y. Yu, D. Tarpley, R. Mundakkara Kovilakom, H. Xu, J. Privette, National Oceanic and Atmospheric Administration (USA) . . [6749-49]

09.40: **3D geo-positioning assessment and accuracy improvement of QuickBird across-track stereo imagery,** G. Qiao, W. Wang, Tongji Univ. (China) . . . . . [6749-50]

Coffee Break . . . . . 10.20 to 10.50

SESSION 13

Room: 3b . . . . . Thurs. 10.50 to 12.10

Sensors and Platforms II

Chair: **Stefan S. Lang**, Univ. Salzburg (Austria)

10.50: **SRTM X-SAR and RAMSES DEM comparison,** X. Dupuis, ONERA (France) . . . . . [6749-53]

11.10: **Simulation of SAR images for evaluation purposes,** R. H. Speck, H. Suess, DLR Standort Oberpfaffenhofen (Germany) . . . . . [6749-54]

11.30: **Change detection using multi-pass and multi-date data at P band,** X. Dupuis, P. Dreuillet, ONERA (France); L. M. H. Ulander, A. Gustavsson, Swedish Defence Research Agency (Sweden) . . . . . [6749-55]

11.50: **Atmospheric correction of HRSC-AX line scanner data using the dark-pixel-profile (DPP) method: a summary after two years,** T. U. Bucher, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [6749-56]

Lunch Break . . . . . 12.10 to 13.10

SESSION 14

Room: 3b . . . . . Thurs. 13.10 to 15.10

Geology and Hazard Monitoring

Chair: **Thomas Blaschke**, Paris-Lodron-Univ. Salzburg (Austria)

13.10: **Logic tree-based GIS inference of geologic structure,** C. C. Ryerson, T. S. Anderson, U.S. Army Corps of Engineers (USA) . . . . . [6749-57]

13.30: **Urban geology: documentation of geo-thematic information for urban areas in Greece, the case of Nafplion, Greece,** P. I. Tsombos, K. G. Nikolakopoulos, Institute of Geology & Mineral Exploration (Greece) . . . . . [6749-58]

13.50: **Updating the 1:50.000 geological maps of Rhodes Island using remote sensing data and GIS techniques,** K. G. Nikolakopoulos, P. I. Tsombos, A. Photiades, K. Psonis, Institute of Geology & Mineral Exploration (Greece) . . . . . [6749-59]

14.10: **Mechanical monolithic accelerometer for low frequency seismic noise measurement,** F. Barone, F. Acernese, Univ. degli Studi di Salerno (Italy); R. De Rosa, G. Giordano, Univ. degli Studi di Napoli Federico II (Italy); R. Romano, Univ. degli Studi di Salerno (Italy) . . . . . [6749-60]

14.30: **Comparison of multi resolution SRTM data for morphometric features identification using neural network self-organizing map: case study, Eastern Carpathians,** A. Ehsani, F. Quiel, Kungliga Tekniska Högskolan (Sweden) . . . . . [6749-61]

14.50: **Efficacy of Gis-probabilistic technique in landslide hazard zonation: a case study of Askot-Kanalichhina Route Corridor, Pithoragarh, Uttaranchal State, India,** A. H. Mehta, K. C. Tiwari, S. Ganapathi, S. K. Sharma, Maharaja Sayajirao Univ. of Baroda (India); D. Ramakrishnan, Indian Institute of Technology (India) . . . . . [6749-62]

Coffee Break . . . . . 15.10 to 15.30

SESSION 15

Room: 3b . . . . . Thurs. 15.30 to 16.30

Volcanic Monitoring

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

15.30: **ASI-Sistema Rischio Vulcanico SRV: a pilot project to develop EO data processing modules and products for volcanic activity monitoring based on Italian Civil Protection Department requirements and needs,** M. F. Buongiorno, Istituto Nazionale di Geofisica (Italy); S. Amici, M. Musacchio, M. Silvestri, C. Spinetti, S. Corradini, V. Lombardo, Istituto Nazionale di Geofisica e Vulcanologia (Italy); S. Zoffoli, Italian Space Agency (Italy) . . . . . [6749-63]

