

Welcome to our latest **Product Focus**, which we have published specifically for **Defense, Security, and Sensing 2012**. Here you can see a range of products from both exhibitors and non-exhibitors alike. We have included booth numbers (*where available*) making it easy for you to check out the products for yourself.

Also included in this handy product guide are selected highlights of recent articles from the optics.org defense channel, including a report on efforts by BAE Systems and

Boeing to integrate conventional kinetic weapons with new laser-based directed energy systems. 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** and **Optics+Photonics**. To ensure that your product is included, contact optics.org as soon as possible as space will be limited.

TRIOPTICS GmbH

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ImageMaster® HR IR - The only vertical and camera based MTF test station measuring in VIS and LWIR

ImageMaster® HR IR, based on well proved **ImageMaster® HR**, has been developed to fulfill customer requirements for highest accuracy and flexibility. It is designed for the measurement of MTF and others optical parameters of today's high-end IR optics in R&D and production.

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Contact Details

TRIOPTICS GmbH
Hafenstrasse 35-39, 22880 Wedel, Germany
www.trioptics.com
info@trioptics.com
Tel: +49 (0) 4103 18006 0
Fax: +49 (0) 4103 18006 20



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12–16 August 2012

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The cost-effective id220-FR-SMF brings a major breakthrough for single photon detection in freerunning mode at telecom wavelengths. The cooled InGaAs/InP avalanche photodiode and associated electronics have been specially designed for achieving low dark count and afterpulsing rates in freerunning mode. The single mode fiber coupled module can operate at two detection probability levels of 10% and 20% with an adjustable deadline between 600ns and 25us, both parameters are adjustable via the USB interface. The timing resolution is as low as 250ps at 20% efficiency.



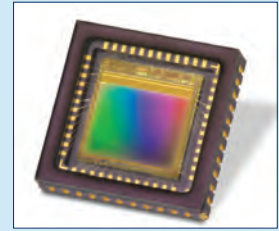
Contact Details
 Michaël Désert
michael.desert@idquantique.com
 ID Quantique SA
 Ch, de la Marbrerie, 3
 1227 Carouge/Geneva
 Suisse/Switzerland
www.idquantique.com
info@idquantique.com
 Tel: +41 22 301 83 71
 Fax: +41 22 301 83 79

e2v

Visit us at Booth No. 212

EV76C660 and EV76C661

e2v has launched the EV76C660 & EV76C661; new members of its Ruby family of CMOS imaging sensors. Offering a pixel size of 5.3µm, QE of over 80% and excellent sensitivity and performance in the near-infrared spectrum (>50% at 850nm), these breakthrough devices significantly reduce system illumination costs, enabling very low-light imaging in outdoor camera applications. Sharing the same package, pin-out and software interface as e2v's Sapphire family allows them to provide a range of differentiated industrial camera products from a single hardware and software development effort.



Contact Details
 e2v
 106 Waterhouse Lane,
 Chelmsford,
 Essex
 CM1 2QU
 United Kingdom
www.e2v.com
enquiries@e2v.com
 Tel: +44 (0)1245 493 493

Photonis

Visit us at Booth No. 205

Lynx CMOS solid-state sensor for low-light imaging and cameras

PHOTONIS announces Lynx, its newest CMOS sensor for low-light imaging and cameras. Lynx is a solid-state sensor designed for simple integration into a variety of camera applications where light levels will vary between full daylight and quarter-moon (night level 3). The Lynx CMOS sensor provides a consistent read noise well below 5e- at 100 fps, with superior signal-to-noise performance due to its large 9.7µm² pixels and high fill factor. The <200mW power consumption makes Lynx ideal for man-portable systems, unmanned posts and 24/7 CCTV surveillance.



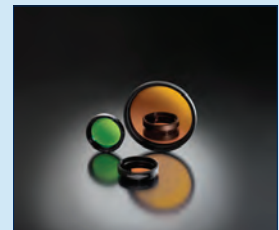
Contact Details
 Photonis
 660 Main Street,
 Sturbridge Business Park,
 P.O. Box 1159, Sturbridge, MA 01518
 USA
www.photonis.com
sales@usa.photonis.com
 Tel: +01 508 347 4000
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Andover Corporation offers IR filters with wavelengths up to 14µm.

