

# VISION

focus



Photo: Matthew Peach.

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# Improved Vision

Welcome to the latest issue of **VISION Focus**, the quarterly digital magazine that covers all aspects of vision and imaging, produced by the team that brings you optics.org. This is an exciting time for the ever-growing vision industry and to reflect this growth, **VISION Focus** is expanding with new dedicated editorial features and plans to increase our coverage of the key vision industry conferences and exhibitions in 2016.

This issue is focused on the developments at BIOS – Biomedical Optics and Photonics West 2016 conference and expo, taking place in San Francisco (14th – 18th Feb). In addition to the latest business news, market trends and product applications from the imaging and machine vision world, we have features on the first holographic tomographic microscope from Swiss start-up Nanolive and a novel inspection system for optimizing production of head up displays for fighter aircraft from UK system developer Industrial Vision Systems.

Each issue of **VISION Focus** magazine is promoted to more than 25,000 industry professionals. From hyperspectral imaging to machine vision applications, **VISION Focus** magazine delivers the industry news that matters in an easily accessible format. We also publish printed copies at major events and exhibitions, so if you're attending either the SPIE DCS exhibition in Baltimore (19th - 21st April) or the AIA Vision show in Boston (3rd - 5th May), make sure to grab a copy of the latest issue.

This year's big event is of course the Vision Show, the world's leading machine vision trade fair returning to Stuttgart (8th - 10th Nov). Our November issue will be distributed throughout the show, packed with dedicated coverage of the latest innovations being launched and the impact they have on industry.

Meet our editorial and sales teams at key industry events throughout the year and let us know about your latest innovations and how you see the vision industry.

Matthew Peach, Contributing Editor  
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## This Issue

MV cameras inspect head-up displays for aerospace industry

Nanolive unveils holographic tomographic microscope

25 make Startup Challenge 2016 semi-final list

Sorting intelligence makes the difference in effectively automating the logistics chain

Optical chip maker ColorChip raises \$25m for growth

Private equity owner sells CMOSIS for €220M

*plus the latest product launches and press releases from within the industry*

## Publication and Editorial Schedule 2016

### April/May Issue

- Bonus Distribution **Vision Boston, SPIE DCS/DSS**
- **Editorial Focus:** aerospace and defense applications, associated research and development
- Published in advance of DCS (*Defence & Commercial Sensing*), 19th – 21st April and VISION Boston, 3rd – 5th May

### August/September Issue

- Bonus Distribution: **SPIE Optics + Photonics, Photonex, UK**
- **Editorial Focus:** optical components, academic research, software applications
- Published in advance of Optics+Photonics, 30th – 1st Sept and Photonex, 12th- 13th Oct

### October/November Issue

- Bonus Distribution: **Vision, Stuttgart**
- **Editorial Focus:** machine vision applications, production line management and quality control, associated products and developments.
- Published in advance of VISION Stuttgart, 8th – 10th Nov

# MV cameras inspect head-up displays for aerospace industry

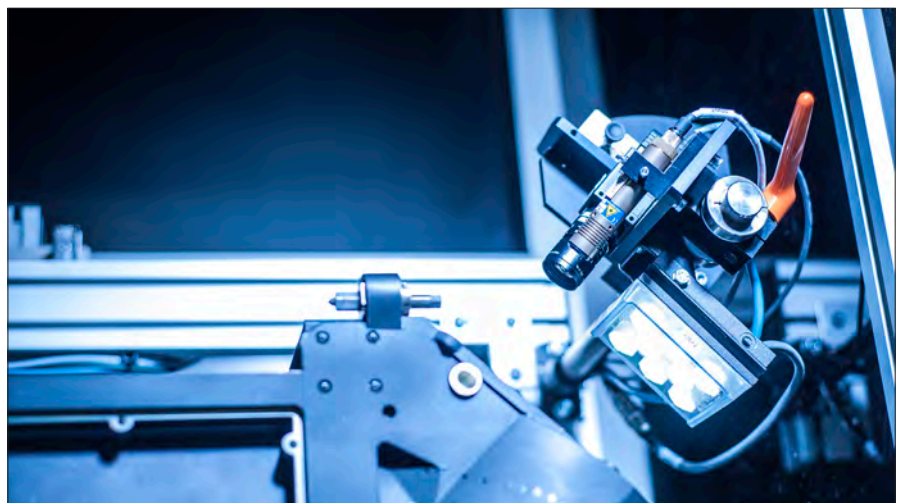
**A UK-based manufacturer of high-precision head up displays designed for fighter pilots turned to Industrial Vision Systems to ensure these valuable systems are built to exacting specifications.**

Head-up displays (HUDs) for the latest-generation jet fighters feature advanced optical components within precision-machined aluminum castings. At a leading UK manufacturer (whose identity is confidential), HUDs are manufactured and calibrated. An exhaustive final inspection is mandatory to ensure that all the assembly tasks have been completed before the unit is shipped to the customer.

To automate this final inspection process, Industrial Vision Systems (IVS), Oxfordshire, UK, ([www.industrialvision.co.uk](http://www.industrialvision.co.uk)) has developed a machine vision (MV) based system that eliminates any human error associated with this task. In developing the system, a major goal was to provide a standardized inspection that provides objective results with minimal operator input.

To develop the system, vision inspection tasks were split into two categories: simple surface level inspections such as the presence of various screws, bolts or covers and more intricate inspections that require precise lighting and camera setups to determine pass/fail criteria.

The challenge posed by the simpler inspections was not the difficulty of assessing the image against a pass/fail criterion, but the variety of inspections required for the six surfaces of the HUD



<Fig. 2> The HUD vision inspection system incorporates a gantry of cameras on a linear.

unit. The inspection process was divided into two parts. First, the operator places the HUD unit upside down into a "nest" to allow three of the faces to be inspected.

The vision system incorporates a gantry of cameras on a linear drive that moves in the z axis (Figure 2). The laser projection unit is mounted in-line with the camera to allow a single laser line to be projected into the machined holes. In addition white LED lighting arrays provide overall diffused lighting for surface inspection. The nest is mounted on two linear drives allowing it to travel in both the x and y axes.

Once the system has indexed around the inspection positions on the three

presented faces, the nest is returned to the front of the machine, and the operator repositions the HUD such that the MV system can inspect the upside positions before returning the HUD to the load/unload position.

The machine control and human machine interface (HMI) required the operator to adjust positions, configure new inspection areas and new nests for future variants without requiring access to the machine code. This design achieves a that displays key HUD data in a clear format during inspection while providing many diagnostic and configuration tools from secure management menus.

