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We invite you to submit your abstract to SPIE Defense, Security, and Sensing 2011—the industry’s leading meeting for scientists and engineers from industry, military, government agencies, and academia throughout the world. We are pleased to announce that Dr. Regina E. Dugan, Director, Defense Advanced Research Projects Agency has graciously accepted our invitation to deliver the Symposium-wide Plenary Presentation.

This year’s event also brings you two new conferences—Sensing Technologies for Global Health, Military Medicine, Disaster Response and Environmental Monitoring; and Scanning Microscopies 2011: Advanced Microscopy Technologies for Defense, Homeland Security, Forensic, Life, Environmental and Industrial Sciences.

We have a great event in the works, and we look forward to your participation. Come build your future today by submitting to SPIE Defense, Security, and Sensing 2011.

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–2010 Paper Presenter
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Sárka O. Southern, Gaia Medical Institute
Symposium-wide Plenary Presentation
Tuesday 8:30 to 9:30 am

Dr. Regina E. Dugan, Director
Defense Advanced Research Projects Agency (DARPA)

Appointed by Secretary of Defense, Robert M. Gates, and announced by the Director, Defense Research and Engineering, Zachary Lemnios, Dr. Regina E. Dugan was sworn in as the 19th director of the Defense Advanced Research Projects Agency (DARPA) on July 20, 2009.

Founded in 1958 as a response to the Soviet Union’s launch of Sputnik, DARPA’s mission is to prevent strategic surprise for the United States as well as create strategic surprise for our adversaries. From its founding more than 50 years ago to current day, this mission implies one imperative for the Agency: radical innovation for national security. Today DARPA is the principal agency within the Department of Defense for research, development and demonstration of high-risk, high-payoff projects for the current and future combat force.

Experienced in counterterrorism and defense against explosive threats, Dr. Dugan first served the Nation as a DARPA program manager from 1996 to 2000. During this first tour with the Agency, she directed a diverse $100 million portfolio of programs including the “Dog’s Nose” program, an effort focused on the development of an advanced, field-portable system for detecting the explosive content of land mines. In 1999, Dr. Dugan was named DARPA Program Manager of the Year for her efforts, and in 2000 she was awarded the prestigious Bronze deFleury medal by the Army Engineer Regiment. She is also the recipient of the Office of the Secretary of Defense Award for Exceptional Service and the Award for Outstanding Achievement.

Dr. Dugan’s contributions to the United States military are numerous. She led a counterterrorism task force for the Deputy Secretary of Defense in 1999 and, from 2001 to 2003, she served as a special advisor to the Vice Chief of Staff of the Army, completing a Quick Reaction Study on Countermine for Enduring Freedom. The results of this study were subsequently briefed to joint senior military leadership and successfully implemented in the field.

Prior to her appointment as director of DARPA, Dr. Dugan co-founded Dugan Ventures, a niche investment firm, where she served as President and CEO. In 2005, Dugan Ventures founded RedXDefense, LLC, a privately held company devoted to innovating solutions for combating explosive threats, where she also served as President and CEO. From private industry, Dr. Dugan brings a wealth of management, finance, product development, and marketing experience to the Agency.


Dr. Dugan obtained her doctorate degree in mechanical engineering from the California Institute of Technology and her master’s and bachelor’s degrees from Virginia Tech. She is the sole inventor or co-inventor on multiple patents and patents pending. Dr. Dugan is the co-author of Engineering Thermodynamics, 1996. She is the first female director of DARPA.
Infrared Technology and Applications XXXVII (DS100)

Conference Chairs: Bjorn F. Andreason, IR Technology and Applications Consultant (Israel); Gabor F. Fulop, Maxtech International, Inc. (USA); Paul R. Norton, U.S. Army Night Vision & Electronic Sensors Directorate (USA)

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Post-Meeting Manuscript Due Date: 28 March 2011

Rapid advances are taking place today in infrared technologies. These are enabling the development of more capable sensor systems that are expected to have improved performance with greater reliability, reduced weight, volume, power consumption, and lower cost.

The emphasis in this conference is on the components used in infrared sensor systems. In addition, general-purpose sub-systems and systems are covered. Finally, selected applications will be covered, especially in military and security systems, so as to provide continuity between developers of components and systems.

This conference will bring together researchers and students, as well as developers and users of infrared technologies, to discuss improvements in military and commercial sensors brought about by the incorporation of advanced technologies and/or new techniques.

Papers solicited for this conference may address infrared technologies like:

- cooled and uncooled focal plane arrays (FPAs)
- cooled and uncooled single element and linear array detectors
- monolithic and hybrid detectors
- two- and three-color detectors
- multiband and hyperspectral FPAs
- very large arrays for astronomy and situational awareness
- FPAs for 3D imaging and ranging
- FPAs for simultaneous active and passive imaging
- scanning and staring imagers
- mono- and multiband IR imaging optics
- optical filters and protective coatings
- in- and behind-the focal plane signal processing electronics

and their use in sensors/systems such as:

- thermal imagers
- microsensors
- multispectral and hyperspectral sensors
- image fusion such as combined thermal imaging/low-light-level imaging systems
- sensors for micro air vehicles and UAVs
- infrared search and track (IRST)
- threat warning systems
- airborne navigation, piloting, and precision targeting systems
- thermal weapons sights (TWS)
- driver’s vision enhancers (DVE)
- smart munitions
- space-based sensors
- missile seekers
- trackers with and without radiation hardening.

Smart Image and Signal Processing

The chairs are pleased to announce an invited-paper session dedicated to smart image and signal processing.

Sessions being planned for the week-long conference:

- superlatice detectors
- high operating temperature MWIR detectors
- MCT for passive single, multi- and hyperspectral operation
- cryocoolers for IR detectors
- uncooled IRFPAs and their applications
- emerging uncooled technologies
- cooled FPAs and their applications
- development of 3rd generation thermal imagers
- on/near FPA Smart Image and Signal Processing
- range-gated imaging and 3D imaging
Call for Papers

“World leading scientists, researchers, and engineers gather to discuss, demonstrate, and learn the state-of-the-art technology.”

–2010 Paper Presenter

Critical Dates
Abstract Due Date: 11 October 2010
On-Site Manuscript Due Date: 14 February 2011
Post-Meeting Manuscript Due Date: 28 March 2011

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.

• QWIP and QDIP FPAs and their applications
• SWIR imagers and their applications
• advanced sensors, technologies, and techniques
• combined uncooled IR and low-light level integrated sensors
• integrated and fused sensors
• thermal imagers
• IR optics
• IR airborne and space sensor systems
• IR technologies in security.

Note 1: Only one paper on a given topic will be accepted from each company/institution.

Note 2: To be considered, your abstract must include your short biography.

Note 3: Papers should emphasize the technical nature of the topic. Product names and any type of product promotion should be avoided.

Note 4: Please address questions and comments concerning the conference to any one or all of the three Chairs: andresen@netvision.net.il, gfulop@maxtech-intl.com, p.norton@verizon.net
Infrared Applications, ThermoSense Mission Statement

The Infrared Applications, ThermoSense conference promotes the worldwide exchange of information about the uses or applications of thermal infrared sensing, imaging and measuring instruments through papers, workshops and short-courses. Over the past Thirty Three years these activities have included topics from the fundamentals of imaging and calibration to virtually all civilian applications of infrared equipment with special emphasis on problem solving and reduction to practice.

Post-Meeting Manuscript Due Date:
28 March 2011

IR Sensors and Systems

Thermosense XXXIII (DS101)

Conference Chairs: Morteza Safai, The Boeing Co. (USA); Jeff R. Brown, Hope College (USA)
Program Committee: Andrea Acosta, Colbert Infrared Services (USA); Nicolas P. Avelesidis, National Technical Univ. of Athens (Greece); Douglas Burleigh, La Jolla Cove Consulting (USA); Fred P. Colbert, Colbert Infrared Services (USA); K. Elliott Cramer, NASA Langley Research Ctr. (USA); Ralph B. Dinwiddie, Oak Ridge National Lab. (USA); Ermanno G. Grinzato, Consiglio Nazionale delle Ricerche (Italy); Sheng-Jen Hsieh, Texas A&M Univ. (USA); Herbert Kaplan, Honeyhill Technical Co. (USA); Timo T. Kauppinen, VTT Technical Research Ctr. of Finland (Finland); Dennis H. LeMieux, Siemens Power Generation, Inc. (USA); Monica Lopez Saenz, IRCAM GmbH (Germany); Xavier P. V. Maldague, Univ. Laval (Canada); Jonathan J. Miles, James Madison Univ. (USA); Gary L. Orlove, FLIR Systems, Inc. (USA); G. Raymond Peacock, Temperatures.com, Inc. (USA); Piotr Pregowski, Pregowski Infrared Services (Poland); Ralph A. Rotolante, Movitherm (USA); Andrés E. Rozlosnik, SI Termografia Infrarroja (Argentina); Takahide Sakagami, Kobe Univ. (Japan); Steven M. Shepard, Thermal Wave Imaging, Inc. (USA); Gregory R. Stockton, Stockton Infrared Thermographic Services, Inc. (USA)
Steering Committee Emeritus Members: Sven-Åke Lingberg, Univ. of Gäyle (Sweden); John R. Snell, Snell Infrared(USA); Robert Madding, FLIR Systems (USA)

- process
- structural.

Manufacturing and Processing Industries
- composites industry (also see NDT)
- glass and ceramics
- machine vision
- metals processing
- petroleum and chemical
- plastics
- predictive maintenance applications
- pulp and paper
- quality control applications
- semiconductors and microelectronics.

Materials Evaluation and NDT
- fatigue analysis
- sonic IR
- thermal properties of materials
- thermal stress analysis (TSA).

Medical
- calibration of IR thermometers
- screening for human body temperature
- veterinary applications of IR.

Miscellaneous
- resource and maintenance management
- economic impact, justifications studies
- equipment, software, and practices guides
- professionalism, standards, and certification.

NDT (Nondestructive Testing)
- subsurface flaws
- composite materials and structures
- metallic structures
- aerospace applications
- civil structures (infrastructure)
- underground anomalies
- electronic components.

Power Generation and Distribution
- field measurement issues
- power plant heat-rate efficiency
- predictive maintenance
- safety and records.

Research and Development
- animal applications
- enhanced spatial resolution
- enhanced time resolution
- image interpretation
- medical applications
- microscopy
- new methods
- thermal modeling and FEA.
Call for Papers

Security
• disease screening
• fire and rescue
• law enforcement
• surveillance in civilian applications.

In case of multiple submissions, the Program Committee reserves the right to allow only one oral presentation per author group while transferring the others to the poster session. During the Symposium, authors are expected to attend their respective sessions to enable interaction with the audience. Unless otherwise requested by authors, authors and abstracts will be posted at http://www.thermosense.org

Monday Evening Exhibitor Vendor Session
What’s New in Infrared Imaging Hardware and Software
(Presentations by equipment and service vendors)

Moderators: Herbert Kaplan, Honeyhill Technical Co., Andres E. Rozlosnik, SI Termografia Infrarroja

This session is now in its seventh year and has become very popular. This venue provides an early opportunity for exhibitors to showcase their latest technology and products to the ThermoSense and IR community prior to the opening of the exhibit. This enables the technical conference attendees to better prioritize their activities when visiting the exhibits. It is a casual meeting with ample time for questions and answers.

Your company must be an exhibitor at DSS11 to be part of this event. If you are interested in participating, or have more questions, please contact:
Herbert Kaplan
hkaplan@earthlink.net
or
Andres Rozlosnik
aer@termografia.com

Student Poster and Poster Briefing Session
Chairs: Jonathan J. Miles, James Madison Univ. and Jeff R. Brown, Hope College

ThermoSense XXXIII will again feature a Student Poster Session. The session is intended to promote awareness of, and encourage undergraduate and graduate research pertaining to, the ThermoSense conference. The oral sessions are open to students who wish to present their work as a manuscript for oral presentation. In order to take part in the Student Poster Session:
(1) an abstract must be submitted electronically to SPIE via the web on or before the SPIE abstract due date of 11 October 2010 (a Tracking Number will be forwarded after submission); then (2) the abstract must be e-mailed to the session chair, Jonathan Miles, at milesjj@jmu.edu with the paper confirmation tracking number (i.e. DSS11-DS101-XX); (3) the lead author must be a student; and (4) the student author must commit to attending the symposium and presenting his or her poster.

Submit your abstract today!
spie.org/dsscallpdf
IR Sensors and Systems

Infrared Imaging Systems: Design, Analysis, Modeling, and Testing XXII (DS102)

Conference Chairs: Gerald C. Holst, JCD Publishing (USA); Keith A. Krapels, U.S. Army Night Vision & Electronic Sensors Directorate (USA)

Program Committee: Piet Bijn, TNO Defence, Security and Safety (Netherlands); Ronald G. Driggers, U.S. Naval Research Lab. (USA); Richard L. Espinola, U.S. Army Night Vision & Electronic Sensors Directorate (USA); David P. Forrai, L-3 Communications Cincinnati Electronics (USA); Alan Irwin, Santa Barbara Infrared, Inc. (USA); Terrence S. Lomheim, The Aerospace Corp. (USA); Endre Repasi, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Hector Reyes, Raytheon Co. (USA); Joseph P. Reynolds, U.S. Army Night Vision & Electronic Sensors Directorate (USA); Bernard M. Rosier, ONERA (France); Ronald B. Sartz, U.S. Army Research Lab. (USA); Michael A. Soel, FLIR Systems, Inc. (USA); Curtis M. Webb, Northrop Grumman Corp (USA)

Sensor technologies are undergoing revolutionary advances. Increases in spatial, spectral, and temporal resolution, and in breadth of spectral coverage, render feasible sensors that function with unprecedented performance. Advances in computational power allow unparalleled exploitation of information collected by multicolor sensors, hyperspectral imagers, and multisensors. Existing applications are significantly enhanced and completely new application areas are arising. This has generated a renewed demand for measuring, modeling, and simulating target and background signatures and synthesizing multisensor contrast attributes to a depth of detail not seen before.

Sensor suites (multisensor platforms) are becoming prevalent. The methods used for design, modeling, analysis, and testing are generic to all imaging systems and apply to all sensors within a suite. Papers (listed in the following areas) are solicited for both non-thermal (UV, visible, low-light-level TV, NIR, SWIR, and mm) as well as thermal imaging systems (MWIR and LWIR).

The potential for smart sensing, robotic platforms, and communication networks has inspired both commercial and military users to look at families of affordable, interactive sensors to enhance situational awareness including surveillance, targeting, seekers, damage assessment, traffic assessment, and environmental monitoring. Platforms for consideration are unmanned ground and air vehicles, munitions, and unattended ground sensors.

Topics include:
- smart sensor design
- sensor suites (including sensor interactions)
- sensor suite analysis metrics
- testing metrics.

Varieties of models (e.g., NVThermIP) exist for analyzing advanced infrared imaging systems. New models or upgrades to existing models are necessary as new concepts are developed or existing systems are improved. Emerging technologies include uncooled detectors, quantum well detectors, novel scanning focal plane arrays, as well as image processing algorithms. The advantages of image processing on target detection has not been fully quantified.

Topics include:
- modeling of scanning, staring, TDI systems
- imaging trackers and seekers
- image quality metrics of sampled data systems
- image processing models (applicable to target detection and recognition)
- human factors
- display characteristics
- effects of sampling and phasing
- system improvements gained by microscan
- superresolution.

Model validation can only be ascertained through accurate and comprehensive testing.

Topics include:
- calibration
- measurement techniques
- uncertainty analysis
- test requirements for second generation and uncooled systems
- laboratory-field test correlation.

The sensor suite may contain laser range finders and laser designators. Future applications on unmanned ground and air vehicles will place more importance on integration, alignment, testing and field support of multisensor platforms.

Topics include:
- multisensor boresight
- laser range finder and designator testing
- low-light-level TV testing
- development of test metrics for integrated systems
- sensor fusion metrics.

Imaging system optimization requires knowledge of the target signatures, and atmospheric propagation effects.

Topics include:
- target and background measurements and characterization
- characterization of backgrounds in other than moderate climates, including the urban environment
- improvements in and validation of target & background models including clutter
- advances in scene simulation/representation models and related technologies
- camouflage, concealment & deception (CC&D)
- target acquisition in benign and cluttered scenes
- broad band atmospheric phenomena (absorption, scattering, and path radiance)
- atmospheric turbulence effects on target acquisition
- comparison of measure and predicted atmospheric transmission.
Technologies for Synthetic Environments: Hardware-in-the-Loop XVI (DS103)

Conference Chairs: Scott B. Mobley, U.S. Army AMRDEC (USA); R. Lee Murrer, Jr., Millennium Engineering and Integration Co. (USA)

Program Committee: James A. Annos, U.S. Navy (USA); Gary H. Ballard, U.S. Army AMRDEC (USA); David B. Beasley, Optical Sciences Corp. (USA); James A. Buford, Jr., Missile Defense Agency (USA); Dennis H. Bunfield, The AEgis Technologies Group, Inc. (USA); Raul Fainchtein, The Johns Hopkins Univ. (USA); W. Larry Herald, MacAulay Brown Inc. (USA); Hajin J. Kim, U.S. Army AMRDEC (USA); John M. Lannon, Jr., RTI International (USA); Heard Lowry, Aerospace Testing Alliance (USA); William M. Lowry, U.S. Army Redstone Technical Test Ctr. (USA); Robert W. Mitchell, Ideal Aerosmith, Inc. (USA); Ronald J. Rapp, Air Force Research Lab. (USA); Richard M. Robinson, The AEgis Technologies Group, Inc. (USA); Donald R. Snyder, Air Force Research Lab. (USA); Florence C. Solomon, U.S. Air Force (USA); Leszek Swierkowski, Defence Science and Technology Organisation (Australia); Owen M. Williams, Defence Science and Technology Organisation (Australia); Brian K. Woode, Naval Air Warfare Ctr. (USA)

Call for Papers

Hardware-in-the-loop (HWIL) facilities continue to play an important role in weapon development programs as a means of reducing risk leading up to flight tests while also reducing the number of flight tests. Smart missiles having imaging sensors (both passive and active), complex signal processing, and a dynamic threat environment, present unique challenges for HWIL ground test facilities. The emergence of multi-mode systems requiring simultaneous stimulation in two or more spectral bands places even greater requirements on these facilities. Many organizations are upgrading their capabilities with dynamic infrared projection systems that are driven with high-fidelity phenomenology modeling codes hosted on real-time rendering computers. Developing, characterizing, and integrating these technologies into a HWIL environment for smart weapons remains an area of intense focus.

This conference will address the broad spectrum of HWIL testing of smart weapons with emphasis on the integration of new test technologies and the associated methodologies pertinent to HWIL simulation. Suggested topics for presentation include:

Facilities, Testbed Examples/Techniques
- a special poster session will be conducted that focuses on the future trends and planning of HWIL facilities and testbed examples and techniques. Papers should layout technology needs, ongoing research efforts, and verification/validation of new technologies/techniques. Papers are encouraged to have more of a technical emphasis rather than a top level description.

Infrared Projectors
- research and characterization efforts of enabling technologies with emphasis on recent advances in plasma display and 2D LED (MWIR and LWIR) devices, high-temperature materials, device architecture, fabrication processes
- characterization of ongoing technologies
- ultimate temperature resolution capability: achieving the 10mK holy grail
- test requirements: spatial sampling, radiometric and temporal fidelity, dual color, cold background, noise resolution, hyperspectral, semi-active laser
- nonuniformity data collection, real-time implementation
- papers discussing projector performance are encouraged to include measurement techniques, analysis examples, and validation techniques.

Ladar Scene Generation and Projection
- with the growing interest in Ladar sensors we will continue with a dedicated session addressing Ladar simulation requirements, implementation solutions, and research/characterization efforts into the enabling technologies
- papers are solicited to those currently addressing Ladar simulation/stimulation requirements
- ongoing research into phenomenology modeling, digital rendering, and photon generation technologies
- validation with field measurements.

System Integration
- solutions to integrating projector devices with drive electronics, scene rendering computers, calibration systems, and the user
- innovations to addressing emerging requirements (large format arrays, high-speed operation, high-resolution, etc.)
- managing noise.

Flight Motion Simulation Systems
- design and implementation of unique flight table configurations
- advancements in gimbal materials, hydraulic actuators, electric motor materials
- current state-of-the-art in flight table design
- advancements in controller design
- meeting higher bandwidth requirements
- challenges of complex target gimbal implementations
- specifying performance for the application.

Scene Generation Technologies
- development/feasibility of low-cost PC scene generators
- user needs, development activities, challenges
- real-time modeling and rendering of synthetic targets/backgrounds: image projection, signal injection
- Ladar hyperspectral, semi-active laser, image generation and presentation for real-time HWIL.

Post-Meeting Manuscript Due Date:
28 March 2011
Window and Dome Technologies and Materials XII
(DS104)

Conference Chair: Randal W. Tustison, Raytheon Co. (USA)
Program Committee: Joel Askinazi, Goodrich Corp. (USA); Richard Gentilman, Raytheon Co. (USA); Daniel C. Harris, Naval Air Warfare Ctr. Weapons Div. (USA); Brian K. Jones, U.S. Army Research, Development and Engineering Command (USA); John S. McCloy, Pacific Northwest National Lab. (USA); Robert J. Ondercin, Air Force Research Lab. (USA); Adrienne E. Selz, Air Force Research Lab (USA); Michael E. Thomas, The Johns Hopkins Univ. (USA); Brian J. Zelinski, Raytheon Missile Systems (USA)

Post-Meeting Manuscript Due Date: 28 March 2011

This conference is intended as an international forum for the presentation of advances in design, processing, characterization, and use of optical windows, domes, and related materials technology. It is particularly focused on optical materials intended for operation from the ultraviolet to the infrared. These materials technologies will impact electro-optic (EO) systems and the platforms on which they operate including ground, air, or sea-based systems.

This conference will report on the state-of-the-art of the various optical materials technologies. Papers on the following and related topics are solicited:

- theoretical studies and modeling of materials and optophotonic crystal applications to windows and domes
- modeling of transmittance, surface and bulk scattering, and absorption in window and dome materials
- physically induced phenomenon in optical materials (e.g., dn/dt, fracture, impact resistance, rain and sand erosion, thermal shock, emission, ballistic impact)
- mechanical toughening and strengthening of optical materials
- optical materials for supersonic and/or hypersonic application
- optical materials for window applications including multimode operation
- abrasion and rain erosion protective and related hard coatings
- conductive coatings and structures
- optical filters, frequency selective coatings, and microstructures
- composite, bonded, tiled, or faceted windows and domes
- actively cooled windows and domes
- conformal optics: design, manufacturing, and testing
- deterministic optical finishing methods
- rapid, low-cost optical finishing methods
- fabrication of optical materials for windows and domes
- low-cost optics including polymeric materials
- optical ceramics and glasses of oxides, nitrides, sulfides, and phosphides
- semiconductor optical materials (i.e.; Ge, Si, GaAs, GaP, ZnS, ZnSe)
- diamond and diamond-like material and coatings
- sapphire and polycrystalline alumina
- UV-VIS-NIR transmitting materials
- 3-5 μm transmitting materials
- 8-12 μm transmitting materials
- materials characterization and testing
- nanophase and nanocomposite optical materials and processing
- photonic bandgap materials and processing
- optical metamaterials for window and dome applications
- optical materials for high-energy laser applications
- optical materials for solid state laser gain medium
- multifunctional optical materials and structures
- inorganic scintillators
- alkali halide optical elements.
In the terrestrial realm, both hastily scattered and buried minefields and isolated improvised explosive devices can be a major impediment to military operations. For this reason the remote detection of buried explosive objects, surface-laid mines, and minefields is a key to the implementation of new Army warfighting doctrine based on rapid movement. Detection of mines and explosive objects to address Naval doctrine in the marine environment, whether in the surf zone, near-shore region, or in deep water is also a continuing technical challenge. Additionally, the use of mines as effective defensive weapons and improvised explosive objects and homemade explosives as inexpensive terrorist alternatives have proliferated worldwide during the last decade. As a consequence, the detection of mines, explosive objects, and obscured targets remains an ever important topic, not just because of its military related applications, but also for its humanitarian and environmental impacts. It is relatively easy to lay a minefield or use an explosive device but very dangerous, costly, and time consuming to detect, localize and to clear it. In the humanitarian context, the threat of a minefield is that it remains active and in place for a very long time, generally outlasting any minefield documentation. Improvised devices can cause massive personal trauma and these devices present unique detection challenges. Unexploded ordnance presents a hazard for military operations during and after conflicts, as well as research systems applied to detection of landmines, UXO, and IED as well as on the geophysical signatures of environmental conditions on clutter and false alarms as well as on the geophysical signatures of landmines, UXO, and IED.

