the business of photonics
optics.org
product focus

SPIE DSS Expo is the East Coast's largest exhibition (500+ companies) for precision optics, lasers, sensors, optical materials, thermal imaging, optoelectronics, instrumentation, data analysis, and more.

SPIE.DSS

Baltimore Convention Center
Baltimore, Maryland, United States
6 - 8 May 2014

In this issue of the optics.org **Product Focus** we look at the **US Navy's** laser deployment for this summer. **DARPA's** extended range for their developmental lasers, **TrueSense Imaging** is acquired by **On Semiconductor**, faster salmonella detection methods developed by **Purdue University** and **FLIR** announce a new Chief Marketing Officer.

You can also review some of the latest product launches from both exhibitors and non exhibitors alike. We have included booth numbers *(where available)* so you can visit booths and view products for yourself.

For the full articles, and daily updates on developments in the wider photonics business, visit **optics.org**.

We're publishing further issues of the optics.org **Product Focus** for **Optatec, Optics+Photonics** and **Vision**.

To ensure that your product is included, contact **optics.org** as soon as possible as space will be limited.

US Navy's laser weapon 'ready for summer deployment'

Improved version of Laser Weapon System soon to be installed on USS Ponce for at-sea testing.

US Navy engineers are now making final adjustments to a laser weapon prototype that will be the first of its kind to deploy aboard a ship late this summer (2014). The prototype, an improved version of the Laser Weapon System (LaWS), is being installed on USS Ponce for at-sea testing in the Persian Gulf, as previously reported by optics.org.

"This is a revolutionary capability," said Chief of Naval Research Rear Admiral Matthew Klunder. "It's absolutely critical that we get this out to sea with our Sailors for these trials, because this very affordable technology is going to change the way we fight and save lives."

US Navy leaders have made directed-energy weapons a top priority to counter what they call asymmetric threats, including unmanned and light aircraft and small attack boats that could be used to deny US forces access to certain areas. They believe that high-energy lasers offer an affordable and safe way to target these threats with extreme precision and an unlimited magazine.

"Our nation's adversaries are pursuing a variety of ways to try and restrict our

continued overleaf

Xenics Infrared Solutions Visit us at Booth #1025

Xenics' SWIR for extreme day and night vision operations

The Rufus-640 SWIR camera tackles the challenge to operate during day and night and in varying conditions. Together with on-board image processing, such as auto exposure and auto gain, Rufus-640 reaches best contrast and high image quality. These advanced features result in superior situational awareness despite fog, haze or high humidity and during bright daylight or moonless nights utilizing the night glow.

- High resolution 640x512 pixels, VisNIR optional
- Small 20µm pixel pitch
- Wide dynamic range and high sensitivity

Contact Details
Xenics nv
Ambachtenlaan 44
BE-3001 Leuven, Belgium
www.xenics.com
sales@xenics.com
Tel: +32 16 38 99 00
Fax: +32 16 38 99 01

Photonis Visit us at Booth #1213

NOCTURN Low-Light Day/Night Cameras from PHOTONIS

Nocturn is a complete family of day-through-night cameras with superior "see in the dark" capabilities, offering <4e- read noise at XSGA resolution. Compact and lightweight, Nocturn cameras are optimized for security, surveillance and mobile applications.

The cameras support a wide range of connectivity options, including Gigabit Ethernet, USB, NTSC or PAL.

With a CS-mount and up to 100Hz rates, Nocturn is ideal for high resolution, long range imaging.

Contact imaging@photonis.com or visit our web site for a complete range of videos: www.nocturncamera.com

Contact Details
PHOTONIS USA
1000 New Holland Ave.,
Lancaster PA 17601, USA
www.nocturncamera.com
imaging@photonis.com
Tel: +1 770 998 1975

US Navy's laser weapon 'ready for summer deployment'

continued from front cover

freedom to operate," Klunder said. "Spending about $1 per shot of a directed-energy source that never runs out gives us an alternative to firing costly munitions at inexpensive threats."

Klunder leads the Office of Naval Research (ONR), which has worked with the Naval Sea Systems Command, Naval Research Laboratory, Naval Surface Warfare Center Dahlgren Division and others to develop powerful directed-energy weapons. The US Navy already has demonstrated the effectiveness of lasers in a variety of maritime settings. In a 2011 demonstration, a laser was used to defeat multiple small boat threats from a destroyer. In 2012, LaWS downed several unmanned aircraft in tests.