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# MV cameras inspect head-up displays for aerospace industry

## Complex tasks

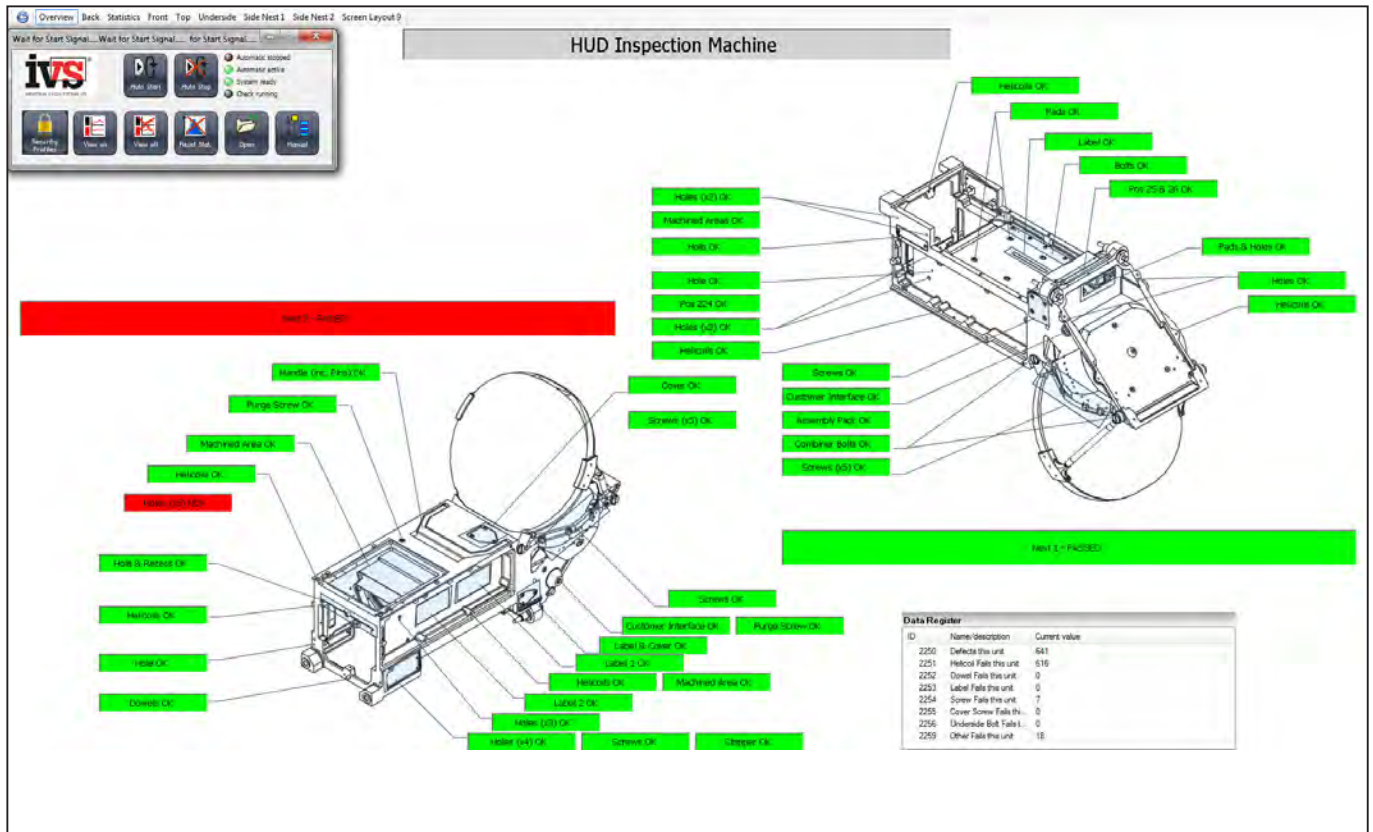
More complex inspections required on the HUD primarily comprise verifying that holes have helically wound coils of stainless steel ("helicoils") correctly

line is projected across the hole, is then used to search within a toroid shaped area for the presence of reflections from the helicoil surface. By using the position determined from the first image, this check can accurately account for any movement of the hole relative to the center of the image.

To inspect individual positions generally requires only a very small field of view, which is achieved with an IVS 1296 x 966 pixel CCD GigE camera with fixed field of view and focal distance. This approach

## Final results

Such a complex array of inspection positions and requirements presented a further challenge in terms of displaying the final results to the operator in a usable format. Individual results for each position were collated into a report format that is automatically printed once the inspection has completed. The system also presents the data on a monitor in graphical form for the operator to visualize which tests have passed and which have failed (Figure 4).



<Fig. 4> The MV system presents data on a monitor in graphical form for the operator to visualize.

inserted. To add complexity, the holes have a shoulder part-way down the bore above the helicoil so visual differentiation between the shoulder and helicoil is required.

To ensure the helicoils are in-place, inspection is performed by a combination of an IVS LED area light and an angled laser set-up (660nm, 20mW laser projector) to illuminate the surfaces perpendicular to the hole axis. An initial image is first captured by an IVS gigabit Ethernet camera and thresholding is used to locate the hole. Any small edge deviations created by any debris or swarf residing around the perimeter of the center of the hole are ignored.

A second image, captured as the laser

requires the system's programmable logic controller to precisely position the x, y and z axes to ensure the object of interest is located in the centre of the field of view.

The inspection of the HUDs also requires some imaging functions to be performed on larger objects. These include verifying that correct labels are applied and capturing an overview image, which is archived for future reference. This requirement is met using a pan-tilt-zoom camera capable of capturing images ranging in size from an overview of the 600mm-long unit down to a 70mm-wide area of interest. The IVS PTZ camera, the GigE cameras, structured lighting and precision laser lines are controlled by IVS proprietary software, a PC based MV application.

Due to the immense value of the HUD units and the fact that they are made to order, only two units were available to configure the machine. Following the installation, IVS and the manufacturer worked together to refine the vision program as production parts were run through the machine to take account of the natural variation in factors such as material finishes and colors. This was performed by remotely accessing the vision system by IVS engineers. Elimination of human error and subjectivity has led to a higher quality of parts leaving the factory and the ability to keep a visual archive of every product produced.

Matthew Peach, Contributing Editor

# Nanolive unveils holographic tomographic microscope

Swiss start-up launched 3D Cell Explorer kit at December's American Society for Cell Biology annual meeting.

**Swiss start-up Nanolive has launched what it claims to be the very first holographic tomographic microscope. Unveiled at the annual meeting of the influential American Society for Cell Biologists (ASCB), held in San Diego in late December, the equipment is said to produce super-resolution images of living cells without the need for any labeling.**



Photo: Matthew Peach.

Yann Cotte, co-founder of Nanolive, pictured at the Laser World of Photonics event in Munich in 2015.

"For the first time, scientists can now observe the inner workings of cells, including their nuclei and organelles," claimed Yann Cotte, CEO of the company, at last year's Laser World of Photonics event in Munich. Cotte co-founded the company in late 2013, picked up the Photonics Technology Award as part of the "Startup World" event at the trade show.

Called the "3D Cell Explorer", the kit is based around a blue-green diode laser emitting at 520nm whose output is split into sample and reference beams. Lisa Pollaro from the company, who demonstrated the equipment at the San Diego launch, said: "Nanolive's 3D Cell Explorer is a high-speed, high-resolution and non-invasive microscope that allows for real-time exploration of living cells, fixed cells and tissues, in 3D."