15.50: **Volcanic ash retrieval at Mt. Etna using Avhrr and Modis data,** C. Spinetti, S. Corradini, Istituto Nazionale di Geofisica e Vulcanologia (Italy); M. F. Buongiorno, Istituto Nazionale di Geofisica (Italy) . . . . . [6749-64]

16.10: **Volcanic activity monitoring using geo-stationary satellite,** M. Musacchio, C. Spinetti, S. Corradini, M. Silvestri, S. Amici, V. Lombardo, L. Merucci, Istituto Nazionale di Geofisica e Vulcanologia (Italy); A. Bartoloni, A. Canestro, A. Fiorani, Consultant (Italy); M. F. Buongiorno, Istituto Nazionale di Geofisica (Italy) . . . . . [6749-65]

Monday-Wednesday 17-19 September 2007 • Proceedings of SPIE Vol. 6750

Lidar Technologies, Techniques, and Measurements for Atmospheric Remote Sensing

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

Cochair: **Gelsomina Pappalardo**, Consiglio Nazionale delle Ricerche (Italy)

Programme Committee: **Albert Ansmann**, Leibniz-Institut für Troposphärenforschung e.V. (Germany); **Arnoud Apituley**, Rijksinstituut voor Volksgezondheld en Millieu (Netherlands); **Andreas Behrendt**, Univ. Hohenheim (Germany); **Giovanna Cecchi**, Istituto di Fisica Applicata Nello Carrara (Italy); **Fernando Congeduti**, Instituto di Scienze dell'Atmosfera e del Clima (Italy); **Martin J. Endemann**, European Space Research and Technology Ctr. (Netherlands); **Pierre H. Flamant**, École Polytechnique (France); **Gilberto J. Fochesatto**, Univ. of Alaska/Fairbanks (USA); **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); **Valentin B. Simeonov**, École Polytechnique Fédérale de Lausanne (Switzerland); **Ove K. Steinvall**, Swedish Defence Research Agency (Sweden); **David M. Winker**, NASA Langley Research Ctr. (USA)

Monday 17 September

Opening Remarks

SESSION 1

Room: 3c . . . . . Mon. 13.00 to 16.50

Laser Remote Sensing Technologies and Methods

Chairs: **Aldo Amodeo**, Consiglio Nazionale delle Ricerche (Italy); **Gelsomina Pappalardo**, Consiglio Nazionale delle Ricerche (Italy)

13.00: **A fluorescence imaging lidar for the control of cultural heritage *(Invited Paper)*,** L. Palombi, G. Cecchi, D. Lognoli, V. Raimondi, Istituto di Fisica Applicata Nello Carrara (Italy); L. F. Masotti, Univ. degli Studi di Firenze (Italy) . . . . . [6750-01]

13.30: **Sea floor classification from airborne lidar data,** M. Tulldahl, C. Vahlberg, Swedish Defence Research Agency (Sweden); A. Axelsson, H. Karlsson, Airborne Hydrography AB (Sweden); P. Jonsson, Lunds Tekniska Högskola (Sweden) . . . . . [6750-02]

13.50: **A novel UV-laser for lidar applications,** B. M. Walsh, N. P. Barnes, NASA Langley Research Ctr. (USA) . . . . . [6750-03]

14.10: **Highly efficient 1.9 μm Tm3+/Yb3+-doped tellurite fibre laser,** B. D. O. Richards, Univ. of Leeds (United Kingdom); Y. H. Tsang, D. J. Binks, The Univ. of Manchester (United Kingdom); J. Lousteau, A. Jha, Univ. of Leeds (United Kingdom) . . . . . [6750-04]

14.30: **High-power single-frequency waveguide laser for detection applications,** S. Taccheo, G. Della Valle, Politecnico di Milano (Italy); K. M. Ennser, Univ. of Wales Swansea (United Kingdom); D. Milanese, Politecnico di Torino (Italy); D. Barbier, Teem Photonics SA (France) . . . . . [6750-05]