- evaluation tests of geophysical sensors for humanitarian demining
- system applications of technology addressing the detection of buried or underwater minelike targets, ordnance, hazardous waste materials in plastic or metallic containers, and obscured structures of all kinds
- measurement instruments and systems for the acquisition of data for the detection of buried and obscured targets, including ground-based, airborne, shipborne, and underwater systems, and related research investigations
- sensor and target models, and their predictive capabilities and limitations
- multisensor signal processing and fusion techniques
- image and signal processing algorithms and related performance evaluation measures, such as probability of detection and false alarm rate
- results of measurements addressing the detectability of targets that are buried, obscured, or in shallow water or coastal environments using both multispectral and hyperspectral systems, active laser systems, synthetic aperture radar, and other systems such as biological, chemical, and olfactory robotics
- the effective analysis of the operator as a signal processing component in a detection system, cognitive engineering
- other enhancements to improve detection of surface mines and minefields, especially in areas to improve night operations, increase area coverage rates, and increase standoff distances or operational altitudes
- passive and active detection of primitive tunnels, underground passageways and bunkers, and tunneling activity.
Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) Sensing XII (DS106)

Conference Chairs: Augustus W. Fountain III, U.S. Army Edgewood Chemical Biological Ctr. (USA); Patrick J. Gardner, The Charles Stark Draper Lab., Inc. (USA)

Program Committee: Jerome J. Braun, MIT Lincoln Lab. (USA); John C. Carrano, Carrano Consulting (USA); Christopher C. Carter, The Johns Hopkins Univ. (USA); Matthew T. Griffin, General Dynamics Armament and Technical Products (USA); Eric J. Houser, U.S. Dept. of Homeland Security (USA); Carter D. Hull, Y-12 National Security Complex (USA); Harry Ing, Bubble Technology Industries, Inc. (Canada); Aaron LaPointe, U.S. Army Night Vision & Electronic Sensors Directorate (USA); Harold R. McHugh, U.S. Dept. of Energy Special Technologies Lab. (USA); Paul M. Pellegrino, U.S. Army Research Lab. (USA); Michael W. Petyk, Defence Research and Development Canada (Canada); James G. Placke, Jr., Y-12 National Security Complex (USA); Cynthia R. Swim, U.S. Army Edgewood Chemical Biological Ctr. (USA); Anna Tedeschi, Strategic Analysis, Inc. (USA) and U.S. Dept. of Homeland Security (USA); Steven W. Waugh, Defense Threat Reduction Agency (USA)

Post-Meeting Manuscript Due Date: 28 March 2011

Reliable methodologies are needed for point and stand-off detection of chemical, biological, radiological, special nuclear and explosive (CBRNE) materials. These technological needs are not universally military in nature. For example, there is pervasive interest among diverse disciplines such as medicine, law enforcement, explosive ordnance disposal, environmental protection, industrial manufacturing and food processing in being able to develop capabilities for the rapid detection and identification capabilities for various chemical markers.

In recent years there has been significant interest in techniques which can detect and identify classical chemical and biological agents. Many of these same techniques can also be used to detect disease causing contagions, toxic industrial chemicals (TICs) or toxic industrial materials (TIMs), encountered either in combat or in the response to an industrial incident; be it accidental or a deliberate act of sabotage. In addition to chemical and biological threats, there is an increasing demand to protect borders, ports, and other geographical points of entry, from the emergent threats of improvised explosive devices (IEDs), homemade explosives (HEMs), nuclear devices and radiological dispersal devices. These threats have elevated the importance of technologies for the reliable detection, classification, and identification of asymmetric threats.

Technologies such as laser induced fluorescence, Raman and infrared spectroscopy, LIBS/LIPS, mass spectrometry, chromatography, specifically labeled antibodies, DNA/RNA extraction and analysis, biomimetic sensors, micromechanical devices and microfluidics have found recent applications in chemical, biological, radiological and explosives sensing. In addition, methods for electro-optical biological monitoring and biomarker sensing technologies are needed to quantify and detect physical and health indicators of exposure to CBRNE materials.

The scientific principles behind many CBRNE detection technologies are similar, despite their diverse application areas. This conference provides an unprecedented forum for authors from Government, industry, and academia to address a wide variety of CBRNE sensing issues and technologies. Suggested topics for presentation include, but are not limited to:

- novel CBRNE detection modalities and materials
- computational methods, algorithms and artificial intelligence methods for CBRNE sensing, data fusion, and biological monitoring
- signal processing, feature extraction, classification algorithms
- modeling and sensing phenomenology
- CBRNE environmental monitoring
- biological surveillance
- atmospheric transport phenomena for CBRNE releases
- environmental fate and transport of CBRNE materials
- novel decontamination and remediation technologies
- consequence management
- integrated base defense
- micromechanical components/nano-composite materials for CBRNE sensing
- biologically inspired or biomimetic CBRNE sensors
- active/passive detection and identification
- results/status of laboratory testing (live or attenuated agents, simulants)
- results/status of field testing (live or attenuated agents, simulants)
- gamma and neutron detection techniques
- standoff detection of ionizing radiation
- shipping container monitoring techniques.
Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense X (DS107)

Call for Papers

Conference Chair: Edward M. Carapezza, Univ. of Connecticut and DARPA (USA)
Program Committee: Zoraida P. Aguilar, Ocean NanoTech (USA); John G. Blitch, ARACAR: Alliance for Robot Assisted Crisis Assessment and Response (USA); George Cybenko, Dartmouth College (USA); Michael J. DeWeert, BAE Systems (USA); Mildred A. Donlon, Defense Advanced Research Projects Agency (USA); Todd M. Hintz, Space and Naval Warfare Systems Command (USA); Nagem E. Hohil, U.S. Army Armament Research, Development and Engineering Ctr. (USA); Ivan Kadar, Interlink Systems Sciences, Inc. (USA); Pradeep K. Khosla, Carnegie Mellon Univ. (USA); Han Q. Le, Univ. of Houston (USA); Daniel Lehrfeld; Tariq Manzur, Naval Undersea Warfare Ctr. (USA); Paul F. Morgan, U.S. Special Operations Command (USA); Dennis J. Reimer, National Memorial Institute for the Prevention of Terrorism (USA); Nino Srou, U.S. Army Research Lab. (USA)

This program will address thirteen technology focus areas related to advanced unattended and attended sensors and command, control, communication, intelligence, and information technologies. In the aggregate, these technology areas provide the fundamental technologies, tools and systems required for the timely and effective support of homeland security, homeland defense, and law enforcement operations. The papers and presentations should provide a description of the technology and should identify existing and potential linkages between the technology and the system developers, industry and government laboratories, and the community of homeland security, defense, and law enforcement and users. The time critical aspects of the various technologies should be described in these papers with special attention to the availability of the specific technology and, in the case of evidence, to the admissibility of information collected and processed (using this technology) in support of legal proceedings. The long-term potential benefits of these technologies to homeland security, defense, and law enforcement agencies and their respective operational personnel should also be described in the papers and presentations. We therefore seek technical papers from researchers, application system developers, and homeland security, defense and law enforcement users for each of the following technology focus areas: Please designate on your abstract one of the following TOPICAL AREAS as primary:

Infrastructure Protection and Counter Terrorism Systems and Technologies: sensors and command, control, communication, and intelligence technologies and systems designed for infrastructure protection and counter terrorism applications.

Cyber Crimes and Cyberterrorism Technologies and Systems: technologies and systems to detect, acquire, analyze, and model cybercrime related events, hardware and software, including investigative and computer system related forensic techniques, trends and methods.

Concealed Weapons and Through-the-Wall Sensor Technologies and Systems: detection, classification and tracking of concealed weapons (metallic and non-metallic handguns, knives, etc), and personnel and objects through walls of different thickness and character including the use of technologies such as passive and active infrared imagers, passive and active millimeter wave, acoustic and x-ray imagers related technologies and systems, including algorithms to process individual and multiple sensor data.

ElectroOptical/Infrared (EO/IR) & Radar Surveillance Technologies and Systems: detection, classification, and tracking of personnel, vehicles, objects and materials such as explosives, drugs, and contraband hidden on persons, and in baggage, vehicles, and shipping containers, using EO/IR and Radar technologies and systems including passive and active visible and infrared imagers, passive and active millimeter wave imagers (i.e. holographic radar, real aperture radar, synthetic aperture radar), acoustic imagers and x-ray imagers related technologies (i.e., active radar, ESM bistatic radar, etc.), infrared and low-light systems, and algorithms to process individual and multiple sensor data.

Biological and Chemical Agent Sensor Technologies and Systems: detection, classification, and tracking of biological and chemical agents, plumes and related materials, including engineered organisms for agent sensing integrated with other sensing modalities and applications, such as acoustic or seismic sentinels, and algorithms to process individual and multiple sensor data.

Unattended Ground, Sea and Air Sensor and Tagging Systems and Technologies: unattended sensor technologies including miniature acoustic, seismic, chemical, weather, magnetic, visual & IR imaging (including video) sensor systems for the detection, classification, localization, and tracking of time critical targets for remote surveillance and physical security applications, geo-location and tracking devices for field operations inside and outside of buildings, tagging technologies used for tracking of people, containers, and vehicles.

Robotics and Mobile Sensor Technologies and Systems: mobile sensor platforms, including air, land and maritime related (surface and submerged), technologies and systems, with particular emphasis on small and miniature systems for homeland security and law enforcement applications.

Intelligence Exploitation Systems and Technologies: speech and image processing, signal intelligence exploitation, correlation and fusion, indications of warning.

Post-Meeting Manuscript Due Date: 28 March 2011
Information Systems and Technologies: interoperability mechanisms for both data and programs to functionally integrate a wide variety of computational resources, which are geographically dispersed but interconnected, information storage and access across and within information systems, multilevel information security to provide access control, authentication, integrity and assured service, user interfaces that provide visualization and natural means of interacting with vast quantities of information.

Communication Systems and Technologies: advanced communications associated with field operations, advanced high-speed secure wireless communication for imagery transmission from the field for evidence gathering, high-speed digital transmission links to the field for local, regional and national crime databases and information networks, image-based and multi-media based file systems, affordable encryption systems, software based re-programmable communication systems for multi-agency interoperability, and advanced low profile antennas.

Command and Control Systems and Technologies: response technologies and systems for natural disasters, major localized events, terrorism related events and civil unrest, techniques for planning, monitoring, and real-time re-planning of operations using artificial intelligence-based planning and scheduling techniques. GIS based systems, applications of planning systems to law enforcement environments, simulation environments for planning and post event analysis, option and decision generation tools, collaborative planning tools, and resource management tools.

Counter Sniper, Small Projectile, and Gunfire Localization Systems & Technologies: fixed and mobile gunfire detection and shooter localization systems, acoustic detection and localization systems, acoustically cued camera detection and localization systems, infrared, radar and laser localization and bullet tracking systems, exploitable signatures from small ballistic projectiles (40 mm and smaller) and gunfire events, forensic analysis of small ballistic projectiles (40 mm and smaller) and gunfire events using detection and localization systems.

Non-Lethal Technologies and Systems: counter-personnel to deny entry to or occupation of an area or facility; to control or direct crowds or large groups, and to incapacitate individuals or small groups until they can be secured by military or law enforcement personnel; counter-materiel to deny entry or operation of vehicles, vessels, or aircraft while minimizing potential harm to the operators/passengers; counter-capability to disable or neutralize facilities remotely and counter WME to deny the use of weapons of mass destruction.

“I can present my work and get updates on the newest trends in many fields”

–2010 Paper Presenter
Call for Papers

Biometric Technology for Human Identification VIII (DS108)

Conference Chairs: B. V. K. Vijaya Kumar, Carnegie Mellon Univ. (USA); Salil Prabhakar, DigitalPersona, Inc. (USA); Arun A. Ross, West Virginia Univ. (USA)

On-Site Manuscript Due Date: 14 February 2011

FOR CONFERENCE DS108 ONLY
In addition to the abstract that is due by 11 October 2010, prospective authors are REQUIRED to submit, at the same time, a Supplemental File that includes a full paper (6 to 12 pages including text, figures, and bibliography) to facilitate the review process. Abstract submissions without the required Supplemental File will neither be reviewed nor considered for acceptance. Formatting information for the supplemental file may be accessed from http://spie.org/x14101.xml

Biometrics is the science of establishing human identity based on the physical and behavioral characteristics of an individual such as fingerprints, iris, face, voice, hand geometry, gait, etc. Reliable automatic recognition of humans is a very important topic in a number of law enforcement (e.g., criminal investigation), government (e.g., border control), and commercial (e.g., logical and physical access control) applications. With increased emphasis on national and global security, there is a growing and urgent need to automatically identify humans both locally and remotely on a routine basis. Biometrics is a rapidly evolving field that engages the research of multiple disciplines including sensor design, pattern recognition, computer vision, image analysis, signal processing, statistics, computer security, etc. The purpose of this conference is to provide a scientific forum for researchers, engineers, system architects, and designers to report recent advances in this important area of human identification using biometrics. Suggested topics for presentation include, but are not limited to:

Biometric Theory
• pattern recognition
• computer vision
• image processing
• statistical analysis.

Biometric Acquisition and Transmission
• novel sensor design
• collaborative data acquisition
• multisensor biometric networks
• secure biometric transmission.

Biometric Modalities
• fingerprint, hand geometry, and palmprint
• face and iris
• voice
• signature/handwriting
• gait and anthropometrics
• novel biometrics
• multimodal biometrics.

Biometrics and Forensics
• individuality models
• gender and age estimation
• DNA biometrics
• surveillance videos.

Biometric System Design and Evaluation
• scalable identification architectures
• real-time embedded systems and smart cards
• indexing databases
• sensor and template interoperability
• performance prediction models.

Biometric Security and Privacy
• liveness detection
• template protection
• encryption and watermarking
• security analysis
• privacy enhancing technology.

Biometric Applications
• travel and transportation
• homeland security and law enforcement
• e-authentication.

Critical Dates
Abstract Due Date: 11 October 2010
On-Site Manuscript Due Date: 14 February 2011
Post-Meeting Manuscript Due Date: 28 March 2011

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.
This conference will address both manned and unmanned information collection and exploitation systems. Military, civil (homeland security, disaster support/FEMA, renewable natural resources management, law enforcement, etc.), and commercial applications will be addressed.

Papers are solicited on the following topics:

- airborne intelligence/surveillance/reconnaissance (ISR) systems (tactical and strategic) and commercial systems
- sensor systems: electro optical, infrared (cooled and uncooled), multispectral imagers (MSI), hyperspectral imagers (HSI), synthetic aperture radar (ISAR/SAR), lidar polarimetric, etc.
- airborne and ground tasking, processing, exploitation, and dissemination (TPED, PED) systems, techniques and developments
- automatic/aided target recognition (ATR) and sensor cueing (e.g. multisensor, multi/hyperspectral, polarimetric, etc.)
- systems for surveillance, tracking, feature location, border protection, and suspect apprehension
- image processing (multisensor fusion, image/information compression, tracking, mosaicing, 3D profile extraction, etc.)
- UAV platforms, micro to full size; very low to high altitude, for ISR applications
- basic and applied research and development applicable to sensors and total sensor system components and developments
- new technologies including surveillance optics, sensor pointing systems, thermal management, image stabilization, image processing
- data manipulation and multisource report generation
- data links (air-to-air, air-to-ground, SATCOM), networking, bandwidth compression
- autonomous navigational systems/GPS
- FEMA/homeland security applications/requirements
- renewable natural resources management
- forest fire detection/suppression support.
Radar Sensor Technology XV (DS201)

Conference Chairs: Kenneth I. Ranney, U.S. Army Research Lab. (USA); Armin W. Doerry, Sandia National Labs. (USA)

Program Committee: Fauzia Ahmad, Villanova Univ. (USA); Joseph C. Deroba, U.S. Army CERDEC Intelligence and Information Warfare Directorate (USA); Doreen M. Dyck, Defence Research and Development Canada (Canada); Benjamin C. Flores, The Univ. of Texas at El Paso (USA); John E. Gray, Naval Surface Warfare Ctr. Dahlgren Div. (USA); Majeed M. Hayat, The Univ. of New Mexico (USA); Todd A. Kastle, Air Force Research Lab. (USA); Seong-Hwoon Kim, Raytheon Space & Airborne Systems (USA); James L. Kurtz, Univ. of Florida (USA); Changzhi Li, Texas Tech Univ. (USA); Jenshan Lin, Univ. of Florida (USA); David G. Long, Brigham Young Univ. (USA); Jia-Jih Lu, General Atomics Aeronautical Systems, Inc. (USA); Anthony F. Martone, U.S. Army Research Lab. (USA); Atindra K. Mitra, Air Force Research Lab. (USA); George J. Moussally, Mirage Systems (USA); Lam H. Nguyen, U.S. Army Research Lab. (USA); Meppalli K. Shandas, dB Control (USA); Jerry Silvious, U.S. Army Research Lab. (USA); Brian Smith, U.S. Army Armament Research, Development and Engineering Ctr. (USA); Helmut H. Suess, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); David Tahmoush, U.S. Army Research Lab. (USA); Lars M. Wells, Sandia National Labs. (USA)

Call for Papers

Post-Meeting Manuscript Due Date:
28 March 2011

The continued advance of basic technologies in areas including components, processing, and enabling tools is facilitating remarkable leaps forward in radar system performance. This includes enabling new modes, more sophisticated processing algorithms, and new applications in defense, homeland security, and commercial arenas.

This conference seeks to foster dialog between researchers and developers in the various aspects of radar technology development, including commercial, academic, military, and government sectors. It furthermore seeks to provide a forum to present new developments, including experimental and theoretical results that might be of interest to the larger community.

Papers are solicited in topical areas including the following:

Programs and Systems
• space-based radar systems and applications
• UAV and UGV radar systems and applications
• experimental, developmental, and demonstration systems
• new or enhanced commercial and military systems
• science missions.

Applications and Exploitation Techniques
• intelligence, surveillance, and reconnaissance (ISR)
• IED detection and defeat
• sense through the wall radar
• foliage penetration (FOPEN) radar
• ground penetration (GPEN) radar and applications including UXO and mine detection, and tunnel detection
• homeland security, law enforcement, border monitoring
• collision avoidance, sense-and-avoid, due-regard
• air traffic control, airport surveillance, guidance, and control
• bistatic, multi-static, and poly-static radar, including use of transmitters of opportunity
• moving target detection, traffic monitoring, vibrometry, micro-Doppler
• human (dismount), weapon, and contraband detection
• meteorological, environmental, and climate monitoring
• high-fidelity mapping, precision navigation
• radar astronomy
• polarimetric techniques
• EM induction techniques
• applications of radar in the medical sciences.

Algorithms and Processing Techniques
• imaging radar including real-beam, SAR, and ISAR
• interferometric processing, coherent change detection
• noise, noise-like, and chaotic radar techniques
• applications of non-coherent image processing techniques
• 3D and tomographic techniques
• Bistatic/multistatic/MIMO radar techniques
• ultra-wideband radar
• waveform design and generation
• space-time adaptive processing (STAP)
• radar target tracking
• automatic target recognition (ATR), target detection (ATD)
• estimation of instantaneous vibration parameters in SAR
• hydrometeor discrimination
• multi-sensor integration and aiding; sensor fusion
• radiometry and other passive techniques.

Components and Technologies
• navigation systems, instruments, and components for radar
• microwave power amplifiers including TWTAs, mini-tubes, and solid-state power
• active electronically scanned array (AESA) antennas, including those using optical techniques
• high-performance antennas and microwave components
• MM-wave focal plane arrays
• high-performance radar processors, transmitters, receivers
• tags and transponders
• radar design tools and modeling software for physics-based EM scattering simulations
• radar performance validation tools and devices
• new microwave circuit design and fabrication technologies and techniques including high-density packaging
• radar-on-chip integration, low-power systems
• multi-function components and sub-systems.

Phenomenology
• radar scattering from terrain, rain/snow, atmospheric particulates, and sea clutter
• microwave and millimeter-wave propagation effects through the atmosphere
• propagation through walls, foliage, ground, other media
• target scattering modeling and measurements from cultural targets and vehicles
• biometric signature quantification and characterization.
Imaging and Sensing

Passive Millimeter-Wave Imaging Technology XIV (DS202)

Conference Chairs: David A. Wilner, U.S. Army Research Lab. (USA); Arttu R. Luukkanen, VTT Technical Research Ctr. of Finland (Finland)
Program Committee: Roger Appleby, QinetiQ Ltd. (United Kingdom); Erich N. Grossman, National Institute of Standards and Technology (USA); Christopher A. Martin, Trex Enterprises Corp. (USA)

Post-Meeting Manuscript Due Date: 28 March 2011

The purpose of this conference is to provide a technical forum for the community working to develop technology and applications in the area of millimeter-wave and sub-millimeter-wave imaging, seeking to bring together customers, end users, industry, and academia.

The two driving attributes of this region of the electromagnetic spectrum are that the atmosphere has good transmission under conditions of poor visibility such as cloud, fog, and dust and that many materials are semi-transparent. These properties open up two core applications: one in poor weather imaging and the other in the security screening of people. Recent developments in technology and applications that are seen as central to this conference include:

- new sub-millimeter-wave band technology which facilitates the transition to more compact systems, which can be used for security scanning
- innovative device technology and electronic beam forming for affordable millimeter-wave imaging systems
- poor weather imaging for piloting aircraft in fog, cloud, or dust conditions
- millimeter-wave imaging based on novel passive or active illumination architectures.

The conference this year will be divided in to the following sections:

- systems (new applications and phenomenology)
- security scanning systems (active and passive)
- enabling technology (receivers, optical materials, and packaging)
- electronic beam-forming (fundamentals, calibration, technology, and systems)
- image processing and simulation (compressive sensing and modeling).

This conference provides an opportunity for users and technologists to update their knowledge in this growing field. Papers are solicited which address imaging applications and technology in the millimeter and sub-millimeter bands.

Non-Intrusive Inspection Technologies IV (DS203)

Conference Chair: Brandon W. Blackburn, Raytheon Co. (USA)
Program Committee: David L. Chichester, Idaho National Lab. (USA); Paul A. Hausladen, Oak Ridge National Lab. (USA); Alan J. Hunt, Univ. of Michigan (USA); Joseph W. Schummer, U.S. Naval Research Lab. (USA)

Post-Meeting Manuscript Due Date: 28 March 2011

This conference will provide an opportunity to explore the current state-of-the-art in research and development opportunities and technical advances for detection of threat materials at stand-off distances of several meters or more. Special interest will be given to long stand-off techniques which can assist in remote sensing of threat objects in both overt and covert applications. Such techniques may be applicable to wide area searches for threat materials.

