Orlando April 2018

Call for Presentations

THERMOSENSE XL

VENDORS PRESENTATIONS AND RECEPTION XIV



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Vendors Presentations and Reception XIV

Call for Presentations Gaylord Palms Hotel Orlando, Florida, USA Monday: 16 April 2018 12 Pm - 5 Pm



What's New in Infrared Sensing & Imaging Hardware and Software?

This session is now in its 14th year and has become very popular. This venue provides an early opportunity for exhibitors to highlight their latest technology and products to the Thermosense and IR community, prior to the opening of the DCS-2018 exhibits. This also 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. Looking for state-of-the-art in future generation of IR imagers radiometric and non-radiometric and IR image processing systems and all other hardware and software involved in the Infrared applications. Your company must be an exhibitor at Defense + Commercial Sensing Expo 2018 to be part of this event. Any DCS-2018 exhibitor offering products or services related to infrared sensing or imaging, photonics can participate. The content -topics of submissions have no restrictions: Technical –Commercial within what is Infrared Imaging Hardware, Optics, Accessories, and Software. Slots are limited and available on a first come first-served basis. The list of participating vendors and the content of their presentations will appear in the final program of the SPIE DCS-2018 symposium.

Primarily audience background:

Innovative infrared systems & applications researchers, Innovative infrared applications engineers & professionals, Advanced optics engineers, Photonics & imaging researchers, Photonics Engineering, Infrared systems engineers, Calibration & Test engineers, Academics, Physicists, General Exhibition-Only Visitors, Exhibitor Representatives (DCS-2018)

• Basic rules:

-Be Exhibitors at SPIE—: SPIE Defense + Commercial Sensing at Orlando Gaylord Palms Hotel – 2018 -All exhibitors are eligible to present. - To aid vendors, see below lists of topics that may be of interest to the audience (pages 2 to 6) -First-come first-served basis -- <u>Slots are limited</u>

• Guidelines:

-Abstract - Manuscript: Not Required -Presentation on site: Flexible. Power Point other - Allowed to bring and show equipment to the audience -Length of presentation around (10'-15')

Contents Technical Commencial Ne restrict

-Contents: Technical –Commercial - No restrictions

• Vendor application information required:

-Legal / commercial name of the company - booth number (SPIE DCS-2018)

-Title of the presentation

-Name of the presenter, affiliation, position in the company

- -Contact information of the presenter
- -Brief summary of presentation content (one line)

If you are interested in participating or have any questions, please contact:

Andres E. Rozlosnik:aer@termografia.comSheng-Jen (Tony) Hsieh:hsieh@tamu.edu

General and specific topics, hardware components characteristics & software that may be of interest to the audience:

(The content -topics of submissions have no restrictions within what is Infrared Imaging Hardware, Software accessories testing equipment etc. Technical –Commercial at SPIE DCS-2018 Exhibits. The following list of products is only for presenter **orientation**: Hardware and software-related topics, etc. and applications detailed below are non-exclusive)

- Blackbodies: Collimators--Cavity blackbodies--Extended area blackbodies--Differential blackbodies Target projectors—Portable calibration devices-- Vacuum temperature blackbody Primary Standards for Temperature Calibration --Temperature metrology. Target projectors for sensor test and characterization capability from ~0.30 um to ~14 um
- Cameras Cool- Uncooled (NIR/SWIR/MWIR/LWIR): Portable Non-Portables IR cameras for passive & active applications Accuracy Advances in batteries technologies- Fast battery charger- Cameras for explosive atmospheres regulations Visual NIR camera & target illuminator. Camera Testing Equipment. Includes VIS-SWIR Cameras. Smart thermal Infrared portables cameras to simplify tasks and avoid human errors.
- Characterization of Infrared cameras (detectors): NEP—NETD-- FOV –IFOV—MTF—MRTD-- SRF- SiTF Integration time--Signal noise improvement---Dynamic range— Non-Uniformity corrections-- Infrared cameras cores Accessories Temperature resolution—Radiance uncertainty reduction.
- ✓ Detectors (Cooled) PtSi- InSb HgCdTe (MCT) QWIP (Quantum Well), JT Detectors.
- Detectors: High Operating Temperature. (HOT) IR Sensors to Improve SWaP (Size, Weight, and Power) New generation of IR sensors: nBn sensors & SLS (strained layer superlattice) -T2SL (Type II Super Lattice) --- sensors temporary work ~130 Kelvin (K) to ~175 Kelvin (K)
- ✓ Detectors (SWIR) InAs- InGaAs Wavelength range of ~ 1 to ~3 μ m.
- ✓ Detectors --Photo conductive PbSe (lead selenide uncooled cooled) --PbS (lead sulfide) a standard SWIR semiconductor detector. Pyroelectric infrared detectors.
- \checkmark Detectors Uncooled microbolometers -- Vanadium Oxide (VOx) and Amorphous Silicon (α -Si)

