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2012 Remote Sensing

24–27 September 2012

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Conference
24–27 September 2012

Technologies
- Atmospheric Sensing
- Sensors, Systems, an Next-generation Satellites
- Environmental Monitoring and Applications
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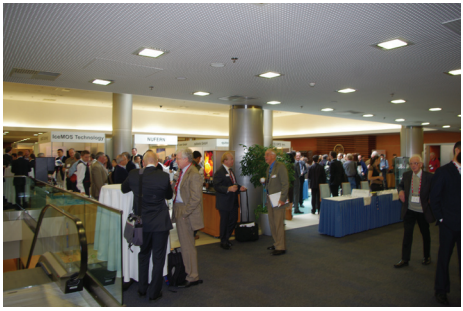

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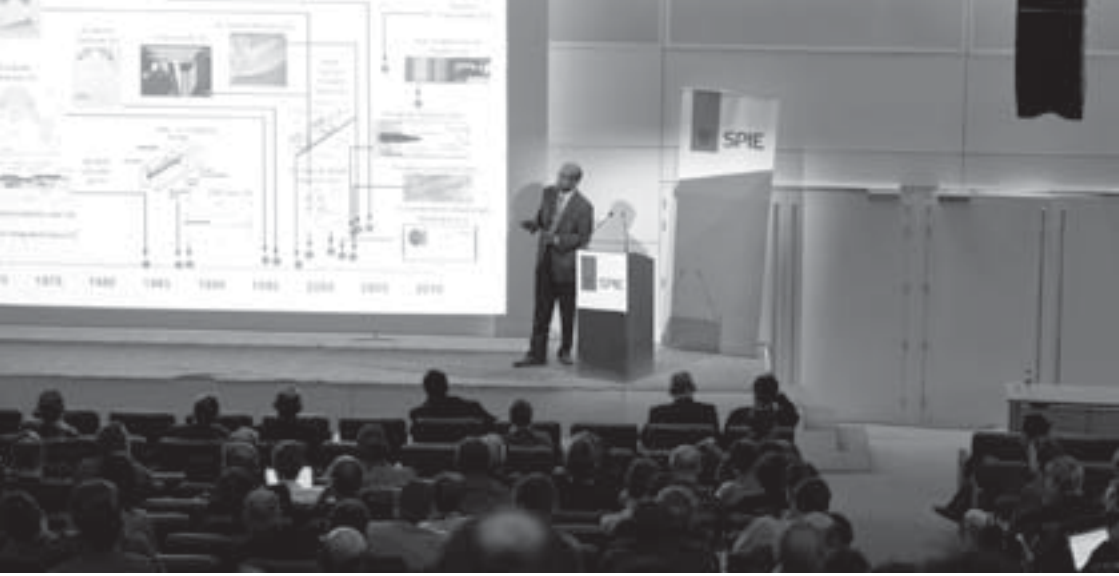

Conferences

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Miguel Velez-Reyes, Univ. de Puerto Rico Mayagüez (United States)

Plan now to participate

We cordially invite you to participate in SPIE Remote Sensing Symposium 2012.

Over the past 18 years SPIE Remote Sensing has become the largest and most prestigious annual international meeting on this subject in Europe; each year sees a comprehensive coverage of scientific topics, applications, sensors, systems, and satellite platforms. With more than 25 countries represented at every meeting, the event provides a unique opportunity for scientists, engineers, programme managers, and policy makers from around the world to recognise the trends and achievements in this area, exchange ideas, and present and discuss the most recent developments and applications.

The 2012 symposium in Edinburgh, United Kingdom, is the 19th in the series and follows last year's successful symposium in Prague, Czech Republic. This year we offer 12 conferences covering the most exciting and prosperous areas in the field of remote sensing:

- Remote Sensing for Agriculture, Ecosystems, and Hydrology
- Remote Sensing of the Ocean, Sea Ice, Coastal Waters, and Large Water Regions 2012
- Sensors, Systems, and Next-generation Satellites
- Remote Sensing of Clouds and the Atmosphere
- Optics in Atmospheric Propagation and Adaptive Systems
- SAR Image Analysis, Modeling, and Techniques
- Image and Signal Processing for Remote Sensing
- Earth Resources and Environmental Remote Sensing/GIS Applications
- Lidar Technologies, Techniques, and Measurements for Atmospheric Remote Sensing
- High-Performance Computing in Applied Remote Sensing
- Special Joint Session on Remote Sensing and Natural Disasters: Remote Sensing 2012
- Special Joint Session on Airborne Remote Sensing: Remote Sensing 2012

The conferences are designed to meet the scientific, technical, and business needs of the remote sensing community, and each conference will include oral and poster presentations with top researchers as invited speakers.