In contrast, most super-resolution microscopy techniques rely on liberal use of fluorescent labels and an intensity of illumination that is simply incompatible with living cells. On the other hand conventional digital holographic microscopy is able to

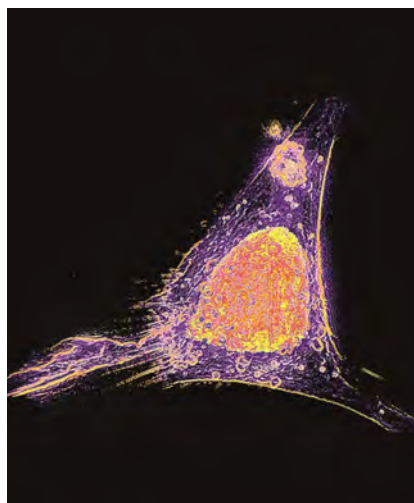


Image: Nanolive.

*A lymphatic endothelial cell, imaged with the 3D Cell Explorer.*

measure cell thicknesses in vitro but cannot generate a 3D reconstruction of a cell's internal structure.

Where the 3D Cell Explorer is different is that it detects changes to light as that light propagates through a cell, in other words mapping the distribution of the refractive index in both space and time.

Pollaro explains that, through a combination

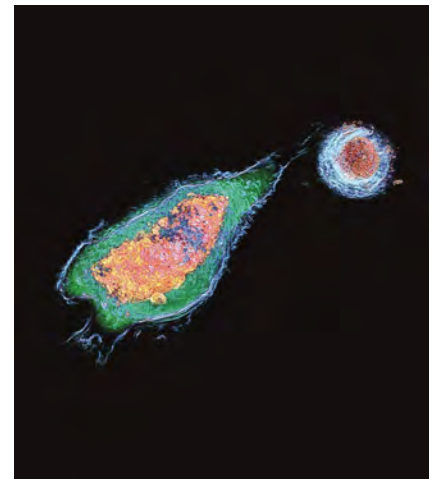


Image: Nanolive.

*A human T-cell.*

of holography and rotational scanning, the refractive index distribution within the cell is measured at each "voxel" (i.e. 3D pixel). The user can decide which parts of the cell to visualize by digitally "staining" them in contrasting colors - without interfering with the cell's normal physiology.

Samples are illuminated by one arm of the laser beam at an angle of 45 degrees, which maximizes the cone of light that the microscope objective can collect.

The imager then records a hologram by combining the reference and sample beams, before the latter is rotated by a small angle, the process is repeated and a hologram recorded at the next beam position. "The holograms are raw data which are incomprehensible for the user, [but] Nanolive's processing technique, based on complex deconvolution, treats these data and displays a comprehensible cell image in gray-scale every two seconds," Pollaro says, adding that the system can correct for imaging errors that otherwise would require expensive optical components and ultra-precise alignment.

Although Nanolive is clearly targeting cell biology researchers in the first instance, Pollaro says that the company wants the technology to reach well beyond university laboratories, and has already received orders from industrial customers. "Our aim is to target cosmetic, medical technology

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## Nanolive unveils holographic tomographic microscope

and pharmaceutical industries all around the world, as well as medical doctors and hospitals for faster diagnosis and education in schools at all levels," she told Vision Focus.

Nanolive does not expect its holographic imager to usurp other forms of microscopy, however. "We do not want to replace any of the existing techniques, our product is complementary," Pollaro said. "It offers new information and insights about a cell's structure, which complete and enrich significantly the information acquired with traditional microscopes - and which cannot be obtained with any other existing technology."

Reflecting on what appears to have been a highly successful launch event, she added: "[ASCB] was awesome, a dream come true. It is the biggest cell biology meeting in the world and every year thousands of cell biology researchers from all around the world [attend]."

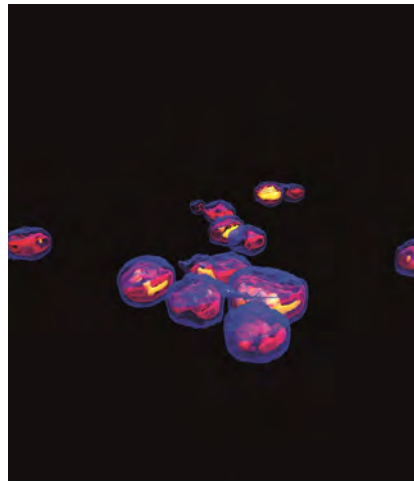


Image: Nanolive.

Living, growing yeast cells, as imaged with the holographic 3D Cell Explorer equipment.

Nanolive had also attended the 2014 conference, but this was the first time the company arrived with its own hardware. "This year we decided to have our official product launch over there and we were proven right," Pollaro said. "People were just amazed by the 3D Cell Explorer. We were overwhelmed by hundreds of biologists visiting our booth and trying [it out] for themselves."

With the official launch taking place on the final night of the conference, two hours after the exhibit hall had already closed, she

was understandably fearful about exactly who might show up. But those fears were unfounded. "We held our keynote lecture in a 50-person room and I could tell that the attendance was at least double that, with standing-room only," said Pollaro, adding that a couple of sales were even sealed on the spot. Since then it appears that orders have continued to flood in "We already got more than sixty orders from all around the world and new orders keep on coming in every day."

Founded in November 2013, Nanolive had completed its initial round of funding as soon as early 2014, yielding enough cash to develop the 3D Cell Explorer and begin production. With the equipment proving popular, Pollaro says that another round of funding to support a production ramp and marketing may happen, although that is yet to be decided.

At the moment, the 12-person team has no plans to grow dramatically - but if the reaction at ASCB is anything to go by, this is one start-up that looks set to go places.

Mike Hatcher, Contributing Editor

**SPIE.**

**the bigger picture**  
Photonics West Show Daily 2017

**PHOTONICS WEST SHOW DAILY**

Chemistry Nobel wins BIOS crowd

Anywhere light goes

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**Photonics West Show Daily** is the official daily newspaper for Photonics West, the influential conference and exhibition for optoelectronics, photonics, microfabrication, lasers and biomedical optics.

It's filled with compelling, up-to-date content and insight that your customers will be reading as the event unfolds.

By positioning your company and products alongside such informed editorial, you will be guaranteeing you receive the visibility you deserve.

To stand out at Photonics West 2017 contact Rob Fisher.

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The winner's parade from last year's SPIE Startup Challenge contest: (l-r) Jeffrey Crosby (Picoyune) 3rd Place, Mike Miekle (Trumpf) Judge, Balthasar Fischer (Xarion Laser Acoustics) 2nd Place, Jason Eichenholz (Open Photonics) Judge, Supriya Jaiswal (Hamamatsu) Judge, Marc Himel (Jenoptik Optical) Judge, and winner Jonathan Gunn (Briteseed). Photo: Matthew Peach.

## 25 make Startup Challenge 2016 semi-final list

Improved contact lenses, a 'marijuana breathalyzer' and a camera no larger than a grain of sand are among the technologies vying for a share of \$25,000 at Photonics West event.

**Organizers of the increasingly popular SPIE Startup Challenge event held at Photonics West have short-listed 25 entries for this year's prizes.**

The semi-final line-up, which includes a seasoned optics and photonics executive alongside novice entrepreneurs from Europe, Asia and North America, again features a large number of biomedical applications.