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Contact Details
 Andover Corporation
 4 Commercial Drive,
 Salem, NH 03079-2800
 USA
www.andovercorp.com
info@andovercorp.com
 Tel: +01 603 893 6888
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Your One Pair of Laser Protective Eyewear

The C115C MultiWave™ laser safety filter from Kentek provides virtually scratchproof coverage for multiple lasers yet offers 70% visible light transmission. A single product with this technology will cover lasers from 200nm to 480nm, 525nm to 550nm, plus nearly complete coverage from 755nm through 3200nm. This unique product family enables color recognition while providing unprecedented levels of safety. Several frame styles are available. Fully ANSI Z136 compliant. Please call us for complete specifications.



Contact Details
 Kentek Corporation
 1 Elm Street,
 Pittsfield, NH 03263
 USA
www.kenteklaserstore.com
info@kenteklaserstore.com
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Defence Vision Systems Inc.

Visit us at Booth No. 1303

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Contact Details
 Defence Vision Systems Inc.
 Millham, Mountfield,
 Robertsbridge,
 East Sussex
 TN32 5JU
 United Kingdom
www.dvsmil.com
info@dvsmil.com

BAE Systems, Boeing blend kinetic and laser weapons

The use of high-energy lasers on naval platforms has been one of the major research and development focuses of the military and industry partnerships working on directed energy system development.

February's Directed Energy Systems Conference in Munich heard about the development of an integrated laser and conventional weapon designed for naval use such as counter-piracy and in anti-aircraft applications.

Mike Rinn, Vice President and Program Manager, Directed Energy Systems, at Boeing, told the conference, "The MK38 TLS (Tactical Laser System) that we are developing has the potential to do a number of things. Some day at higher power levels, it will be used in cruise missile defense, countering sensors and eventually hard-kills on unmanned airborne vehicles (UAVs or "drones") will be possible as we increase the power. For both naval and merchant shipping, small boat threats are a big problem in many locations, especially when ships approach ports.

"With BAE Systems, what we have been looking at was how to build a directed energy system that would coexist effectively with a kinetic weapons system, such as a conventional machine gun. We think that's really the path forward rather than having a standalone system. That's why we approached BAE, because they have developed the 25mm MK38 chain gun and together we began to design a system. So far 182 systems have been delivered to the US Navy, which have been deployed on 12 different ship classes."

The primary purpose of the MK38 MOD2 machine gun is defense against small boat swarms including Fast Attack Craft (FAC) and Fast Inshore Attack Craft (FIAC).



Photo courtesy of Boeing.

Fire power: Use of high-energy lasers on naval platforms has been one of the major R&D focuses of the military and industry partnerships working on directed energy system development.

The addition of the tactical laser system provides an integrated kinetic/directed energy capability on a single mount; "war fighter engagement" options to impart a wider range of effects than conventional gun systems; and other capabilities to counter UAVs and other air threats.

The partners are confident that adding the High Energy Laser (HEL) technology will offer unique capabilities in the tactical applications, including – depending on the type of laser – the depth of "magazine", the potential escalation of force by a single integrated weapon, improved range for target identification and discrimination, and so-called ultra precision.

The fiber laser part of the integrated system incorporates the following features: a 10kW commercial off the shelf system, a 37cm beam director and all necessary optical, electro-optical, mechanical, and electrical components required to achieve precision beam control.

The laser system is mounted on BAE Systems' MK38 base unit, which includes independent elevation and train drives to inertially stabilize the beam director. The system includes near infrared (NIR) and midwave infrared (MWIR) tracking capabilities. The all-important thermal management system provides thermal conditioning to the laser, beam director electronics and enclosure. It is cooled by a propylene glycol/water mix.

Rinn explained the benefits of a combined system with respect to modern conflict applications, such as piracy and the increasing use of UAVs. "With a kinetic-only system if you have a swarming boats problem and you're not sure whether it is a hostile threat or, say fishermen, then you're kind of limited as to what you can do – basically all you can do is shoot it. But if you add the directed energy system to it then it gives you this precise pointing and variable lethality effects such as damaging equipment as a warning."

"We have a 37cm beam director, which we think is optimum for this particular mission space where are talking about primarily swarming boats, small arms threats. In the future we could take this design up to higher power levels but the lethality that is provided by single mode bright fiber lasers is actually quite impressive.