The 19th SPIE Remote Sensing will be co-located with the 9th SPIE Security + Defence. Explore new opportunities to collaborate with partners from other fields of activity. Showcase your multidisciplinary research in a major international forum.

The Organising Committee of SPIE Remote Sensing invites you to submit papers to this exciting meeting to make it a symposium of the highest quality. We look forward to seeing you in historic Edinburgh.

Karin Stein
Fraunhofer-IOSB, Institute for Optronics, System Technologies and Image Exploitation (Germany)

2012 Symposium Chair

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

2012 Symposium Cochair

Remote Sensing for Agriculture, Ecosystems, and Hydrology (RS01)

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

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Remote sensing technology continues to play a significant role in the understanding of our environment. It has evolved into an integral research tool for the natural sciences. Disciplines such as climatology, hydrology, and studies of the terrestrial biosphere have all developed a strong remote sensing component. Moreover, remote sensing has facilitated our understanding of the environment and its many processes over a broad range of spatial and temporal scales. This is a highly important aspect of land surface research, especially in the management of land and water resources and for the detection of environmental change.

Remote sensing applications have greatly enhanced our ability to monitor and manage our natural resources, especially in the areas of agriculture, forestry, and water resources. However, in spite of significant progress in recent years, there are still many areas where the potential of remote sensing has not been fully realized, and these are areas of active research. Much of this current research is related to the development of new and improved sensors. However, of equal importance are those efforts that are focused on gaining a better understanding of what sensors are actually measuring as well as new and improved applications and inverse modelling techniques. This conference seeks papers describing recent research results in the hydrological sciences, studies of the terrestrial biosphere, and other land surface processes. Contributions using visible, near- and thermal infrared, microwave as well as other wavebands are solicited, as well as applications using laser or hyperspectral imaging. The conference is especially interested in papers, which emphasize the use of satellite and airborne data, the synergistic application of multiple wavebands and sensors, and other new and innovative remote sensing applications. Papers related (but not limited) to the following topics are solicited:

Hydrological Sciences
- hydrological modelling
- data assimilation
- data scaling
- water balance applications
- soil moisture
- satellite precipitation and modeling
- evapotranspiration and energy balance applications
- surface temperature
- radiative transfer modelling
- water quality
- snow hydrology
- water resource management
- drought monitoring, analysis and prediction
- sedimentation and erosion
- climate modeling, prediction and environmental change
- forecasting techniques
- radar applications (interferometry for land slide detection; canopy, soil moisture and soil roughness characterisation; flooding and flood area detection)
- lidar applications in hydrology
- remote sensing in depth to ground water modeling (passive and active microwaves, thermal infrared, gravimetry)
- remote sensing in surface water topography.

Terrestrial Biosphere
- agricultural and precision farming applications
- forestry dynamics and carbon cycle studies
- ecosystem management
- crop yield modelling
- species and stand identification techniques
- insect infestation and disease detection
- wildfire applications
- early warning techniques
- canopy and leaf optical models
- vegetation indices applications
- biomass monitoring
- photosynthetically active radiation
- stomatal resistance
- regional and global vegetation monitoring
- ecosystem dynamics
- estuarine and coastal applications
- remote sensing hydrodynamics
- land-atmosphere interaction.

Remote Sensing of the Ocean, Sea Ice, Coastal Waters, and Large Water Regions 2012 (RS02)

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

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

Remote sensing science is one of the most modern approaches for studying oceans, littoral regions, seas and large lakes, as well as sea ice covered regions. An important aspect of remote sensing science is the ability to monitor complex environmental media (air, land, water) and their interfaces (water surface waves and air-water interaction, water-sediment, and internal interfaces). Understanding these complex environmental systems is key to scientific understanding of oceans, estuaries, and coastal areas, large lakes, ports and waterways as well as sea ice dynamics since remote sensing data provides valuable monitoring information. This information often serves as input to complex numerical models of environmental systems, such as climate change models, coupled oceanic-atmosphere models at the global (planetary) scale as well as at the mesoscale space and time scales. Remote sensing techniques also provide the most valuable tool set and techniques for monitoring and mapping different bottom features in aquatic systems, such as coral reefs, submerged aquatic vegetation and other "targets" of interest to the oceanographic and aquatic community. Also of interest are robotic and mechatronic platforms for in-situ sensing of interfaces.