- Detectors in general FPA Number of pixels --Pixel pitch --Fill factor -- New materials— Quantum efficiency & Peak Quantum Efficiency (QE) --Time constant Speed of response -- D* Spectral responsivity. Dark Current. Specific Read-Out Integrated Circuit (ROIC). Video engine for cooled & Uncooled Thermal Imaging Systems.
- High Speed & Definition Cameras (VIS/ NIR /SWIR / MWIR / LWIR) resolution, frame rate, and sensitivity. Transferring the data off the camera. Camera Synchronization. External camera Triggering Control. Start and stop acquisition options (camera -software)
- Imaging Spectro radiometer--Micro-Spectrometers--Hyper Spectral Imaging system --Instruments for measurement: Directional reflectance / Hemispherical emissivity --Spectral / Total directional emissivity / Bidirectional reflectance (BRDF) spectral/total --Directional hemispherical transmittance.
- Infrared, multispectral, and hyperspectral cameras / systems new standards in: Temporal resolution (Hz) Spectral Resolution (wavenumber/ wavelength intervals) Spatial Resolution (IFOV-pitch) Thermal Resolution (NETD) radiometric resolution
- Infrared Cameras: Environmental Housing/ Enclosures & Connectors Waterproof/Dustproof (IP/NEMA) Environmental protection Shock / Vibration standards ISO IEC. Rear connectors appropriate for environmental standards requirements. Homologation and validation of IR systems for extreme environmental conditions: ice, spray water, salt fog, sand, extremely high and low temperatures, altitude, very low or high humidity.
- ✓ Infrared fibers optics, General applications of IR fibers, Types of IR fibers.
- ✓ Infrared sensors for Industrial & Medicine Thermometry Nano thermometry Non-Contact Infrared Temperature Measurement Line scanners Pyrometers
- Interface Options (rear panel/other) / Command and Controls (hardware general): Digital output option. Gigabit Ethernet interface GenlCam Ethernet cable- Power supply HD Video = HD-SDI video output, SPI video interface Composite Video: NTSC: 60Hz / PAL: 50Hz, S-Video, SVGA USB, RS-232 /Analog RS-170 and CCIR / IEEE-488 GPIB, Camera Link Simultaneous Gigabit Ethernet / CoaxPress (CXP), di, Wi-Fi, TCP/IP, HDMI (High-Definition Multimedia Interface) Others Interface/ Commands Cables Lengths and Transmission of the data Speeds (limiting the length) factors can determine the maximum cable length in each case. Audio connections if applicable- SD memory card. Infrared camera connection to complementary instruments via Bluetooth.
- Lenses IR Lens choices /Technology --- Auto & Manual focus, Infrared Mechanical Zoom Lenses (Continuous zoom) –F-numbers -Effective Focal Length-- Vignetting Narcissus effect— Lenses new materials. Aspheric and spherical lenses, Lens design for specific sensor. Anti-reflection coating options. Broad band anti-reflective. Athermalization solutions. Ruggedized infrared lenses instead of standard imaging lenses. DFOV (Dual Field of View) lenses. Customized Infrared Optics Lenses. Lens Testing Equipment- Equipment for the measurement of optical image quality from the ultraviolet to the far infrared. Infrared Optics Dynamic Interferometry Measure optics surface roughness. Optics Metrology. Coatings Metrology. Optics Assemblies Metrology. Optics Testing Standards. Choice the proper lens for a specific FPA. Protective glass for protection of the lens from dust and scratching.
- ✓ Miniature LWIR cameras (microbolometers) Miniature SWIR cameras (InGaAs) Miniature Payloads
- ✓ Modules—OEM (Cool Uncooled) Cores and Components.
- ✓ Mobile Smart Phones with Thermal imaging devices.
- ✓ Opto-mechanical designs from UV to VIS and NIR, to the thermal regions SWIR, MWIR and LWIR.

- ✓ Remotely Operated Vehicles (ROVs) land-based remotely controlled vehicle equipped with cameras for hazardous areas.
- ✓ Semitransparent materials-- Infrared windows, Filters Infrared windows coatings –Infrared Mirrors: flat, conics, aspheres -- Reflectors.
- Software: Infrared signature software analysis /Real time analysis software -- Thermal modeling & FEA software --Infrared image documentation software -- Energy Audit software.
 Signal processing software. Barcode & Labels Printing data base IR Software. Interpretation of thermal images: 3D. Image Contrast Enhancement. Thermography basic reports available for iOS and Android
- ✓ Stirling Engine Technology Cryogenic & Vacuum Systems Miniature Cryocoolers Noise & vibration, efficiency, Fast cooldown times systems Advances in coolers. Dewar's
- ✓ Terahertz (THz) electronics, sensors, and cameras.
- ✓ Unmanned Aerial Vehicle (UAV) Stabilized EO gimbal based visible & thermal infrared. Specifications Software-Controlled flight aerial monitoring- Airborne Imaging Systems Data integration Thermal, GPS location, Visible others.
- ✓ Video engine for cooled Thermal Imaging Systems.
- ✓ Wireless systems IR Systems -- Space qualify IR Outdoor Scanners, --IR Remote Sensing systems.