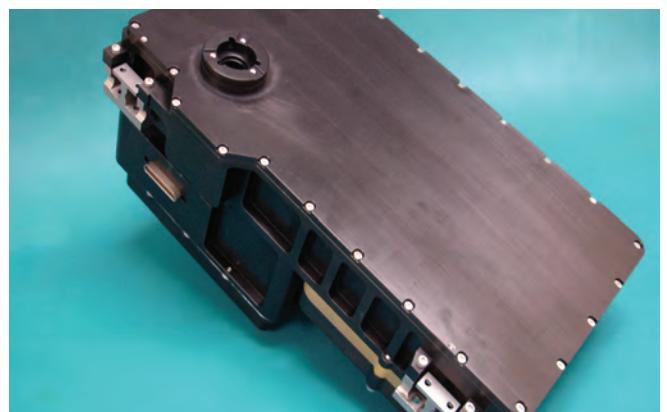
"The other unique feature is the repacking of these existing fiber lasers into a package that fits either underneath the gun mount, so that the deck space is not disturbed, so you don't have to penetrate the deck, which is a big advantage for the US Navy. In the other case, where there is a height problem, this box can be located just off to the side of the gun."

In recent developments, the thermal source components have been repackaged and redesigned from the unnamed vendor as well as the electronics and electrical side. The beam director design is now complete and the system is expected to be ready for full testing some time during summer 2012.

Northrop Grumman's Airborne Laser Threat Terminator

Northrop Grumman's all-semiconductor Airborne Laser Threat Terminator (ASALTT™) infrared countermeasure (IRCM) laser system has now advanced to Technology Readiness Level 6 (TRL-6).

TRL-6 represents a successful system/subsystem model or prototype demonstration in a relevant environment, and is the sixth of nine stages in all. ASALTT™ is an advanced technology quantum cascade laser-based mid-infrared laser designed and developed to protect a wide variety of aircraft including fixed-wing and rotor aircraft, whether based on land or at sea.



GPD Optoelectronics Corp

Visit us at Booth No. 406

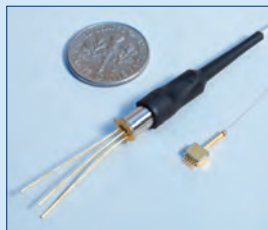
High Reliability InGaAs Photodiodes

GPD Optoelectronics Corp. announces the availability of high-rel fiber pigtailed InGaAs pin photodiodes in TO and surface-mount packages.

All seams are either cap welded, seam sealed or laser welded, and fiber/ferrule seal is made using space-approved epoxy.

These parts have been qualified for satellite/space applications and can be supplied with qualification data as required. These products are manufactured in the US.

Please visit us at Defense and Security or CLEO to discuss your particular application with a sales engineer or contact the sales office.



Contact Details

GPD Optoelectronics Corp
7 Manor Parkway,
Salem, NH 03079
USA

www.gpd-ir.com
sales@gpd-ir.com

Tel: +01 603 894 6865
Fax: +01 603 984 6866

Raptor Photonics Limited

Visit us at Booth No. 2036

Compact and rugged digital Visible-SWIR camera from Raptor

The OWL Visible SWIR camera, model OW1.7-VS-CL-320, features a 320x256 pixel, 30µm x30µm pixel pitch, high sensitivity InGaAs sensor with visible extension.

The camera is peltier cooled, uses a 14 bit A/D converter and offers a standard CameraLink output.

The OWL camera offers optimum image quality thanks to its on board Automatic Gain Control (AGC), image enhancement and built-in 3 points non-uniformity correction (NUC).

Raptor's SWIR cameras are ideally suited for cutting edge application such as: 1.55mm laser detection, Active Imaging, Imaging through fog or Vision enhancement.



Contact Details

Raptor Photonics Ltd
Willowbank Business Park,
Larne, Co Antrim
BT40 2SF
Northern Ireland

www.raptorphotonics.com
info@raptorphotonics.com

Tel: +44 28 2827 0141

DataRay Inc.

Visit us at Booth No. 555

DataRay's New High Resolution IR Beam Profiler and Camera

DataRay is pleased to announce the release of our New High Resolution WinCamD-FIR Infra-red, 14 bit, USB port powered, high resolution IR camera for profiling of beams from 2.0 to 16 µm. A 640 x 480 pixel array and pixel size of 17 µm, offers the highest resolution array IR profiler on the market today.

The WinCamD-FIR does not require a chopper so it is ideal for CW or pulsed sources.

DataRay products run under Windows 7, XP and Vista (64 or 32 bit).