There is a need to improve the accuracy and precision of retrieved geophysical parameters from remote sensing data, and a need to use optical signal processing or filtering of remotely sensed signals from instruments to help improve underwater visibility applications for mapping subsurface water properties and features. In this context, it is often necessary to integrate data from different sensors as well as to include the knowledge of different disciplines. This is especially important in remote sensing of water quality, submerged aquatic vegetation and related subsurface features. From a remote sensing point of view, these data are mainly extracted from active or passive sensor systems, and models of complex phenomena are important. Techniques important to the above include radar, acoustic, optical, sensing systems and resulting data. With reference to the above, this conference will address the above remote sensing systems and platforms with special emphasis on areas such as:

- detection of ocean currents and oceanic frontal features; lidar, radar and altimeter uses
- subsurface sensing using acoustics, optical, laser and magnetic systems
- oceanic storm prediction using ocean remote sensing techniques
- ocean wave measurement and predictions
- operational use of remote sensing data in global and regional ocean observing platforms
- use of satellite data such as from Eumetsat's Metop-A and ESA's SMOS (Soil Moisture/ Ocean Salinity) in ocean, coastal and mesoscale atmospheric-oceanic models
- coastal ocean, estuarine and large lake water-quality monitoring (suspended sediments, dissolved organic matter, phytoplankton pigments and biomass, submerged aquatic vegetation) as well as other bottom feature and target recognition studies
- oceanic photochemistry and hyperspectral remote sensing; coupled oceanic and mesoscale models at the air-sea boundary, remote sensing input to atmospheric seabreeze models
- studies and modeling of microwave signatures of ocean and coastal waves and sea ice
- studies of shore-fast ice; sea ice prediction and modeling
- multi-satellite, sensor integration, and sensor studies from various platforms
- data fusion, optical signature analysis and modeling, hyperspectral imaging and remote sensing
- laser fan beam sensor systems and data analysis
- Lidar and passive-active (Raman) remote sensing theory, applications, and techniques fusion of lidar and hyperspectral imagery
- regional and global sea and ice monitoring in climate change research, particularly work related to new satellite missions such as Cryosat-2 and Sentinel with the new SAR instruments designed to investigate continental and marine sea ice thickness changes
- operational sea ice monitoring systems and requirements
- active and passive remote sensing and techniques for improving underwater imaging for mapping ports, waterways and harbors
- remote sensing missions for observation of oceanic, coastal, sea ice and large water regions.

Abstracts and papers concerning the above are invited for review and acceptance for presentation at the conference & publication in the proceedings. Those interested in developing a special session or joint sessions on any topic related to the conference may contact Charles Bostater at Florida Tech: bostater@probe.ocn.fit.edu.

Sensors, Systems, and Next-Generation Satellites (RS03)

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

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

Many new remote sensing programs are under way throughout the world, specifically in the U.S., Europe and Japan. NASA's Earth Science Division is developing and implementing a broad range of Earth spaceborne remote sensing missions to answer fundamental scientific questions requiring the view from space and to meet societal needs. These include the Foundational (LDCM, GPM), Decadal Survey,-and Climate Continuity series of satellites. The Japan Aerospace Exploration Agency (JAXA) is developing and implementing the ALOS, GOSAT, GCOM, GPM/DPR, and EarthCare series of programmes. The European Space Agency (ESA) is developing and implementing the METOP, METEOSAT, GMES, Earth Explorer, and Earth Watch programs. A number of new remote sensing programmes are also under development by other organisations and nations. Many of the above are contributing to the Global Earth Observation System of Systems (GEOSS) as envisioned by the intergovernmental Group on Earth Observations (GEO). Instruments and satellites are developed for planetary exploration exploiting the technological synergy with those developed for Earth observation. Each of these programs comprises a set of remote sensing systems to address their science objectives.

Papers are solicited on the following and related topics:

- sensors being developed
- satellites being developed
- enabling technologies for sensors and satellites
- new design concepts for sensors, systems and satellites
- hyperspectral spaceborne sensors
- Earth radiation budget and solar irradiance sensors
- sensor calibration techniques
- in-situ sensor measurement assimilation
- modeling and simulation techniques for sensor concept development
- focal plane assemblies including detectors and spectral filters
- future LIDAR missions
- space cryogenics
- system precursors including test beds and airborne simulators
- data systems being developed
- new data processing techniques
- sensor webs for in-situ cal/val or remote sensing.

Sessions on the following topics are being planned:

- Japanese missions and technologies
- European missions and technologies
- US missions and technologies
- sensors and missions for planetary exploration
- new satellite technologies (navigation, on-board data processing, cryocooling systems, etc.)
- calibration
- hyperspectral sensors (missions, designs, performance, technologies, airborne sensors, etc.)
- focal plane technologies.