Among those technologies and applications are a "marijuana breathalyzer" based on Raman spectroscopy, an optoacoustic monitor for newborn babies, contact lenses that correct for presbyopia, and a variety of wearable devices to measure heart rhythm, pulse rates and hemoglobin levels.

### Freeform optics headset

Outside the realm of biomedicine there are new ideas for manufacturing silicon nanowire arrays, a lightweight virtual reality headset based on freeform optics, tiny cameras said to be no larger than a grain of sand, and an optical module that is able to convert standard microscopes into holographic imagers.

Intriguingly, one of the entrepreneurs pitching for the \$10,000 first prize is Michael Cumbo from the flow cytometry specialist Eta Diagnostics. Previously the president of IDEX Corporation's optics and photonics divisions – still widely known by the CVI and Melles Griot brand names – Cumbo's new venture is looking to develop a massively parallel version of the analytical equipment for rapid, early detection of cancer cells.

After hearing all the semi-finalists pitch on February 16, the Startup Challenge judging panel will select six finalists. The final, which is open to all Photonics West attendees, will take place the following day, with the top three pitches all winning a cash prize.

The prizes, including \$10,000 for first place, \$5,000 for second, and \$2,500 for third, are funded by founding partner Jenoptik. Additional support comes from lead sponsors Axsun Technologies and the National Science Foundation (NSF), and supporting sponsors Edmund Optics, Trumpf, Open Photonics, and Knobbe Martens. Edmund Optics also will award the first-place winner \$5,000 in products.

### The full run-down of semi-finalists is:

- **3D nanoscale imaging** (Leslie Kimerling, **Double Helix LLC**): imaging at the single-molecule level inside the individual cell
- **Advanced Silicon Group** (Fatima Toor, Advanced Silicon Group Electrical and Computer Engineering Department, University of Iowa): low-cost technology to manufacture silicon nanowire arrays in a controllable process, with applications in next-generation solar PV, biosensors, batteries, and more
- **Bold Biometrix, LLC** (Kyle Miller, Northwestern University Center for Device Development/ Bold Biometrix, LLC): monitoring patches to help patients and their physicians understand their true blood pressure by recording trends over a seven-day period
- **Circulating tumor cell diagnostics** (Eric Strohm, **Echofos Medical**): a diagnostic instrument that uses sound waves to listen for the presence of cancer cells in a patient's blood sample
- **ColorSpritz** (Timothy Jones): "part art, part science, totally cool."
- **Diagnostic anSERS, Inc.** (Sean Virgile): a "marijuana breathalyzer" to answer the question, "How high is the suspect right now?"
- **Disease Diagnostic Group** (John Lewandowski): "What if we told you we could save one million lives every year with just refrigerator magnets and a laser pointer?"
- **Eta Diagnostics, Inc.** (Michael Cumbo): massively parallel flow cytometry for fast, efficient analysis of rare biological cells and particles

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## 25 make Startup Challenge 2016 semi-final list

- Extended depth of focus contact lens (Juan Rodriguez): a presbyopia prescription that allows focus from far (infinity) to close (reading) and in-between
- **FabriXense** (Zeev Zalevsky): smart clothing providing active, continuous measure of biomedical parameters such as heartbeat rhythm, breathing and blood pressure without the need of having tight contact

between the fabric and the body of the wearer

- **Guaks**: virtual reality you can wear (Carmen Lastres, Limbak): a 1/2 weight and volume VR headset keeping all performance features, with freeform optical system as key enabling technology
- Holographic module for microscopes (Paolo Pozzi, **Holobe s.r.l.**): patented technology allowing conversion of standard microscopes in cutting-edge multiphoton spatial light modulation microscopes, with a simple, plug-and-play device
- Leverage the Future of Electronics (Supriya Jaiswal, Astrileux Corporation): revolutionary advanced optical technologies that enable

high-volume manufacturing of next-generation integrated circuit chips at 14 nm and smaller at significantly less cost

- **Multicore Photonics, Inc.** (Darren Engle): drawing together cyber-physical systems, the Internet of Things, and the Internet of Services to monitor physical processes, communicating and cooperating with each other and with humans in real time
- Optoacoustic Patient Monitoring (Graham Randall, **Noninvasix**): using light and sound for the safe, accurate and noninvasive monitoring of fetal welfare during labor and delivery
- Patented Neural Stem Cells Harvest (N. P. Lui, **OPER Technology Limited**): innovative neurodegenerative disease therapy, able to safely and specifically harvest neural stem cells from the brain of a live subject by strategically designed magnetic nanoparticles, allowing repeated neural stem cell extraction from the same live subject without raising ethical issues nor threatening life
- **PixelEXX Systems, Inc.** (Renee Carder): cameras the size of a grain of sand with 62% more pixels to capture the critical details
- Reflective displays for wearables (Peiman Hosseini, **Bodle Technologies**): ultrahigh-resolution, colorful, flexible reflective displays for wearables
- **Rubitection** (Sanna Gaspard): a low-cost optical diagnostic tool for hospitals, long-term care facilities, and home-care agencies
- **Solchroma Technologies, Inc.** (Roger Diebold): electroactive polymer-driven displays for sunlight-readable, large-area digital signage
- **TheWhollySee** (Dan Yanson): a system for marking and remote identification of multiple objects and people with high position accuracy in real time
- **Think Biosolution** (Shourjya Sanyal): mobile application PulseR allows users to take a video of the face using the smartphone camera to visualize blood flow in real time as well as measure heart rate and respiratory rate; Android application QuasaR allows users to measure their heart rate, respiratory rate, blood-oxygen level, and blood hemoglobin content using an armband
- **Vibronix, Inc.** (Pu Wang): MarginPAT system is a photoacoustic/ultrasound tomography system that can provide highly sensitive intraoperative margin assessment during lumpectomy within 5 minutes
- Wearable Vital Sign Monitor (Jyh-Chern Chen, **Taiwan Biophotonic Corporation**): finger-free wrist-worn pulse oximeter that measures pulse rate and blood oxygen with a micro-structured reflective optical sensor

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# First Light imaging finalist at Prism Awards 2016

**First Light Imaging is one of the finalists of the Prism Awards 2016 contest, with its scientific camera C-RED One.**

Meyreuil (FR), January 11th, 2016 – First Light Imaging is one of the 3 finalists of the famous Prism Awards for Photonics Innovation, in the “Cameras & Imaging” category, with C-RED One, the world’s fastest low noise scientific infrared camera.

Organized since 2008 by SPIE with the sponsorship of Photonics Media, this leading international competition rewards every year the best photonics technological innovations, during the Photonics West exhibition in San Francisco, California.

The nomination of C-RED One which will be commercialized next summer, among the 3 best photonics products of the “Cameras & Imaging” market for 2016, is an honor for the French start-up, and a recognition for the French R&D on an international market.

David Boutolleau, CEO of First Light Imaging, said: “we are really honored to be one of the finalists of this famous contest, and particularly proud that our products

make a difference on this constantly evolving photonics market”.

The winners, selected by a panel of leading industry experts, venture capitalists, luminaries and visionaries, will be announced during the Prism Awards ceremony on February 17th, 2016.