Many stand-off detection methodologies have become important worldwide in the areas of safety and security. Some of them have already been proven in some other application unrelated to safety and security; others have shown to be effective experimental research tools. This conference provides an important forum for the interaction between researchers (developers) and program managers (end users) of these technologies. The latter will provide information on their programmatic needs and requirements, while the former will discuss the theory, design, and results of their methodology.

Papers are solicited in the following general categories:

**Bulk/Trace Detection Task**

- detection of explosives (high-explosives, improvised explosives)
- long stand-off detection of nuclear materials, radiation dispersal devices, trace elements
- detection of special nuclear materials, including heavy shielded and masked ones
- detection of chemical/toxic materials (chemical warfare agents, highly toxic chemicals)
- detection of illicit materials (drugs, contraband, etc.).

**Type of Packaging**

- private and commercial vehicles, containers (sea freight and air freight), private boats, private aircraft
- detection of threat items on people, inspection of congested areas.

**Methodologies**

- active and passive methods, various sources including: x-rays (transmission, backscattering, diffraction), gamma rays, neutrons, high-energy charged particles, GPR, acoustics, molecular, NQR, IR, vapor/particle detection, microwave, terahertz- and mm-wave imaging, NRF, highenergy pulsed sources, applications of alternate signatures.

**Method of Identification**

- shape, density, elemental composition, molecular composition, isotopic composition, dielectric properties, image analysis, data/sensor fusion.
Radiation in the terahertz range, loosely defined as 0.1 - 10 THz, spans the relatively undeveloped gap between electronics at the low end of the spectrum and optics at the high frequency end. The goal of the conference is to bring researchers active in the general area of THz research and provide a platform for the mutual exchange of ideas. The conference will address topics directed toward the understanding and advancement of the state of the art of the terahertz portion of the spectrum emphasizing applications in industry, security, and military.

Initially, THz radiation was used exclusively by astrophysicists for applications such as the detection of antimatter. However, this extremely expansive and spectrally unique portion of the EM spectrum was initially of high interest for such applications as space-based communications, upper atmospheric sensing and communications, and potentially for short-range terrestrial communications and nonintrusive package screening. More recently, radiation in the THz range has been identified as ideal for an extremely wide range of applications from security to medical systems. Moreover, the realization of THz transistors and the use of negative index materials may revolutionize THz technology.

Terahertz radiation can be transmitted nearly transparently through most non-metallic and non-polar materials. This enables extremely accurate and noninvasive detection of concealed weapons and other contraband substances through clothing, cardboard, and other typical packaging materials. Also, biological and chemical agents have been shown to exhibit a strong “fingerprint” response to THz radiation, leading to possible uses from early warning systems to the deployment of biological and chemical weapons. Because THz radiation is non-destructive to living tissue, it is a promising alternative to radiation in existing medical systems (x-ray, MRI, etc.) for non-destructive imaging and medical diagnostics.

Furthermore, cancer cells specifically have been shown to strongly resonate when exposed to THz waves. Terahertz imaging also shows promising use in characterizing fundamental semiconductor growth processes as well as the manufacture of other materials such as plastics. Additionally, the successful realization of metamaterials, plasmonic and nanoelectronics-based THz devices and systems and their integration with conventional devices and systems may allow novel applications.

Challenges

There remain significant phenomenological and technological challenges that will need to be resolved for many applications. In terms of defense/security applications, the refinement of THz systems is needed to enable very near-term payoffs such as security screening and the detailed characterization of materials such as explosives and pharmaceuticals. Significant advancements are needed in THz source and detector technology to enable medium-range applications such as identification of biological and chemical agents; and new breakthroughs in sensing science phenomenology and sensor architectures will be required for enabling far-future applications such as detailed spectroscopic characterizations of biological molecules and nanoscale systems.

Call for Papers

We invite papers and technical presentations in the following general areas:

- terahertz devices: electronics/photonics/plasmonics
- terahertz generation, propagation, and interaction
- passive components and materials issues in terahertz
- terahertz imaging
- terahertz detectors and receivers
- terahertz system architectures and distributed networks
- terahertz diagnostics
- terahertz nanoelectronics
- terahertz sources and detectors
- terahertz photonic/electronic devices
- terahertz spectroscopy
- terahertz systems
- advanced materials (e.g., metamaterials, memristor)
- novel concepts (e.g., plasmonic THz)
- terahertz to optical metamaterials, assemblies, and systems
- new frontiers in terahertz research
- novel applications
- industrial inspection
- security and military
- biomedical
- information processing and computing
- electronics/information/communication systems
- integration of advanced materials with conventional devices and systems.

Who Should Attend

This meeting will bring together researchers working on all aspects of THz radiation, from the coherent generation, transmission, and detection of THz waves to the individual opto-electronic devices needed to integrate them into viable systems. To further promote multidisciplinary interactions, we will recruit leading researchers from academia, government, and industry.

Conference Chairs: Mehdi Anwar, Univ. of Connecticut (USA); Nibir K. Dhar, U.S. Army Research Lab. (USA); Thomas W. Crowe, Virginia Diodes, Inc. (USA)

Program Committee: Alexander G. Davies, Univ. of Leeds (United Kingdom); Gottfried H. Döhler, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Achyut K. Dutta, Banpil Photonics, Inc. (USA); M. Saif Islam, Univ. of California, Davis (USA); Hiroshi Itto, NTT Photonics Labs. (Japan); Peter U. Jepsen, Technical Univ. of Denmark (Denmark); James Kolodziej, Univ. of Delaware (USA); Edmund H. Linfield, Univ. of Leeds (United Kingdom); A. Hamed Majedi, Univ. of Waterloo (Canada); Tariq Manzur, Naval Undersea Warfare Ctr. (USA); Taiichi Otsuji, Tohoku Univ. (Japan); B. M. Azizur Rahman, The City Univ. (United Kingdom); Victor Ryzhii, Univ. of Aizu (Japan); Richard A. Soref, Air Force Research Lab. (USA); Simon Verghese, MIT Lincoln Lab. (USA); Richard T. Webster, Air Force Research Lab. (USA); K. Sigfrid Yngvesson, Univ. of Massachusetts Amherst (USA); Weili Zhang, Oklahoma State Univ. (USA)
The increasing need for rapid, in situ characterization and quantification of environmental, industrial, and biological samples in complex systems has created important analytical challenges. This critical need comes from many important areas, ranging from environmental sensing, industrial control for waste minimization to field remediation. The application of nano- and micro-system technologies to address these analytical challenges has proved extremely successful. Stand-alone micromachined sensors as well as miniaturized chemical analysis systems that automatically perform multiple steps including sampling, sample transport, separation, and detection have the potential to greatly advance the field of analytical sciences. An urgent application is surveillance and early warning.

The development of advanced chemical and biological sensors and analytical systems requires an integration of micro- and nanosystem technology, analytical chemistry, physics of sensors, microfluidics, and biomolecular recognition methods. The primary aim of this conference is to focus on recent advances in the development of photonic monitoring methods, the design, fabrication technologies, and applications of optical chemical nano/microsensors and nano/micro-analysis systems, and nanoscale devices. The conference will also focus on promoting interdisciplinary interaction between scientists and engineers from industry, academia, and federal laboratories.

The research and development community is encouraged to submit contributions in, but not limited to, the following:

- indoor and outdoor environmental chemical sensors and biosensors
- advanced photonics for spectroscopic trace detection (fluorescence, phosphorescence, Raman, SERS, IR, UV absorption, microwave, RF, LIBS, x-ray, terahertz)
- chemically active sensors (optrodes, coating-based distributed sensors)
- instrumentation for air, liquid, and surface pollution
- detection of toxic industrial compounds (TICs) in air and water
- chemical and physical characterization of environmental sensors
- instrumentation for air pollution and ozone sensing
- global atmospheric monitoring systems
- ground water, river water, and waste water monitoring
- nano/microsensors, sensor array devices, and biochips
- nano/microchemical analysis systems, lab-on-the-chip for environmental analysis (electrophoresis, flow injection analysis, chromatography, etc.)
- nanotechnology-based sensors systems
- nano/microfluidics for sensors (sample handling, fluidic mechanics, microvalves, bio-reactors, etc.)
- high-throughput detection methods and systems
- industrial control systems for environmental protection and waste minimization
- environmental remediation technologies
- sensors for art identification and diagnostics
- monitoring techniques for cultural heritage preservation
- sensor signal processing technologies
- sensor system integration and performance
- advanced algorithms and treatment of environmental data.

Post-Meeting Manuscript Due Date:
28 March 2011
Call for Papers

Smart BioMedical and Physiological Sensor Technology VIII (DS302)

Conference Chairs: Brian M. Cullum, Univ. of Maryland, Baltimore County (USA); Eric S. McLamore, Purdue Univ. (USA)

Program Committee: Karl S. Booksh, Univ. of Delaware (USA); Marie-Christine F. Daniel, Univ. of Maryland, Baltimore County (USA); Majed Dweik, Univ. of Missouri-Columbia (USA); Andre J. Gesquiere, Univ. of Central Florida (USA); Ilko K. Ilev, U.S. Food and Drug Administration (USA); Chang-Soo Kim, Missouri Univ. of Science and Technology (USA); William T. Monroe, Louisiana State Univ. (USA); T. Joshua Pfefer, U.S. Food and Drug Administration (USA); Mark R. Riley, Shiv K. Sharma, Univ. of Hawai‘i (USA); Brian S. Sorg, Univ. of Florida (USA); Liju Yang, North Carolina Central Univ. (USA); Anhong Zhou, Utah State Univ. (USA)

Post-Meeting Manuscript Due Date:
28 March 2011

Technological advances in sensor development and sensing applications have had a major impact on the fields of biomedical diagnostics and biological research in the last decade. This conference on Smart BioMedical and Physiological Sensor Technology and their application, will provide an interdisciplinary forum for scientists, engineers, clinical researchers, medical doctors and industrial partners, from a variety of disciplines, who are engaged in the application of smart sensor technology to problems in the biological and biomedical sciences, to interact and explore cutting edge research and development. Medical doctors, biomedical clinicians, and basic bioscience researchers will present recent results and explain the difficulties they face in terms of detection, diagnosis, treatment and integration of new technologies into the field. Engineers and other researchers, who are developing these sensors, will present the latest in smart sensor and sensing technology concepts and research. Industry representatives will present the latest commercially available technologies for biomedical and optical sensing applications.

This meeting will include sessions ranging from basic research in sensor development and instrumentation to clinical studies using various sensing and therapeutic methodologies (e.g., minimally and non-invasive sensors, lab-on-a-chip, etc.), all having the same common theme of biological or medical sensing/imaging. This conference will focus on the development of novel smart sensor materials and technologies capable of providing additional information and/or more robust analyses than conventional techniques. Smart sensors employ many different diagnostic/therapeutic methodologies (i.e., optical spectroscopy, electrochemical analyses, etc.) as well as instrumentation and data evaluation methods. This conference will be comprised of many sessions, devoted to each different aspect of biological and biomedical sensor development and application.

Contributed papers are solicited concerning, but not limited to the following areas:

- nano-biotechnology
- bio-compatible materials development
- smart sensing materials
- implantable sensor technology
- optical sensor design and development
- electrochemical sensor design and development
- photoacoustic biological sensing
- photon migration
- Raman and SERS imaging and sensing
- near-infrared sensing
- infrared sensing
- non-invasive imaging
- biological ‘Lab-on-a-chip’ platforms and technologies
- microfluidics
- smart sensor arrays for multi-species analyses
- micro- and nano-bioinstrumentation
- point-of-care medical diagnostics
- wireless signal transmission
- space-based health monitoring
- multivariate sensor response evaluation
- data compression and transmission
- remote biological/biomedical sensing
- pre-symptomatic detection
- challenges for the physician
- clinical applications of biomedical sensors
- biomedical forensics
- commercial smart sensor technologies
- drug delivery/therapeutics
- nanovectors/nanocarriers.

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Photonic Applications for Aerospace, Transportation, and Harsh Environment IV (DS303)

Conference Chairs: Alex A. Kazemi, ARK International (USA); Bernard Kress, USI Photonics Inc. (USA); Lothar U. Kempen, Intelligent Optical Systems, Inc. (USA)

Cochair: Eric Y. Chan, The Boeing Co. (USA)

Program Committee: Frank Abdi, AlphaSTAR Corp. (USA); Jacques Albert, Carleton Univ. (Canada); Christopher S. Baldwin, Aither Engineering, Inc. (USA); Ayoub Chakari, Ecole Nationale Supérieure de Physique de Strasbourg (France); Fu-Kuo Chang, Stanford Univ. (USA); Brian Culshaw, Univ. of Strathclyde (United Kingdom); Thomas Dietsch, BMW Group Research and Technology (Germany); James E. Fesmire, NASA Kennedy Space Ctr. (USA); Leo R. Gauthier, Jr., The Johns Hopkins Univ. (USA); Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Harold Hager, The Boeing Co. (USA); Zuyuan He, The Univ. of Tokyo (Japan); Vic Hejmadi, Universal Semiconductor, Inc. (USA); Richard T. Howard; Nicolas Javahiraly, Ecole Nationale Supérieure de Physique de Strasbourg (France); Robert G. Johnson, NASA Kennedy Space Ctr. (USA); Peter Kiesel, Palo Alto Research Center, Inc. (USA); Dennis G. Koshinz, The Boeing Co. (USA); David A. Krohn, Light Wave Venture Consulting, LLC (USA); Edgar A. Mendoza, Redondo Optics, Inc. (USA); Patrick P. Meyrueis, Ecole Nationale Supérieure de Physique de Strasbourg (France); Jean-Pierre Mieglin, Institut Franco-Allemand de Recherches de Saint-Louis (France); Mohammad Mojahedi, Univ. of Toronto (Canada); Herbert O. Moser, National Univ. of Singapore (Singapore); Juock S. Namkung, Naval Air Warfare Ctr. Aircraft Div. (USA); Allen S. Panahi, Redondo Optics, Inc. (USA); Saeed Rehman, Fibertronix (United Kingdom); Nabeel A. Riza, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Stephen F. Sagan, BAE Systems (USA); Indu F. Saxena, Intelligent Optical Systems, Inc. (USA); Kalin Spariosu, Raytheon Space & Airborne Systems (USA); William St. Cyr, NASA Stennis Space Ctr. (USA); Tuan Vo-Dinh, Duke Univ. (USA)

Post-Meeting Manuscript Due Date: 28 March 2011

Photonics is experiencing new and exciting opportunities due to the growing needs of the automotive, aerospace industry and transportation marketplace. This conference will highlight new photonic technologies and emerging applications occurring in the global photonics in transportation industry. This includes photonics technology for auto, truck, rail, aircraft, seaborne, infrastructure, military vehicles and aerospace applications.

The conference will provide invited technical presentations and poster papers, as well as a panel of speakers from industry and government to discuss current and future challenges and opportunities.

We invite technical abstracts in the following disciplines:

- fiber optic sensors for aerospace application
- nano-technology for fiber optic sensors
- optical sensors in automobile
- imaging sensors
- novel on-board display technologies
- collision avoidance
- emerging fiber optic sensor technologies for avionics
- HMD (Helmet Mounted Displays) for transportation
- vision-based sensor (visible, UV, NIR and IR, night vision) and related software for both automotive and aerospace
- lighting and signals
- optical fiber sensors for health monitoring, environmental and gas sensing
- optical satellite-to-satellite communication
- high-volume optical transceivers for car and consumer applications
- safety technology in auto industry using fiber optic sensors
- hazard detection
- specialty optical fiber for harsh and complex environments
- communications and control networks
- industrial collaboration programs
- education and outreach
- cost reducing methodologies.
Sensing for Agriculture and Food Quality and Safety III (DS304)

Conference Chairs: Moon S. Kim, USDA Agricultural Research Service (USA); Shu-I Tu, USDA Agricultural Research Service (USA); Kaunglin Chao, USDA Agricultural Research Service (USA)

Program Committee: Arun K. Bhunia, Purdue Univ., Ctr. for Food Safety Engineering (USA); Suming Chen, National Taiwan Univ. (Taiwan); Bryan A. Chin, Auburn Univ. (USA); Byoung-Kwan Cho, Chungnam National Univ. (Korea, Republic of); Stephen R. Delwiche, USDA Agricultural Research Service (USA); Ki-Bok Kim, Korea Research Institute of Standards and Science (Korea, Republic of); Naoshi Kondo, Kyoto Univ. (Japan); Kurt C. Lawrence, USDA Agricultural Research Service (USA); Kangjin Lee, Rural Development Administration (Korea, Republic of); Alan M. Lefcourt, USDA Agricultural Research Service (USA); Renfu Lu, USDA Agricultural Research Service (USA); Bosoon Park, USDA Agricultural Research Service (USA); Yankun Peng, China Agricultural Univ. (China); Yang Tao, Univ. of Maryland, College Park (USA); Gang Yao, Univ. of Missouri-Columbia (USA); Yibin Ying, Zhejiang Univ. (China); Seung-Chul Yoon, USDA Agricultural Research Service (USA)

Based on physical and chemical characteristics, optical sensing methods for real-time inspection of food and agricultural products can produce rapid, accurate, and consistent inspection solutions for product quality and safety. Advances in sensing technology have broadened the field of applications suitable for computerized optical instrumentation. No longer restricted to detailed laboratory analyses or simplified implementation in industrial or commercial settings, optical sensing technologies now can accommodate non-destructive, comprehensive, high-resolution spectral and image analyses for real-world safety and quality inspection on rapid food-processing lines.

This conference will focus on optical, spectroscopic, and spectral imaging sensing techniques, and approaches for the use of chemical imaging and biosensors, for rapid or non-destructive assessment of safety and quality for meats, fruits, and vegetables. Novel techniques, instruments for real-time measurement and processing, and industrial applications of optoelectronic sensing systems to detect diseases, defects, and fecal or bacterial contamination on meats, fruits, and vegetables will be emphasized.

Contributed papers are solicited concerning, but not limited to, the following areas:

- high throughput spectral imaging inspection system
- Vis/NIR spectroscopic imaging applications
- hyperspectral imaging applications
- multispectral imaging applications
- time-resolved spectroscopy
- fluorescence imaging
- surface-enhanced Raman scattering (SERS) spectroscopy
- optical scattering
- nanomaterials and nanosensors
- biosensors
- terahertz sensing
- chemical imaging applications in food adulterants and contaminants detection.

Submit your abstract today!

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Sensing for Industry, Environment, and Health

Fiber Optic Sensors and Applications VIII (DS305)

Conference Chairs: Stephen J. Mihailov, Communications Research Ctr. Canada (Canada); Henry H. Du, Stevens Institute of Technology, Gary Pickrell, Virginia Polytechnic Institute and State Univ.

Co-chairs: Anbo Wang, Virginia Polytechnic Institute and State Univ.; Alexis Mendez, MCH Engineering LLC; Eric Udd, Columbia Gorge Research

Program Committee: Christopher S. Baldwin, Aither Engineering, Inc.; Ote Bang, Technical Univ. of Denmark (Denmark); Eric A. Bergles, BaySpec, Inc. (USA); Jeff Bush, Optiphase, Inc.; Kevin P. Chen, Univ. of Pittsburgh (USA); Steven D. Christesen, U.S. Army Edgewood Chemical Biological Ctr. (USA); Brian Culsbath, Univ. of Strathclyde (United Kingdom); Abdessamaa Elayamen, Northrop Grumman Navigation Systems (USA); Yoel Fink, Massachusetts Institute of Technology (USA); Eric Goldner, US Sensor Systems Inc. (USA); Tom W. Graver, Micron Optics, Inc. (USA); Ming Han, Univ. of Nebraska-Lincoln (USA); Hajime Haneda, National Institute for Materials Science (Japan); Kazuo Hotate, The Univ. of Tokyo (Japan); Jiri Kanka, Institute of Photonics and Electronics of the ASCR, v.v.i. (Czech Republic); Victor I. Kopp, Chiral Photonics, Inc. (USA); Katerina Krebber, Bundesanstalt für Materialforschung und –prüfung (Germany); Steven T. Kregor, Luna Innovations Inc. (USA); David A. Krohn, Light Wave Venture Consulting, LLC (USA); Paul Lefebvre, LxDATA, (Canada); Thomas D. Monte, KVH Industries, Inc. (USA); Glen A. Sanders, Honeywell Technology (USA); Svetlana A. Sukhishvili, Stevens Institute of Technology (USA); Dennis J. Trevor, OFS Labs. (USA); Xingwei Wang, Univ. of Massachusetts Lowell (USA); Reinhardt Willisch, IPHT Jena (Germany); Younan Xia, Washington Univ. in St. Louis (USA); Hai Xiao, Missouri Univ. of Science and Technology (USA)

Post-Meeting Manuscript Due Date: 28 March 2011

This conference combines the former Fiber Optic Sensors and Applications, Sensors for Harsh Environments, and Photonic Crystals and Photonic Crystal Fibers for Sensing conferences into a single major fiber optic sensor conference that covers all aspects of fiber optic sensor technology, for both civil and defense applications.

Major R&D efforts in fiber optic sensor technology have been conducted since the mid 1970s, which have led to the development, among many others, of optic acoustic sensors based on the Mach-Zehnder interferometer; fiber rotation gyro (FOG) sensors based on the Sagnac interferometer; discrete point sensors based on Fabry-Perot and fiber Bragg gratings; as well as distributed sensing techniques based on Rayleigh, Raman and Brillouin scattering techniques. Today, fiber optic sensors enjoy widespread use in a broad variety of applications and fields ranging from structural sensing and health monitoring of composites and structures in civil and aeronautic areas; to downhole pressure and temperature sensors for oil and gas reservoir monitoring; to high voltage and high current sensing systems for the power industry-to name just a few. However, new components and technology are continually being developed to support enhancement and extensions of existing fiber optic sensor technology, as well as to allow totally new innovations. New innovations-such as photonic crystals-that offer the prospect of new highly efficient light sources as well as the potential for much higher levels of performance.

Fiber Optic Sensors and Applications & Photonic Sensors for Harsh Environments

This conference seeks papers on the development and application of fiber optic sensors technology and the components that are being used to support them which includes but is not limited to the following:

- fiber etalon and fiber Bragg grating (FBG) based sensors
- specialty fibers and passive/active fiber devices for sensing applications
- discrete and multi-point sensors and systems for mechanical, EM, chemical, bio, or medical properties
- interferometric & polarimetric fiber sensors
- distributed sensors, sensing systems and applications (Rayleigh, Raman, Brillouin)
- multiplexing and sensor networking
- field applications and system trials in civil structures, aerospace, oil and gas, medical, utilities and security
- harsh environment applications and sensor packaging for operation in extreme environments
- military and defense fiber sensor development, uses and applications

In conjunction with the 2011 conference a special session is planned on sensing applications of micro-structured and micromachined optical fibers. This special session of the 2011 conference seeks sensing application papers involving:

- laser micromachining of fibers and waveguides for sensors and microfluidics
- tapered optical fibers
- exotic coatings (metallic, ceramic or polymer) of optical fibers and waveguides for different sensing applications
- specialty microstructured fibers (ex. side hole fiber)
Photonic Crystal and Photonic Crystal Fibers for Sensing Applications

Given the unique optical properties of Photonic Crystal Fibers (PCF) coupled with the development of new and improved fabrication techniques and availability of high-quality photonic bandgap crystals, has fueled the global interest in their theoretical and experimental studies. The optical properties such as bandgap and light propagation characteristics of photonic bandgap crystals and PCFs can be manipulated by structural design and defect engineering. These properties can also be altered by external stimuli that can be thermal, optical, electrical, magnetic, chemical, biological, and nuclear, etc. The great potential of photonic bandgap crystals and PCF has been well-recognized for a variety of applications, including optical communications, integrated optical circuits, and sensors.