14.50: **Fiber lasers: new effective sources for coherent lidars,** J. Cariou, Leosphere (France); G. Canat, M. Valla, ONERA (France) . . . . . [6750-06]

15.10: **Development of a fringe-imaging Michelson interferometer for wind speed measurements using a short-range 355-nm Rayleigh-Mie lidar,** N. Cezard, A. Dolfi-Bouteyre, ONERA (France); J. Huignard, Thales Research and Technology (France); P. H. Flamant, Ecole Polytechnique (France) . . [6750-07]

Coffee Break . . . . . 15.30 to 15.50

15.50: **Automated polarization-discrimination technique to minimize lidar-detected skylight background noise,** Y. Y. Hassebo, City College/CUNY (USA) . . . . . [6750-08]

16.10: **Multiplicative decomposition as a tool for intercomparison of range-resolved pulsed and modulated CW lidar capacities,** R. R. Agishev, Kazan State Technical Univ. (Russia) . . . . . [6750-09]

16.30: **Finding the mixing layer: algorithms to identify the mixing layer height in lidar signals automatically,** J. Mehnert, M. Pesch, Technische Univ. Berlin (Germany) . . . . . [6750-10]

SESSION 2

Room: 3c . . . . . Mon. 16.50 to 17.50

Differential Absorption for Gases and Chemical Composition

Chairs: **Doina N. Nicolae**, National Institute of Research & Development for Optoelectronics (Romania); **Giovanna Cecchi**, Istituto di Fisica Applicata Nello Carrara (Italy)

16.50: **New concept design of a DIAL based on a pulsed quantum-cascade laser,** A. P. Lytkine, B. Lau, W. Jaeger, J. Tulip, Univ. of Alberta (Canada) . . . . . [6750-11]

17.10: **Volumetric gas monitoring through a DSA laser network for the estimation of gas emission flux by surface sources,** F. Cuccoli, R. Lupo, T. Berna, L. Facheris, Univ. degli Studi di Firenze (Italy) . . . . . [6750-12]

17.30: **The development of an optical parametric amplifier for CO2 profiling,** J. F. Burris, NASA Goddard Space Flight Ctr. (USA); D. A. Richter, ITT Industries Systems Inc. (USA) . . . . . [6750-13]

Tuesday 18 September

SESSION 3

Room: 3c . . . . . Tues. 08.30 to 12.10

Aerosols and Clouds I

Chairs: **Ina Mattis**, Leibniz-Institut für Troposphärenforschung e.V. (Germany); **Upendra N. Singh**, NASA Langley Research Ctr. (USA)

08.30: **Optimization of lidar data processing: a goal of the EARLINET-ASOS project *(Invited Paper)*,** A. Amodeo, G. Pappalardo, Consiglio Nazionale delle Ricerche (Italy); J. Bösenberg, Max-Planck-Institut für Meteorologie (Germany); A. Ansmann, Leibniz-Institut für Troposphärenforschung e.V. (Germany); A. Apituley, Rijksinstituut voor Volksgezondheid en Milieu (Netherlands); L. Alados-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. Comerón, Univ. Politecnica de Cataluña (Spain); G. D'Amico, Consiglio Nazionale delle Ricerche (Italy); V. Freudenthaler, Ludwig-Maximilians-Univ. München (Germany); G. H. Hansen, Norwegian Institute for Air Research (Norway); I. Mattis, Leibniz-Institut für Troposphärenforschung e.V. (Germany); V. Mitev, Observatoire Cantonal de Neuchâtel (Switzerland); D. Müller, Leibniz-Institut für Troposphärenforschung e.V. (Germany); D. N. Nicolae, National Institute of Research & Development for Optoelectronics (Romania); L. Osterloh, Univ. Potsdam (Germany); A. D. Papayannis, National Technical Univ. of Athens (Greece); M. R. Perrone, Univ. degli Studi di Lecce (Italy); A. Pietruczuk, Institute of Geophysics (Poland); M. Pujadas, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (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-Univ. München (Germany) . . . . . [6750-14]