First Light Imaging will be at Photonics West, with the support of Optitec and Business France, on the French Pavilion, Booth 1123B, February 16th to 18th 2016, at the Moscone Center, San Francisco, USA.

For more information:  
[www.photonicsprismaward.com](http://www.photonicsprismaward.com)  
<http://spie.org/conferences-and-exhibitions/photonics-west>

Start-up created in 2011, emanating from public research laboratories[1], First Light Imaging designs and manufactures high-technology scientific cameras. The company has already been funded twice by the Ministry of Higher Education and Research and the Public Investment Bank (BPI) in France.



First Light Imaging is also laureate of the Horizon 2020[2] SME Instrument program from the European Commission.

Its flagship product, OCAM<sup>2</sup>, is the world’s fastest and most sensitive camera for visible wavelengths.

OCAM<sup>2</sup> is already chosen by the world’s biggest telescopes such as the Subaru Telescope in Hawaii or GranTeCan in Spain. First Light Imaging also brings its expertise to the NASA spatial agency.

## First Light Imaging

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# FLIR Increases Sensitivity of Optical Gas Imaging Cameras

**High Sensitivity Mode (HSM) is a technological innovation developed by FLIR Systems to enhance the leak detection performance of their GF-Series optical gas imaging cameras.**

FLIR’s proprietary High Sensitivity Mode is based upon an image subtraction video processing technique that effectively enhances the thermal sensitivity of the camera. The HSM feature subtracts a percentage of individual pixel signals from frames in the video stream from the subsequent frames, thus enhancing the differences between frames, which make leaks stand out more clearly in the resulting images. Using the high sensitivity mode even the smallest of gas leaks can be spotted using a FLIR GF Series optical gas imaging (OGI) camera.

FLIR GF Series OGI camera’s offer quick, non-contact measurement of gas leaks in real time. Where many other measuring instruments only present users with a number, GF Series OGI cameras present visual information, making the leak detection process more intuitive. Optical

gas imaging cameras can also be used in hard-to-access locations, since they can detect small leaks from a distance. Unlike restricted point measurement provided by ‘gas sniffers’ a GF Series OGI camera allows you to detect gas leakage anywhere within the field of view of the camera. This speeds up the process of inspection for gas leaks considerably.

For further information please visit [www.flir.co.uk/cs/display/?id=55758](http://www.flir.co.uk/cs/display/?id=55758) or contact FLIR Systems on +32-3665-5100 or [gasimaging@flir.com](mailto:gasimaging@flir.com).

FLIR Systems, Inc. is a world leader in the design, manufacture, and marketing of sensor systems that enhance perception and awareness. FLIR’s advanced thermal imaging and threat detection systems are used for a wide variety of imaging, thermography, and security applications, including airborne and ground-based surveillance, condition monitoring, research and development, manufacturing process control, search and rescue, drug interdiction, navigation, transportation safety, border and maritime patrol, environmental monitoring,



and chemical, biological, radiological, nuclear, and explosives (CBRNE) detection. For more information, go to FLIR’s web site at [www.FLIR.com](http://www.FLIR.com)

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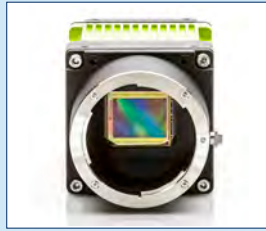
**JAI A/S**

**JAI introduces the world's fastest 12 megapixel camera**

JAI has expanded its Spark Series of high performance industrial area scan cameras with SP-12000M-CXP4 (monochrome) and SP-12000C-CXP4 (color). Both camera models are based on the CMOSIS 12-megapixel sensor (CMV12000) featuring 189 FPS and global shutter technology. Applications include machine vision, sports/entertainment and traffic/outdoor.

- 12 megapixel resolution
- CMOS global shutter
- 4096 x 3072 pixels
- 189 frames/s
- 5.5 µm square pixels
- CoaXPress (4-connector) and GigE Vision interface

**Read more on:** <http://www.jai.com/en/newsevents/news/new-spark-sp-12000-cxp4-machine-vision-camera-with-coaxpress-interface>



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**Critical Link**

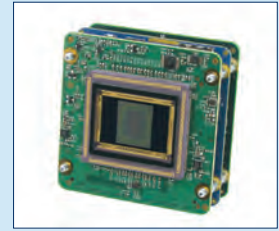
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We offer board-sets and enclosed configurations for easier integration.



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- Container inspection (*Cans, bottles, etc.*)
- Extrusion inspection



**Contact Details**

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A Caspian Microscopy Development kit is now available, including X2, X3, X5 extension rings, power supply and an Auto Focus Microscope module.



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**FISBA OPTIK AG**

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**View now:**  
[www.ptgrey.com/chameleon3](http://www.ptgrey.com/chameleon3)



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# Sorting intelligence makes the difference in effectively automating the logistics chain

**In intralogistics, e-commerce and returns management, automating standard sorting tasks and checking the machine capability of items are important criteria for improving system availability. Increasing the speed of the system, and therefore achieving a higher throughput, makes systems more efficient and cost-effective – an urgently needed advantage in an extremely competitive market. FRAMOS Imaging Systems offers a range of plug-and-play imaging sensor solutions and adaptable identification technologies for automating logistics functions. Marketed under the name of “Sorting Intelligence”, they can be seamlessly integrated into both new and existing systems.**

Sorting intelligence technologies can be used in a wide range of different ways to automate the logistics chain. Optimising freight costs for e-commerce retailers, using machines for sorting accuracy in empty goods logistics, ensuring the machine capability of parcels before they reach package openers in returns management and checking curvature to ensure shuttle compatibility in shuttle warehouse systems are just some of the challenges that the FRAMOS sorting intelligence technology can help to overcome. “As a technology that is used across a variety of industries, imaging offers sorter manufacturers, OEMs, suppliers of material handling solutions and system integrators in the logistics industry an intelligent way of automating and controlling their systems,” says Dr. Simon Che’Rose, Director of FRAMOS Imaging Systems. “This can lead to simplified processes for end customers in industry, effective system utilisation with reduced downtimes and improved cost and resource efficiency.”

When performing standard sorting tasks, the sorters in logistics facilities need clear sorting criteria in order to correctly classify the items. Imaging specialist FRAMOS offers support in this area with its extensive expertise in designing algorithms and many years of project experience. Rules-based or learning algorithms are used, depending on the specific application and the nature of the sorted goods. A rules-based process is an appropriate solution if the products can be clearly differentiated and separated. A learning sorting algorithm is a better option when clear and constant basic criteria such as shape or size are not sufficient to ensure reliable classification. Higher-level variations, such as traces of use, damage, label residues or colour deviations require enhanced criteria definitions that have the ability to learn in order to ensure consistent, error-free sorting.

Dr Simon Che’Rose describes the typical course of a project: “As a technology partner, we take the customer’s individual needs into account and work with them to create a catalogue of criteria for the project. On this basis, we then develop an appropriate sensor system, including the necessary software, that transmits the required results to the controller for the subsequent stages of the process. Control



systems can take several forms, including light barriers, 2D or 3D camera systems and laser scanners combined with code readers and weighing scales, depending on the application in question and the needs of the customer. Our systems fit seamlessly into automation processes in new and existing logistics systems alike and are characterised by their long MTBF. The services we offer also include flexible and efficient communication with ERP and WMS systems, as well as material flow computers and a direct connection to conveyor and PLC systems.”