Over the past several months, working under the ONR Quick Reaction Capability program, a team of Navy engineers and

More bang, less bucks: the Laser Weapon System will be installed on USS Ponce.

scientists have upgraded LaWS, and proved that targets tracked with a Phalanx Close-In Weapon can be easily handed over to the laser's targeting and tracking system. The result is a weapon system with a single laser weapon control console, manned by a surface warfare weapons officer aboard USS Ponce who can operate all functions of the laser, using a video game-like controller.

Data regarding accuracy, lethality and other factors from the Ponce deployment will guide the development of even more capable weapons under ONR's Solid-State Laser - Technology Maturation program. Under this program, industry teams led by Northrop Grumman, BAE Systems and Raytheon Corp. have been selected to develop cost-effective, combat-ready laser prototypes that could be installed on vessels such as guided-missile destroyers and the Littoral Combat Ship in 2016.

Future developments

The Navy will decide in 2015 which, if any, of the three industry prototypes are suitable to move forward and begin initial ship installation for further testing. "We are in the midst of a pivotal transition with a technology that will keep our Sailors and Marines safe and well-defended for years to come," said Peter Morrison, ONR program manager for SSL-TM. "We believe the deployment on Ponce and SSL-TM will pave the way for a future acquisition program of record so we can provide this capability across the fleet."

About the Author

Matthew Peach is a contributing editor to optics.org.

Machine Vision Problem Solver: The Cyton-CXP

The Cyton-CXP is a Machine Vision power house

The Cyton-CXP can handle every CoaXPress camera manufactured today and some that aren't yet available. With a Gen 2.0 PCIe x8 back end, it has bandwidth to spare for today's super high speed cameras. BitFlow built on its long history of successful Machine Vision tools to design the ultimate high-speed, high-flexibility CoaXPress frame grabber.

Cyton-CXP4 Specifications:

- CoaXPress 1.0/1.1 compliant
- Supports one to four CXP-6 cameras
- Supports multi-link CXP-6 cameras (up to four CXP-6 link cameras)
- Supports CXP speeds from 1.250 to 6.250 Gb/S
- Provides one CXP-6 uplink to the camera (bulk data uploads, zero latency triggers)
- Uses DIN 1.0/2.3 connectors with the new CXP standard 4+1 connector spacing
- Provides power for all cameras (up to 13 Watts per link)
- Cable lengths of up to 135 meters are supported
- Cameras can be accurately synchronized, or can be completely independent
- PCI Express x8 Gen 2.0 interface (also works in x16 slots)
- Separate I/O for each camera
- Supported on both 32-bit and 64-bit Windows and Linux platforms
- Drivers for most 3rd party processing environments
- Full GenICam support for control and capture
- All models are "half size" PCIe cards
- RoHS compliant

BitFlow™

400 West Cummings Park, Suite 5050, Woburn, MA 01801 USA
tel 1-781-932-2900 | fax 1-781-933-9965
www.bitflow.com

Duma Optronics Ltd.

Visit us at Booth #1141

Electronic Autocollimator

The Electronic Autocollimator offered by Duma Optronics, model EAC-1012, now has added laser analyzing capabilities, measuring angular and beam divergence of an incoming beam.

Applications include bore-sighting between laser and an aiming scope, alignment between mechanical axis and laser propagation axis, alignment of long haul mechanical carriages, alignment of laser cavities, pitch and yaw measurements of slides, and flatness measurements.

A built-in beam profiler simultaneously displays laser beam parameters accompanied by the reflected information from the Autocollimators built-in cross reference.

Contact Details

Duma Optronics Ltd.
POB 3370
Nesher 20306
Israel
www.duma.co.il
sales@duma.co.il
support@duma.co.il
Tel: +972 4 8200577
Fax: + 972 4 8204190

Iridian Spectral Technologies

Visit us at Booth #218

New optical filters from Iridian

- MWIR imaging and gas sensing filters
- Multi-spectral filter arrays
- LaseReflect™ glasses for protection from laser pointer attacks
- Large format, high uniformity bandpass filters

Iridian develops thin film optical filters and coated components for a wide variety of applications including telecommunications, spectroscopy, consumer optics, defense, security, and sensing including space, satellite, and astronomy. Filter types include band-pass, edge-pass, AR, anti-smudge, multi-band, and other optical filters from 300nm to 10um.