This conference aims to provide a forum for scientists and engineers involved in modeling, design, fabrication, device integration, and applications of PCFs to share the advances made in sensor-related research and development; to explore the frontier and offer insights into emerging and new sensing technologies in this infant and rapidly expanding field; and to promote and nurture networking and collaboration amongst researchers with complementary experiences and expertise. A particular focus will be placed on the science and technology of 1-, 2-, and 3D photonic bandgap crystals and 1- and 2D hollow- or solid-core photonic crystal fibers for advanced sensing applications.

Papers are solicited on, but not limited to, the following topics:

Theory and Simulations

Sensing Architectures and Techniques
• optical, electrical, magnetic, chemical, biomimetic
• point and stand-off, arrays, networks, and systems
• data mining and processing, pattern recognition.

Fabrication Techniques and Processes
• multi-beam holography, two- and multi-photon lithography, photo-lithography
• surface- and bulk-micromachining
• novel fiber technologies.

Applications of Sensors and Sensor Systems
• bio and chemical sensing in gas and liquids
• detection of nuclear radiation, warfare agents, explosives and toxic industrial compounds
• genomics and biomedical analysis
• monitoring of pollutants in environment.

Enabling and Emerging Technologies

Critical Dates
Abstract Due Date: 11 October 2010
On-Site Manuscript Due Date: 14 February 2011
Post-Meeting Manuscript Due Date: 28 March 2011

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.
Advanced sensing technologies are rapidly expanding into new applications in healthcare and environmental monitoring. In particular, there is a large need for mobile wireless sensors in global healthcare, military medicine and disaster response. The fastest-growing technologies are pathogen microarrays, biomarkers, nanotechnology, multiplexed assay platforms, hand-held devices, multi-parametric sensing, sensor fusion and bioinformatics. The main trends include point-of-care diagnostics, prognostic tests, noninvasive and minimally invasive sampling, and wireless applications.

The mission of this conference is to facilitate the development of advanced sensing technologies by connecting technologists with thought-leaders, funding managers and commercialization experts. Papers are solicited for the following areas:

**Global Healthcare**
- overview of grand challenges
- low-cost technologies for diagnostics of priority medical conditions: HIV/AIDS, malaria, pneumonia, tuberculosis, enteric and diarrheal diseases, diabetes and mother-child health
- point-of-care (POC) diagnostics
- field diagnostics
- epidemiological models, forecasting and simulations
- wireless applications.

**Military Healthcare**
- overview of priority technology needs
- physiological monitoring in extreme environments
- biomarker-based monitoring of performance and operational stress
- signature injuries of current wars: traumatic brain injury (TBI) and post-traumatic stress disorder (PTSD)
- enhancing operational readiness through neuroimaging
- post-deployment soldier support using computer simulation and virtual reality
- 3D User interfaces for interaction in game-based motor rehabilitation
- thermal, hydration and cognitive health state determination
- wound detection and severity assessment
- multi-parametric physiological sensors
telemedicine and wireless applications.

**Disaster Response and Biosurveillance**
- technologies used in the 2010 Deepwater Horizon oil spill in the Gulf of Mexico
- technologies for monitoring biological effects of oil spills
- technologies for diagnostics of health problems after natural and industrial disasters
- current and future biosurveillance systems
- technologies for data integration and sensor fusion
- sensors for emerging diseases and zoonotic infections
- concepts and simulation/modeling technologies for situational awareness
- interventional informatics, tools for e-health and telehealth.

**Biomarkers**
- proteomic, nucleic acid, metabolite and imaging biomarkers
- organ or cell injury biomarkers (necrosis, apoptosis, autophagic cell death markers)
- surrogate biomarkers based on cellular stress
- diagnostic and prognostic tests based on biomarkers
- tissue-based biomarkers
- soluble biomarkers in saliva and blood
- methods for biomarker discovery: antibody microarrays, reverse capture protein microarrays, 2D gel electrophoresis and mass spectrometry
- biomarkers for animal and plant diagnostics.

**Nanotechnology**
- nanomaterials for research and consumer products
- quantum dots as enabling materials for highly efficient sensing platforms
- intracellular delivery of QD-based nanoassemblies
- environmental, health and safety risks posed by engineered nanomaterials
- nanotoxicology.
Sensing Platforms
• emerging new technologies
• microarray technologies for pathogen and biothreat detection
• biophotonic imaging
• rapid scalable molecular assays
• miniature optical sensors
• portable diagnostic systems
• wearable biosensor systems
• stand off biosensor systems
• commercial automated systems
• challenges of standardization, miniaturization and field use.

Environmental Monitoring
• monitoring and predicting water quality in the oceans, coasts and Great Lakes
• process water in industry and food production:
• food industry:
• waste water monitoring to comply with regulations
• source water monitoring for quality control
• water distribution systems
• gray water systems for closed systems such as ships and/or hospital water supplies.
• ecosystem health monitoring
• environmental forecast systems
• air quality
• soil quality.

Commercial Opportunities in Healthcare Technologies
• commercial trends
• point-of-care diagnostics, in vitro and in vivo
• how to bring discovery to market and grow innovation-driven business in the global marketplace
• entrepreneurship
• business strategy development and market opportunity analysis
• FDA regulatory requirements
• technology transfer and licensing strategy.

“Experts and professionals exchange ideas and define the future directions in technology development.”
—2010 Paper Presenter

Access last year’s papers for this year’s innovation.
Open and coastal oceans are key areas of defense and security interests. This conference is intended to cover the R&D efforts in the ocean and lake sensing community to provide better solutions to the overall defense and security market by addressing current technology and environmental limitations, system decision, and implementation issues, as well as new technology that may be applied to ocean sensing problems. Specifically, these include topics associated with in situ and remote monitoring of the ocean surface, water column, deep sea, bathymetric and benthic features, impacts on sensor performance and calibration, data assimilation, and forecasting.

Traditional ocean research techniques are widely augmented today with in situ sampling packages on moorings, buoys, floats, flow-through systems, mobile platforms (gliders, AUVs and ROVs), integrated sensor networks, and observatories. These are vibrant research and development areas and generate the most accurate data available, 3D, often in real-time, and are less affected by adverse conditions. However, spot sampling lacks the rapid, broad coverage that are critical in high-level real-time tactical decision making. In situ observations at times are not available for unsafe or denied-access environments. Remote sensing techniques (both active and passive) have been proven to offer synoptic surface coverage with adequate accuracy, when sensors are calibrated and validated correctly. It is essential to establish and maintain precise protocols for deciding the appropriate mix and application of different sensor systems in order to maintain data coherence and comparability. Further, modern defense and security needs demand that accurate information be provided when and where it is needed (e.g. Battlespace on Demand). Ocean sensing must provide not only timely and accurate data, but also offer insights regarding overall 3D and future environmental conditions, i.e. forecasting. The combined use of in situ observations, remotely sensed data and physical models is a rapidly evolving field to be effective, although improved assimilation of available data into models still poses a challenge. The ability to sense, integrate, and predict is vital in establishing a true real-time 4D cube of verified and validated information for ocean nowcast and forecast.

This conference is aimed at bringing together research and technical personnel, from industry, governments, and especially academia, to foster cooperation to increase the utility of operational oceanographic assets to meet defense and homeland security concerns.

This conference will benefit from fruitful technical and scientific discussions on these and related topics:

**In Situ Sensing and Monitoring**
- advancements in instrumentation
- emerging sensing and monitoring techniques, especially chemical and biological
- sensors and platforms: ship-based, buoys, observatories, moorings, UUV/gliders
- real-time observation systems
- data management
- hydrographic surveys and ocean mapping
- harmful algal blooms (HAB), water quality
- adaptive sampling strategies.

**Imaging Systems and Signal Processing**
- underwater EO systems: gated, modulated, scanned, polarized, 3D, stereo, video
- sonar: synthetic aperture, scanning, multibeam, sidescan
- image processing techniques
- imaging through air-sea interface
- effects of particles, turbulence, bubbles, surface/internal waves.

**Oil Detection and Monitoring**
- detection of oil spills from space and in situ
- time series of detection and monitoring from various sensors
- instrumentation and platforms in detection and quantification.

**Characterization and Forecasting of Battlespace Environments**
- rapid environment assessment
- marine optical properties: particles/chlorophyll/CDOM
- marine physics: surface and internal waves, currents, tides, small-scale eddies, and turbulence
- benthic and bathymetric properties
- surf zones
- sediment transport and suspension
- riverine and lake environment characterization
- model and data assimilation
- 3D/4D environmental forecasting, uncertainty assessment
- data integration and visualization.

**Calibration and Validation of Present and Future Remote Sensing Systems**
- site characterization and classification
- protocols
- vicarious methods
- inter-sensor comparison
- uncertainty evaluation
- quality control, data access, management
- cooperative (inter-agency) efforts.

**Deep Sea Sensing and Operations**
- long range communication
- long range, extended duration sensing
- acoustical, EO and hybrid surveillance
- distributed nodes.

**Other Topics**
- ocean pollution
- energy harvesting
- sub-sea communications
- policies and education programs
- global warming and homeland security
- climate impacts (hurricanes, long term trends)
- extreme environments: Artic, desert, jungle, riverine, tidal flats.
Micro- and Nanotechnology Sensors, Systems, and Applications III (DS109)

Conference Chairs: Thomas George, Consultant (USA); M. Saif Islam, Univ. of California, Davis (USA); Achyut K. Dutta, Banpli Photonics, Inc. (USA)

Program Committee: Debjyoti Banerjee, Texas A&M Univ. (USA); Steve Blair, The Univ. of Utah (USA); Anja Boisen, Technical Univ. of Denmark (Denmark); Robert Candler, Univ. of California, Los Angeles (USA); Scott D. Collins, Univ. of Maine (USA); Nibir K. Dhar, Defense Advanced Research Projects Agency (USA); Ernest J. Garcia, Sandia National Labs. (USA); Savas Kaya, Ohio Univ. (USA); Shanalyn A. Kemme, Sandia National Labs. (USA); Nobuhiko P. Kobayashi, Univ. of California, Santa Cruz (USA); Ryan P. Lu, Space and Naval Warfare Systems Command (USA); Joseph N. Mait, U.S. Army Research Lab. (USA); Thomas W. Parson, The Johns Hopkins Univ. (USA); Jeremy J. Pietron, U.S. Naval Research Lab. (USA); Noriko Satake, UC Davis Medical Ctr. (USA); Andre U. Sokolnikov, Visual Solutions and Applications (USA); Kyung-Ah Son, Jet Propulsion Lab. (USA); Thomas G. Thundat, Oak Ridge National Lab. (USA); David V. Wick, Sandia National Labs. (USA); Eui-Hyeok Yang, Stevens Institute of Technology (USA); Karl Y. Yee, Jet Propulsion Lab. (USA)

The scope of the conference ranges from topics in basic research in Micro- and Nanotechnology (MNT), to component and subsystem level developments for defense, security, biomedical, and space applications. This conference intends to bring together scientists and engineers involved in the development and transition of novel MEMS/NEMS and Nanotechnology concepts for various system-level applications. Given the enormous diversity of MNT, we have selected several cutting-edge topics relevant to the technology development and system-level transition process. It is anticipated that this conference will foster cross-fertilization across many disciplines with participants being exposed not only to a broad range of scientific and engineering problems associated with the concepts-to-systems technology development pipeline, but also the accompanying programmatic considerations such as development roadmaps at commercial companies and government agencies.

Ultimately, at the system-level, very little attention has thus far been directed to the reliability and robust performance of MEMS/NEMS systems.

This conference has successfully pioneered a unique, “follow the investments” approach of having sessions that are based on MNT research and development programs currently being pursued by various DoD agencies, DOE, NSF, NIH and commercial companies. An example of such a comprehensive, interdisciplinary program is the Army Research Laboratory’s Micro Autonomous Systems and Technology (MAST) program that is showcased in a joint session with the Unmanned Systems Conference. Recent advances in the areas of navigation and communication have led to exciting developments in Bio-inspired systems, Simultaneous localization and mapping (SLAM), optical flow, miniature millimeter wave radar and strategies for robotic maneuvering through points of ingress and egress.

Areas of research that are particularly active include the growth, fabrication, characterization, and system-level applications of nanostructures such as nanowires, nanotubes, quantum dots, graphene-based devices, and novel biomaterials for sensing, actuations and energy generation and storage applications.

Significant advances have been achieved with MEMS-based optical devices that are now finding applications in a wide range of imaging and hyperspectral sensing applications. Nanophotonics has also emerged as a very active area of research with numerous practical applications.

In 2011 we are fortunate to highlight, for the first time, novel MNT systems for mm-Wave/THz applications.
The past twenty years have seen a massive investment in photonics, electronics and MEMS, aimed at developing new telecommunications capabilities and related products. These advances have lead to advances in miniature optics, light sources, tunable filters, array detectors, fiber optic sensors, and a range of other photonic devices, across the whole electromagnetic spectrum, along with technologies for their mass production. These and related advances are increasingly being exploited in new spectroscopic instruments. In recent years, there have been remarkable developments in handheld consumer electronics (RF technology, processors, operating systems, user interfaces, memory, Bluetooth, WiFi, cameras, accelerometers, etc.), and these are now poised to be the basis of next generation handheld scientific instruments.

Portable and handheld instruments are being developed that are often more sensitive and selective, smaller, cheaper, and more robust than their laboratory predecessors. Concurrent improvements in analytical theory, data analysis methods and portable processors enable these spectroscopic devices to give specific answers to their non-specialist operators. Spectroscopy-based systems are now making critical judgments in environments and applications that were unreachable twenty years ago, from hazardous materials to the operating theater, and from field geologists to customs and border personnel. Advances in array detectors (CCD, CID, InGaAs, nInP, MCT, CMOS, etc.) are enabling a new generation of faster imaging spectrometers, with both laboratory and field applications. Lower cost infrared arrays have been developed, employing MEMS techniques (microbolometers and, on the horizon, up-conversion techniques). Again, advances in spectroscopic data processing are providing the ability to generate chemical-based images answers from the mass of data produced. Finally, spectrometers are being coupled to functionalized sensors to detect specific species.

The emphasis in this conference is on advanced technologies for optical spectroscopic instrumenta-
tion, particularly the IR, near-IR, and Raman molecular techniques, but advances in technologies across the electromagnetic spectrum are of interest. Original papers are being solicited in the following areas from those involved in research, system development, application engineering, data analysis and processing, as well as users applying these systems for specific applications:

**Novel Enabling Technologies for:**
- IR, NIR, Raman, TeraHertz, fluorescence, UV-visible
- MEMS-based, miniature, and robust spectrometers
- spectral-based sensors
- sources, point-, and imaging-detectors, including quantum cascade lasers
- spectroscopic imaging systems, including hyperspectral imaging.

**Miniature, Portable, and Hand-Held Spectrometers:**
- molecular (IR, NIR, Raman, TeraHertz, fluorescence, UV-visible, cavity-ringdown)
- elemental (LIBS, plasma-based emission, XRF, etc.)
- other novel miniature spectrometers (NMR, ESR, mass, IMS, etc.)
- combined/integrated techniques (e.g., Raman/LiBS).

**System Engineering and Industrial Design for Solution-Focused Applications, including:**
- operating systems/user interface/ergonomics for hand-held analyzers
- sampling considerations
- interfaces to robots
- model-based design.

**Chemometrics and Data Analysis Techniques for Hand-Held Analyzers and Imaging Spectrometers:**
- multivariate calibration and classification
- multivariate curve-resolution, blind source separation
- figures of merit, performance evaluation.

**Design Considerations and Theory for Specific Applications in the areas of:**
- homeland security and public safety
- narcotics and illicit drug manufacturing
- field analyses, including customs, Hazmat and IED applications
- anti-counterfeiting and counterfeit detection
- biological and medical applications
- advanced materials characterization, including composites
- pharmaceutical and industrial processing, including PAT.
Advanced Photon Counting Techniques V (DS111)
Conference Chairs: Mark A. Itzler, Princeton Lightwave, Inc. (USA); Joe C. Campbell, Univ. of Virginia (USA)
Program Committee: Gerald S. Buller, Heriot-Watt Univ. (United Kingdom); Sergio D. Cova, Politecnico di Milano (Italy); William H. Fox, Jet Propulsion Lab. (USA); Robert H. Hadfield, Heriot-Watt Univ. (United Kingdom); Majeed M. Hayat, The Univ. of New Mexico (USA); Michael A. Krainak, NASA Goddard Space Flight Ctr. (USA); Robert A. Lamb, SELEX Galileo Ltd. (United Kingdom); Alan L. Migdall, National Institute of Standards and Technology (USA); Simon Verghese, MIT Lincoln Lab. (USA); Michael Wahl, PicoQuant GmbH (Germany); Hugo Zbinden, Univ. of Geneva (Switzerland)
Post-Meeting Manuscript Due Date: 28 March 2011

Call for Papers

Single photon detection is the ultimate level of sensitivity in optical measurements. There has been a recent surge of interest in single photon detectors spurred by emerging applications for which photon counting is an enabling capability. In many cases, these applications involve physical processes in which a very small number of photons - often just one - are available for detection, such as single molecule spectroscopy and ultra-low-light-level imaging. In other instances, it is the quantum properties of a single photon that are exploited, and the broad field of quantum optics, particularly quantum information processing, is critically dependent on the means for sensing individual photons.

This conference provides a forum for the presentation of advances in all aspects of single photon counting. The program will emphasize the latest developments in detector technologies capable of sensing single photons as well as applications and techniques that employ these detectors. A multitude of material systems is used to achieve single photon detection at operating wavelengths that span ultraviolet through infrared. Associated electronic circuitry is often crucial to photon counting instrumentation, and advances in this area are of great value. Submissions covering all elements of photon counting technology are encouraged.

Original papers are solicited in the following areas:
- photon counting theory
- single photon sources
- detectors for photon counting
  - photomultiplier technologies
  - single photon avalanche diodes (SPADs)
  - superconducting single photon detectors (SSPDs)
  - novel structures/devices for single photon detection
  - electronic circuitry for photon counting detectors
- signal processing for photon counting
- technical principles of photon counting
  - photon correlation techniques
  - multidimensional TCSPC
  - photon counting imaging techniques
  - single photon metrology
- applications of photon counting
  - fluorescence techniques (FLIM, FRET, FCS)
  - optical tomography
  - quantum optics and quantum information processing
  - quantum cryptography
  - free-space optical communications
  - laser radar for ranging and 3D imaging
  - low-light-level imaging
  - adaptive optics systems
- instrumentation for photon counting.

Submit your abstract today!
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Emerging Technologies

Photonic Microdevices/Microstructures for Sensing III (DS112)

Conference Chairs: Hai Xiao, Missouri Univ. of Science and Technology (USA); Xudong Fan, Univ. of Michigan (USA); Anbo Wang, Virginia Polytechnic Institute and State Univ. (USA)

Program Committee: Hatice Altug, Boston Univ. (USA); Junhang Dong, Univ. of Cincinnati (USA); Henry H. Du, Stevens Institute of Technology (USA); Erica Forzani, Arizona State Univ. (USA); Bai-Ou Guan, Jinan Univ. (China); Wei Jin, The Hong Kong Polytechnic Univ. (Hong Kong, China); Susan M. Maley, U.S. Dept. of Energy (USA); Radislav A. Potyrailo, GE Global Research (USA); Venkataraman S. Swaminathan, U.S. Army Armament Research, Development and Engineering Ctr. (USA); Ian M. White, Univ. of Maryland, College Park (USA); Yibing Zhang, ExxonMobil Research and Engineering Co. (USA); Mohammed M. Zourob, Biophage Pharma Inc. (Canada)

Post-Meeting Manuscript Due Date: 28 March 2011

Research and technology development in photonic microdevices and microstructures have experienced a significant growth in recent years, fueled by their broad applications as sensors for in situ, highly sensitive measurement of a wide variety of physical, chemical and biological quantities. Some examples of the photonic microdevices/microstructures that have been explored for sensing applications include, but not limited to, optical microresonators, optofluidics, microinterferometers, gratings, surface enhanced Raman scattering (SERS) probes, miniaturized surface plasmon resonance (SPR) devices, photonic crystals, micro/nanostructured fibers and waveguides, and surface plasmon polaritons (SPPs). The latest advancements in functional nanomaterial synthesis and high precision three dimensional (3D) micro/nano fabrication techniques have also opened a window of opportunity to develop new microphotonic sensors delivering unprecedented performance. Consequently, the optical sensor field has quietly gone through a revolutionary transition from the traditional discrete bulk optics to today’s microdevices and microstructures with enhanced functionalities and improved robustness.

The objective of this conference is to provide an interdisciplinary forum of sharing technical achievements and exchanging ideas in the fast progressing area of photonic microdevices and microstructures. The conference will be of interest to scientists, engineers, and individuals concerned with measurement and control of a wide range of physical, chemical, medical, and biological parameters as well as those actively involved in the research, development, manufacturing, applications, and commercialization of photonic microsensors.

Papers are solicited on, but not limited to, the following topics:

- novel mechanisms and designs of photonic microdevices and microstructures for sensing applications
- characterization and demonstration of photonic microdevices and microstructures for physical, chemical and biological sensing
- new techniques and methods to fabricate and package photonic microsensors
- microphotonic sensor interrogation, signal processing, and instrumentation
- investigation, characterization and mitigation of environmental effects on photonic microsensors and sensing materials
- multimodality and functional enhancement/ expansion through integration of other functions such as nanomaterials and microfluidics with microdevices and microstructures
- commercial product development and manufacturing.
Energy Harvesting and Storage: Materials, Devices, and Applications II (DS113)

Conference Chairs: Nibik K. Dhar, Defense Advanced Research Project Agency/MTO (USA); Priyalal S. Wijewardanasiyura, U.S. Army Research Lab. (USA); Achyut K. Dutta, Banpil Photonics, Inc. (USA)

Program Committee: Pulikel M. Ajayan, Rice Univ. (USA); Palani Balaya, National Univ. of Singapore (Singapore); Fow-Sen Choa, Univ. of Maryland, Baltimore County (USA); Deryn Chu, U.S. Army Research Lab. (USA); Angelo S. Gilmore, EPIR Technologies, Inc. (USA); M. Saif Islam, Univ. of California, Davis (USA); Ahalapitiya H. Jayatissa, The Univ. of Toledo (USA); Nobuhiyo P. Kobayashi, Univ. of California, Santa Cruz (USA); Pat McGrath, Booz Allen Hamilton Inc. (USA); Robert Olah, Banpil Photonics, Inc. (USA); Unil A. Perera, Georgia State Univ. (USA); A. Fred Semendy, U.S. Army Research Lab. (USA); Ashok K. Sood, Magnolia Optical Technologies, Inc. (USA); Rao Surampudi, Jet Propulsion Lab. (USA); Patrick J. Taylor, U.S. Army Research Lab. (USA); Sudhir B. Trivedi, Brimrose Corp. of America (USA); Rama Venkatasubramanian, RTI International (USA)

Call for Papers

28 March 2011

The scope of the conference ranges from topics in basic research in energy harvesting and storage techniques to component and subsystem level development for defense, security, space, and commercial applications. This conference intends to bring together scientists and engineers involved in the development and transition of novel Energy Harvesting and Energy Storage concepts. Concepts relating to portable, flexible and integrated energy source/storage relevant to defense applications are of interest. Given the enormous diversity of energy harvesting and storage techniques, we have selected several cutting-edge topics relevant to the technology development and transition process. The sessions are organized to facilitate the exchange of ideas and promote the discussion of recent progress in energy harvesting, storage and integration research and trends toward system-level development. It is anticipated that this conference will foster cross-fertilization across many disciplines with participants being exposed to the entire range of scientific and engineering problems associated with the concepts-to-systems development pipeline, as well as the development roadmaps at commercial companies and government agencies.