For OEMs and system integrators, the benefits lie in the outsourced development and the added value for the customer as a result of the industry partners’ expanded

service portfolio. As an expert in imaging and sensors, FRAMOS can also supply the required system intelligence. With years of applications experience, we help our partners to create smart logistics solutions which are intelligent and easy to use and which, because of their low level of complexity, can be integrated easily and with very little risk.

## Example: Optimising freight costs

The aim was to improve the shipping costs for an e-commerce retailer. After the picking process, the FRAMOS VLG dimension measurement system automatically classifies the outgoing packages according to size and weight. The data collected is used to select the

best shipping partner and the correct label is applied using label applicators. A downstream sorter allocates the packages to the correct consigner deliveries. The savings in shipping costs ensure a quick return on investment for the sorting intelligence system.

## Example: Empty goods logistics

In foodstuffs logistics, fresh goods are usually transported in reusable containers, although each supplier will prefer different types of container. The solutions from FRAMOS use image recognition and self-learning algorithms to automate the

*continued on next page*

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## Sorting intelligence makes the difference in effectively automating the logistics chain

processing of these containers. When the fresh goods are delivered, the container types are automatically recognised so that they can be appropriately separated and stored. After the supermarkets return the containers to the empty goods centre, they are organised into groups of a single type, before they either move on to the washer or are returned to the corresponding supplier.

### Example: Bulge check for shuttle warehouse

Unwanted variations (such as bulges) in the shape of transported objects can quickly become a problem for many shuttles in automated warehouses. If the permitted tolerances are exceeded, the shuttle system stops and the warehouse comes to a standstill. To prevent costly

downtime and maintenance, a curvature measurement is conducted beforehand using sorting intelligence technology. This allows items that are not compatible with the shuttle to be removed and ensures maximum system availability.

### Example: Machine capability in returns management

Most e-commerce retailers have to deal with very high levels of returns. This process needs to be designed as efficiently as possible in order to keep the associated costs down. The use of automated package openers is one potential option here. In the pre-sorting phase, a system of sensors based on sorting intelligence technology decides whether the package in question can be processed by the machine or needs to be opened manually due to its nature.

### About FRAMOS:

"Teaching machines to see" is what drives us. For FRAMOS, image processing is not just a technical discipline, but a fascination, the future and our mission

all at the same time. Since 1981 FRAMOS is a leading technology provider in industrial, scientific and medical image processing. Headquartered in Munich and with 4 subsidiaries worldwide we enable manufacturers, system integrators and researchers to benefit from imaging technologies. Our team of approximately 85 associates offers a fully comprehensive portfolio of imaging components, technical consulting and support. Thanks to many years of experience in the industry, we offer engineering services for custom camera development as well as complete turn-key-solutions. We are proud of our participation in a revolutionary technology. The spirit of innovation and development of our early days has remained at the heart of our company.  
**www.framos.com**

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## Machine Vision Laser Modules for process and quality control

LASER COMPONENTS' Flexpoint® Machine Vision laser modules are continually being adopted by engineering companies to produce 3D images and models of their components for quality control purposes such as process improvement and automatic defect analysis.

Used in conjunction with a camera system, the Flexpoint® Machine Vision laser series can increase production throughput as well as decrease repair times and quality defects by providing the user on-the-fly metrology data which can also be saved for future reference and use.

Our wide variety of modules is expanding, with the newest addition

being microcontrollers; providing the user complete operating flexibility when specifying parameters such as optical power and modulation frequency. This handy feature also provides parameters such as module power consumption and temperature data.

The Flexpoint® MV series is available from 405-905nm, including 450nm, 520nm, 532nm, and 785nm, and with optical powers up to 100mW (wavelength dependant).

Multiple options can be included such as analogue or digital modulation, manual potentiometer power control, and custom housing sizes.



### Laser Components (UK) Ltd

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## Active Silicon launches a new Camera Link Frame Grabber

Active Silicon with its broad range of CoaXPress and Camera Link frame grabbers is the universal partner for virtually any demanding machine vision application. The latest addition to the state-of-the-art FireBird series is the high performance and cost-effective Camera Link frame grabber FireBird 1xCLD-2PE4.

This new FireBird Camera Link Deca1 board conforms to the latest version 2.0 Camera Link specification, including both 80 bit modes: 8 bit 10-tap and 10 bit 8-tap modes – often referred to as Camera Link “Deca”, at clock rates up to 85 MHz. The Gen2 x4 PCIe bus can sustain a 1.7Gbytes/s throughput and is fast enough to cope with the full data rate that the Camera Link Deca interface can support. The FireBird also supports capture from two simultaneous Base Camera Link cameras, as well as single Base, Medium and Full configurations. Power over Camera Link (PoCL) is provided.

Designed for ultimate performance the FireBird uses Active Silicon's proprietary

DMA Engine technology, “ActiveDMA”. This technical innovation applies RISC based processor techniques and guarantees zero CPU intervention, high speed and very low latency image data transfers.

All Active Silicon acquisition solutions are provided with an easy to use, comprehensive Software Development Kit which allows integrators to develop applications quickly and effectively, together with a range of third-party software drivers for packages such as Cognex VisionPro, Common Vision Blox, StreamPix, LabVIEW etc.

Drawing on Active Silicon's expertise in multi-operating systems, FireBird, including this frame grabber, is supported under Linux, Mac OS X, and QNX, as well as Windows 32 bit and 64 bit.

FireBird also supports GenICam, making this frame grabber compatible with all Camera Link cameras that support CLProtocol, including those using GenCP. A GenTL Producer is provided as part of the FireBird driver installation.



Customers always have direct access to Active Silicon's technical staff for systems advice, consultancy and integration work to ensure a successful completion of end-user applications.

For more information [click here](#).

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# Optical chip maker ColorChip raises \$25m for growth

**Developer of "SystemOnGlass" transceivers, receives funding lead by IGP. Vintage, Gemini Israel Funds, and BRM Group also investing.**

**ColorChip, which produces dense, "hyper-scale" optical transceivers and advanced optical splitters, has raised a further \$25 million in growth-funding to scale up manufacture of its products for communications and data centres.**

with production expected to increase 15 times in the next 24 months. We are already serving top-tier customers in the US and China, and this new funding will support our efforts to scale further and meet the accelerating demands of the market."