Contact Details

Iridian Spectral Technologies
2700 Swansea Crescent
Ottawa, ON, Canada
K1G6R8
www.iridian.ca
inquiries@iridian.ca
Tel: +1 (613) 741 4513

Diverse Optics Inc.

Visit us at Booth #948

Custom Precision Polymer Optics

When you're looking for precision polymer optics to reduce cost, trim weight, simplify design, and improve performance, come to Diverse Optics.

We specialize in diamond turning (SPDT) and precision injection molding of custom polymer optics.

Prototype to series production of spheres, aspheres, domes, convex/concave, plano/convex, bi-convex, free-forms, diffractives, Fresnels, prisms, light-pipes, cylinders, lens arrays, collimators, combiners, toroids, CPC's, TIR's, micro-optics, mirrors, parabolics, off-axis, ellipticals, cylinders, and more!

Whether it's diamond turned prototypes or thousands of molded optics, we'll show you how polymer optics are perfected.

Contact Details

Mrs. Letty Trevino, Sales Engineer
Diverse Optics Inc., 10310 Regis Court,
Rancho Cucamonga, CA 91730
www.diverseoptics.com
info@diverseoptics.com
Tel: +1 (909) 593-9330
Fax: +1 (909) 596-1452

ID Quantique SA

Visit us at Booth #1005

id350-PPLN

ID Quantique's ID350 series consists of a packaged Periodically Poled Lithium Niobate (PPLN) crystal designed to generate photon pairs at telecom wavelengths using spontaneous parametric down-conversion (SPDC), where a single photon at 775nm generates a pair of photons at 1550nm.

It can also be used for Second Harmonic Generation (SHG) or Sum Frequency Generation (SFG).

The crystal comes fiber-coupled to provide minimal insertion losses.

It contains an internal temperature controller able to adjust wavelength through a USB connection and GUI software *(Labview VI also delivered)*.

Contact Details

ID Quantique SA
Ch, de la Marbrerie, 3
1227 Carouge/Geneva
Suisse/Switzerland
www.idquantique.com
info@idquantique.com
Tel: +41 22 301 83 71
Fax: +41 22 301 83 79

Logitech Limited

Visit us at Booth #943

Akribis-air: The Intelligent Sample Preparation System

Logitech's highly automated sample preparation system delivers the highest levels of performance in material processing capabilities.

The addition of features such as automatic wafer thickness detection, increased plate speed, software driven set-up and process management delivers a reduction in processing time by as much as 40%.

The results achievable with Akribis-air show substantial advances in removal rates, accuracy, repeatability and surface finish.

This is particularly visible in IR and High Power applications using materials such as CZT, GaAs, InP and SiC.

Contact Details

Logitech Limited,
Erskine Ferry Road,
Old Kilpatrick,
Glasgow, G60 5EU
United Kingdom
www.logitech.uk.com
enquiries@logitech.uk.com
Tel: +44 (0)1389 875444

DRS Technologies, Inc.

Visit us at Booth #625

Tamarisk® Family of Advanced Thermal Imaging Modules

For security and surveillance, unmanned systems, medical imaging, handheld optics and other vital OEM projects, DRS Technologies' Tamarisk® miniature thermal cores offer superior image clarity and flexible configurations.

The 17 µm LWIR uncooled thermal imagers feature a multitude of lens options, VGA and QVGA resolutions and DRS proprietary Image Contrast Enhancement (ICE™) for dynamic thresholding unmatched scene definition.

All Tamarisk® products are backed by a two-year warranty.

Contact Details

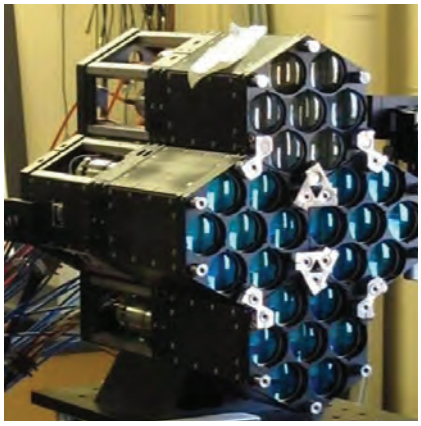
DRS Technologies, Inc.
13532 North Central Expressway
Dallas, TX 75243
www.drsinfrared.com
sales@drsinfrared.com
Tel: +1 (855) 230 2372

DARPA extends laser weapon range

Latest work in 'Excalibur' project uses new 21-element optical phased array technology.