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Remote Sensing of Clouds and the Atmosphere (RS04)

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

Programme Committee: **Aldo Amodeo**, Istituto di Metodologie per l'Analisi Ambientale (Italy); **Christopher J. Mertens**, NASA Langley Research Ctr. (United States); **Didier F. Rault**, NASA Langley Research Ctr. (United States); **Nicolaos I. Sifakis**, National Observatory of Athens (Greece); **Michiel van Weele**, Koninklijk Nederlands Meteorologisch Instituut (Netherlands); **Konradin Weber**, Fachhochschule Düsseldorf (Germany)

This conference will focus on all aspects of remote sensing of clouds and Earth and planetary atmospheres, with planned specialised sessions:

Remote Sensing of Clouds, including topics:
- cloud detection and characterization; cloud screening
- retrieval of cloud properties
- cirrus modeling and measurements, including scattering and absorption by nonspherical particles.

Radiative Transfer, including topics:
- Earth radiation budget
- 3D radiative transfer and approximation methods
- retrieval methods, profiling, and data assimilation
- atmospheric correction.

Remote Sensing of the Middle and Upper Atmosphere, including topics:
- studies of middle and upper atmosphere variability and climatology
- non-LTE radiative effects and transfer codes
- non-LTE retrieval methods
- remote sensing of constituents, dynamical and electrical structure, and wave motions
- advances in instrumentation.

Atmospheric Profiling of Aerosols, Trace Gases, and Meteorological Parameters of Remote Sensing, including topics:
- trace gas retrieval and measurements from ground and satellite
- aerosol detection, measurements and retrievals from ground, aircraft and satellite
- limb (infrared, microwave, scattering) satellite retrievals targeting the upper troposphere and lower stratosphere (MIPAS, ACE-FTS, MLS, OMPS,....)
- air pollution monitoring from satellite, including data and information fusion
- hyperspectral data processing.

Remote Sensing by FTIR, DOAS and Other Spectrometric Methods, including topics:
- measurements of industrial, agricultural, biospheric, and volcanic emissions, including determination of emission source strengths
- environmental, disaster, and fire monitoring
- application of imaging methods
- GIS applications and data fusion
- advances in instrumentation and new technologies, including remote sensing of gas and aerosol releases.

Lidar, Radar, and Passive (Microwave, Infrared. Visible and Ultraviolet) Atmospheric Measurement Techniques, including topics:
- advances in instrumentation
- advances in data evaluation and retrieval methods
- observations from mobile (space/airborne) platforms
- measurement accuracy
- validation of satellite remote sensing
- sensor networking
- data fusion
- hyperspectral data processing
- applications of femtosecond lasers.

Critical Dates

Abstract Due Date: 2 April 2012

Manuscript Due Date: 27 August 2012

Please Note: Submissions imply the intent of at least one author to register, attend the symposium, present the paper as scheduled, whether it is an oral or poster presentation, and submit a full-length manuscript for publication in the conference proceedings.

Optics in Atmospheric Propagation and Adaptive Systems (RS05)

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

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

The use of sensors for active and passive remote sensing of the Earth and its atmosphere, for free-space laser communication, and for high-resolution imaging of ground-based and airborne objects are fields of growing interest for both civilian and military applications.

Such high-resolution space-to-ground (or ground-to-space) optical sensing systems use spectral regions varying from UV to Radar. However, they all must deal with long path atmospheric geometries and different radiating backgrounds. Instrument and measurement analysis therefore depends crucially on a thorough understanding of all optical effects that limit the sensor performance through an atmosphere that acts as an absorbing, scattering, and radiating random medium. Increasingly important in this area are modern methods used to ameliorate these effects through compensative hardware, algorithms, and measurements of atmospheric parameters at different locations.

Contributions are invited on the following topics and those related to them:

- **Characterization of the Propagation Environment:** profiles of temperature, humidity, extinction, refractivity, radiance (also non-LTE), optical turbulence; updates of transmission and radiance codes, atmospheric refraction, atmospheric turbulence, VIS and IR backgrounds, statistics of propagation parameters.
- **Propagation and Imaging through Optical Turbulence:** meteorological models, the strong turbulence regime, laser beam propagation, laser speckle effects; correction methods for atmospheric effects in remote sensing, compensation for anisoplanatism and scintillation.
- **Propagation and Imaging through Inhomogenous and Dense Media:** laser beam propagation, scattering and multiple scattering effects, the strong turbulence regime, aero-optic and jet plume effects, laser speckle effects; correction methods for atmospheric effects; coherent and incoherent imaging in anisoplanatic conditions; laser beam projection on an extended target; target-in-the-loop propagation and compensation in atmospheric turbulence.
- **Laser-based Sensing and Laser Communication:** laser beam focusing, sensing, and free-space communication, system and atmospheric simulations, hardware configurations, communications theory issues, bandwidth limits, multiplexing issues, adaptive optics use for increased performance, atmospheric modelling, and laser speckle and other noise sources, loss of coherence for active (laser) systems.
- **Techniques for Mitigation of Atmospheric Effects on Systems:** adaptive optics, deconvolution, sensor fusion, post processing etc; multi-conjugate adaptive optics, compensated imaging systems, etc.
- **New Devices for Atmospheric Measurement or Compensation:** novel optical components such as liquid crystal and MEMS devices, wavefront sensors, high-frame rate and low-noise IR detectors.