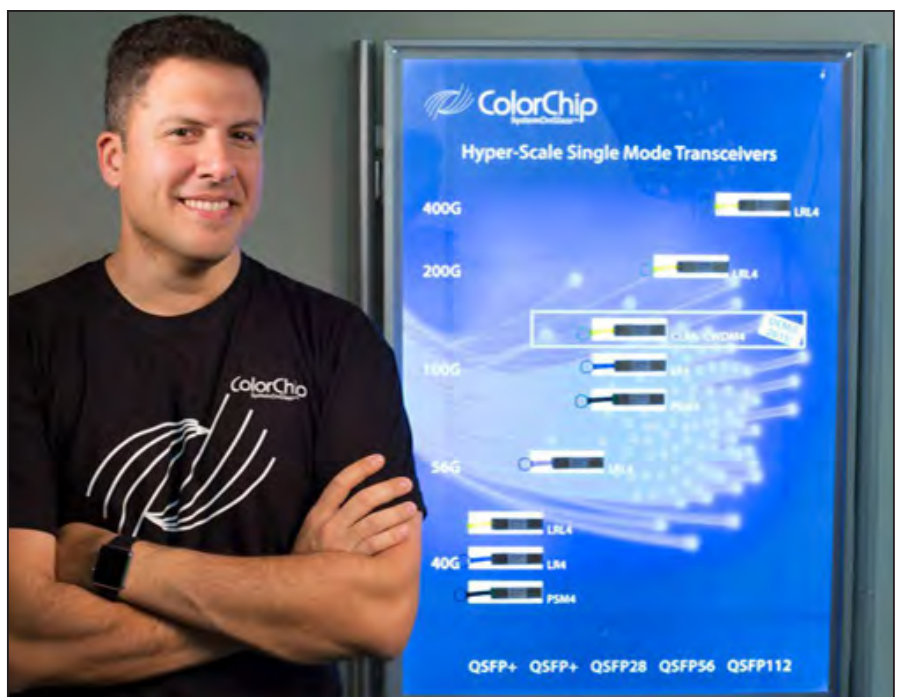


*Colorchip: Aiming to solve the growing bandwidth demands of the web.*

The company says that with Internet services becoming more data intensive due to streaming HD video, cloud computing and IoT devices, there is a growing need for new technologies to help data-centers manage all of the exponentially growing traffic: "ColorChip's innovative optical communication solutions are well positioned to help solve the growing bandwidth demand of the web.

The funding round was led by Israel Growth Partners, a technology-focused growth equity fund with participation from Vintage Investment Partners, and existing investors Gemini Israeli Ventures and BRM Group. IGP General Partner Haim Shani will be joining the ColorChip Board of Directors. To date, the company has raised \$60 million with Gemini and BRM leading the previous rounds.

Yigal Ezra, ColorChip CEO, said "The company is currently in high-growth mode,



*Colorchip CEO Yigal Ezra: "currently in high-growth mode".*

## Semiconductor techniques

ColorChip has developed its SystemOnGlass technology, a hybrid optical integrated circuit. ColorChip uses glass wafers to industrialize its optical devices, allowing for cost effective, rapid, and highly scalable production.

This approach allows the company to bring efficiencies commonly only seen in semiconductor fabrication to the world of optical communications. The company is also vertically integrated and manufactures its core technology in its wholly owned fab in Israel, which utilizes the company's unique IP and is a critical component of its core technology.

Haim Shani, Co-Founder and General Partner at IGP, said, "We believe that ColorChip's unique inter-disciplinary optical and networking technology addresses a major pain in an industry that is experiencing exploding bandwidth and speed demands and is looking for breakthrough innovations. IGP believes that ColorChip's technology provides a unique opportunity to better serve the growing demands of the Datacom market and this round will enable the company to scale its operations to meet those demands."

<http://optics.org/news/6/11/40>

Sponsored Editorial

# Linear Variable Bandpass Filters for Hyperspectral Imaging

**Hørsholm, Denmark, January 21st 2016 - Delta Optical Thin Film A/S announces the launch of several Linear Variable Bandpass Filters that are specifically designed for Hyperspectral Imaging.**

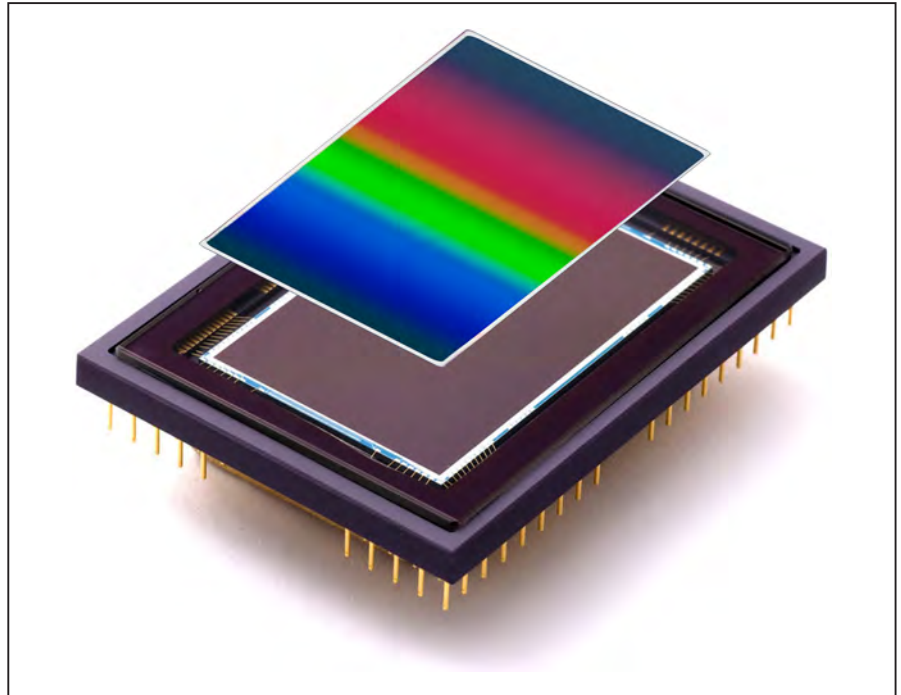
Hyperspectral imaging (HSI) has been used for a couple of decades in applications such as satellite imaging, air reconnaissance and other not overly price sensitive markets. Classical Hyperspectral imaging cameras use prisms or grating as dispersive elements. These cameras are bulky, sensitive to misalignment and very expensive. The advent of alternative approaches makes HSI attractive for volume markets or even consumer products, for example cancer detection, precision farming, food testing in supermarkets and many more.

Delta Optical Thin Film A/S develops and manufactures custom Linear Variable Bandpass Filters (LVBPF) for mid-size and full-frame CCD/CMOS sensors (e.g. 25mm x 25mm or 24mm x 36mm). These filters offer very high transmission and are fully blocked in the light sensitive wavelength range of silicon-based detectors (200nm to 1150nm). The combination of LVBPFs with silicon detectors allows the design of very compact, robust and affordable HSI detectors that offer several advantages and benefits over conventional approaches:

- Huge aperture compared to grating and prism
- Higher transmission than grating and prism
- Short measurement time
- High suppression of stray light
- Excellent signal to noise ratio

Delta Optical Thin Film A/S welcomes requests for custom designed Linear Variable Bandpass Filters. Available for immediate testing are filters with the following specifications:

- Centre wavelength range 450nm to 880nm, bandwidth approximately 2% of centre wavelength, transmission 60% to 90%, blocking range 200 nm to 1150nm, blocking level OD4, size 24mm x 36mm
- Centre wavelength range 450nm to 850nm, bandwidth approximately 4% of centre wavelength, transmission 70% to



90%, blocking range 200nm to 1100nm, blocking level OD4, size 25mm x 25mm

- Centre wavelength range 800nm to 1000nm, bandwidth approximately 0.6% of centre wavelength, transmission >70%, blocking range 200nm to 1200nm, blocking level OD4, size 19mm x 8mm
- Centre wavelength range 800nm to 1000nm, bandwidth approximately 1% of centre wavelength, transmission >70%, blocking range 200nm to 1200nm, blocking level OD4, size 19mm x 8mm

The sizes are given as height x length, where height is perpendicular to the wavelength gradient and length is along the wavelength gradient. The filters can be diced to smaller sizes.