The US Defense Advanced Research Projects Agency (DARPA) says that a developmental laser weapon has precisely hit a target from 7 kilometres, thanks in large part to a 21-element optical phased array (OPA) that maintains good beam quality over such large stand-off distances.

Although the latest demonstration was not with the kind of high-power beam that would ultimately be needed for such weapons – a ramp to 100 kilowatt is envisaged over the next three years – it does show that optics are able to compensate for the distortion caused by atmospheric turbulence, a key technical challenge for laser weapons.



Credit: Optonicus.

The optical phased array used in the Excalibur demonstration. DARPA partner Optonicus is working on a large number of DoD-funded projects designed to improve laser weapons performance.

Joe Mangano, the program manager within DARPA's "Excalibur" project, says that the recent demo shows that the OPA-corrected laser can outperform conventional systems that suffer from reduced beam quality. Maintaining a good beam shape is critical to ensure that sufficiently concentrated power is delivered to a target to destroy it.

The 21-element OPA used by DARPA, which was made by Ohio-based Optonicus, comprised three identical clusters of seven fiber lasers. Each cluster measures 10 cm across.

Combined with an "ultra-fast" algorithm, the OPA is said to be able to correct for atmospheric turbulence within a millisecond.

"These experiments validated that the OPA could actively correct for even severe atmospheric distortion," DARPA officials said. "The demonstration ran several tens of meters above the ground, where atmospheric effects can be most detrimental for Army, Navy and Marine Corp applications."

"In addition, these experiments demonstrated that OPAs might be important for correcting for the effects of boundary layer turbulence around aircraft platforms carrying laser systems."

Coherent combining

Future work will concentrate on ramping up the power of the laser system towards the levels required for effective military deployment, while maintaining the beam quality.

According to last week's fiscal year 2015 budget request from DARPA, part of the wider US Department of Defense (DoD) request, the Excalibur project has also demonstrated 11.2 kilowatt of combined optical output from 16 fiber lasers, as well as coherent (i.e. spectral) combining of a 19-element OPA delivering a 21 kilowatt beam featuring tip/tilt adaptive optics.

"Each array element possesses an adaptive optic capability to minimize beam divergence in the presence of atmospheric turbulence, together with wide field-of-view beam steering for target tracking," states the document regarding the Excalibur arrays.

"With each Excalibur array element powered by high-power fiber laser amplifiers at up to 3 kilowatts per amplifier, high-power air-to-air and air-to-ground engagements have been enabled that were previously unfeasible because of laser system size and weight."

Optonicus projects

Optonicus, which is working on a large number of US military projects related to laser and so-called "directed energy" weapons, received funding from DARPA to continue its development of fiber-array beam projection systems in late 2012.

Around the same time, the company also received backing from the US Air Force to develop a new type of sub-aperture wavefront sensor for optical fiber phase-array systems that could be used in directed energy, astronomy, and optical communications applications.

Similar awards followed in 2013 from the US Navy, the Joint Technology Office and the Air Force again, including funds to develop what it calls the "Advanced Phased Array for Conformal, High Energy" (APACHE) approach.

Here, each of the system sub-aperture modules is composed of multiple adaptive beamlet elements. The modules can then be clustered to deliver a phased combined beam that scales to tens of kilowatts of total power.

To further develop optical sensing of atmospheric turbulence, in October 2013 Optonicus won Air Force backing for a set of sensors capable of operating at three different wavelengths and over a propagation distance of more than 100 km. This project is set to demonstrate both near and far-field measurements of major atmospheric turbulence, laser beam and image characteristics – measured simultaneously at several spatially separated sub-apertures.

Cooling challenge

Other key challenges in raising the output of the laser weapons include dealing with the immense amount of heat generated, and mitigating those effects. Even for a fiber laser system operating at a highly efficient 35 percent, with 100 kilowatts of optical output the cooling requirements are huge.

According to the FY 2015 DARPA budget request, technology developed under the Excalibur program is set to be extended under the related "Endurance" project. It aims to develop pod-mounted lasers to protect aircraft from more advanced surface-to-air missile threats.

The request, which must first be agreed by Congress, earmarks $13.1 million in fiscal 2015 to miniaturize components needed for high-precision target tracking, identification and lightweight agile beam control. Another $36.7 million is set to be allocated to wider project development.