Contact Details

John Wilson
DataRay Inc.
14505 Seaman Gulch Road,
Bella Vista, CA 96008
USA

www.dataray.com
jwilson@dataray.com

Tel: +01 866 946 2263 x701
Tel: +01 203 210 5065
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Optikos Corporation

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*** Remember to attend:**

"Precise economical lens calibration and measurement techniques for VIS, NIR, and LWIR optical systems" -
Stephen D. Fantone, Daniel Orband
Tuesday April 24th
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Contact Details

Roger Kirschner
Optikos Corporation
107 Audubon Rd, Bldg 3,
Wakefield, MA 01880
USA

www.optikos.com
sales@optikos.com

Tel: +01 617 902 3100 (Direct Line)
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Contact Details

Optometrics Corp.
8 Nemco Way,
Ayer, MA,
USA

www.optometrics.org
sales@optometrics.com

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Fax: +01 978 772 0017

Offset Raman reaches stand-off distances

Scientists in Austria have found a way to extend a Raman spectroscopy technique so that it can detect signs of explosive materials inside opaque containers from a distance of more than 100 meters.



Photo: TU Wien

Photonics kit for stand-off spatially offset Raman spectroscopy (SORS) includes a nanosecond-pulse frequency-doubled Nd:YAG laser (right), and a 6-inch Schmidt-Cassegrain telescope (left).

Bernhard Lendl and his co-workers at the Vienna University of Technology have adapted an approach known as "spatially offset" Raman spectroscopy (SORS), which was first developed by Pavel Matousek at the UK's Central Laser Facility (CLF).

According to Lendl, SORS has so far only proved useful at relatively short ranges, with the sample to be analyzed needing to be placed close to the laser used to generate a detectable Raman signal. But by using a nanosecond-pulsed laser, and gated detection via a telescope, the Vienna team has shown that it is possible to detect those signals from much further away.

SORS has proved so successful that Cobalt Light Systems, a spin-off from the CLF, now has a commercial instrument based on the technique that is undergoing extensive trials at European airports, with a view to using the technology to screen liquids at security checkpoints.

In Europe, airline passengers are currently banned from taking liquids of more than 100 milliliters onto aircraft in their hand luggage. The regulation could be relaxed next year, although only if a highly reliable screening system can be implemented in time.

SORS could be that method - Cobalt says that its INSIGHT100 SORS bottle scanner exceeded the European Civil Aviation Conference (ECAC) standard for use at airport security, with "almost perfect" detection capability and a negligible false alarm rate. The system screens individual bottles in less than 5 seconds, and is currently in trials at several major European airports - suggesting that Raman spectroscopy could be in line for a major commercial deployment.

In a research paper published in the journal *Analytical Chemistry* last year, Lendl's team showed how the contents of an opaque plastic container could be analyzed by SORS from several meters away, while they claim that the approach works at a stand-off distance of more than 100 meters.

In their latest work, the team used a Q-switched Nd:YAG laser from the Lithuanian company EKSPLA to deliver 4.4 ns pulses at a rate of 10 Hz to sample containers, and a 6-inch Schmidt-Cassegrain telescope from the well-known US astronomy equipment specialist Celestron to collect the SORS signal.

Jenoptik strengthens military business in US

Germany's Jenoptik has established a new US subsidiary to develop new business in the defense and homeland security sectors. Jenoptik Defense, Inc. (JDI), incorporated at the end of 2011 but only recently announced publicly, is a part of the Jenoptik Defense & Civil Systems division, which provides a wide range of products, components and system solutions focusing on ground combat vehicles and reconnaissance instruments.

The parent company has high hopes for this division in North America, but realized last year that it would need to establish a US company in order to meet the US Government's trade criteria. The parent company, which is based in the photonics hub city of Jena, Germany, has five divisions of which one is Defense and Civil Systems.

Martin Ruff, commercial manager, told optics.org: "We are hopeful that the US Government will become one of our customers and we have already made a bid to supply hand-held infrared devices incorporating a classified GPS system. Looking ahead to the future business prospects for Jenoptik Defense, I would expect to see double digit millions of dollars of new business within the next five years."

"At the moment we are working on three main product lines; mechatronics - which includes electromechanical stabilization systems, generators and electrical energy systems; OEM laser range finders and observation and trajectory equipment. Initially JDI will be selling systems manufactured in Germany but we are preparing ourselves for assembly in the US and possibly even complete production."

JDI is partly co-located in Jupiter, Florida, with the US operation of Jenoptik Optical Systems, which has about 80 staff. JDI also has a satellite operation in Rochester Hills Michigan collocated with Hommel-Etamic America, another Jenoptik division, which manufactures high-precision, tactile and non-tactile production metrology systems.

Stories by
Matthew Peach and Mike Hatcher

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ORGANIZER
P. E. Schall GmbH & Co. KG · Gustav-Werner-Straße 6 · D-72636 Frickenhausen
T +49 (0)7025 9206-0 · F +49 (0)7025 9206-620 · info@schall-messen.de · www.schall-messen.de

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