09.00: **Characterization of atmospheric aerosols with multiwavelength Raman lidar *(Invited Paper)*,** D. Müller, I. Mattis, A. Ansmann, U. Wandinger, D. Althausen, Leibniz-Institut für Troposphärenforschung e.V. (Germany); A. Kolgotin, Physics Instrumentation Ctr. (Russia) . . . . . [6750-15]

09.30: **Combining OPAC and lidar *(Invited Paper)*,** D. N. Nicolae, C. L. Talianu, C. M. Radu, National Institute of Research & Development for Optoelectronics (Romania); S. Stefan, Univ. din Bucuresti (Romania) [6750-16]

Coffee Break . . . . . 10.00 to 10.20

10.20: **AGLITE: a multiwavelength lidar for measuring particle sizes, concentrations, and fluxes emitted from agricultural operations *(Invited Paper)*,** T. D. Wilkerson, G. E. Bingham, V. V. Zavyalov, C. Marchant, J. M. Anderson, L. P. Andrew, Space Dynamics Lab. (USA) . . . . . [6750-17]

10.50: **Characterization of the atmospheric aerosol by combination of lidar and sunphotometry,** L. Alados-Arboledas, J. L. Guerrero-Rascado, H. Lyamani, F. J. Olmo-Reyes, Univ. de Granada (Spain) . . . . . [6750-18]

11.10: **Calibrating a backscatter lidar for continuous measurements of PM2.5,** M. Pesch, D. C. Oderbolz, Technische Univ. Berlin (Germany) [6750-19]

11.30: **An automatic, low-cost telemetric lidar for the continuous monitoring of urban aerosols in the surface Layer,** M. Del Guasta, F. Castagnoli, V. Venturi, Consiglio Nazionale delle Ricerche (Italy) . . [6750-20]

11.50: **Characterization of super-cooled water aerosols by dual polarization lidar at 1.574 μm,** G. J. Fochesatto, K. Sassen, R. L. Collins, Univ. of Alaska/Fairbanks (USA) . . . . . [6750-21]

Lunch Break . . . . . 12.10 to 13.10

SESSION 4

Room: 3c . . . . . Tues. 13.10 to 14.00

Aerosols and Clouds II

Chairs: **Ina Mattis**, Leibniz-Institut für Troposphärenforschung e.V. (Germany); **Upendra N. Singh**, NASA Langley Research Ctr. (USA)

13.10: **Standoff determination of bioaerosol size based on double scattering measurement with MFOV lidar: concept and experimental validation *(Invited Paper)*,** G. A. Roy, N. Roy, Defence Research and Development Canada (Canada) . . . . . [6750-22]

13.40: **Fluorescent lidar technologies for organic aerosol remote analysis,** G. G. Matvienko, A. I. Grishin, G. M. Krekov, Institute of Atmospheric Optics (Russia); V. I. Timofeev, M.V. Lomonosov Moscow State Univ. (Russia) . . . . . [6750-23]

SESSION 5

Room: 3c . . . . . Tues. 14.00 to 15.20

Atmospheric Remote Sensing

Chairs: **Gilles A. Roy**, Defence Research and Development Canada (Canada); **Thomas D. Wilkerson**, Space Dynamics Lab. (USA)

14.00: **Water vapour fluxes measured by collocated airborne DIAL and wind lidar during COPS 2007,** C. Kiemle, S. Rahm, M. Wirth, A. Schaefler, A. Fix, M. Weissmann, G. Ehret, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [6750-24]

14.20: **Scanning temperature measurements in the lower troposphere by rotational Raman lidar,** M. Radlach, A. Behrendt, S. Pal, A. Riede, V. Wulfmeyer, Univ. Hohenheim (Germany) . . . . . [6750-25]

14.40: **GPS calibrated multiwavelength water vapor Raman lidar measurements to assess urban aerosol hygroscopicity,** B. M. Gross, D. V. Vladutescu, Y. Wu, F. Moshary, S. Ahmed, City College/CUNY (USA) . . . . . [6750-26]