Article by Mike Hatcher

Truesense Imaging set for $92M transition to ON Semiconductor

Acquisition of former Kodak digital imaging division gives chip maker access to high-performance market.

ON Semiconductor, the Nasdaq-listed chip manufacturer, is set to enter the high-performance imaging sector with a $92 million cash acquisition of Truesense Imaging.

Based in Rochester, New York, Truesense sells technology originally developed by

Credit: Truesense Imaging.

Truesense CEO Chris McNiffe.

Eastman Kodak's digital imaging division. It was acquired by private equity firm Platinum Equity in late 2011, shortly before Kodak filed for Chapter 11 bankruptcy protection.

The company specializes in high-performance CCD and CMOS image sensors, used in a variety of industrial end-markets ranging from machine vision, surveillance and traffic monitoring to medicine, science, photography and some high-profile space missions.

The deal will give Phoenix-headquartered ON Semiconductor access to a much-expanded technology portfolio and add more than 200 customers to its roster. ON's existing imaging portfolio runs to custom and application-specific CMOS sensors operating at frame rates up to 18,000 frames per second at megapixel resolution and a small range of active pixel image sensors, sensor modules and ambient light sensors.

"The pending acquisition of Truesense Imaging is a step towards our stated strategic goal of expanding our presence in select segments of the industrial end-market," said Keith Jackson, the CEO of ON Semiconductor, in a company announcement.

"With the acquisition, we will augment our abilities to deliver a broad range of high-performance image sensors to the industrial end-market and at the same time significantly expand our customer footprint."

Strategic fit

According to the various parties involved, Truesense's revenues for calendar 2013 were approximately $79 million, with an operating margin of 23 per cent. The company is set to be incorporated into ON Semiconductor's "application products group (APG)" business unit by the end of June this year, following regulatory approvals and customary closing conditions – both boards of directors have already approved the deal.

Truesense CEO Chris McNiffe said that ON Semiconductor would be an "ideal strategic fit" for the sensor company, complementing the Truesense technology base with its own research and development, plus large-scale manufacturing and global logistics infrastructure.

Platinum Equity partner Rob Joubran, who served as the group's operations lead on the investment, added: "We are proud of the way Truesense has evolved under Platinum Equity's ownership. The value we have created is a testament to the hard work of many dedicated Truesense employees and the vision of Chris McNiffe and the company's management team. The business is well positioned for continued success."

CCD pioneer

With its roots in Kodak's physics department, the business unit that eventually became Truesense was regarded as something of a pioneer in the world of digital imaging sensors. Looking to improve on the earliest CCD sensors developed at Bell Laboratories in the late 1960s, the Kodak division came up with a prototype 1000-pixel device in 1975 and by the end of the 1970s it had broken ground on a new wafer fabrication facility to make sensors in volume for internal use.

Next, Kodak's newly formed Microelectronics Technology Division (MTD) developed the world's first megapixel image sensor and then a 1.3 megapixel device for the world's very first digital SLR camera, the Kodak DCS-100.

After subsequently becoming Kodak's Image Sensor Solutions business unit and given the freedom to sell to external customers, the division went on to develop a wide range of CCD and CMOS process technologies and devices, with pixel resolutions ranging up to 29 megapixels.

But despite having this technology at its disposal, Kodak failed to capitalize on the emergence of digital imaging – a strategy that ultimately forced the company into the bankruptcy protection from which it has since emerged.

Views from Mars

Examples of the kind of high-end applications in which Truesense devices are being used include the Mars Curiosity rover - four different cameras on the vehicle use the company's "KAI-2020" interline transfer CCD sensor.

They include the Mars Hand Lens Imager (MAHLI) that captures close-up color images of rocks and surface material at a resolution of up to 14.4 µm per pixel and the main "MastCam" used by the rover, which is actually two separate cameras allowing detailed near-field and far-field images to be captured.

Credit: NASA.

Imaging Martian dust.

The MastCam-100 part, which uses a 100 mm lens to capture distant images, is said to be able to see an object approximately the diameter of two golf balls from a distance of one kilometer.

Another of the company's KAI-2020 sensors is currently en route to Jupiter as part of NASA's Juno mission, and should provide three-color images of the giant gas planet from orbit when it arrives in 2016.

On the CMOS front, the most recent product launch from Truesense is the company's "KAC-06040" 6 megapixel sensor. Capable of 10-bit full resolution output at up to 160 frames per second, it is said to offer good near-infrared sensitivity and is being aimed at applications in machine vision, intelligent transportation systems, and surveillance.