This conference will consider existing and new harvesting and storage techniques as well as recent advances in novel harvesting and storage materials and devices. Its objective is to bring together experimentalists, theorists, computational specialists, and development engineers to provide an interdisciplinary forum to discuss physical understanding and the state-of-the-art of active and passive electronic and optoelectronic harvesting and storage materials, devices, and their applications. Areas of research that are particularly active include standard (bio, electrolytes, semiconductor, polymer, etc.) and non-standard materials (including biological materials along with its standard and nanostructures such as nanopolars, nanotubes, quantum dots, quantum wires, and bio-inspired materials for energy scavenging including energy storage techniques and their applications are attracting increasing interest in the scientific community.

This special meeting will be of interest to researchers in next generation harvesting or scavenging energy and their storage technology. We hope to bring together researchers from the wide fields of materials science, devices, optics, physics, chemistry, biology, electrical engineering, etc.

Novel Micro/Nano Materials Growth and Device Architectures for Energy Harvesting and Storage:

- advanced patterning: nano-imprinting e-beam lithography, etc. for nano energy devices
- new materials; synthesis & fabrication: electrolytes, semiconductors, dielectrics, polymers, superconductors, organics, magnetics, pyroelectrics, hybrid composites, nano-particles and nano-composites
- techniques for improvement of the energy generation and storage properties, surface treatment and surface functionalization
- MEMS, NEMS and NOEMS devices for energy generation and storage
- theoretical investigation of the phenomena for understanding the energy generation and storage mechanism in micro/nano device architectures
- nano-structure/ nano-composite materials and devices for biological inspired energy devices.
- biologically assisted nano-energy devices
- next-generation nano-bio-opto energy devices for improved storage and energy generation
- development of new hybrid energy generation and storage devices and systems with traditional electrolyte, polymeric, semiconductors and/or biological materials
- multifunctional nano-particles based devices
- novel optical rectenna technology
- modeling and simulations of energy devices in micro/nano devices
- novel, energy device structures employing PV, vibration, or piezoelectric, RF effects
- novel micro-nano scaled thermoelectric devices for power harvesting (generation)
- MEMS based, reformed methanol micro fuel cell for portable power
- self-sustaining miniature solid oxide fuel cell
- high power density storage devices based on nanostructures.

Thin Films and Novel Micro/Nano Materials Growth and Device Structures for Energy Generation and Storage:

- novel 3D confined structures, nano-wire and nano-tube based energy devices and energy storage devices for mechanical, chemical, biological, and medical applications
- novel nano-wire, nano-dots, and nano-tube growth and synthesis
- interactions between photons (radiation) and nano-wires, nano-tubes, and nano-dots

continued on page 36
Emerging Technologies

Energy Harvesting and Storage: Materials, Devices, and Applications II (DS113)

Continued from page 35

- functionalization of nanostructures for energy generation
- nano-photonics devices for PV cells
- thin-film materials for solar energy harvesting such as II-VI, III-V, polymer, Si etc.
- organic photovoltaics toward solar energy harvesting.

Hybrid Generation and Storage Device and Systems:
- interfaces of electrolyte with semiconductor devices
- energy generation/storage from bio-mass, bio-fuels, electrolyte (battery)
- electrical characterization of hybrid devices (generation, storage)
- mesoscale microdroplet-based combustion power generation using ultrasonic droplets
- MEMS and nanowires for Li or Ni-based micro batteries and novel fuel cells electrodes.

Applications:
- flexible, rigid, semi-rigid, energy harvesting/storage systems
- power tent, circuit interfaces of energy devices
- power skin, power electronics
- integrated portable/deployable systems incorporating energy generation and energy storage devices
- thin film energy storage (battery) including thin-film Li , Ni, or novel material based battery
- energy scavenging systems for on-chip power harvesting and storage.

Critical Dates

Abstract Due Date: 11 October 2010
On-Site Manuscript Due Date: 14 February 2011
Post-Meeting Manuscript Due Date: 28 March 2011

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.
Call for Papers

Scanning Microscopies 2011:

Conference Chairs: Michael T. Postek, National Institute of Standards and Technology (USA); Dale E. Newbury, National Institute of Standards and Technology (USA); S. Frank Platek, U.S. Food and Drug Administration (USA); David C. Joy, The Univ. of Tennessee (USA); Tim K. Maugel, Univ. of Maryland, College Park (USA)

Program Committee: Eva M. Campo, Ctr. Nacional de Microelectrónica (USA); Lucille A. Giannuzzi, FEI Co. (USA); Brendan J. Griffin, The Univ. of Western Australia (Australia); Dennis A. Margosan, Agricultural Research Service (USA); Michael A. Trimpe, Hamilton County Coroner's Lab. (USA); Vladimir A. Ukraintsev, Nanometrology International, Inc. (USA); John S. Villarrubia, National Institute of Standards and Technology (USA); András E. Vladár, National Institute of Standards and Technology (USA); Oliver C. Wells, IBM Corp. (USA); Delilah F. Wood, Agricultural Research Service (USA)

Post-Meeting Manuscript Due Date: 28 March 2011

Papers are being accepted in new growth areas as well as:
- agricultural applications of microscopy
- backscattered electron detection and diffraction for imaging and characterization
- characterization of nanoparticles (preparation and microscopy)
- confocal and other optical microscopy techniques
- cryo-microscopy
- environment, health and safety
- instrument calibration, evaluation and standards
- focused ion beam microscopy/scanning microscopy and sample modification with beams of ions
- helium ion microscopy
- fast x-ray spectrometry/mapping with silicon drift detector (SDD) EDS
- food analysis: microstructure, identification and counter-terrorism
- forensic microscopy and microanalysis
- industrial semiconductor and nanotechnology applications of scanning microscopies
- light microscopy techniques and methodology
- materials microscopy, characterization and microanalysis
- medical applications of scanning microscopies
- microanalysis in SEM/EPMA/AEM
- microscopy and microanalysis in the biological sciences
- microscopy and microanalysis in the pharmaceutical sciences
- microscopy and microanalysis: theory, instrumentation and techniques
- microwave preparation technology
- Monte Carlo modeling for microscopy and microanalysis
- multidimensional microscopy
- nanotechnology imaging and characterization
- nanofabrication and nanolithography with scanned probes
- particle beam/specimen interaction (WORKSHOP)
- scanning probe microscopes
- semiconductor devices, materials, and process characterization
- silicon drift detector (SDD) EDS
- scanning transmission electron microscopy (STEM)
- transmission electron microscopy (TEM)
- ultrahigh resolution scanning electron microscopy.

Workshops:
- Particle beam and scanned probe/specimen interaction workshop
- Scanning microscopies in forensic science and homeland security.
Laser Radar Technology and Applications XVI (DS205)

Conference Chairs: Monte D. Turner, Defense Advanced Research Projects Agency (USA); Gary W. Kamerman, FastMetrix, Inc. (USA)

Program Committee: Philip Gatt, Lockheed Martin Coherent Technologies (USA); James C. Lamoreux, NASA Johnson Space Ctr. (USA); Vasyl V. Molebny, National Taras Shevchenko Univ. of Kyiv (Ukraine); Russell Philbrick, North Carolina State Univ. (USA); Upendra N. Singh, NASA Langley Research Ctr. (USA); Ove Steinvall, Swedish Defence Research Agency (Sweden)

Laser Sensors and Systems

Post-Meeting Manuscript Due Date:
28 March 2011

Laser radar and laser remote sensing methods continue to evolve with the development of the enabling component technologies, advanced systems concepts, integration with new platforms, and innovative employment strategies. Combined with advances in signal processing, sensor fusion, and visual display, the diversity and sophistication these capabilities support a growing number of defense, scientific, and commercial applications. The opportunity for participants in these communities to interact, collaborate, and foster innovation is central to the success of this field of research and development and is the focus of this conference.

While the development of technology is an important and interesting topic in and of itself, the development of technology is much more effective when considered within the context of the applications of that technology. Furthermore, emerging and difficult defense, security, and counter terrorism requirements demand innovative solutions for which laser radar techniques appear to be well suited. These new applications may create additional demands upon the supporting technologies. As a result, this conference will focus not only on laser radar technology, but also on the practical applications of that technology and, in particular, new applications of laser radar technology. Separate sessions in this conference will be devoted to specific application areas. Papers on military, industrial, and commercial applications are solicited.

Papers are solicited in the following areas:

- laser radars for defense applications, target detection, identification, and accurate geolocation
- laser systems remote detection of mines, explosives, and weapons of mass destruction
- design, development, or testing (laboratory or field) of laser radars including laser radar calibration standards, testing standards, and quality assurance procedures
- scannerless and flash laser radar systems
- fusion of passive imagery with 3D laser radar data
- autonomous vehicle navigation and control, robotics, and machine vision
- spacecraft docking systems, inspection systems, and sensors for space exploration
- collision avoidance sensors for aircraft and marine vessels
- automated target recognition based on laser radar methods
- topographic mapping and bathymetry systems, their testing, calibration, and applications
- foliage and camouflage poke-through 3D laser radar systems and methods
- processing, interpretation, or exploitation of 3D data
- validation of performance models and new analytical techniques
- modeling and simulation of laser radar systems and methods
- atmospheric sensing systems including meteorological applications and atmospheric monitoring (e.g., airport hazard warning, windshear detection, tornado detection, wind field mapping, etc.)
- advanced cost-reduction techniques and more system architectures
- combined active and passive systems, and passive and active data fusion
- non-contact metrology, multispectral and laser polarimetry
- vibrometry and acoustic detection, dynamics and microdynamics measurements
- new laser radar materials, coherent eye-safe sources and component technology
- hostile environment applications (e.g., underwater, high radiation, high or low temperature environments, etc.)
- laser radar techniques used in any new or unconventional applications
- signal and data processing of laser radar data, image segmentation, and object recognition
- medical applications.
Atmospheric Propagation VIII (DS206)

Conference Chairs: Linda M. Wasiczko Thomas, U.S. Naval Research Lab. (USA); Earl J. Spillar, Air Force Research Lab. (USA)

Program Committee: Larry C. Andrews, Univ. of Central Florida (USA); Gary J. Baker, Lockheed Martin Space Systems Co. (USA); Harris R. Burris, Jr., U.S. Naval Research Lab. (USA); James M. Cicciello, Northrop Grumman Electronic Systems (USA); G. Charmaine C. Gilbreath, U.S. Naval Research Lab. (USA); Gary G. Gimmestad, Georgia Tech Research Institute (USA); Kenneth J. Grant, Defence Science and Technology Organisation (Australia); Christopher I. Moore, U.S. Naval Research Lab. (USA); Jonathan M. Saint Clair, The Boeing Co. (USA); David H. Tofsted, U.S. Army Research Lab. (USA); Morio Toyoshima, National Institute of Information and Communications Technology (Japan); Cynthia Y. Young, Univ. of Central Florida (USA)

Post-Meeting Manuscript Due Date: 28 March 2011

Atmospheric effects on laser systems are common to many applications. The atmosphere causes both attenuation and random physical effects such as beam spreading, scintillation, and beam wander. These phenomena result in engineering consequences such as power loss, fading, errors in target recognition, and tracking. Boundary layer and complex flows around structures can have a significant effect on line-of-sight free space optical links, lidar and imaging systems.

The objective of this conference is to bring together the laser systems and atmospheric propagation communities to exchange ideas on challenges posed by the atmosphere. Specific DOD and industry applications are of particular interest.

Papers that are theoretical or experimental are solicited in the following areas:

Absorption and Scattering (Deterministic Effects)
- aerosol effects on laser propagation
- optical obscurants (smoke, fog, etc.)
- the statistics and effects of natural clouds on propagation.

Optical Turbulence (Random Effects)
- models governing optical wave propagation through the atmosphere
- propagation experiments and model validation
- fade statistics
- variation of turbulence with altitude
- turbulence statistics across time and space
- deep turbulence.

Propagation in the Marine Environment
- ship to ship and littoral environments
- boundary layer effects
- marine propagation models and validation
- impact of mirages and other maritime phenomena.

Mitigating the Atmosphere
- diversity techniques: temporal, spatial, wavelength, etc.
- aperture averaging
- adaptive optics
- partial coherence
- photon counting.

Airborne and Aero-optical Layers
- fluid-optic interaction
- experimental measurements of optical aberration of fundamental and complex flows
- scaling laws for aircraft turrets, pods, and domes.
Laser Sensors and Systems

Laser Technology for Defense and Security VII (DS207)

Conference Chairs: Mark Dubinskii, U.S. Army Research Lab. (USA); Stephen G. Post, Missile Defense Agency (USA)

Program Committee: Steven R. Bowman, U.S. Naval Research Lab. (USA); Scott Christensen, Nufern (USA); Anthony M. Johnson, Univ. of Maryland, Baltimore County (USA); Mark W. Neice, High Energy Laser Joint Technology Office (USA)

Post-Meeting Manuscript Due Date: 28 March 2011

The development of moderate to high average power solid-state (bulk and fiber) lasers or ultra-high pulse power lasers is a demanding engineering feat, involving critical component technologies based on the latest scientific advances. These laser systems have important emerging DOD applications as well as uses in commercial markets. This conference will focus on moderate to high-power solid-state (bulk and fiber) laser component and device technology to address laser source technology applicable to lidar, ladar, IRCM, high-power illuminators, trackers, and laser weapons. These laser systems have many similar challenges yet can be quite different depending on the type of laser, the laser architecture, and the requirements and constraints of the application. Development of the laser engine itself, e.g., solid state laser, or a solid-state/gas hybrid, and the components that go into making a high energy laser are critical for any high energy laser system. All high energy lasers must have an efficient thermal management and very good beam quality, which assumes proper designs. In addition, depending on the particular application, there are many other engineering issues such as efficiency, size and weight, power management, beam propagation, pulse width, repetition rate, and wavelength to consider. This conference will address the current issues facing moderate to high average power and ultra-high pulse power solid state lasers and introduce future projections for component and system technologies.

The topic areas include:

- laser performance—modeling and simulation
- beam propagation and phase aberrations within the laser cavity, involving issues such as resonator design, adaptive optics for wavefront correction, and mode locking
- thermal management: novel means to control heat and minimize its impact on the laser power and beam quality while maximizing overall laser efficiency, including cryogenic cooling of gain medium
- laser scaling to higher energy and power levels and how the laser can be designed to effectively mitigate or take advantage of nonlinear effects, probability of damage to optical elements, and complexity
- beam combining: incoherent coupling such as spectral beam combining; coherent coupling such as through cavity and mode coupling, linear optical elements, or nonlinear optical elements
- solid state laser designs such as single aperture and multi-aperture with beam combining, rod, slab, disk, and fiber lasers as well as gain media advances such as ceramics, bonding new materials, new laser materials with advanced thermal and/or spectroscopic properties
- fiber laser advances in single aperture power or energy scaling
- diode laser advances in output power and efficiency, brightness, spectral brightness, and spectral stability; advances in underdeveloped spectral ranges; efficient diode laser fiber coupling
- advanced laser designs and devices such as waveguide-based lasers, ultra-short pulse lasers, hybrid gas/diode lasers, scalable optically pumped semiconductor lasers, novel laser materials, and critical optical components for advanced laser development.
Signatures are key to detection and identification of events that can be characterized either phenomenological or as a predictable marker or pattern. Essentially, most events have a signature. We are soliciting papers to explore active and passive signatures as they pertain to:

- 3D lidar imaging sensors and signatures
- terahertz signatures
- signatures and biometrics
- composite signatures from multiple sensors: methods and algorithms
- signature support to address dispersion of aerosols
- novel and unique applications of signatures
- signatures of life: terrestrial planet signatures, etc.
- signatures of climate change.

We are specifically seeking papers which address signatures from the infrared through the ultraviolet regime, the related sensors, and implications.

After submitting an abstract to SPIE, please submit a copy to Dr. G. C. Gilbreath at Charmaine.gilbreath@nrl.navy.mil.

Papers and presentations at this Conference and at the DSS11 are Unclassified.
Interest in head- and helmet-mounted display (HMD) technology continues to grow as HMDs and night vision goggles (NVGs) become more pervasive. Military programs continue to pursue the development of HMDs as well as investigating visual and human factor issues associated with displayed information. Advanced military HMDs for airborne (fixed and rotary wing) and ground-based applications (soldier, combat vehicle, mine detection, and simulator applications) are also being developed internationally as HMDs have become essential equipment to future combat information systems.

After decades of military driven development, new, non-military uses are evolving. HMD applications are expanding into commercial, industrial, and academic environments. Medical, educational, and entertainment applications are expanding arenas for HMD technology. Homeland defense and law enforcement are perhaps the most crucial of the areas where HMDs may have important applications. It is a core technology for vision enhancement and visual augmentation systems, regardless of application. The future of HMDs lies in these new application areas and is limited only by our imagination and creativity.

Due to the nature of the technology, HMD space, weight, and power consumption are critical system characteristics that must be balanced against imaging performance and may limit system utility and acceptance. The development of smaller, high-performance components (displays, optics, and electronics) in response to requirements continues and is dramatically lowering system head-supported weight, system power, and packaging size.

This conference will focus on advancements in the general field of HMD design and use, including technological advancement in core components as well as the design, testing, and specifications. We are keenly interested in research papers that push the ideas of HMDs beyond military applications and welcome papers ranging from basic research and component technology to fully implemented, fielded systems. The conference will examine new, dual-use applications in fields such as maintenance, mission rehearsal, medical imaging, virtual and augmented reality, and entertainment. Related technologies such as night vision goggles, image fusion, head and eye trackers, and head-mounted sensors will be represented. The global nature of HMD technology development means that wide participation is an essential element of this conference. Papers are sought from international researchers to enhance the broad base of HMD experiences presented. Special emphasis on university research in virtual and augmented reality applications is a continuing goal of this year’s conference. We are considering ways to better allow demonstration of equipment and encourage authors to inform the committee of interest in hardware demonstrations when the abstract is submitted.

Papers are solicited in the following and related areas:

**HMD Use and Research**
- applications for HMDs: military, homeland security, law enforcement, maintenance, medical, virtual and augmented reality, entertainment, and other fields
- lessons learned for operational HMD systems
- advances in night vision goggle technology
- advances in head-mounted camera systems, head-mounted image fusion, or other visual sensory enhancement techniques
- HMD flight and laboratory performance testing
- system integration
- helmet system anthropometry, ergonomics, industrial manufacturing, and training applications
- simulation and mission rehearsal
- HMD technology for virtual and augmented reality
- critiques of current military specifications on HMD technology.

**HMD System Components**
- image source technologies: LCD, OLED, LCOS, laser projections, and others
- optical systems for HMDs
- advances in optical design: binary, holographic, aspherics, and others
- advances in eye- and head-tracker technologies
- future applications of head-mountable sensors and image fusion electronics.

**HMD Human Factors Research**
- advances in the understanding of human visual perception and performance
- HMD performance in a dynamic environment, including examinations of awareness, physical limitations, and operational performance
- database development for HMD symbols and information
- flight symbology design criteria for ongoing or anticipated programs
- proposed standards for HMD technology
- effect of degraded environment on displayed information
- advances in the presentation of information on HMDs including novel symbology
- determinations of information criteria for full mission and/or flight mode
- human informational requirements and display formatting.
Display Technologies and Applications for Defense, Security, and Avionics V (DS210)

*Conference Chairs:* John T. Thomas, General Dynamics Canada Ltd. (Canada); Daniel D. Desjardins, Air Force Research Lab. (USA)

*Program Committee:* Reginald Daniels, Air Force Research Lab. (USA); Eric W. Forsythe, U.S. Army Research Lab. (USA); Michael J. Hackert, NAVAIR (USA); David C. Huffman, L-3 Display Systems (USA); Mark A. Livingston, U.S. Naval Research Lab. (USA); Gail M. Nicholson, Naval Surface Warfare Ctr. Crane Div. (USA); Kalluri R. Sarma, Honeywell Technology (USA)

**Post-Meeting Manuscript Due Date:**
28 March 2011

The objective of this conference is to bring together engineers, researchers, industry and the military user community in display related disciplines serving all applications of displays other than mass-market, thereby providing a common forum to share all aspects of display technology and application knowledge.

This conference addresses displays and supporting technologies and applications of all kinds. Applications of interest are for industrial and military users in land, sea, air, and space. The emphasis is both on systems delivered to the field and emerging science and technology associated with displays, including human factors and human interface issues, display metrology and operational experience from “the field,” as well as new vehicle integrations.

The future display technologies aspect of this conference focuses on technologies that have yet to establish economic viability or operational success in any application. Papers in this section may address new display types, supporting and enabling technologies (electronics, interfaces, optical components, etc.), and system or packaging solutions that overcome difficult operational requirements. We encourage a wide ranging scope for content that is broadly associated with industrial and military applications.
Additional related topics are listed below:

**Enhanced and Synthetic Vision Systems (ESVS)** leverage weather-penetrating imaging sensors, vehicle navigation state, terrain elevation data, off board data links, and many other sources to derive real-time imagery presented on head-down, head-up, or head-mounted display systems. The focus of this conference is to raise awareness of emerging ESVS concepts, capabilities, testing, standards, and platform requirements. The primary goal is to provide R&D guidance and alignment between academia, industry, and government.

Platform-specific performance and mission tend to dictate sensing, database, and display requirements, whereas the underlying algorithms and systems are very similar. The various combinations of ESVS sensing, database, processing, and displays may be expressed by three fundamental components: enhanced vision, synthetic vision, and external vision. “Enhanced Vision (EV)” typically refers to SA derived primarily from imaging sensors such as low light level, infrared, and millimeter-wave (MMW). “Synthetic Vision (SV)” typically consists of 2D orthographic or 3D perspective views of terrain elevation and obstacle data, time-critical pathway guidance (4D), local traffic indicators, vehicle state overlays, etc. “External Vision (XV)” applies when the navigator is afforded no windows, where SA is derived solely from a combination of imaging sensors and SV, regardless of environmental conditions. Low-boom supersonic aircraft, unmanned air and ground vehicles, submarines, and even space flight exemplify the need for XV.

Papers are sought on all aspects of enhanced and synthetic vision systems, from physical sensing techniques to system level human factors studies. Of particular interest are papers on the fundamental components and subsystems of EV, SV, and XV: weather-penetrating imagers, image enhancement, multi-spectral image fusion, precision navigation, terrain database and rendering techniques, 3D graphics processing techniques, GPU acceleration, 4D pathway guidance, novel display formats, lidar/ladar visualization, and 360° viewing.

Also welcome are applications of ESVS to manned or unmanned autonomous vehicles, aircraft approach, landing and ground operations, required navigation performance (RNP), minimum operating performance standards (MOPS), enhanced driving, rescue, on and off board surveillance, space operations, fire fighting, military, and homeland defense. Additional related topics are listed below:

**Sensors and Displays**

Low-light-level CCD; long-wave, mid-wave, short-wave infrared; active millimeter-wave radar; passive MMW imaging; night vision, including “color night vision”; head-up, head-down, head-mounted; 360° viewing; electronic windows in windowless cockpits (XV); and photo-realistic displays.