15.00: **Errors estimation in water vapor mixing ratio from a Raman lidar,** M. Adam, Howard Univ. (USA); D. N. Whiteman, NASA Goddard Space Flight Ctr. (USA); D. D. Venable, Howard Univ. (USA) . . . . . [6750-27]

Coffee Break . . . . . 15.20 to 15.40

SESSION 6

Room: 3c . . . . . Tues. 15.40 to 17.50

Space Lidar I

Chairs: **Detlef Müller**, Leibniz-Institut für Troposphärenforschung e.V. (Germany); **David M. Tratt**, The Aerospace Corp. (USA)

15.40: **Recent advances in technology and instruments for Earth, planetary and space exploration *(Invited Paper)*,** T. J. Carrig, Lockheed Martin Coherent Technologies (USA); J. C. Petheram, R. S. Price, Lockheed Martin Corp. (USA); S. W. Henderson, Lockheed Martin Coherent Technologies (USA); J. H. Crocker, Lockheed Martin Corp. (USA) . . . . . [6750-28]

16.10: **A laser sounder for measuring atmospheric trace gases from space,** H. Riris, J. B. Abshire, NASA Goddard Space Flight Ctr. (USA); G. R. Allan, Sigma Space Corp. (USA); J. F. Burris, J. R. Chen, NASA Goddard Space Flight Ctr. (USA); P. Jian, Science Systems and Applications, Inc. (USA); S. R. Kawa, NASA Goddard Space Flight Ctr. (USA); J. Mao, Science Systems and Applications, Inc. (USA); M. A. Krainak, M. A. Stephen, X. Sun, E. L. Wilson, NASA Goddard Space Flight Ctr. (USA) . . . . . [6750-29]

16.30: **Measurement of carbon dioxide column via space-borne laser absorption,** W. S. Heaps, NASA Goddard Space Flight Ctr. (USA) . . [6750-30]

16.50: **Contamination control of future lidar remote sensing satellites: a recipe for mission success,** C. R. Maag, T&M Engineering (USA); C. S. Weimer, Ball Aerospace & Technologies Corp. (USA); M. S. Cisewski, NASA Langley Research Ctr. (USA); F. E. Hovis, Fibertek, Inc. (USA) . . . . . [6750-31]

17.10: **Deployable, lightweight and large-aperture spaceborne telescope for lidar-based Earth observations,** P. Mazzinghi, V. Bratina, D. Ferruzzi, L. Gambicorti, F. Simonetti, A. Zuccaro, Istituto Nazionale di Ottica Applicata (Italy); P. Salinari, F. Lisi, Osservatorio Astrofisico di Arcetri (Italy); M. Olivier, A. Bursi, Carlo Gavazzi Space SpA (Italy); D. Gallieni, ADS International s.r.l. (Italy); R. Biasi, Micro Photon Devices s.r.l. (Italy); J. P. N. Pereira do Carmo, European Space Agency (Netherlands) . . . . . [6750-32]

17.30: **Lightweight active controlled primary mirror technology demonstrator,** M. Olivier, A. Bursi, Carlo Gavazzi Space SpA (Italy); P. Mazzinghi, D. Ferruzzi, V. Bratina, Istituto Nazionale di Ottica Applicata (Italy); P. Salinari, F. Lisi, Osservatorio Astrofisico di Arcetri (Italy); D. Gallieni, ADS International s.r.l. (Italy); R. Biasi, Micro Photon Devices s.r.l. (Italy); J. P. N. Pereira do Carmo, European Space Agency (Netherlands) . . . . . [6750-33]

✔ Posters-Tuesday

All registered symposium attendees are invited to attend the interactive poster session. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway on the Ground Floor of the Convention Ctr. An interactive poster session and reception with authors present will be held on Tuesday 18.00 to 19.30. Light refreshments will be served.