BARDOT allows faster, easier detection of Salmonella

Purdue University uses laser scattering to identify specific bacteria.

Reliable detection of Salmonella is a serious concern in the food industry, with the US FDA and other regulators applying zero-tolerance standards for the presence of the bacteria.

But outbreaks of Salmonella continue to occur, reinforcing the need for faster and more cost-effective methods to identify the bacteria and its different strains, especially if those methods can do so without biological reagents or antibody probes.

Purdue University, Indiana, has developed an analysis platform known as BARDOT, short for BActerial Rapid Detection using Optical scatter Technology, that might prove to be of great value. It uses a red diode to scan bacteria colonies on an agar plate, and matches the resulting scatter pattern with a library of images to determine which pathogens are present.

The origins of BARDOT go back some time, beginning in a Purdue project aimed at identifying particle contaminants on semiconductor wafers, but Arun Bhunia of the university's Department of Food Sciences always felt that it could be of value if applied to microcolonies of bacteria grown on agar plates.

"A laser scattering approach had been used before, with the earliest attempts being aimed at detection of single cells in suspension," commented Bhunia. "From a microbiology standpoint, two different organisms may share similar morphological or structural properties, and a laser may not be able to differentiate them in suspension. Our system, by contrast, directly detects the colonies of bacteria on the agar plate."

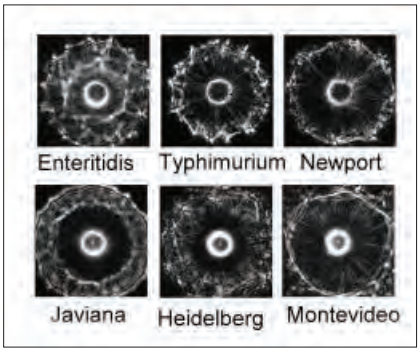
BARDOT passes a 635 nm laser beam through the center of a colony and generates a unique scatter signature, for comparison with other such fingerprint patterns held on record. A low beam power limits the energy absorbed by the bacteria during the process to only 1 to 2 mJ mm-2, theoretically preventing any cellular damage that might interfere with subsequent analysis - although the team noted that the subtle effects of laser light on bacterial physiology merited further study.

Identifying serovars

The technique had already demonstrated that it could differentiate between a number of common bacteria, but the Purdue team has now tested its ability to identify different strains, or serovars, of Salmonella, an important factor for its use in commercial and industrial scenarios.

"We knew that the scatter pattern of a bacterium is medium-dependant, and changes according to the solid agar medium they grow on, so a major hurdle was finding growth media that ensured the Salmonella patterns were different from the non-Salmonella colonies on the agar plate," said Bhunia. "A second challenge was to make sure that the same agar media could also differentiate different serovars of Salmonella."

In tests, the data show that BARDOT accurately detected most of the 20 most prevalent Salmonella serovars with an accuracy of up to 95 percent, and proved able to individually distinguish eight of the most significant serovars. This ability can be highly valuable when attempting to trace an outbreak back to the original source.



Credit: Arun Bhunia/Atul Singh.

BARDOT generates distinct laser scatter patterns for Salmonella and non-Salmonella colonies.

The main barrier for the system's current configuration is the need for a sample to lend itself to optical scattering in the first place. Fungi and yeasts, to name two examples, appear to be too dense. But that still leaves many other pathogens as desirable candidates for detection.

"Right now, we are testing this system with naturally contaminated samples for Salmonella, and also continuing to develop methods for other pathogens such as E. coli, Staphylococcus, and many other pathogens of food, environment, water or clinical samples," noted Bhunia.

In the mean time, BARDOT is already marketed commercially through Advanced Bioimaging Systems, a spin-out from Purdue, and is set to make continued inroads into food testing thanks to its ease of operation and cost-effectiveness.

"BARDOT needs minimal reagents, apart from the growth media, and so is relatively inexpensive to operate," Bhunia said. "Unlike other methods, it does not damage the integrity of the colony, which can also be used for genomic fingerprinting or molecular study. It should help microbiologists to find any pathogens very quickly, provided they have the scatter image library. I believe it has the potential to be a revolutionary approach to microbial testing."

FLIR Systems Announces Hiring of Chief Marketing Officer

Former Samsung Electronics America marketing VP Travis Merrill joins infrared imaging firm in newly created position.