**Algorithms and Development Tools**

Image enhancement, image registration, multi-spectral image fusion, image exploitation, feature extraction, obstacle and wire detection, dangerous weather identification (micro-burst, wind shear, etc.); vehicle dynamics estimation from image sequences (runway or carrier deck alignment); computer vision approach and landing trajectory measurement; efficient rendering techniques for terrain and high-volume lidar/ladar data; embedded processing systems; airport, runway, and taxiway feature matching; weather radar fusion with SV; dynamic perspective flight guidance; sensor, weather, and environmental effect simulation; and terrain and obstacle database management.

**Performance and Accuracy**

Sensor operation and control; sensor capabilities in haze, fog, dust/sand, rain, and snow; database terrain, obstacles, navigation aids, airports acquisition, generation, verification, certification, formats; flight qualification and certification issues (requirements, lessons learned, etc.); airport surface characterization at low-grazing angles (MMW effects); alignment methods for world-conformal display in head-up and head-mounted applications; system latency and refresh rate issues for head-up and head-mounted displays; and multi-core GPU algorithm acceleration.

**Related Industry Panels, Committees, and Specifications**


**Platforms and Programs**

Related European and U.S. government R&D programs; platform architectures; integration roadmaps; and mobility and transport, supersonic transport, fixed-wing, rotorcraft, tilt-rotor, maritime, unmanned vehicle systems, unmanned air, ground, maritime vehicles, and vehicle systems (UAV, UGV, UMV, UVS).

**Mission Operations**

Terrain Following/Terrain Avoidance (TF/TA) and “Nap-Of-Earth (NOE)” operations; autonomous computer-vision-based approach and landing; runway and taxiway following, runway incursions, collision avoidance; GPS approach and landing, hands-off landing, carrier landing; flight-management systems and autopilots; flight planning systems integration; Electronic Flight Bag (EFB) integration; homeland defense, cockpit, and cabin surveillance; operations through smoke and obstructions; and operational surveys, studies, and trials.
Three-Dimensional Imaging, Visualization, and Display 2011 (DS212)

Conference Chairs: Bahram Javidi, Univ. of Connecticut (USA); Jung-Young Son, Daegu Univ. (Korea, Republic of)

Co-chairs: Manuel Martinez-Corral, Univ. de València (Spain); Wolfgang Osten, Univ. Stuttgart (Germany); Fumio Okano, Ultra-Realistic Communications Forum (Japan)

Program Committee: Saeed Bagheri, IBM Thomas J. Watson Research Ctr. (USA); Frank Dubois, Univ. Libre de Bruxelles (Belgium); Michael T. Eismann, Air Force Research Lab. (USA); Pietro Ferraro, Istituto Nazionale di Ottica Applicata (Italy); Thierry Fournel, Univ. Jean Monnet Saint-Etienne (France); William E. Higgins, The Pennsylvania State Univ. (USA); Yi-Pai Huang, National Chiao Tung Univ. (Taiwan); Naomi Inoue, Advanced Telecommunications Research Institute International (Japan); Osamu Matoba, Kobe Univ. (Japan); Thomas J. Naughton, National Univ. of Ireland, Maynooth (Ireland); Takanori Nomura, Wakayama Univ. (Japan); Min-Chul Park, Korea Institute of Science and Technology (Korea, Republic of); Adrian Stern, Ben-Gurion Univ. of the Negev (Israel); Wa James Tam, Communications Research Ctr. Canada (Canada); Chao-Hsu Tsai, Industrial Technology Research Institute (Taiwan); Edward A. Watson, Air Force Research Lab. (USA); Kenji Yamamoto, National Institute of Information and Communications Technology (Japan); Sumio Yano, NHK (Japan); Zeev Zalevsky, Bar-Ilan Univ. (Israel)

Post-Meeting Manuscript Due Date:
28 March 2011

This conference is intended to provide a forum for interchange on various algorithms, devices, systems, sensors, and architectures for novel applications in the field of 3D imaging, 3D visualization, 3D display, 3D TV, and 3D video. Original unpublished contributions reporting recent advances and invited overview papers are solicited. Both invited papers and regular contributions from internationally known scientists and engineers on these subjects will be presented. These presentations will demonstrate the possibility of realizing 3D imaging, 3D visualization, 3D display, and 3D TV/video systems. All abstracts will be reviewed by the program committee for originality and merit.

Topics of interest include, but are not limited to, the following:
- algorithms for 3D image processing systems
- devices for 3D imaging/TV/video/visualization systems
- hardware for 3D visualization/TV/video/imaging systems
- applications of optical devices for 3D visualization/TV/video/imaging systems
- holographic applications in 3D visualization/TV/video/imaging
- electro-holography methods/displays
- Digital holography for 3D imaging
- 3D image sensing systems
- 3D image processing
- psychological sciences of 3D perception
- applications of novel materials for 3D TV/video/imaging
- packaging for 3D visualization/TV/video/imaging
- animating and synthesizing images for 3D visualization
- applications of 3D imaging and display in medical and various industries
- video standards for 3D TV/display
- biomedical applications of 3D visualization/TV/video/imaging; 3D microscopy
- Interactive technologies with 3D images
- reality media technologies
- interaction of surrounding sound with 3D images.

Best Paper Awards

Announcing the 2011 Best Paper Awards in Three-Dimensional Imaging, Visualization, and Display!

Three papers will be selected for the Best Paper Awards among the papers accepted for this conference. A panel of experts will evaluate all the papers for technical quality and merit. The criteria for evaluation will include: 1) innovation; 2) clarity and quality of the manuscript submitted for publication; and 3) the significance and impact of the work reported. In order to be considered for a Best Paper Award, authors must make their oral presentation and submit their manuscript as scheduled. Conference chairs will not participate in the evaluation process of the papers. All decisions regarding selection of the best papers will be made by an evaluation committee.
The popular appreciation for the effects of space weather, orbital debris, the proliferation of space launch capability within the third world, and the impending halt of American manned space flight have all increased the demand for contextual understanding for both challenges and possibilities for the future of space. Developments in microsat and picosat systems, coupled with more affordable launch services such as the pioneering Space X enterprise, may vastly transform space architectures for navigation, surveillance, communications, and other missions. The success of the recent launches of missile defense tracking and surveillance systems along with the launch of advanced missile warning sensors are closely shadowed by anti-satellite missile tests, the shoot down of an errant satellite, and a catastrophic collision between two space vehicles. All these events raise concern over space situational awareness capabilities to mitigate orbital debris and characterize orbital threats. This conference captures the unique military interests in space and provides a forum for cross fertilization between international civil space, military space, and the intelligence community.

Papers are solicited on the following and related topics:
- advances in global positioning
- tracking, telemetry, and control
- station-keeping and attitude maintenance
- radiation hardening and space weather effects mitigation
- sensor contamination detection, abatement, and effects
- missile warning and missile defense
- space situational awareness
- operationally responsive space
- space radar
- algorithms for processing and exploitation
- innovations in tasking and dissemination architectures
- modeling and simulation of space-based systems
- commercial imaging applied to military operations
- dual-use civil-military sensors and systems.

Post-Meeting Manuscript Due Date:
28 March 2011

Though the attention of the Defense Security and Sensing symposium is directed at military systems, a substantial civil space interest that stretches across all optics and photonics areas is still maintained. The recent success of the privately funded company Space-X at achieving an orbit, the sudden and impending halt of US manned space flight, the recent highly publicized successes of orbital astronomical observatories (Herschel, Spitzer, Hubble, Chandra, etc.) have conspired to stoke the interest in the future of civil space. A cautionary tale for space operations and constellations designers has been told from recent space vehicle collisions, shoot down of errant satellites, and anti-satellite tests that have increased concern for orbital debris. Further, the boundaries between civil and defense space continue to erode and dual use applications are becoming increasingly prevalent. This conference focuses on all technology, whether born from civil or defense industries, that will assist mankind’s exploration of space.

Papers are solicited on the following and related topics:
- manned spaceflight
- orbital debris detection, analysis and mitigation
- space weather detection and forecasting
- data relay architectures
- multi-function ground operations
- sensors for autonomous and telesupervised operations in space
- propulsion measurement sensors
- spaceborne astronomical observatories
- spaceborne meteorological systems
- microsats, nanosats, and picosats
- space launch developments
- space solar power
- interplanetary and lunar exploration
- private space systems and missions.

Post-Meeting Manuscript Due Date:
28 March 2011
As photonics technologies mature a natural progression is for systems engineers to become more interested in assimilating the technologies into their space systems designs. The space environment is far different than the terrestrial environment and extreme temperatures, vacuum, electro-static discharge, g-forces during launch and radiation vastly influence the susceptibility of failure from the system to the component level. Gaining an appreciation for the advancements made and the struggles undergone to gain certification of a photonics component for space use will prepare the audience to exploit similar solutions in their own research programs. Further, there are many theoretical applications of photonics to the space community that should be thoroughly challenged in peer reviewed research prior to major investments being made in their development and acquisition.

Papers are solicited on the following and related topics:
- component level developments
- laser crosslink, downlink, uplink
- spacecraft optical bus and optical interconnects
- radiation hardening of optical components
- integrated and component level test and evaluation
- photonic based signal processing
- photonic arrays for adaptive beam-forming
- innovative sensor architectures
- flight certification.

Critical Dates
Abstract Due Date: 11 October 2010
On-Site Manuscript Due Date: 14 February 2011
Post-Meeting Manuscript Due Date: 28 March 2011

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.
This conference explores research and development opportunities for autonomous and semi-autonomous unmanned vehicle systems (UVS). It examines the technology requirements and operational capabilities of robotic vehicle programs for air, ground, water, and underwater and planetary exploration applications. This conference brings together the technologist, developer, and user communities to discuss requirements, challenges, and technical approaches for commercial and military UVS systems. It seeks to provide a balanced perspective on (a) programs and applications, and (b) theory, algorithms, designs, and implementation. This conference provides a unique opportunity for UVS program managers to present their unique requirements and perspectives on the important technical issues.

A special theme for the 2011 Conference will be “The Robots of 2040, and how to create them.” While “robotics” invariably appears on every list of the top ten or twenty technologies for the next decade or century, no one seems to be articulating a coherent vision for developing the robots of 2030 or 2040, and certainly no program is pursuing such a goal in a coherent manner. The development of unmanned ground vehicles began in the early 1980s with the Autonomous Land Vehicle program and has continued through Demo II and Demo III, and the DARPA Challenges, and yet, after more than 25 years of development and of Moore’s Law improvements in IT technology we still do not see autonomous vehicles driving on our roads. Robotics researchers are like the blind men describing an elephant—each articulates the problem in terms of his or her own area of specialization: perception, navigation, mechatronics, control, power, communications, etc. Contributions are especially welcome which motivate systems addressing specific robotic application goals and which articulate strategies across the full range of technologies required to realize them.

This conference will also feature an expanded opportunity for hands-on demonstration of robot systems and component technologies. Researchers who would like to demonstrate their robotic vehicles and unique capabilities are strongly encouraged to contact one of the program chairs.

Papers are solicited in the following topic areas:

• future robotic systems and strategies to realize them
• intelligent behaviors for unmanned vehicle systems
• government programs: technical and performance challenges
• system performance testing and evaluation
• perception for autonomous UVS’s
• vehicle mobility and motion control
• biologically inspired robotics
• novel sensor configurations for mobility and perception
• sensor fusion and integration
• novel mobility platforms and running gear configurations
• commercial and civilian UVS applications
• embedded world and vehicle models
• system performance modeling and simulation
• operator interface and human-robot interactions
• payloads and mission execution
• path planning and navigation
• autonomous UVS’s
• communication links
• metrics, standards and regulations
• manipulation for mobile platforms
• propulsion systems.

Special Session on Self Organizing, Collaborative Unmanned ISR Robotic Teams:

A special session on Self Organizing, Collaborative ISR Teams is jointly planned with the Defense Transformation and Network-Centric Systems conference. Network-centric systems are spawning a revolutionary transformation in multi-vehicle collaboration for autonomous teams of UVS’s with ISR missions. Human/robot partnerships can provide RSTA-on-demand and area effects operations. This is a timely topic especially in light of Future Combat Systems and urban operations in the Middle East. Special emphasis will be given to UAV/UGV collaboration and RSTA missions.
Unattended Ground, Sea, and Air Sensor Technologies and Applications XIII (DS118)

Conference Chair: Edward M. Carapezza, Univ. of Connecticut and DARPA (USA)
Program Committee: Jacques Bédard, Defence Research and Development Canada (Canada); John G. Blitch, ARACAR: Alliance for Robot Assisted Crisis Assessment and Response (USA); John C. Carrano, Carrano Consulting (USA); Christina J. Deckard, Space and Naval Warfare Systems Ctr. Pacific (USA); Daniel D. Desjardins, Air Force Research Lab. (USA); John S. Eicke, U.S. Army Research Lab. (USA); Alan J. Gray, Defence Science and Technology Lab. (United Kingdom); Todd M. Hintz, Space and Naval Warfare Systems Command (USA); Myron E. Hohil, U.S. Army Armament Research, Development and Engineering Ctr. (USA); Ivan Kadar, Interlink Systems Sciences, Inc. (USA); Myron E. Hohil, U.S. Army Armament Research, Development and Engineering Ctr. (USA); George McNamara, Naval Undersea Warfare Ctr. (USA); Frank Patton, Defense Advanced Research Projects Agency (USA); Huub A. van Hoof, TNO Defence, Security and Safety (Netherlands); Graeme P. van Voorthuijsen, TNO Defence, Security and Safety (Netherlands)

This conference will offer an opportunity to explore and promote advances in all aspects of unattended implanted or mobile ground, sea and air sensors, and potential uses and benefits for peacetime and wartime scenarios. The objectives of this conference are to foster interest by the potential customer community, and promote partnerships and technology sharing by the research, development, and acquisition communities.

Papers are solicited in the following areas:

• application concepts for unattended sensors (e.g. force protection, counter and non-proliferation, treaty verification, cooperative monitoring, drug/law enforcement, counter-terrorism, border protection, replacement for explosive mine systems, etc.)
• unattended and micro-unattended sensor technologies for ground, sea, and air environments including imaging, seismic, acoustic, magnetic, chemical and biological sensors and related sensor systems
• systems and technologies that enable the real-time discrimination of human objects from animal objects
• environmental models (seismic, acoustic, etc) and signal source models and characterizations (aircraft, ground vehicles, humans, animals, facilities, etc) for unattended sensor systems
• smart sensor, computationally efficient signal and data processing algorithms (e.g. detection, classification, ID, tracking, data fusion, data compression, array initialization and organization, and power management and related intelligent processing technologies
• mobile unattended and micro-unattended ground, sea and air sensors
• sensor exfiltration and command and control technologies including communications and tag related technologies for systems of unattended ground, sea and air sensors (e.g. mobile and implanted devices including control, information transmission, and multiplatform and sensor interning approaches and technologies)
• ground, sea, and air sensor platform developments and system-level technologies and concepts (e.g. modularity, concealment, power management and storage, platform management, emplacement, countermeasures, and tamper proofing).

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Ground/Air Multisensor Interoperability, Integration, and Networking for Persistent ISR II (DS119)

Conference Chair: Michael A. Kolodny, U.S. Army Research Lab. (USA)
Cochairs: Tien Pham, U.S. Army Research Lab. (USA); Kevin L. Priddy, Air Force Research Lab. (USA)
Program Committee: Jacques Bédard, Defence Research and Development Canada (Canada); Robert Heathcock, U.S. Dept. of Defense (USA); Jeff Houser, U.S. Army Research Lab. (USA); Gavin Pearson, Defence Science and Technology Lab. (United Kingdom); Stephen G. Perry, MTC Services Corp (USA); Ronald B. Sartain, U.S. Army Research Lab. (USA); King K. Siu, U.S. Army Armament Research, Development and Engineering Ctr. (USA); Raja Suresh, General Dynamics Advanced Information Systems (USA); Graeme P. van Voorthuijsen, TNO Defence, Security and Safety (Netherlands); Rob Williams, Air Force Research Lab. (USA)

Unmanned, Robotic, and Layered Systems

Post-Meeting Manuscript Due Date:
28 March 2011

The conference focuses on research and technology for persistent surveillance applications. More specifically, the conference will focus on how to integrate and network disparate ISR elements (i) to enable disparate sensor and information sources to be combined, fused and/or discovered autonomously or semi-autonomously; (ii) to provide the users (e.g., analysts) with reliable and actionable information products to conduct persistent surveillance missions; and (iii) to autonomously and/or remotely (re)configure and (re)task ISR assets to adapt to changing conditions and missions.

Topical areas and applications include, but are not limited to the following:
- persistent ISR for current operations
- data and information dissemination and exploitation
- collaborative information processing and decision making among human-based and sensor-based systems
- distributed/decentralized sensor networks and data fusion
- novel ISR sensing for detection, tracking, and classification
- unmanned ISR sensors and systems
- interoperability for joint operations and coalition warfare
- persistent surveillance exercises, demonstrations, and lessons learned.
Current as well as planned multispectral (MSI), hyper-spectral (HSI), and ultraspectral (USI) imaging spectrometers offer significant potential for a wide range of commercial, civil, homeland security, environmental, atmospheric, and defense applications. Advances in optical fabrication and focal plane sensor technology for the ultraviolet through longwave infrared (0.3 - 14 μm) spectral regions, in combination with high-speed data capture, storage, and retrieval have made it practical to conduct remote spectrometry from field, airborne and spaceborne platforms.

Robust algorithms and techniques for mitigating the effects of the atmosphere, characterizing target and background spectral phenomena, extracting useful information from spectral data, and fusion of information from different sensor platforms must keep pace with remote spectral sensor system development.

The objectives of this conference are to demonstrate the utility and advance the capabilities of algorithms, sensors, and applications for multispectral, hyperspectral, and ultraspectral imagery and to provide comprehensive insight into the field of spectral remote sensing. This conference facilitates the exchange of information and new ideas amongst the community of spectral sensor systems developers, automated processing and exploitation systems and algorithm developers, atmospheric phenomenology researchers, spectral data analysts, geo-spatial researchers, and developers of specific commercial, civil, homeland security, environmental, and defense MSI, HSI and USI applications. Panel discussions are encouraged to facilitate collaboration amongst this community of remote sensing professionals on all topics of relevance to this conference.

Papers are solicited on all topics relevant to demonstrating or improving the utility of current as well as planned ultraviolet through longwave infrared imaging systems. Subjects of particular interest include, but are not limited to the following areas:

**Algorithms for**
- spectral and spatial feature extraction
- spectral matching and quantitative spectral analysis for solids, liquids, and gases
- subpixel spectral analysis and pixel unmixing
- anomaly detection and material identification
- change detection
- geo-spatial science such as multisensor platform image registration and rectification
- control and removal of sensor artifacts
- atmospheric compensation and radiometric calibration
- spectro-polarimetry
- compression and dissemination of spectral data.

**Development of**
- quantitative accuracy estimates of Green House Gases derived from remotely sensed ground, air, and space based spectral observations and their utility in monitoring global climate change
- multispectral, hyperspectral, and ultraspectral sensor and optical related technology for ground, air, and space based sensors
- techniques and approaches for automated processing and exploitation of spectral data
- techniques for physics-based target and background characterization, modeling, and simulation
- hardware implementation and parallel processing optimization of algorithms for spectral data analysis
- spectral phenomenology understanding associated with solid, liquid, gaseous, particulate, and composite materials
- lidar systems for production of topographic and bathymetric digital elevation maps (DEMs).

**Applications demonstrating**
- environmental monitoring
- atmospheric profile measurement techniques
- atmospheric characterization and correction techniques
- homeland defense, commercial, civil, environmental, and defense utility of current MSI, HSI and USI sensor systems (e.g. ground, air and space based)
- field and laboratory quality control techniques for collection of spectral data
- calibration techniques and materials for remote sensing utility of spectral reflectance and BRDF libraries
- sensor fusion
- electronic and optical data processing related to spectral technology
- cartographic use of registered/geo-rectified fused multisensor platform data including DEMs with spectral data
- GIS/visualization of information extracted from spectral or fused sensor data.
Sensor Data and Information Exploitation

Automatic Target Recognition XXI (DS121)

Conference Chairs: Firooz A. Sadjadi, Lockheed Martin Maritime Systems & Sensors (USA); Abhijit Mahalanobis, Lockheed Martin Missiles and Fire Control (USA)

Program Committee: Mohammad S. Alam, Univ. of South Alabama (USA); Farid Amoozegar, Jet Propulsion Lab. (USA); Mahmood R. Azimi-Sadjadi, Colorado State Univ. (USA); David P. Casasent, Carnegie Mellon Univ. (USA); Leon Cohen, Hunter College (USA); Frederick D. Garber, Wright State Univ. (USA); Guillermo C. Gaunaud, Consultant (USA); Izidor Gertner, The City College of New York (USA); Patti S. Gillespie, U.S. Army Research Lab. (USA); Riaad I. Hammoud, Delphi Corp. (USA); Bahram Javid, Univ. of Connecticut (USA); Ismail I. Jouny, Lafayette College (USA); Behzad Kamgar-Parsi, U.S. Naval Research Lab. (USA); Timothy J. Klausutis, Air Force Research Lab. (USA); Wolfgang Kobler, Data Fusion Corp. (USA); Aaron D. Lanterman, Georgia Institute of Technology (USA); Randolph L. Moses, The Ohio State Univ. (USA); Robert R. Muise, Lockheed Martin Missiles and Fire Control (USA); Nasser M. Nasrabadi, U.S. Army Research Lab. (USA); Les Novak, Scientific Systems Co., Inc. (USA); Joseph A. O’Sullivan, Washington Univ. in St. Louis (USA); Mubarak A. Shah, Univ. of Central Florida (USA); Alan J. Van Nevel; Bradley C. Wallet, Automated Decisions LLC (USA); Edmund Zelnio, Air Force Research Lab. (USA)

Post-Meeting Manuscript Due Date: 28 March 2011

This conference will emphasize all aspects relating to the modern automatic and machine assisted target and object recognition technology: concepts such as model-based object/target recognition and tracking, neural networks, wavelets, information fusion, knowledge-based methods, adaptive and learning approaches, and advanced signal and image processing concepts for detection, tracking, and recognition for sonar/acoustic, IR, radar, laser radar, multispectral and hyperspectral sensors. Papers dealing with the entire spectrum of algorithms, systems, and architecture in ATR/AOR will be considered.

Papers presented at this conference will be automatically considered for inclusion in an ATR Special Issue in a refereed journal. Papers are solicited in the following and related topics:

IR-based Systems
- detection, tracking, and recognition
- phenomenological modeling of targets and background
- polarization diversity
- target/object and scene segmentation
- performance evaluation issues.

Hyperspectral-based Systems Registration Issues
- detection, tracking, and recognition
- phenomenological modeling of targets and background
- polarization and waveform adaptation
- target/object and scene segmentation
- performance evaluation issues.

Radar/Laser Radar-based Systems
- high-range resolution radar techniques
- joint radar target tracking and classification approaches
- ultra-wide band radar techniques
- Doppler, polarization, and waveform diversity for target classification
- detection, tracking, recognition, segmentation, target, and clutter modeling
- multisensor processing and fusion
- performance evaluation issues.

Sonar/Acoustic and Seismic-based Systems
- inverse scattering issues
- direct scattering of acoustic waves
- tomographic image formation
- material identification
- ultra-wide band methods for target detection and classification
- multisensor fusion
- biosensor systems
- performance evaluation issues.

New Methodologies
- information theoretical approaches in ATR
- distributed and centralized sensor decision making
- model-based object recognition
- neural networks for ATR applications
- wavelet decomposition methods for ATR
- machine learning techniques
- mission adaptive systems
- data characterization
- performance modeling
- ATR/AOR development tools
- ATR/AOR architecture
- algorithms for human detection, tracking, and activity recognition.
Announcing the 2010 ATR Best Paper Awards

Lockheed Martin Corporation has generously offered to sponsor the Best Paper Awards for the Automatic Target Recognition (ATR) conference, part of SPIE Defense, Security, and Sensing, which will be held in Orlando 25-29 April 2011. Two awards are planned: the first is the overall Best Paper Award in the amount of $4000, and the second is a Best Student Paper Award in the amount of $1000.