SAR Image Analysis, Modeling, and Techniques (RS06)

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

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In recent years many new developments have been made in the field of SAR image analysis. These range from a host of environmental applications such as the monitoring of deforestation and crop studies to issues involved with military reconnaissance and extraterrestrial exploration. It is clear that there are particular properties of SAR images that demand fundamentally different interpretation techniques from conventional optical imagery.

The conference is intended to present an updated view of the state-of-the-art techniques in SAR image exploitation, based on the above models as well as applications of these models to all areas of remote sensing. Particular attention will be given to applications and algorithms developed for the data of current available sensors (TerraSAR-X, COSMO-SkyMed, RADARSAT-2), also in the direction of the upcoming satellites such as GMES Sentinel 1. Applications in the domain of risk management and damage assessment are addressed as well. In fact the incoming growing capabilities of the most recent SAR sensors, in terms of spatial resolution and temporal revisit time, offer a potential tool for prevention, monitoring and damage assessment in relation to natural disasters such as earthquake, flood, landslide and fires.

Furthermore, in the last years a growing attention is paid to the food and energy applications that can be exploited by multi-temporal SAR images.

Contributions are solicited on the following and related topics:

- spaceborne and airborne SAR and IFSAR
- SAR and IFSAR processors: algorithms, architectures, dedicated hardware
- 3D SAR: modelling, algorithms, experimental results
- waveform influence on SAR performance: chirp, phase-coded, random noise
- multiangle, multitemporal, multipolarisation, multifrequency SAR and IFSAR
- techniques for generating geometrically and radiometrically correct SAR images
- statistical properties of remote sensed images, including polarisation and wavelength effects
- phenomenological and theoretical models for rural and urban scenes
- inversion and information extraction techniques: despeckling, superresolution and segmentation
- modelling and simulation of ocean waves
- inversion techniques and algorithms for retrieval of biophysical parameters from SAR images
- current available sensors: TerraSAR-X, COSMO-SkyMed, RADARSAT-2
- applications for upcoming sensors e.g. GMES Sentinel 1
- application of SAR images to risk prevention and disaster management
- SAR techniques towards food and energy applications.

Image and Signal Processing for Remote Sensing (RS07)

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)

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The main goal of this conference is to address advanced topics related to signal processing, image analysis, pattern recognition, machine learning and data fusion methodologies in the field of remote sensing.

Papers describing recent and original work in the following and related research topics are welcome:

- calibration and registration techniques
- image enhancement and restoration
- edge detection and segmentation
- shape and texture analysis
- target detection and object recognition
- automatic classification
- estimation of geo- bio-physical parameters
- statistical and structural pattern recognition techniques
- machine learning techniques
- change detection and analysis of multitemporal data
- analysis of multispectral images
- analysis of hyperspectral images
- analysis of SAR and LIDAR signals
- analysis of very high resolution multispectral and SAR images
- multisensor and multisource data fusion
- data mining techniques
- image coding and data compression
- data processing applications.

Note: To assure a high quality conference, all abstracts will be reviewed by the conference scientific committee and co-chairs for technical merit and content.

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Earth Resources and Environmental Remote Sensing/GIS Applications (RS08)

Conference Chairs: **Ulrich Michel**, Univ. of Education Heidelberg (Germany); **Daniel L. Civco**, Univ. of Connecticut (United States)

Cochairs: **Manfred Ehlers**, Univ. Osnabrück (Germany); **Karsten Schulz**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Konstantinos G. Nikolakopoulos**, Institute of Geology & Mineral Exploration (Greece)

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

Satellite remote sensing has become a common tool to investigate the different fields of Earth and environmental sciences. The progress of the performance capabilities of the optoelectronic and radar devices mounted on-board remote sensing platforms have further improved the capability of instruments to acquire information about the Earth and its resources for global, regional and local assessments.

With the advent of new high-spatial and spectral resolution satellite and aircraft imagery new applications for large-scale mapping and monitoring have become possible. The integration with Geographic Information Systems (GIS) allows a synergistic processing of multi-source spatial data. The present conference will be an occasion to outline how scientists involved in the Earth and environmental studies can take advantage of new remote sensing techniques and the advances in spatial technology. Particular subjects are:

Sensors and Platforms
- new sensor developments
- radiometric calibration studies
- geometric correction approaches
- simulation studies.