WILSONVILLE, OR--(Marketwired - Apr 7, 2014) - FLIR Systems, Inc. (NASDAQ: FLIR) today announced that Travis Merrill will join the Company in the newly-created position of Senior Vice President and Chief Marketing Officer. Reporting to CEO Andy Teich, Merrill will be tasked with developing and leading FLIR's global marketing and brand building efforts. Mr. Merrill served most recently as Vice President of Marketing for Samsung Electronics America, where he led the GALAXY Tab marketing initiatives from 2011 to 2014.

Previously, he held various strategy and marketing roles for Samsung in Korea and in the U.S., as well as various leadership positions at Covad Communications and at U.S. West (now CenturyLink). Mr. Merrill received his BA magna cum laude from Wabash College, an MS in Telecommunications from the University of Colorado Boulder, and an MBA from Harvard Business School.

"We are delighted to welcome Travis to our team. With the recent introduction of the FLIR One iPhone thermal camera accessory and the low-cost Lepton thermal micro-camera core, we expect FLIR's customer base and market breadth to expand rapidly into markets where effective brand-building and world class marketing will create significant value. Travis brings tremendous experience in these critical areas and we look forward to having him as a part of the management team," said Andy Teich, President and CEO of FLIR.

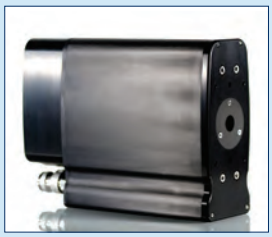
First Light Imaging

Visit us at Booth #335

OCAM2-S

OCAM2-S is a high speed low noise camera with an integrated electronic shutter able to run full frame at 2067 fps with subelectron readout noise and apertures shorter than 1µs.

- 240x240 pixels State of the Art EMCCD
- Up to 2067 FPS Full Frame
- Embedded Electronic Shutter
- Wide 24µm pixels
- 95% Peak QE typical
- 14 bits precision A/D converter
- Ultra Low Latency CameraLinkT Full Interface



Contact Details

First Light Imaging
100 route des Houilleres,
13590 Meyreuil, France
www.firstlight.fr
Tel: +33 4 42 61 29 20
Fax: +33 4 42 61 29 21

Meadowlark Optics

Visit us at Booth #1129

Looking for MWIR polarization solutions?

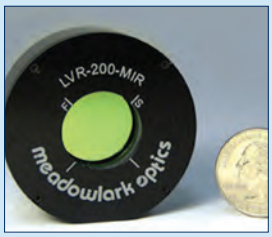
Meadowlark Optics is proud to announce a new family of products!

Non-mechanical Phase Modulators, Attenuators, Polarization Rotators, Polarizers and Tunable Filters from 3 to 6 microns are now possible.

You've been looking for MWIR polarization solutions?

We have them!

Plus check out the Paper delivered on Liquid crystals for polarization control in the MWIR.



Contact Details

Meadowlark Optics, Inc.
P.O. Box 1000
Frederick, CO 80530
www.meadowlark.com
Tel: +1 303 833 4333
Fax: +1 303 833 4335

BitFlow

Visit us at Booth #1206

CXP Family

With the CXP Family, BitFlow continues our support of high speed and flexibility that has made us a leader in high speed data acquisition.

The Cyton CXP4, Karbon CXP4 and Karbon CXP2 are the latest offerings from our team.

Since 1993, we have provided the best and most versatile in data acquisition.

No other company can offer as many options for frame grabbers as we do. From Analog to LVDS to CL to CXP, we have it all.

Let us help you with your newest imaging challenge.

Contact Details

BitFlow
400 W Cummings Park, Suite 5050,
Woburn MA 01801 USA
www.bitflow.com
sales@bitflow.com
Tel: +1-781-932-2900

Pixelteq

Visit us at Booth #449

NEW Spectral Sensors | 8-band Spectroscopy

PixelSensor multispectral sensors use exclusive on-chip filtering to pack up to eight wavelength-selective photodiodes into a compact array < 1 cm2 for simpler and smaller optical devices. One PixelSensor replaces several components, delivering more signal and shrinking multispectral instruments from portable spectroscopy to fluorescence detection. PixelSensor VIS splits the visible spectrum into eight discrete color bands. Customized OEM versions are available with user-defined spectral bands. PixelSensor's unique wafer-level optical filters suppress background light and enhance passband transmission. Find out how PixelSensor can support your application.