In order to be considered for these awards:
- Presenter must make their oral presentation as scheduled
- Manuscript must be submitted to SPIE no later than the week of 28 March 2011.

STUDENTS: In addition to the above requirements, to be considered for the Best Student Paper Award:
- Student must be the presenting author at the conference
- Student must be the leading author of the manuscript
- Student must send a message to the conference chairs identifying them/you as a student. This should be done after you have submitted your abstract, and must include your Tracking Number and paper title.

Please send to:
Firooz Sadajdi- firooz.a.sadjadi@lmco.com
and:
Abhijit Mahalanobis- abhijit.mahalanobis@lmco.com

A panel of experts headed by the ATR conference chairs will evaluate all the papers, both for quality and content. Attention will be given to 1) the innovation, clarity, and style of both the oral presentation at the conference and the manuscript submitted for publication, and 2) the importance of the work to the field of ATR. The winners will be notified by email shortly after all manuscripts have been received and evaluated. They will be recognized in person at the 2011 ATR conference, and will receive a certificate along with a photo-opportunity with Lockheed Martin officials.

The 2010 Best Paper Award Winner
Alexey S. Potapov, Alexander E. Puysya, Igor A. Malyshiev, S. I. Vavilov State Optical Institute (Russian Federation); Anton N. Averkin, St. Petersburg State Univ. of Information Technologies, Mechanics and Optics (Russian Federation) for their paper on New paradigm of learnable computer vision algorithms based on the representational MDL principle, [7696A-5]

The 2010 Best Student Paper Award Winner

These papers were selected based on the following criteria: Novelty, Depth, Completeness and Oral presentation.

These awards are made possible by the generous sponsorship from:

Critical Dates
Abstract Due Date: 11 October 2010
On-Site Manuscript Due Date: 14 February 2011
Post-Meeting Manuscript Due Date: 28 March 2011

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.
Signal Processing, Sensor Fusion, and Target Recognition XX (DS122)

Conference Chair: Ivan Kadar, Interlink Systems Sciences, Inc. (USA)

Program Committee: Mark G. Alford, Air Force Research Lab. (USA); William D. Blair, Georgia Tech Research Institute (USA); Erik P. Blasch, Air Force Research Lab. (USA); Mark J. Carlotto, General Dynamics Advanced Information Systems (USA); Kuo-Chu Chang, George Mason Univ. (USA); Chee-Yee Chong, BAE Systems Advanced Information Technologies (USA); Marvin N. Cohen, Georgia Tech Research Institute (USA); Mohammad Farooq, Royal Military College of Canada (Canada); Charles W. Glover, Oak Ridge National Lab. (USA); I. R. Goodman, Consultant (USA); Lynne L. Grewe, California State Univ., East Bay (USA); Michael L. Hinman, Air Force Research Lab. (USA); Kenneth J. Hintz, George Mason Univ. (USA); Jon S. Jones, Air Force Research Lab. (USA); Thiagalingam Kirubarajan, McMaster Univ. (Canada); Martin E. Liggins II, MITRE Corp. (USA); James Llinas, Univ. at Buffalo (USA); Ronald P. Mahler, Lockheed Martin Maritime Systems & Sensors (USA); Raj P. Malhotra, Air Force Research Lab. (USA); Alastair D. McAulay, Lehigh Univ. (USA); Raman K. Mehra, Scientific Systems Co., Inc. (USA); Harley R. Myler, Lamar Univ. (USA); David Nicholson, BAE Systems (United Kingdom); Les Novak, Scientific Systems Co., Inc. (USA); Andrew G. Tescher, AGT Associates (USA); Stelios C. A. Thomopoulos, National Ctr. for Scientific Research Demokritos (Greece); Wiley E. Thompson, New Mexico State Univ. (USA); Pierre Valin, Defence Research and Development Canada (Canada)

Post-Meeting Manuscript Due Date:
28 March 2011

This conference will address a range of issues pertinent to the target recognition task, such as signal/image detection, sensor/data/information fusion and resource management, signal processing, computational complexity, information extraction and decision making, image compression, and processor architectures. Military as well as dual-use and commercial applications of the acquisition, signal processing, and sensor fusion problems will be considered.

Papers are solicited in the following and related topics:
- multisensor and multisource information fusion
- random sets and conditional event algebra applications
- homeland defense applications of multisource information fusion
- biological and cognitive foundations for information fusion
- target detection, tracking, and sensor/data fusion using centralized and/or distributed multisensor architectures
- adaptive and knowledge-based sensor fusion
- hard and soft information fusion
- resource and connection/communications management
- distributed communications issues and effects on performance: ad-hoc networks and network-centric service-oriented architectures
- situation/threat assessment and intent modeling
- human-computer interface
- measures of performance and measures of effectiveness
- target identification/recognition
- model-based target recognition
- sensor modeling
- target models and implementation issues
- feature extraction
- image models and compression
- target classification utilizing individual and/or multiple sensors
- computational techniques including neural networks and fuzzy logic
- dual-use concepts
- innovative architectures including high-performance computing (HPC) and optical implementation.

Note: As a new venue established in 2004, this conference plans to host in 2011 an Invited Panel composed of internationally recognized experts. The topic will be announced at a future date.
Call for Papers

Algorithms for Synthetic Aperture Radar Imagery XVIII (DS123)

Conference Chairs: Edmund Zelnio, Air Force Research Lab. (USA); Frederick D. Garber, Wright State Univ. (USA)

Program Committee: David Blacknell, Defence Science and Technology Lab. (United Kingdom); Mujdat Cetin, Sabanci Univ. (Turkey); Gil J. Ettinger, BAE Systems Advanced Information Technologies (USA); Charles V. Jakowatz, Jr., Sandia National Labs. (USA); Eric R. Keydel, SAIC (USA); Jian Li, Univ. of Florida (USA); Michael Minardi, Air Force Research Lab.; Randolph L. Moses, The Ohio State Univ. (USA); Les Novak, Scientific Systems Co., Inc. (USA); Lee Potter, The Ohio State Univ. (USA); Brian D. Rigling, Wright State Univ. (USA); Timothy D. Ross, Air Force Research Lab. (USA); Michael A. Saville, Air Force Institute of Technology (USA); Gerard W. Titi, BAE Systems Advanced Information Technologies (USA)

Synthetic aperture RADAR research is advancing in several key application areas

- video SAR for continuous surveillance
- image compression for large area coverage and video SAR streams
- moving target (vehicles, dismounts) detection, tracking, and imaging exploiting the long integration times provided by SAR based MTI
- ground, foliage, and building penetration
- advanced detection algorithms including coherent and non-coherent change detection for finding difficult targets (e.g., IED's, tunnels, wires, etc.
- target discrimination and classification algorithms and characterization of performance tradeoffs
- 3D reconstruction and geolocation.

These enhancements are enabled by significant advancements in 2D and 3D imaging which are, in turn, driven by the incorporation of diversity into the imaging process. These diversities include: wide angle, polarization, waveform, frequency (e.g., Ka, Ku, X, L, UHF, VHF), and aperture (interferometric, MIMO, multi-static, passive sensing, and multi-pass sensing).

Concurrently, relevant advanced technologies are being developed which directly impact these challenges including:

- compressive sensing and other sparsity/structure driven approaches
- inverse scattering
- sensor fusion and sensor management
- real-time algorithms and computation
- Bayesian methods, graphical models, manifold learning.

This conference invites SAR research contributions to the key application areas, to advanced imaging technology driven by sensing diversity, and to the advanced technologies as described above.

Challenge Problems

Previous conferences have revealed emerging needs for the following types of problems: compressive sensing, sparse aperture processing systems, change detection systems, foliage and building penetration systems, and adaptive ATR systems that adapt to changing conditions and requirements. To facilitate the development of such systems, AFRL will publish the following challenge problems: 1) sparse-aperture problem set (SparAPS), 2) adaptive SAR ATR problem set (AdaptSAPS), 3) through wall imaging problem set (TWIPS), 4) registration problem set (RePS), 5) VHF change detection problem set (VCDPS), 6) back-projection versus polar format problem set and a newly formulated challenge problem: 7) SAR-based ground moving target problem set, on the site: https://www.sdms.afrl.af.mil/main.php.

The challenge problems define data sequences, along with recommended test procedures and performance measures. Results from these challenge problems are of particular interest for this year's conference.

ASARI 2011 Best Student Paper Award

In order to be considered for this award, the student must be the presenter and the primary author. A panel of experts will evaluate the papers, both for quality and content with regard to: 1) innovation, clarity, and style, and 2) the importance of the work to the field.

The 2010 ASARI Best Student Paper was awarded to Dr. Kerry Dungan for his paper “Classifying sets of attributed scattering centers using a hash coded database,” with advisor Lee Potter, The Ohio State University.
The technologies involved with acquisition, tracking, and pointing (ATP) systems continue to be developed on both the hardware design as well as the signal and information processing fronts to achieve increased functionality, higher effectiveness, increased performance, smaller packages, and lower system-level costs. Programs like Global Hawk, Common Missile Tri-Mode Seeker, Small Diameter Bomb, and Future Combat System are pushing the state of the art in tactical components, optical systems, and signal processing technologies. Laser-based ATP systems such as the Airborne Laser are developing new laser and beam control technologies to achieve very high performance in operational systems. Technology advancements are occurring in wavefront sensors, laser devices, optical components including adaptive optics, gimbal mechanisms, rapid beam steering including electronic beam steering approaches, active and passive sensors, electronics, multimode sensors, gimbal control systems, sensor stabilization, real-time imaging algorithms, signal processing, target tracking, sensor fusion, and other related sensor, control tasks, and target tracking.

This conference is devoted to current and future technologies relevant to the design, analysis, modeling, integration, and testing of acquisition, tracking, and pointing systems and their related subsystems and components. A particular focus area for this conference will be rapid beam steering, including electronic or phased array beam steering concepts. There is interest in the results of theoretical investigations, laboratory-scale experiments, and field experiments and testing. This conference provides an ongoing exchange of applications and technology for engineers, researchers, and managers working in this multidisciplinary field.

Papers are solicited for the following areas:

**System-Level Applications**
- electro-optical acquisition, tracking, and pointing systems
- phased array optical acquisition, tracing, and pointing systems
- radar acquisition, tracking, and pointing systems
- ladar acquisition and tracking systems
- passive and active tagging of targets for optical ID
- fire control systems
- missile guidance systems
- astronomical pointing systems
- reconnaissance systems
- surveillance systems for target detection and tracking
- real-time test and evaluation techniques
- training simulators for tracking systems
- system level analytical models and simulations
- papers of a tutorial nature by recognized experts on acquisition, tracking, and pointing systems.

**Laser Systems and Components**
- novel active tracking algorithms and test data
- tracking of airborne or rocket-powered vehicles
- handover from plume tracking to hardbody tracking
- novel adaptive optics algorithms and hardware
- multiple deformable mirror systems
- multiple conjugate wavefront sensor systems
- secondary mirror deformable mirrors
- atmospheric effects measurement and correction techniques; tracking through atmospheric turbulence
- precision aimpoint determination and control algorithms
- relay mirror systems
- beam stabilization sensors
- inertial reference units
- auto-alignment systems
- concepts and technologies for ATP implementation in phased array optical systems.

**Control Systems and Components**
- electro-mechanical gimbal systems
- stabilization systems
- stabilized mirror assemblies
- gimbal friction models
- magnetic suspension bearings and drives
- control system designs and simulation models
- flexible gimbal structures and control systems
- structural dynamic models.
Call for Papers

Image and Signal Processing for Target Tracking Applications
- single and multiple target acquisition algorithms
- track-before-declare techniques
- tracking through clutter; clutter rejection algorithms
- multipath mitigation techniques
- single and multiple target tracking algorithms
- sensor alignment techniques
- sensor data fusion techniques
- multisensor target tracking systems
- hardware/software designs for target trackers
- image processing analytical models and simulation methods
- real-time image and signal processing hardware designs
- high-frame image processors
- image processing applications.

Rapid Beam Steering
- liquid crystal optical phased arrays
- fluidic and electrowetting concepts
- Risley prisms
- Risley gratings
- MEMs
- fast steering mirrors, FSMs
- spatial light modulators
- lightweight gimbals
- birefringent polarization gratings
- volume holographic gratings
- lenslet arrays
- on-chip controllability of the beam direction
- requirements, applications, and demonstrations of rapid beam steering systems.

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Signal, Image, and Neural Net Processing

Enabling Photonics Technologies for Defense, Security, and Aerospace Applications VII (DS213)

Conference Chairs: Michael J. Hayduk, Air Force Research Lab. (USA); Peter J. Delfyett, Jr., CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

Co-chairs: Andrew R. Pirich, ACP Consulting (USA); Eric Donkor, Univ. of Connecticut (USA)

Program Committee: H. John Caulfield, Diversified Research Corp. (USA); Reinhard K. Erdmann, Air Force Research Lab. (USA); Michael L. Fanto, Air Force Research Lab. (USA); Sangyoun Gee, Gwangju Institute of Science and Technology (Korea, Republic of); Bahram Javidi, Univ. of Connecticut (USA); Robert L. Kaminski, Air Force Research Lab. (USA); Guifang Li, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Joseph M. Osman, Air Force Research Lab. (USA); Edward W. Taylor, International Photonics Consultants, Inc. (USA); Henry Zmuda, Univ. of Florida (USA)

Post-Meeting Manuscript Due Date: 28 March 2011

This conference will provide a forum for state-of-the-art and emerging photonic and electro-optic component development, device implementation, and system applications for the next generation of communication, information technology, sensor, and homeland defense systems.

Emphasis will be placed on photonic components and technology, novel materials, subsystem architectures, and system applications required for the sensing, high-speed transport, processing, accessing, and storage of data. Specific technical areas of interest are highly efficient photonic components including novel sources, optical filters, optical modulators, optical amplifiers, and optical detectors for the transmission and processing of both digital and analog data.

Also of interest to this conference is the development of photonic components for system level applications including: optical processing, optical interconnects, free-space laser communications, active and passive sensors, avionics, fly-by-light, and vehicle health monitoring systems. The design, characterization, testing, reliability, and packaging of photonic devices and components are critical in the development of these system applications.

Participation from academic, industrial, and government laboratories worldwide engaged in research and development of photonic and electro-optic components and system architectures is strongly encouraged.

Papers are solicited on the following and related subjects:

**Photonic/Electro-Optic/Devices**
- silicon photonics
- optical filters, modulators, amplifiers, and detectors
- optical interconnects
- photonic integrated and opto-electronic circuits
- low-power laser sources for visible, NIR, and mid-IR sensing applications
- eye safe laser sources
- novel sources - scalable lasers, polariton lasers
- LEDs and OLEDs
- photonic bandgap devices and photonic crystal fiber
- optical and opto-electronic switches
- optical memory/delay lines
- photonic and electronic device integration and techniques
- design, modeling, and simulation of novel photonic components.

**Materials**
- emerging materials for non-IR FPAs and detectors
- silicon nanophotonics
- quantum dots
- bio-photonic materials and devices
- X2 materials for emerging modulators
- organic semiconductors
- high-efficiency non-linear optical materials
- magneto-resistive materials
- meta-materials.

**System Applications**
- advanced computing architectures
- optical communication systems
- free-space laser communications
- WDM LAN and long-haul systems
- photonic components and subsystems for avionics
- aerospace sensor systems
- microwave / RF photonic links and processing
- optical arbitrary waveform generation
- personnel identification systems (e.g., lasers and LED’s used in the field to ID friendly forces)
- vehicle health monitoring systems.
Call for Papers

Optical Pattern Recognition XXII (DS214)

Conference Chairs: David P. Casasent, Carnegie Mellon Univ. (USA); Tien-Hsin Chao, Jet Propulsion Lab. (USA)

Program Committee: Mohammed S. Alam, Chrysler Group, LLC (USA); Don A. Gregory, The Univ. of Alabama in Huntsville (USA); Bahram Javidi, Univ. of Connecticut (USA); Yunlong Sheng, Univ. Laval (Canada); Robert C. Stirbi, Jet Propulsion Lab. (USA); Ashit Talukder, Jet Propulsion Lab. (USA); B. V. K. Vijaya Kumar, Carnegie Mellon Univ. (USA); Shizhuo Yin, The Pennsylvania State Univ. (USA); Rupert C. D. Young, Univ. of Sussex (United Kingdom)

On-site Manuscript Due Date:
14 February 2011

This conference is an annual forum for new research on optical pattern recognition (OPR). It includes algorithm, architecture, and system approaches. Theoretical, simulation, and especially hardware optical realizations are encouraged. Special emphasis will be given to new advances in distortion-invariant filters. Papers on optical filters and systems that perform with real-world non-ideal optical devices are encouraged. Other optical pattern recognition architectures and approaches besides correlators are also encouraged, such as optical feature extractors for product inspection and object identification. Papers on optical devices, components, systems, and products developed under the Small Business Innovative Research (SBIR) program are encouraged. We further encourage papers on new techniques to process newer sensor data, such as laser radar and synthetic aperture radar (SAR) inputs.

The tentative sessions and hence the list of topics for which papers are requested include:

- optical pattern recognition (OPR) systems
- distortion-invariant (and controlled invariance) optical correlation filters
- optical correlation filters for clutter and structural noise rejection, and for segmentation/detection
- new techniques to process IR, SAR, laser radar, MMW, etc., sensor data
- optical feature extractors for product inspection and target identification
- OPR neural networks
- OPR hardware and use of non-ideal real-world devices
- photorefractive elements in OPR systems
- SBIR optical devices, components, systems, and products
- OPR as related to homeland defense.

Visual Information Processing XX (DS215)

Conference Chairs: Zia-ur Rahman, NASA Langley Research Ctr. (USA); Stephen E. Reichenbach, Univ. of Nebraska-Lincoln (USA); Mark A. Neifeld, The Univ. of Arizona (USA)

Program Committee: Amit Ashok, The Univ. of Arizona (USA); Gary W. Euliss, MITRE Corp. (USA); Richard D. Juday, NASA Johnson Space Ctr. (USA); Ram M. Narayanan, The Pennsylvania State Univ. (USA); John M. Pellegrino, U.S. Army Research Lab. (USA); Robert A. Schowengerdt, The Univ. of Arizona (USA); Joseph van der Gracht, HoloSpex, Inc. (USA)

Post-Meeting Manuscript Due Date:
28 March 2011

The continual growth in the performance of PCs and embedded architecture platforms has made the applications of imaging, especially digital imaging, increasingly ubiquitous and varied. The applications range from consumer photography and cell phones to medical imaging, surveillance, and homeland security. The varied nature of these applications places different design constraints on imaging systems and image-processing algorithms. Optimal system design can be achieved by jointly optimizing the end-to-end system, including the image acquisition device and image processing algorithms. However, cost constraints may dictate a less optimal, but effective, system design. This conference emphasizes all aspects of visual information processing, from model-based, end-to-end assessment and design of visual communication systems to embedded systems that are optimized for particular image processing tasks.

Papers are solicited on the following and related topics:

- visual information processing systems: modeling, simulation, performance analysis, and perception
- image acquisition: end-to-end system design methodologies, focal-plane processing, unconventional imaging systems
- image processing: image enhancement techniques, artifact and noise removal, image quality measures, restoration and reconstruction
- imaging applications: remote sensing, security and surveillance, military and homeland defense, machine vision, medical imaging, distributed and embedded imaging systems, consumer products, and multimedia systems
- image compression: still and video image compression techniques and standards for image archival, transmission, and storage
- computational imaging and photography: non-traditional imaging systems and algorithms providing novel functionality such as motion invariant imaging, compressive sensing, task-specific imaging, 3D and/or multispectral imaging.

Additionally, the conference will consider abstracts for short oral presentations (without accompanying papers) describing significant industrial and commercial advances related to these topics.
Quantum Information and Computation IX (DS216)

Conference Chairs: Eric Donkor, Univ. of Connecticut (USA); Andrew R. Pirich, ACP Consulting (USA); Howard E. Brandt, U.S. Army Research Lab. (USA)

Program Committee: Paul M. Alsing, Air Force Research Lab. (USA); Reinhard K. Erdmann, Air Force Research Lab. (USA); Michael R. Frey, Bucknell Univ. (USA); Michael J. Hayduk, Air Force Research Lab. (USA); Louis H. Kauffman, Univ. of Illinois at Chicago (USA); Vladimir E. Korepin, Stony Brook Univ. (USA); Samuel J. Lomonaco, Jr., Univ. of Maryland, Baltimore County (USA); John M. Myers, Harvard Univ. (USA); Vladimir Privman, Clarkson Univ. (USA); Alexander V. Sergienko, Boston Univ. (USA); Tai Tsun Wu, Harvard Univ. (USA)

Post-Meeting Manuscript Due Date: 28 March 2011

Quantum systems that compute, store, and distribute information based on quantum mechanical entanglement, superposition, and interference phenomena are being developed and realized in many physical systems, with possible commercial/industrial applications in quantum cryptography, quantum communication, and quantum computation. Quantum cryptography exploits the non-cloning property of quantum states to implement secure cryptosystems, quantum communication exploits entanglement of quantum states for teleportation, and quantum computing utilizes the parallelism of quantum interference states for computational complexity and speed that exceed the capability of today’s digital technology. Non-locality principles can provide a basis for robust quantum networks that can detect and defend against malicious cyber attacks.

Progress in quantum information and computing technologies requires interdisciplinary efforts from physicists, chemists, computer scientists, mathematicians, and engineers. This conference will provide a forum for discussion among theoreticians and experimentalists from these disciplines, and others with interest in quantum technologies. Papers that report on new developments and breakthroughs in quantum information science, quantum communication, quantum cryptography, and quantum computing are invited as well as papers that employ non-locality. Of particular interest are papers dealing with the following topics:

Quantum Information Science
- quantum information theory
- quantum measurement
- decoherence effects
- quantum complexity theory
- quantum algorithms
- quantum error correction
- quantum memory and erasure.

Quantum Communication and Cryptography
- quantum repeaters
- entangled states and their creation
- information processing with entangled states
- teleportation
- quantum cryptography and cryptosystems
- QKD system architecture
- QKD engineering
- quantum networks.

Quantum Computing
- solid state computing
- ion-trap quantum computing
- NMR quantum computing
- neutral-atom quantum computing
- Josephson junction quantum computing
- photonic quantum computing
- cavity-QED quantum computing
- molecular quantum computing
- fault-tolerant quantum computing
- topological quantum computing
- quantum circuits
- quantum computer architecture
- geometry of quantum computation.

Homeland Defense
- secure communications
- information sharing and secrecy
- cyber attack countermeasures
- quantum computer threat assessment.

Quantum Systems and Sensors
- quantum architectural systems
- quantum operations in chemistry and biology
- quantum imaging systems
- quantum sensors
- quantum games.
Independent Component Analyses, Wavelets, Neural Networks, Biosystems, and Nanoengineering IX (DS125)

Post-Meeting Manuscript Due Date: 28 March 2011

DSS focuses on the real-world applications. Be it law enforcement, asymmetric warfare, homeland security, or household biomedical defense against microorganism or disorders, we require smart sensors and algorithms to adapt the persistent surveillance in an unsupervised manner. This includes but is not limited to: nano-robots, system biology and sensory monitoring supported by the new discipline of biomedical wellness engineering and nano-engineering.