Processing Methodologies
- fusion of multi-source and multi-scale data
- multitemporal remote sensing
- integration of remote sensing and GIS
- analysis of optical and thermal data
- hyperspectral analytical approaches
- geoobject-based image analysis
- artificial intelligence approaches
- mobile solutions
- LIDAR techniques.

Environmental Monitoring Concepts
- land degradation studies
- natural hazards (floods, landslides)
- landscape modeling
- sustainability and planning
- coastal zone management
- interaction sea-land
- resource management
- global climate change.

Hazard Mitigation Geologic Applications
- geological hazards, mine waste
- earthquakes and volcanoes
- lithological and mineral mapping
- mineral and petroleum exploration
- structural geology, tectonics
- hydrogeology.

Infrastructures and Urban Areas
- 3D urban modeling
- change detection
- remote sensing for urban information systems
- microclimate studies
- virtual city models
- urban feature extraction with high resolution SAR-sensors.

Remote sensing for archaeology, cultural and natural heritage.

Geospatial Infrastructure.

Remote sensing and GIS in Education.

GeoWeb Delivery and Analysis of Remote Sensing Data.

Lidar Technologies, Techniques, and Measurements for Atmospheric Remote Sensing (RS09)

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

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

Optical remote sensing techniques are being widely used for continuous, systematic monitoring of atmospheric constituents and meteorological parameters using ground-, air-, and satellite-based remote sensing instruments. The ability of laser/telescope systems to reach out to great distances in the atmosphere has opened up a major field of applied optics that now attracts the efforts of scientists and engineers from many countries.

This technology makes it possible to rapidly obtain profiles of atmospheric properties (e.g. temperature and wind) and constituents (e.g. H2O, O3, and CO2). Time-dependent 3D mapping of the atmosphere has now become a reality through the international development of the lidar technique. Lidar practice now incorporates a wide variety of optical phenomena (absorption, fluorescence, etc.). Applications are increasing in the areas of meteorology, urban and industrial air pollution, aircraft safety, global monitoring of ozone and climate change, and the basic processes of atmospheric dynamics. Global wind profiling and CO2 measurement from space requires high energy and high power lasers for extended operation. Laser risk reduction, technology maturation and life time testing at component and system level has become an important issue for space deployment.

Similarly, thermal, contamination, and radiation effects are need to be fully understood for developing highly efficient, long life, high power laser sources for long-term operation in space. As the world moves towards increased population and industrial development, laser remote sensing will become more and more important as the method of choice for obtaining the environmental data needed in intelligent decision-making for resource management. This conference focuses on current and future laser remote sensing technologies, techniques, applications, and observations related to environmental monitoring.

To allow maximum participation, a wide range of topics will be considered for presentation and discussion at the conference.

The suggested list of topics to be covered in this conference is:

- solid-state and fiber laser developments for lidar applications
- high-power laser diodes for space lidar applications
- innovative lidar detector and receiver technologies
- efficient, compact, ground-, air-, and spaceborne lidar systems
- laser ranging and imaging
- space reliability and thermal, contamination, and radiation effects on component and systems for space
- lidar methods for constituent monitoring (DIAL, Raman, Raman/DIAL, Resonance)
- lidar methods for natural resource management (vegetation, fishery)
- laser-based remote chemical and biological detection and analysis
- tunable IR to mid-IR lidar for chemical/pollution detection
- wind field profiling (coherent, direct)
- atmospheric aerosols and cloud studies
- lidar applications to global issues (ozone depletion, climate change, global transport of pollutants)
- lidar applications to regional issues (urban pollution, dust transport)
- polar cloud monitoring (PSCs, NLCs, PMCs)
- atmospheric dynamics (boundary layer, gravity waves, tides, etc.)
- multi-sensor stations and campaigns for comprehensive atmospheric characterization
- affordable lidar for cloud, aerosol, and pollution monitoring
- global scale monitoring by satellite-borne lidars.

High-Performance Computing in Remote Sensing (RS10)

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

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

Advances in sensor technology with higher spatial, spectral and temporal resolutions are revolutionizing the way remote sensing data are collected, managed and processed. Latest-generation instruments for Earth and planetary observation are now producing a nearly-continual stream of high-dimensional data, and this explosion in the amount of collected information has rapidly introduced new processing challenges.

In particular, many current and future applications of remote sensing in Earth and space sciences require the incorporation of high performance computing techniques and practices to address applications with high societal impact such as retrieval of Earth and planetary atmospheres, monitoring of natural disasters including earthquakes and floods, or tracking of man-induced hazards such as wild-land and forest fires, oil spills and other types of chemical contamination.

