

EPIC Members Event Report

SPIE. SECURITY+ DEFENCE

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About the EPIC Members Event Reports

Initiated by the founder of EPIC Dr. Thomas Pearsall in 2003, these reports are prepared by members of EPIC to the benefit of the wider community. If you did not have a chance to attend the event but would like to know some key highlight, this report is for you. Emphasis is placed on exploring technical and business opportunities for the members of EPIC.



Introduction

SPIE Security+Defence 2014 (co-located with SPIE Remote Sensing) attracted more than 900 attendees, making it a leading technical event in Europe for photonics technologies in defence and security applications. It is primarily a conference chaired by international experts for engineers, researchers and scientists involved in optic and optronic technologies for advanced security and defence systems. In parallel to the conference, a small industrial exhibition with 31 companies on stands and table-tops enabled exhibitors to reach two distinct audiences: experts and researchers to explore new opportunities of project collaboration and other optronics suppliers to make connections for business capabilities.

SPIE Security+Defence Conference



Photo credit: SPIE

The conference took place from Monday to Thursday and was divided into different technical themes (Unmanned/unattended Sensors, Infrared Systems, Hyperspectral imaging, High power lasers, Terahertz sensors, etc.), but this short report is focused on a few interesting examples of the conference I attended, “**Electro-Optical Remote Sensing**” chaired by Gary Kamerman from FastMetrix in USA and Ove Steinvall from the Swedish Defense Research Agency.

The work presented by Agata Pawlikowska from Selex on a Long-range 3D single-photon imaging LIDAR system was particularly interesting. Selex is developing a next generation 3D active imaging system based on Geiger-mode detectors. Geiger mode detection combines single-photon detection sensitivity with high temporal, or range, precision which provide superior performance when compared to analogue detection techniques for depth profiling. Geiger-mode detection allows weaker laser sources to be used and time-of-flight data may be acquired from significantly longer ranges. This reduces the size, weight and power requirements of the LIDAR system.



Photo credit: SPIE

New applications utilizing fiber lasers were discussed by Agnes Dolfi-Bouteyre of ONERA in her presentation "New fiber laser for LIDAR developments in disaster management". In particular, developments in fiber lasers for use in structural damage assessment, multi-gas detection and long-range wind mapping were presented. A LIDAR vibrometer based on coherent LIDAR utilizing a 1.5 μm , 2W source capable of remote measurements in a 10 s recording time at ranges from 200m up to 3km was developed and tested in Grenoble. Data obtained from the instrument enables safer structures to be designed. A 1995nm, 20kW peak power continuum source operating at 20kHz was designed and built for supercontinuum spectroscopy detection of multi-gas environments for use in defense, security, and environmental monitoring applications. The supercontinuum source delivered a spectral range of 1.5 μm to 4.25 μm suitable for detection of a wide range of gas species. The

summary of Agnes Dolfi-Bouteyre's paper has been inspired from the SPIE website, you can read more interesting news on <http://www.spie.org/x110192.xml#Fiber>

For the third example, a master oscillator power fiber amplifier (MOPFA) design achieving 4W at 10kHz and 470W of peak power was built and tested for wind mapping. The three examples cited in this work demonstrate progress in distinct applications where the flexibility provided by fiber laser technology coupled with increases in average and peak power enable new uses of the technology.

A third presentation focused on LIDAR sensing technologies was presented by H. Michael Tulldahl from the Swedish Defence Research Agency. Its comments were focused on LIDAR integration on small UAV for 3D mapping. He presented the first experimental results and the mechanical and electrical integration of the Velodyne HDL-32E LIDAR on a six-rotor aircraft with a total weight of 7 kilograms. His work consists in evaluating the LIDAR data position accuracy both based on an inertial measurement unit (IMU) combined with GPS-data, and based on combined IMU-data, GPS-data and photogrammetry data. Its experimentations highlighted several advantages of LIDAR development towards miniature systems as the ability to penetrate through vegetation and detect partially obscured targets or to obtain 3D data over the whole survey area, without the limited performance of passive photogrammetry in low contrast areas.

SPIE Security+Defence exhibition

The SPIE Security+Defence exhibition was held Tuesday and Wednesday with thirty industrials showcasing their latest hardware products and systems (optical fibers, lasers, and optical components, infrared detectors and systems, camera, thermal and active imaging systems, test and measurement equipment, etc.) and software solutions (communication, data transmission and analysis, signal and image processing systems, etc.). Attendees were likely to come and discuss on exhibitors' booth about project opportunities, products and systems customisation during their coffee and lunch break but the affluence was rather limited the rest of the opening exhibition hours. Although it's not the size that makes the quality ... this exhibition lacks a bit of dynamism and scope to reach the critical mass that would allow it to settle in the European optronic landscape, like the SPIE DSS Expo in Baltimore (USA) which is a 450-company exhibition on optics, lasers, sensors, image processing, spectroscopy, infrared systems, thermal imaging, optoelectronic components, instrumentation, data analysis, and more. The presence of European optronic integrators as Thales, Sagem, Airbus defence and space, BAE systems, etc. would be a real added value for the growth of the show: firstly, it would allow researchers to confront their expertise with a wider audience and secondly, it would attract more suppliers to exhibit their innovative products.



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SensUp SensUp is an innovative SME based in Rennes, France. We design, manufacture and commercialize OEM (Original Equipment Manufacturer) electro-optical systems based on laser technology. Our main products - OEM laser rangefinders and 3D laser scanning systems (LIDAR) - are used for medium and long range distance measurement, obstacle detection and enhanced navigation. Our subsystems are integrated in land, airborne and naval/maritime embedded solutions. The compromise between compactness / strong power / lightweight of our innovative products allows us to fit the "S.W.A.P" requirements of optronic market integrators. www.sensup-tech.com

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