More... Vendors who are interested to speak (or include in their presentation) on some of following specific <u>applications</u> & <u>systems</u>: *(*only for presenter **orientation**)

- ✓ Aerial and Portable Home auditing infrared systems Aerial Thermography. Roof IR inspections
- ✓ Artificial intelligence in IR systems involve
- ✓ Automotive night vision camera systems (cars & trucks & buses & rail)
- ✓ Concealed surveillance IP Thermal Infrared Camera
- ✓ Customize Infrared systems: Hardware & Software
- ✓ Drones with heat-tracking cameras for multiple applications (6)
- ✓ Enhanced Vision System (EVS) for aircraft landing in limited visibility environments (*)
- ✓ Electromagnetic (eddy current) thermography (NDT): Hardware and Software
- ✓ Energy audit. Facilities, buildings: Infrared cameras and software
- ✓ Forest Fire Fighting Infrared integrated systems (2)
- ✓ Fire Fighting with Short Wave Infrared (SWIR+ LWIR) Cameras (2)
- ✓ Handheld (pocket instrument) scanners near-infrared spectroscopy for almost instant fit: nutritional information & fingerprint & quality from food we daily eat
- ✓ Handheld ultraviolet imaging system
- ✓ Hidden Security Infrared Cameras for various applications
- ✓ Hyperspectral earth observation systems (space-qualified)

- ✓ Hyperspectral imaging system (NIR /SWIR) for Plastic sorted recycling (PP, PE, PVC, PET, PS)
- ✓ Hyperspectral imaging system for monitoring: landfill biogas emission (methane), natural & liquefied gas leaks greenhouse gases. (4)
- ✓ Infrared cameras systems for Fire Fighters (hand held) Fire prevention (2)
- ✓ Infrared systems (fixed) for continuous Volcanoes Monitoring (3)
- ✓ Infrared systems for detect & Identification and quantify gas leaks (+ emissions). Gas compounds Acids, Hydrocarbons, Organics, SF6, others. (4)
- ✓ Infrared systems for Explosion Characterization
- ✓ Infrared systems for Forensic latent evidence applications. Include Ultraviolet Forensics Imaging Systems
- ✓ Infrared systems for maritime guidance in foggy, smoky, and misty environments
- ✓ Infrared systems for Stress and Fatigue Analysis
- ✓ Infrared system for imaging & temperature measurement of glassmaking
- ✓ Infrared systems (+SWIR) for Wild Life: animal detection & hunting
- ✓ Infrared systems used in Aircraft Landing Assistance systems (*)
- ✓ Infrared Thermographic Imaging Systems for Medicine -Veterinarian -Biology. Disease screening & evaluation
- ✓ Infrared Thermography systems in Electronics Printed Circuit Boards
- ✓ Integrated Imaging systems for Harbors', Rail station and Airport protection (1)
- ✓ Integrated Vision Systems Fusion imaging (UV/VIS/NIR /SWIR /MWIR/LWIR)
- ✓ Infrared Signatures of rocket, missiles flares.
- ✓ Laser Rangefinder and laser pointers for different applications with an infrared camera
- ✓ Ladle Check Refractory Infrared Monitoring System & Slag Detection System
- ✓ Lock-in thermography systems: Hardware and Software
- ✓ Military target infrared signature acquisition and analysis. Thermal Weapons Sight
- ✓ Multispectral and Hyperspectral imaging cameras for Mineralogy and Geology Mapping
- ✓ Multispectral and Hyperspectral imaging cameras for Agriculture classification product
- ✓ Multi Sensor surveillance systems applications: for borders, coastal and critical infrastructure (1)
- ✓ Multi Sensor surveillance systems qualify for high-shock environments
- ✓ Pan/Tilt unit with different performance levels for infrared systems
- ✓ Pulse (flash) Thermography systems (NDT) hardware and software
- ✓ Pulse phase thermography (PPT) systems (NDT) hardware and software
- \checkmark Smart sensors: over heat or Δt scene input that make sensor to takes some predefined action
- ✓ Sensors and thermal cameras for space-restricted applications
- ✓ Solar photovoltaic cells Thermographic Testing: modules, panels, and arrays. (lightning, storms, overheating defective cells, panel hotspots others)
- ✓ Solar photovoltaic cells SWIR InGaAs inspection test for uniformity (Cell efficiency- Electroluminescence Inspection)
- ✓ Systems for Precision General Agriculture & Farming (VIS + SWIR + Thermal)
- ✓ Systems for Thermal Inspection of gas, steam, and wind Turbine Blades
- ✓ Systems for validating and characterizing Near Infrared/ Short-Wave Infrared (NIR/SWIR) cameras
- ✓ Surveillance & Military mid and long range integrated systems
- ✓ SWIR in Non-destructive Analysis of Underdrawings in Art Objects
- ✓ Terahertz (THz) Passive & Active-- Imaging through objects (security) & NDT
- ✓ Thermal Imaging and Thermometry in metal industry: rolling mill, die forming and wire drawing machine
- Thermal Imaging and Thermometry in the automotive industry (cars manufacturer) Car robot spot weld monitoring (5)