✔ **Simulation studies of the Raman measurements of NOx and H2O using a space-borne lidar,** M. V. Satyanarayana, S. R. Radhakrishnan, B. Presennakumar, Vikram Sarabhai Space Ctr. (India) . . . . . [6750-44]

✔ **SIRTA, a multi-sensor station for clouds and aerosols characterization in the atmosphere: infrastructure, objective and prospective,** C. M. Pietras, Y. Morille, T. G. Elias, B. Romand, F. Lapouge, C. Boitel, M. Haeffelin, Ecole Polytechnique (France) . . . . . [6750-46]

✔ **Improved methodology for the retrieval of the particulate extinction coefficient and backscatter-to-extinction ratio from lidar multiangle measurements,** V. A. Kovalev, C. E. Wold, J. O. Newton, W. M. Hao, USDA Forest Service (USA) . . . . . [6750-47]

✔ **Saharan dust event over Bucharest observed by an elastic backscatter lidar,** C. L. Talianu, A. V. Nemuc, E. D. Carstea, L. Belegante, National Institute of Research & Development for Optoelectronics (Romania) . . . . . [6750-48]

✔ **Highly compact backscatter lidar for unattended measurements in the planetary boundary layer and lower troposphere,** R. Matthey, V. Mitev, Observatoire Cantonal de Neuchâtel (Switzerland) . . . . . [6750-49]

✔ **Selection of an averaging technique by simulation study of a DIAL system for toxic agents monitoring,** J. P. Dudeja, M. K. Jindal, S. Veerabuthiran, Missile Facilities Laser Science and Technology Ctr. (India) . . . . . [6750-50]

✔ **Development of the 1.6 μm carbon dioxide DIAL for tropospheric CO2 study,** D. Sakaizawa, C. Nagasawa, Tokyo Metropolitan Univ. (Japan); T. Nagai, Meteorological Research Institute (Japan); M. Abo, Y. Shibata, Tokyo Metropolitan Univ. (Japan); M. Nakazato, Meteorological Research Institute (Japan) . . . . . [6750-51]

✔ **Bright onyx: a tunable, mid-IR, DIAL lidar for chemical and biological sensing,** E. J. Burlbaw, A. R. Geiger, J. Ding, C. Ting, Y. Huang, C. J. Urbina, M. Gutierrez, Akamai Physics, Inc. (USA); R. D. Richmond, Air Force Research Lab. (USA) . . . . . [6750-52]

✔ **Sounding of the environment by means of the un-impulse of the low power continuous source,** J. Polkanov, B.I. Stepanov Institute of Physics (Belarus) . . . . . [6750-53]

✔ **Optimization of dispersion models used to locate gas sources,** L. C. Thomson, Univ. of Glasgow (United Kingdom); W. Hirst, Shell International Exploration and Production BV (Netherlands); M. J. Padgett, Univ. of Glasgow (United Kingdom) . . . . . [6750-54]

✔ **MicrodsPIC-based design for a lidar flexible unit,** A. Lay-Ekuakille, Univ. degli Studi di Lecce (Italy) . . . . . [6750-55]

✔ **CNR-IMAA integrated measurements for the characterization of the atmosphere,** F. Madonna, A. Amodeo, A. Boselli, C. Cornacchia, G. D'Amico, A. Giunta, L. Mona, G. Pappalardo, Consiglio Nazionale delle Ricerche (Italy) . . . . . [6750-56]

✔ **Scanning water vapor DIAL based on a high-power Ti:sapphire laser: first experimental results,** M. Schiller, V. Wulfmeyer, A. Riede, A. Behrendt, H. Bauer, G. Wagner, Univ. Hohenheim (Germany); U. Wandinger, D. Althausen, Leibniz-Institut für Troposphärenforschung e.V. (Germany); A. Fix, M. Wirth, G. Ehret, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [6750-57]

✔ **Mid IR-fiber spectroscopy in 2-17μm range (II),** V. G. Artiouchenko, A. Bocharnikov, G. Colquhoun, Fibre Photonics Ltd. (United Kingdom); C. A. Leach, Fibre Photonics Ltd (United Kingdom); V. Lobachov, T. Sakharova, D. Savitskij, General Physics Institute (Russia) . . . . . [6750-58]

Wednesday 19 September

SESSION 7

Room: 3c . . . . . Wed. 08.30 to 13.10

Space Lidar II

Chairs: **Timothy J. Carrig**, Lockheed Martin Coherent Technologies (USA); **Malladi V. Satyanarayana**, Vikram Sarabhai Space Ctr. (India)