Destination URL: http://www.pixelteq.com/product/pixelsensor/

Contact Details

Pixelteq
8060 Bryan Dairy Rd.,
Largo, FL 33777
www.pixelteq.com
info@pixelteq.com
Tel: +1 727 545 0741

G5 Infrared

Visit us at Booth #215

Custom thin film coating services

G5 has in-house thin film design capabilities to offer custom thin film coating services in addition to standard high performance abrasion resistant DLC (diamond-like-carbon) and Anti-Reflection coatings.

Customer furnished lens elements or window substrate materials are accepted for coating services or G5 can provide complete-to-print lens elements and windows or filters see us in booth #215

Contact Details

G5 Infrared, LLC
8 Security Drive,
Hudson, NH 03051
www.g5ir.com
sales@g5ir.com
Tel: +1 603 204 5722

To announce your new product or to ensure your existing products get the visibility they deserve and are put in front of the industry's key decision makers, make sure you are in the next issue of optics.org product focus.

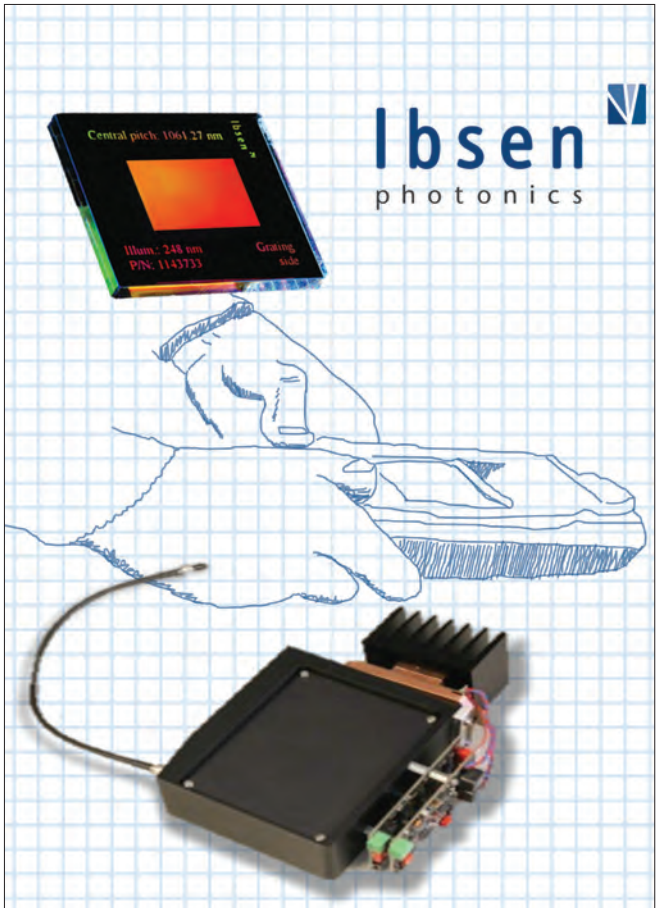
Contact one of our sales team on

+44 (0)117 905 5330

email sales@optics.org

or visit us online to download the latest product focus media pack

optics.org/advertise



UV-NIR Gratings and Spectrometers

Ibsen Photonics' core technology is fused silica transmission gratings, with main grating products today including Phase masks, telecom gratings, laser pulse compression gratings and spectrometer gratings.

By combining unique optical design capabilities with superior transmission grating technology, Ibsen Photonics additionally supplies compact, OEM spectrometer modules for applications such as UV, VIS, NIR, Raman, OCT, and fiber sensing.

For laser applications such as femtosecond laser pulse compression and spectral beam combining, fused silica transmission gratings offer unbeatable power and energy handling capability, and for spectroscopy, fused silica transmission gratings combine broad spectral bandwidth with high dispersion and convenient optical designs.

These benefits are clear in the performance of our ultra-broadband UV-NIR FREEDOM spectrometers, as well as in our high resolution EAGLE spectrometers that are well suited for Raman spectroscopy. A comprehensive line-up of I-MON Interrogation Monitors sets new standards for fast, real-time spectrum monitoring of FBG sensor systems.

Ibsen photonics

Ryttermarken 15-21, DK-3520 Farum, Denmark
www.ibsenphotonics.com
Email: inquiry@ibsen.dk
Tel: +45 44 34 70 00
Fax: +45 44 34 70 01

Visit us at Booth #1159