- ✓ Thermal Imaging & Thermometry in everyday life massive use (household appliances, kitchen, backyards, gardens, perimeter fences)
- ✓ Thermal Imaging and Thermometry related with Internet of Things (IoT)- Smart cities and Smart buildings
- ✓ Thermal imaging cameras /systems for Airport fever screening (Influenza Imported Dengue)
- ✓ Thermal imaging cameras /systems for Battery Technology Development
- ✓ Thermal imaging cameras /systems for control Storage Depots and Warehouse
- ✓ Thermal imaging cameras /systems for improve Hypersonic Aerodynamic Designs
- ✓ Thermal imaging cameras /systems for monitors District Heating Networks
- ✓ Thermal imaging cameras /systems improving comfort for Athletes Footwear
- ✓ Thermal imaging cameras /systems Intelligent Transportations Systems & Tunnels- Verify road conditions
- ✓ Thermal imaging cameras /systems(sensors) for Traffic Control: vehicle bicycle pedestrian
- ✓ Thermal imaging cameras /systems for control resistance Spot Welding (RSW) and Seams Welding (5)
- ✓ Thermal Imaging for Microscopy Infrared Microcopy systems
- ✓ Thermal imaging cameras for different Robots systems & applications
- ✓ Thermal Imaging the future in Biometric Security
- ✓ Thermal Imaging in Dams and Bridge Deck monitoring. Example Cracks in the concrete (1)
- ✓ Thermal infrared hyperspectral imaging for characterization of the volcanic emissions (3)
- ✓ Thermal infrared NDT in microelectronics & micromachining
- ✓ Thermal infrared systems combined with other NDT inspections (ultrasound, X-ray, terahertz, visual)
- \checkmark Thermal, multispectral, and Hyperspectral imaging cameras /systems for preserve Cultural Heritage
- ✓ Thermal, multispectral, and Hyperspectral imaging cameras Pollution Monitoring and emission Characterization of Smokestacks
- Thermography Systems (portable) Electrical: faulty connections / overloaded circuits -- Mechanical Equipment: warm motors-/ bearing failures
- ✓ Thermography Systems (portable) Fluid Systems pipe temperatures --line blockages tank levels
- ✓ Thermography Systems (portable-fixed) for Boilers, Furnaces, and Refractory
- ✓ Thermography Systems for boosting product quality in Thermoconforming process
- ✓ Thermography Systems for Industrial Automation- Optimize products, Process control (machine vision -includes SWIR) & Industrial workers safety
- Thermography Systems for Monitoring Specific Industrial Plants/Utilities Proactive Maintenance -Condition Monitoring
- ✓ Thermography Systems for Monitoring Water Course Pollution
- Thermography Systems (fixed) Rotary Kiln Scanner
- ✓ Thermography-Kit for detection of trapped water in Honeycomb -Mobile NDT system Inspects Composite
- ✓ Transient (large pulse) Thermography systems (NDT) Hardware and Software
- ✓ Unmanned Aerial Vehicles Systems for Aerial Infrared (IR) Inspection Service High Voltage Power Lines. Distribution and Substation Systems (6)
- Unmanned Aerial Vehicles Systems: for monitor buildings, infrastructure, gas leaky, land and crops, wildlife, geothermal environments (6)
- ✓ Unmanned Aerial Vehicles Systems: for security, Search & Rescue(SAR) Support Firefighters (6)
- ✓ Ultraviolet Imaging System for Skin and Sunscreen
- ✓ Vibro Thermography Systems: Lock-in vibrothermography Burst vibrothermography: hardware and software
- ✓ 3D advances thermal imaging systems. Three-dimensional thermal images with surface temperatures in them

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