08.30: **EARLINET correlative measurements for CALIPSO *(Invited Paper)*,** I. Mattis, Leibniz-Institut für Troposphärenforschung e.V. (Germany); G. Pappalardo, Consiglio Nazionale delle Ricerche (Italy) . . . . . [6750-34]

09.00: **First comparisons between CNR-IMAA multi-wavelength Raman lidar measurements and CALIPSO measurements,** L. Mona, A. Amodeo, G. D'Amico, G. Pappalardo, Consiglio Nazionale delle Ricerche (Italy) . [6750-35]

09.20: **Comparisons with CALIPSO measurements for Thessaloniki EARLINET station,** D. S. Balis, E. Giannakaki, Aristotle Univ. of Thessaloniki (Greece); V. Amiridis, National Observatory of Athens (Greece); T. Bouboulouidis, Aristotle Univ. of Thessaloniki (Greece) . . . . . [6750-36]

09.40: **CALIPSO correlative measurements at Napoli EARLINET station,** X. Wang, M. Armenante, M. G. Frontoso, G. Pisani, N. Spinelli, Univ. degli Studi di Napoli Federico II (Italy) . . . . . [6750-37]

10.00: **Lidar measurements within the world weather research project COPS *(Invited Paper)*,** A. Behrendt, Infineon Technologies Austria AG (Austria); V. Wulfmeyer, Univ. Hohenheim (Germany); C. Kiemle, G. Ehret, O. Reitebuch, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); C. Flamant, Univ. Pierre et Marie Curie (France); M. Radlach, S. Pal, M. Schiller, A. Riede, Univ. Hohenheim (Germany); A. Wieser, Consultant (USA); P. Di Girolamo, Univ. degli Studi della Basilicata (Italy); F. Davies, Univ. of Salford (United Kingdom); C. Collier, Consultant (USA); D. Althausen, Leibniz-Institut für Troposphärenforschung e.V. (Germany); R. Engelmann, J. Cuesta, Consultant (USA) . . . . . [6750-59]

Coffee Break . . . . . 10.30 to 10.50

10.50: **ALADIN doppler wind lidar: recent advances *(Invited Paper)*,** D. Morancais, F. Fabre, EADS Astrium (France); M. J. Endemann, A. J. F. Culoma, European Space Research and Technology Ctr. (Netherlands) . . . . . [6750-38]

11.20: **The ESA EarthCARE mission: results of the ATLID instrument pre-developments *(Invited Paper)*,** Y. Durand, A. Hélière, J. Bézy, R. Meynart, European Space Research and Technology Ctr. (Netherlands) . . . . . [6750-40]

11.50: **NASA laser remote sensing technology needs for earth science in the next decade and beyond *(Invited Paper)*,** D. M. Tratt, J. M. Neff, The Aerospace Corp. (USA); A. Valinia, NASA Goddard Space Flight Ctr. (USA) [6750-41]

12.20: **Spaceborne lidar data acquisition system and its challenges *(Invited Paper)*,** M. V. Satyanarayana, B. Presennakumar, D. Rama Krishna Rao, S. R. Radhakrishnan, Vikram Sarabhai Space Ctr. (India) . . . . . [6750-42]

12.50: **Studying regional aerosol events with the CALIPSO lidar and other a-train instruments,** L. A. Hunt, M. T. Ferebee, NASA Langley Research Ctr. (USA) . . . . . [6750-43]

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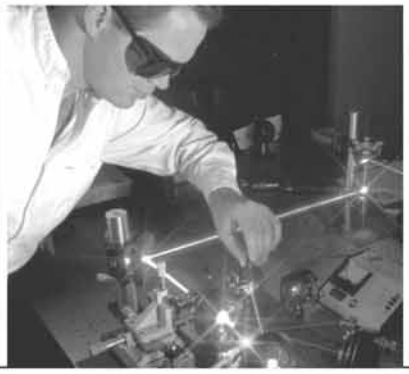


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