The goal is to provide end-to-end systems from robust biology approach and nano-biomimetic sensors via multiple resolution analysis wavelets pre-processing and ICA unsupervised neural network post-processing. This forum provides creative exchange and interaction among a multiple discipline community of researchers. All those who have previously contributed to SPIE conferences, spanning from wavelets applications to ICA, to unsupervised neural network smart sensors, are encouraged to make a presentation and report on what is new in their field. Offering post-conference proceeding is consistent with timely dissemination of the most up-to-date technology and current engineering applications.

We specifically seek contribution in the following topic areas:
- wavelets applications
- unsupervised learning and ICA
- learning theory and applications
- nanoeengineering
- smart sensor systems and miniaturization
- biomedical wellness applications
- wellness smart sensors
- system biology
- smart sensors applications.

This conference will feature five related discipline technical professionals and awards: Wavelets, ICA, Nanoengineering, Wellness Engineering, and System Biology, as a noninvasive, persistent surveillance, affordable and accumulative-effective system. Together these technologies serve a wide-sense homeland security for an aging baby boomer population by means of an end-to-end smart plug-play test-bed system. Awardees are selected by past recipients and associated committee panelists, chaired by the immediately past recipients. The recipients are mandated to write a review paper, participate in keynote presentations, a panel discussion, and tutorial activities.

Recipient of the following awards to be determined:
- Wavelets Pioneer Award
- Unsupervised Learning ICA Award
- Nanoengineering Award
- Biomedical Wellness Award
- Systems Biology Award

Special Instructions to Authors
It is advisable to make an early reservation at Marriott WHQ hotel.

In addition to oral presentations there is also a tutorial session. The sub-conference chairs: Wavelet Applications, Ronald R. Coifman, Yale Univ.; Unsupervised Learning ICA, Soo-Young Lee, Korean Advanced Institute of Technology (Korea); Nano-Engineering, F. Jack Agee, Rice Univ.; Biomedical Wellness, Takeshi Yamakawa, Kyushu Institute Tech (Japan); Systems Biology, Anke Meyer-Bäse, Florida State Univ., may be found from the Internet and directly contacted for the recommendation of Awardee, or volunteer to serve as the committee member, or giving a review talk. We have already instituted the policy that the current recipient will serve as the nomination chair and voted by and supported by the former recipient(s) and the sub-conference chair. Furthermore, in a certain popular category, the committee may decide to have two candidates. The final decision depends solely on the candidates’ availability. As such, the other who happens to be unavailable at the time will subsequently become a new recipient with the consent of the immediately past recipient. Organizers will not be part of the selection process. For the overall coordination, please contact one of the overall conference chairs, e.g. harold.szu@us.army.mil or szhuaroldh@gmail.com
Meeting the challenge of homeland defense and security requires the multi-dimensional analysis of overwhelming volumes of multi-source, multi-format data. Making timely and proper sense of these data often requires human judgment as the data are frequently dynamic, complex, diverse, or even deceptive. However, as our ability to collect data is increasing at rates far beyond our ability to analyze data, a problem that is multiplied by the rapid growth of remote sensing technologies, new methods are required to enable users to reach better insights and understandings about the data with greater efficacy and efficiency.

Visual analytics, as the science of analytical reasoning facilitated by interactive visual displays, offers a promising research direction for meeting this challenge. In particular, visual analytics offers the potential to make substantial contributions to multiple homeland defense and security challenges including: cyber defense; infrastructure protection; threat analysis; boarder and port security; and emergency management, including prevention, planning, response, and recovery.

The 4th Annual Conference on Visual Analytics for Homeland Defense and Security provides a multi-disciplinary forum to share and discuss research challenges and advances in visual analytics in support of time-critical analyses for homeland defense and security. Scientists from universities, industry, government, and research institutes are invited to present their research results and findings. Sessions will be organized to promote discussions and the exchange of ideas. Manuscripts are solicited in the following areas as they relate to the abovementioned homeland defense and security challenges.

Visual representations and interactions techniques that enable users to:
• explore voluminous data efficiently and effectively
• enhance situation awareness during crisis management
• understand information in terms of their connections and relationships
• identify change and uncertainty for situational assessment, trend analysis, and anomaly detection
• facilitate the construction of proper common operating pictures.

Analytical reasoning techniques that enable users to:
• understand past situations in terms of events, trends, and key indicators
• identify intent as well as plausible futures
• improve the detection of indicators, warning signs, and unexpected events
• support decision makers in times of crisis.

Data representations and transformations that enable users to:
• mediate sparse, ambiguous, and conflicting information
• register and manage levels of abstractions within and among information
• situate information within their proper analytical context.

Production, presentation, and dissemination techniques that enable users to:
• share assessments in unambiguous and meaningful ways
• tailor production and presentation to the audience, interface, and task
• construct and disseminate analytical products efficiently and effectively.

Authors should submit a detailed abstract (including, if practical, an extended supplementary file). Detailed submissions will be given a higher priority for acceptance during the review process.
Evolutionary and Bio-inspired Computation: Theory and Applications V (DS218)

Conference Chairs: Teresa H. O’Donnell, Air Force Research Lab. (USA); Misty Blowers, Air Force Research Lab. (USA); Olga L. Mendoza-Schrock, Air Force Research Lab. (USA)

Program Committee: Peter M. LaMonica, Air Force Research Lab. (USA); Leonid I. Perlovsky, Air Force Research Lab. (USA); Michael R. Peterson, Univ. of Hawai‘i (USA); Alex F. Sisti, Air Force Research Lab. (USA); Hugh L. Southall, Air Force Research Lab. (USA); John Spina, Air Force Research Lab. (USA)

Almost since its inception, evolutionary/bio-inspired computation has been applied to the solution of military problems. Given the current global security environment, there has been increased interest within the military and security communities in novel techniques for solving challenging problems within their domains. The genesis of this interest lies in the fact that repeated attempts of using traditional techniques have left many important problems unsolved and, in some cases, not addressed.

Additionally, new problems have emerged within the broad areas of the global war on terrorism, homeland security, and force protection that are difficult to tackle with conventional methods, since social, cultural, and human behavioral factors tend to be at the heart of these new types of problems.

The purpose of the conference is to continue the discussion of current and ongoing efforts in using genetic, evolutionary, intelligent, and other bio-inspired computation techniques. These discussions will include, but are not limited to, the following areas:

• design of military systems and sub-systems
• logistics and scheduling of military operations
• strategic planning and tactical decision making
• site security and force protection
• knowledge discovery and data mining
• advanced modeling and simulation
• advanced next-generation wargaming
• cyber defense and security
• space situational awareness
• sensor networks and layered-sensing.

We also welcome any suggestions you might have for workshops, tutorials, plenary talks, and/or panel discussions.

Critical Dates
Abstract Due Date: 11 October 2010
On-Site Manuscript Due Date: 14 February 2011
Post-Meeting Manuscript Due Date: 28 March 2011

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.
Information Systems and Networks: Processing, Fusion, and Knowledge Generation

Modeling and Simulation for Defense Systems and Applications VI (DS219)

Conference Chair: Eric J. Kelmelis, EM Photonics, Inc. (USA)
Program Committee: James N. Elele, Naval Air Systems Command (USA); Susan Harkrider, U.S. Army Night Vision & Electronic Sensors Directorate (USA); Alex F. Sisti, Air Force Research Lab. (USA); David J. Thornley, Imperial College London (United Kingdom); Dawn A. Trevisani, Air Force Research Lab. (USA)

Modeling and simulation plays a critical role in the development, testing, and acquisition of new systems and technologies. Modeling and simulation of systems and applications allows us to explore future concepts, augment, quantify and simplify the decision-making process, safely replicate dangerous situations and environments, and advance information technologies. Modeling and simulation has been, and will continue to be, an essential element that promotes timely and cost effective development and analysis in a variety of fields.

Defense applications rely heavily on modeling and simulation technology. Everything from individual components to fully integrated systems to high-level military operations are tested through advanced modeling and simulation before deployment. This conference seeks to discuss these technologies. Papers are sought that address the development of modeling and simulation technology (both algorithms and implementation) and the application of modeling and simulation technology to component design, system analysis, or higher level interaction.

Suggested topics for presentation include, but are not limited to:

Systems and Environments
- distributed mission operations (DMO)
- operationally focused simulation
- airborne networking & communication
- command and control 101: ‘no-kidding’ processes and procedures
- scenario, scene, and target generation
- imaging systems.

Algorithms and Applications
- cyber network operations (CNO)
- command and control (C2)
- component and device design
- systems analysis (SA)
- scientific computing
- simulation of defense and security vehicles
- computer-generated forces (CGF).

Platforms and Tools
- state-of-practice: M&S tools, scenarios, databases, testbeds, standards, environments, and exercises
- emerging hardware platforms (graphics cards, FPGAs, etc.)
- verification, validation, and accreditation (VV&A)
- integration and interoperability
- information visualization/animation
- operational C2 systems/tools: “as is” versus “to be”
- performance analysis.

Verification, Validation and Accreditation of Models and Simulations
- data VV&A
- VV&A for scenarios and testbeds
- VV&A for federations, their integration and interoperability
- VV&A processes for realistic battlespace environments
- VV&A for autonomous systems and agent based simulations.

Post-Meeting Manuscript Due Date:
28 March 2011
Wireless Sensing, Localization, and Processing VI (DS220)

Conference Chairs: Sohail A. Dianat, Rochester Institute of Technology (USA); Michael D. Zoltowski, Purdue Univ. (USA)

Program Committee: Moeness G. Amin, Villanova Univ. (USA); John W. Nieto, Harris Corp. (USA); Raghuveer M. Rao, Rochester Institute of Technology (USA); Yimin D. Zhang, Villanova Univ. (USA)

Post-Meeting Manuscript Due Date: 28 March 2011

This conference covers the full gamut of wireless technologies for communication, sensing, and processing. This includes topics related to communication infrastructure, sensing networks, algorithms, hardware, and software.

Papers on the following and related topics are solicited:
- beamforming techniques
- adaptive antennas for wireless systems
- architecture issues
- bandwidth efficient modulation
- channel modeling and equalization techniques
- geolocation techniques
- homeland security applications
- MIMO communication systems
- MIMO radar
- multi-user detection
- performance analysis
- RFID technology
- tranceivers
- wireless and sensor networks
- wireless network modeling
- software defined radio
- space-time coding
- waveform diversity
- cognitive radio
- OFDM
- source localization
- cooperative communication
- wireless traffic control and QoS.

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Defense Transformation and Net-Centric Systems 2011 (DS221)

Conference Chair: Raja Suresh, General Dynamics Advanced Information Systems (USA)
Program Committee: Keith Arthur, Consultant; Vasu D. Chakravarthy, Air Force Research Lab. (USA); Melanie Dumas, Defense Advanced Research Projects Agency (USA); John S. Eicke, U.S. Army Research Lab. (USA); Paul Gaertner, Embassy of Australia (USA); Gayle D. Grant, Consultant; Michael A. Kolodny, U.S. Army Research Lab. (USA); James R. Milligan, Air Force Research Lab. (USA); Leo J. Rose, U.S. Air Force (USA); Larry B. Stotts, Defense Advanced Research Projects Agency (USA); Venkataraman Sundareswaran, Teledyne Scientific Co. (USA); Guy Vézina, Defence Research and Development Canada (Canada)

Post-Meeting Manuscript Due Date:
28 March 2011

Defense transformation is the holistic process of examining the interaction of concepts, doctrine, organization, and technology to radically improve defense capabilities. As an element of defense transformation, net-centric systems use broadband, secure ubiquitous communications and distributed applications to break away from the traditional platform-centric paradigm to enable the development of survivable, rapidly deployable forces.

Internetworking sensors and shooters in a net-centric paradigm (versus hierarchically) is the key to getting the right information to the right warfighter at the right time. The resultant machine-to-machine collaboration enables revolutionary transformation of military forces for an information superiority and decision dominance, to succeed in military operations quickly and with minimal casualties.

Papers are solicited in all areas of defense transformation and net-centric systems including, but not limited to, the following topics:

- national strategies and acquisition plans for defense transformation; defense transformation concepts and enabling technologies
- operational, technical, and system requirements and architectures for the net-centric battlespace; impact on human performance, operational and organizational factors and training; concepts for Counter Insurgency (COIN) and SASO operations
- predictive battlespace awareness and ToPED systems
- distributed collaborative robotic teams
- sensors and surveillance systems with special emphasis on WAMI and persistent surveillance sensors
- service-oriented architectures, information management, and battle management
- unmanned systems (UMS) for urban ISR, collaborative engagement of heterogeneous UMS, see and avoid technologies for UMS, and UMS sensing and control for target geolocation
- long endurance UAS for border patrol, micro and organic UAS for persistent surveillance in caves and other difficult to access areas; counter-UAS technologies and secure UAS systems
- modeling and simulation techniques for development and validation of net-centric systems, as well as for planning, training, and mission rehearsal
- battlespace visualization, display systems, and the human dimension of C2
- communications and networking, with special emphasis on ad hoc wireless mobile networks, cross-layer techniques, network aware applications, spectrum management, cognitive radios and jammers
- autonomous intelligent systems, including smart sensor networks and application layer self-organization
- effects-based operations and precision engagement
- information assurance and security in net-centric systems
- distributed net-centric computing architectures, heterogeneous computing, and meta computing
- net-centric system operational test, evaluation, experimentation, and lessons learned.

Special Session on Self-Organizing, Collaborative Unmanned ISR Robotic Teams

A special session on Self-Organizing, Collaborative ISR Teams is jointly planned with the Unmanned Vehicles Systems Technology conference. Net-centric systems are spawning a revolutionary transformation in multi-vehicle collaboration for autonomous teams of UVs with ISR missions. Human/robot partnerships can provide RSTA-on-demand and area effects operations. This is a timely topic especially in light of the Future Combat Systems and urban operations. Special emphasis will be given to RSTA systems.
Special Session on
Wide Area Persistent Surveillance (WAPS)
In the global war on terror, ubiquitously persistent surveillance in urban areas can most effectively be provided by Wide Area Motion Imagery (WAMI) and other Wide Area Airborne Surveillance (WAAS) sensors. We welcome papers on sensors, PED and communications for WAPS.

Special Session on
Layered Sensing
A special session on layered sensing is being jointly planned with the Layered Sensing Technology conference. Networking layered sensors from space-to-the-mud is seen as being essential to the success of ubiquitously persistent surveillance systems.

Special Session on
Information Management Services for Bridging Enterprise and Tactical Environments
This session calls for papers that describe research, development, experimentation, and application of information technologies that address Department of Defense (DoD) requirements for tactical combat systems and Command and Control (C2) systems to exchange data and information (often across tactical networks) to achieve operational advantage. Papers are sought which provide insight into the capabilities, opportunities and limitations of IM services for bridging the gaps between combat systems and C2 systems and between C2 systems over tactical networks. Papers which help to identify Science and Technology (S&T) needs for future investment to attain new and promising capabilities for the rapid coupling and exploitation of tactical information technology assets are also of interest for this session.

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Mobile Multimedia/Image Processing, Security, and Applications 2011 (DS222)

Conference Chairs: Sos S. Agaian, The Univ. of Texas at San Antonio (USA); Sabah A. Jassim, Univ. of Buckingham (United Kingdom); Yingzi Du, Indiana Univ.-Purdue Univ. Indianapolis (USA)

Program Committee: Fardid Ahmed, The Johns Hopkins Univ. (USA); David Akopian, The Univ. of Texas at San Antonio (USA); Salim Alsharif, Univ. of South Alabama (USA); Cesar Bandera, BanDeMar Networks (USA); Chang Wen Chen, Univ. at Buffalo (USA); Reiner Creutzburg, Fachhochschule Brandenburg (Germany); Stephen P. DellMarco, BAE Systems (USA); Martin Dietze, Consultant (Germany); Frederic Dufaux, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Touradj Ebrahimi, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Eri Lan H. Feria, College of Staten Island (USA); Sonia Garcia-Salicetti, Telecom ParisTech (France); Phalguni Gupta, Indian Institute of Technology Kanpur (India); Yo-Ping Huang, National Taipei Univ. of Technology (Taiwan); Jacques Koreman, Norwegian Univ. of Science and Technology (Norway); Maryline Maknacivius, TELECOM & Management SudParis (France); Alessandro Neri, Univ. degli Studi di Roma Tre (Italy); Salli Prabhakar, DigitalPersona, Inc. (USA); Cheryl L. Resch, The Johns Hopkins Univ. (USA); Harin Sellahewa, Univ. of Buckingham (United Kingdom); Xiuyu Shi, Univ. of Surrey (United Kingdom); Yuri Shukuryan, National Academy of Sciences of Armenia (Armenia)

Post-Meeting Manuscript Due Date: 28 March 2011

This conference is designed to attract expert researchers and end users in multi-media field, secure communication, and their counterparts in the mobile and wireless field, with the aim of creating a framework to foster research in various aspects of image/video processing, analysis, and transmission over wireless mobile channels. Current generations of programmable mobile devices are endowed with low-cost high-resolution digital cameras and can provide new opportunity for mass deployment in applications that involve the use of imaging. The range of such applications is widening fast to include a variety of commercial, civil, military, and industrial use. Video streaming over mobile devices, the use of PDA's in m-health, transmission of image-based biometrics over mobile networks in conflict zones, and deployment of mobile secure communications in disaster areas are all but a few examples of such applications. Recent trends within the wireless communications industry are indicating a growing common ground between commercial and potential military applications, with emphasis on defense and security. The constrained capabilities of mobile devices and the nature of wireless channels are a source of tough challenges in image processing and security of multimedia objects. The combination of commercial and security-related topics to be covered in this conference is designed to facilitate multidisciplinary discussions and collaboration on the algorithmic and technological issues. In addition, the conference welcomes contributions relating to other real-world applications and theoretical developments in the area of mobile multimedia/image techniques in secure and pervasive computing environments.

Key topics discussed include:
- multimedia algorithms and systems
- multimedia processing for mobile devices
- innovative image processing techniques (e.g., enhancement, detection, recognition, restoration, verification, and authentication)
- secure mobile communication
- homeland defense and crime-fighting applications
- biometrics-based authentication for mobile and wireless devices/networks
- security and privacy of image-based identity data
- steganography, steganalysis, and watermarking
- fusion techniques for multimedia analysis
- computing architectures for mobile imaging
- mobile image/video databases
- content-based video indexing and retrieval
- virtual reality and imaging for navigation
- digital media and mobile forensics
- security, trust, and privacy issues in wireless ad hoc networks
- multimedia authentication, encryption, identification, fingerprinting, and copyright protection
- secure multimedia system design and evaluation benchmarks
- biometric key generation and data hiding in biometrics
- practical systems exhibiting data hiding
- mobile TV technologies.
- multimedia algorithms and systems
- multimedia processing for mobile devices
- innovative image processing techniques (e.g., enhancement, detection, recognition, restoration, verification, and authentication)
- secure mobile communication
- homeland defense and crime-fighting applications
- biometrics-based authentication for mobile and wireless devices/networks
- security and privacy of image-based identity data
- steganography, steganalysis, and watermarking
- fusion techniques for multimedia analysis
- computing architectures for mobile imaging
- mobile image/video databases
- content-based video indexing and retrieval
- virtual reality and imaging for navigation
- digital media and mobile forensics
- security, trust, and privacy issues in wireless ad hoc networks
- multimedia authentication, encryption, identification, fingerprinting, and copyright protection
- secure multimedia system design and evaluation benchmarks
- biometric key generation and data hiding in biometrics
- practical systems exhibiting data hiding
- mobile TV technologies.
Multisensor, Multisource Information Fusion: Architectures, Algorithms, and Applications 2011 (DS224)

Conference Chair: Jerome J. Braun, MIT Lincoln Lab. (USA)
Program Committee: Belur V. Dasarathy, Information Fusion Technologies (USA); Michael Heizmann, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Charles F. Hester, U.S. Army Research, Development and Engineering Command (USA); Damian M. Lyons, Fordham Univ. (USA); Mirela Popa, General Dynamics Armament and Technical Products (USA); Firooz A. Sadjadi, Lockheed Martin Maritime Systems & Sensors (USA); Pierre Valin, Defence Research and Development Canada (Canada); Shanchieh J. Yang, Rochester Institute of Technology (USA)

Call for Papers

Post-Meeting Manuscript Due Date: 28 March 2011

This conference is designed to highlight the advances being made in the exponentially growing field of multisensor, multisource information fusion and will cover all the different facets of information fusion systems starting from the conceptual design through development, testing, and fielding.

The main objective of the conference will be to promote synergistic exploitation of the ideas from the different areas of endeavor that together constitute the field of information fusion. In particular, the emphasis will be on the triplet: Architectures, Algorithms, and Applications. Papers dealing with intelligent techniques that are relevant to fusion processing are actively sought. Applications from both defense and civilian domains (such as robotics, medicine, and space, as well as those dealing with non-traditional information sources) are welcome to further a fruitful exchange of ideas and issues. Studies dealing with real-world issues, such as computational demands, real-time constraints, and the like are particularly encouraged. Papers that address one or more of the questions of what, where, why, when, and how in the context of multisource information fusion fall within the scope of the conference.

Areas of interest include but are not limited to:

- multisensor, multisource fusion system architectures
- data, feature, decision, and multilevel fusion
- higher levels of JDL including situation awareness (SA), threat assessment, and impact assessment
- application of SA techniques to such areas as cyber, tactical, global, and asymmetric threats
- multi-classifier fusion, algorithmic processes fusion
- elucidative fusion systems, fusion benefits assessment and prediction, and associated metrics
- multi-look and temporal fusion
- active, passive, and mixed sensor suites as well as non-traditional data/information sources such as databases and HUMINT
- adaptive and self-improving fusion system architectures
- multisensor and distributed sensor system design
- fusion learning in imperfect, imprecise, and incomplete environments
- intelligent techniques for fusion processing
- computational resources optimization
- customized hardware dedicated to fusion applications
- system design and algorithmic issues
- linguistic information fusion, including fusion ontologies and semantic web
- neurophysiologically motivated architectures and applications
- biomedical applications, including ICU patient monitoring, health care, and diagnostics
- homeland defense including military and civilian
- other real-world applications such as robotics, mine detection, remote sensing, transportation systems, document analysis, character recognition, identity verification, multisensor intrusion detection, and the like.

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General Information

Venue

Orlando World Center Marriott Resort and Convention Center
8701 World Center Drive
Orlando FL 32821 USA

The Orlando World Center Marriott Resort and Convention Center, Orlando, Florida, is approximately 18 miles from the Orlando International Airport, centrally located to area attractions such as Walt Disney World Resort, SeaWorld Orlando, and Universal Studios Escape.

Technical Program

Available January 2011

The comprehensive Advance Technical Program for this symposium will list conferences, paper titles, and authors in order of presentation; an outline of all planned special events; and hotel and registration information. All those who submit an abstract will receive a copy.

Registration

Available Online December 2010

All participants, including invited speakers, contributed speakers, session chairs, co-chairs, and committee members, must pay a registration fee.

Fee information for conferences, courses, a registration form, and technical and general information will be available on the SPIE website in December.

Hotel Information

Reservations are scheduled to open December 2010. SPIE will arrange special discounted hotel rates for attendees that will be available when housing opens.

Student Travel Contingency Grants

A limited number of SPIE contingency student travel grants will be awarded based on need. Applications must be received no later than 10 weeks prior to the meeting. Eligible applicants must present an accepted paper at this meeting. Offer applies to undergraduate/graduate students who are enrolled full-time and have not yet received their PhD.

Clearance Information

If government and/or company clearance is required to present and publish your presentation, start the process now to ensure that you receive clearance if your paper is accepted.

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