Many of these applications require timely responses for swift decisions which depend upon (near) real-time performance of algorithm analysis. These systems and applications can greatly benefit from high performance computing techniques and practices to speed up data processing, either after the data has been collected and transmitted to a ground station on Earth, or during the data collection procedure onboard the sensor, in real-time fashion. Parallel and distributed computing facilities and algorithms as well as high-performance FPGA and DSP systems have become indispensable tools to tackle the issues of processing massive remote sensing data.

In recent years, GPUs have evolved into highly parallel many-core processors with tremendous computing power and high memory bandwidth to offer two to three orders of magnitude speedup over the CPUs. A cost-effective GPU computer has become an affordable alternative to an expensive CPU computer cluster for many researchers performing various scientific and engineering applications.

This conference provides an interdisciplinary forum for exchanging the latest research results and views in the area of high-performance computing applied to remote sensing problems. The conference is expected to bring together experts from many different institutions to provide a remarkable sample of the latest advances in the field. Specifically, papers and reviewers will be solicited in, but not limited to, the following areas:

- high-performance computing in remote sensing image and video coding, decoding and error correction
- high-performance computing for spaceborne, airborne, or ground-based remote sensing instruments
- high-performance computing in geophysical parameter retrieval from remote sensing data
- high-performance computing in remote sensing data modeling or assimilation for environmental and weather monitoring and forecast
- high-performance computing algorithms or techniques for ultraspectral, hyperspectral and multispectral data
- high-performance computing algorithms or techniques for microwave, visible, ultraviolet, radar, and lidar remote sensing data
- high-performance computing in passive and active remote sensing data processing
- high-performance computing in remote sensing forward models and inverse problems
- high-performance computing for visualization of large remote sensing data
- high-performance computing for efficient transfer and storage of large remote sensing data
- high-performance computing for on-board processing, compression and communications.

Special Joint Session on Remote Sensing and Natural Disasters: Remote Sensing 2012 (RS11)

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

Cochairs: **David Messinger**, Rochester Institute of Technology (United States) and Univ. of Edinburgh (United Kingdom); **Antonino Maltese**, Univ. degli Studi di Palermo (Italy)

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Remote sensing technology and data are being used in support of societal needs in support of natural and technologically related disasters. Earthquakes, tsunamis, floods and landslides, fires, tropical cyclones, heat waves, tornados, volcanic eruptions, droughts and famines, large scale disease and epidemics, as well as large scale chemicals released into the environment are all examples phenomena that require information in order to recover and/or remediate the impacts upon human land and water use activities.

An important aspect of remote sensing science is the ability to monitor complex environmental media (air, land, water) and their interfaces (air-water, water sediment, air-land and their respective internal interfaces and environmental media in order to provide timely information to support decision making needs - both public and private. In addition, understanding small scale as well as regional scale complex environmental systems is central to increasing our scientific understanding of the global atmosphere, land, and ocean systems that provide the climate for life to exist on our planet. Remote sensing data is the most robust form of basic information sources used to provide necessary environmental monitoring and surveillance as well as safety related information during disaster events.

With the increase in human activities as population increases, these disaster events are impacting not only personal lives but have far reaching economic impacts that influence all forms of global interactions. Recognizing the information needs to help manage and recover from these natural and manmade events, the organizers of SPIE's European Remote Sensing symposium and conferences will hold a special joint session in 2012. This call for papers requests papers and presentations in the special session in order to encourage recognition of the existing and future role of sensing systems and data to assist in societal decision making in support of managing human activities during disaster events.

This joint session will offer a forum for oral presentations as well as a poster session papers during the European Remote Sensing Symposium sponsored by RS01 and RS02 Conferences, and emphasis in the following areas are encouraged:

- improving predictions of tornado and tropical cyclones using remote sensing data and models derived from remote sensing data and related geophysical variables
- disaster monitoring of land & water surface features for post disaster planning and safety response activies using existing as well as future sensors and the needed sensing requirements
- flood modeling, forecasting and mapping
- mapping and early warning of landslides, glacier movements
- volcanic activity early warning and plume tracking
- utilizing operational aspects of existing satellites and future systems for "pointing" and orbital changes in order to image critical areas during disaster events, as well as using dedicated nanosatellite systems
- characterization of earth surface and subsurface geophysical systems in order predict the future or onset of events such as famines, droughts and disease, and earthquakes
- littoral zone and harbor remote sensing in order to determine impacts after tropical cyclones and tsunamis
- single and multiband sensing and signatures that can be used to target different types of disaster needs
- studies of climate change at the mesoscale to global scale that can utilize remote sensing data for change detection and related modeling
- multi-sensor integrations that can help provide needed first response to disasters
- data fusion techniques using sensor data in order to assist in producing higher spectral and spatial remote sensing signatures
- past as well as ongoing remote sensing in support of disaster short term planning; response, and recovery efforts
- the role of coupling remote sensing data as input to hydrological models in order to better predict the on set and magnitude of floods in population centers as well as in agricultural areas

Questions concerning the session and topics can contact the session co-chairs and technical committee members: shahid.habib@nasa.gov, messinger@cis.rit.edu, malteseantonino@gmail.com

Special Joint Session on Airborne Remote Sensing: Remote Sensing 2012 (RS12)

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

Programme Committee: **Charles R. Bostater, Jr.**, Florida Institute of Technology (United States); **Richard J. Breitlow**, Agfa Corp. (United States); **Filip Hajek**, Forest Management Institute (Czech Republic); **Steven P. Neeck**, NASA Headquarters (United States); **Xavier Neyt**, Royal Belgian Military Academy (Belgium); **Petri Pellikka**, Univ. of Helsinki (Finland)

Remote sensing systems for local and regional earth science, engineering and resource management continues to rely upon the use of aerial platforms and systems. In fact, even most satellite based sensor systems are designed for, and tested aboard airborne platforms. Aircraft, balloons and recent advances in unmanned aerial vehicles (UAV's) continues to represent a modern as well as next generation approach for studying the atmosphere and related cloud processes; land surface characteristics and related hydrological processes; littoral regions, coastal and estuarine regions, regional seas, large lakes, as well as regional sea ice covered regions.

An important aspect of remote sensing science is the ability to monitor complex environmental media (air, land, water) and their interfaces (air-water, water sediment, air-land and their respective internal interfaces and environmental media). Understanding small scale as well as regional scale complex environmental systems is central to scientific understanding the global atmosphere, land, and ocean systems. In all of these spatial scales, remote sensing data provides valuable environmental monitoring and safety related information.

Airborne remote sensing systems often provide imagery and data that serve as initial & boundary conditions and state variables in regional or watershed based models that help to assess and predict processes controlling regional or mesoscale spatial and temporal processes. Thus airborne platforms and related sensor systems continue to provide a valuable tool set and techniques for mapping different land, and water features such as coral reefs, submerged aquatic vegetation and other "targets" for security related interests.

The joint session on airborne remote sensing platforms and systems calls for papers that describe future systems, existing research as well as operational airborne remote sensing activities and results that have the potential or demonstrated use to provide information in solving regional, watershed, and local societal issues. Papers that demonstrate approaches to help improve the accuracy and precision of retrieved geophysical parameters from airborne remote sensing imagery and system signals are also of interest for the session.

This joint session will offer a forum for oral presentations as well as a poster session papers during the European Remote Sensing Symposium sponsored by RS02 and RS03 Conferences.

With reference to the above, this joint session will address airborne remote sensing systems and the use of these systems on aerial platforms, with special emphasis on areas such as:

- detection of ocean currents and oceanic frontal features; lidar, radar and altimeters
- land & water surface and sub-surface sensing using acoustics, optical, laser and magnetic systems
- operational use of regional remote sensing data in coupled mesoscale atmospheric models
- airborne remote sensing of land and surface vegetation (both active and passive systems)
- land and littoral zone hyperspectral remote sensing
- airborne microwave signatures of land and water features, and air SAR systems
- studies of shore-fast ice; regional sea ice prediction and modeling
- multi-sensor integration, and sensor studies from airborne platforms
- data fusion techniques using airborne sensing systems
- laser fan beam sensor systems
- lidar and passive-active (Raman) airborne remote sensing systems, applications, and techniques
- regional ice monitoring in climate change research, particularly work related to sensors for assessing thickness changes
- operational sea ice monitoring systems and requirements
- active and passive remote sensing and techniques for improving underwater imaging for mapping ports, waterways and harbors
- next-generation sensors and aerial platforms for regional and scientific studies
- calibration and validation of space-based measurements and retrieval algorithms
- remote sensing missions for climate science
- use of airborne remote sensing techniques in addressing in pre and post disaster assessments
- airborne multi-modal sensing platforms
- remote Sensing for cultural and historical preservation
- unmanned airborne remote sensing systems.

Questions concerning the session and topics can contact Charles Bostater at Florida Institute of Technology at: cbostate@fit.edu.

Edinburgh, Scotland's inspiring Capital, is one of the most beautiful cities in Europe, where stunning cultural heritage fuses with the best of modern, dynamic city life to create the perfect destination. The city and its surrounding area to the South and West have a high concentration of photonics related industries, along with a large number of educational institutes furthering research and training students.

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SPIE Remote Sensing

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