## About Delta Optical Thin Film A/S

Delta Optical Thin Film A/S ([www.deltaopticalthinfilm.com](http://www.deltaopticalthinfilm.com)) is the leading supplier of advanced, high performance linear variable filters commonly used in a variety of biomedical imaging applications including fluorescence microscopy, flow cytometry, monochromators and micro-plate readers among others.

Delta Optical Thin Film A/S also provides single, multiband, laserline and broadband band pass filters; long pass filters; short pass filters; notch filters; dichroic and polarizing beam splitters along with other custom coated optical components.

Delta Optical Thin Film A/S offers a wide range of high efficiency durable ultra-hard coated filters that have set the standard for high performance and precise operation. With its unique design tools and decades of experience, Delta is able to provide highly competitive standard filters and customized filters and optical components tailored to customers' specific applications.

### Trade shows:

Photonics West 2016 – booth #1148  
SPE Bios – booth #8737

### Contact Information



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# Private equity owner sells CMOSIS for €220M

**TA Associates sells maker of CMOS imaging technology to the Austrian sensor company ams.**

**The Austrian manufacturer of high-performance sensors ams has agreed to acquire optical imaging specialist CMOSIS for €220 million.**

The all-cash deal will see CMOSIS transfer out of private equity ownership, almost exactly two years after the Antwerp, Belgium, company was bought by TA Associates.

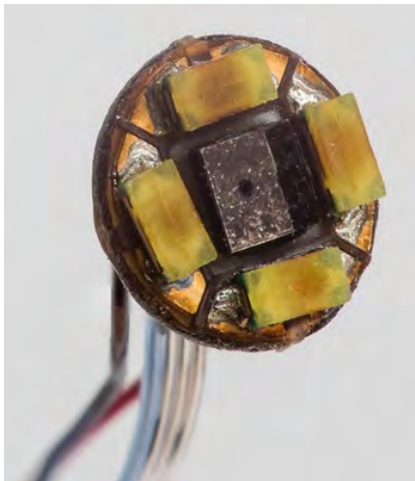


Photo: AWAIBA/CMOSIS.

*The tiny NanEye from AWAIBA, the Portuguese imaging technology firm acquired by CMOSIS last year. AWAIBA has since moved its base to Germany, and will become part of the Austrian company ams following the latter's decision to buy CMOSIS from current owner TA Associates.*

ams says that CMOSIS, whose technology originated at the IMEC microelectronics research center, will add sales of around €60 million to its annual revenues - which currently stand at around €600 million.

Listed on the Swiss stock market but headquartered near the Austrian city Graz, ams describes itself as the "worldwide leader in intelligent integrated light sensors" and runs a center of excellence in optical sensors out of Plano, Texas.

CMOSIS will add expertise in both standard and customized high-performance area and line-scan CMOS image sensors for demanding applications.

## Diverse markets

Those sensors are said to serve a broad range of high-end applications across markets like machine vision, medical, broadcast, traffic, scientific and photographic imaging. For

example, CMOSIS' line of miniature 'NanEye' camera modules (see image, above, and video, below) is targeted at endoscopy-like applications, and recently won the German Innovation Award for Non-Clinical Intensive Care.

Set to be completed around the end of 2015 the deal will also see more than 110 CMOSIS employees transfer to ams - swelling the Austrian firm's staff ranks to around 1700.

ams CEO Kirk Laney said: "Acquiring CMOSIS is a highly complementary expansion of our sensor portfolio and another major step in executing our sensor solutions growth strategy. This transaction extends our market leadership in optical sensors and will strengthen our position as the leading pure-play sensor solutions provider for growth markets including Industry 4.0, the Internet of Things, and medical diagnostics."

He added: "Integrating cameras with advanced optical sensors will drive new sensor solutions across vertical markets and accelerate our growth plans as we combine CMOSIS' leading-edge intellectual property and design capabilities with our manufacturing competence and optical sensor strengths."

## Fabless model

Unlike ams, CMOSIS operates a 'fabless' business model, meaning that it uses third-party foundry companies to manufacture its own sensor designs. That complements ams, which is one of a number of high-tech

companies currently looking to expand its operations in upstate New York.

It is renting a new wafer fabrication facility that is being custom-built by state authorities. Fab construction is said to be on track, with a production ramp expected in early 2018.

Since being founded by former employees of the imec spin-out FillFactory back in 2007, CMOSIS grew quickly before the TA Associates deal in late 2013. Last year it grew again with the acquisition of Portugal-based AWAIBA, which had developed high-speed optical sensors boasting a very high dynamic range - ideal for applications like crash-tests and surveillance.

## Challenging applications

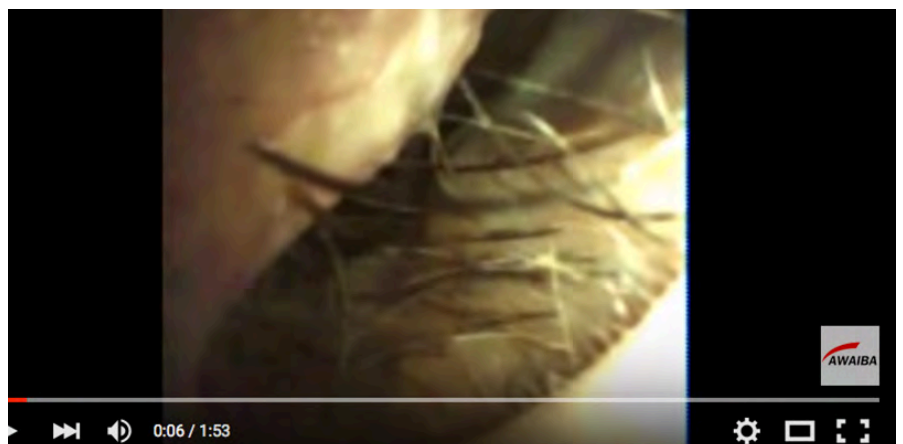
ams, which made a net profit of €34 million on sales of €153 million in its latest financial quarter, says that CMOSIS' operations are even more profitable than that.

The Austrian firm adds that it will be able to fund the acquisition with existing cash and available credit lines, with no need for any additional finance. The deal should then close within six weeks - assuming that the relevant regulatory approvals are received.

Luc de Mey, CEO of CMOSIS, said of the agreement: "CMOSIS has built a leading position in some of the most challenging imaging applications based on our deep technology expertise in CMOS area and line scan image sensors.

"Our team is at the forefront of global shutter technology for high-end imaging [with] more than 15 years of experience in this field. We are excited to join ams, creating a leader in advanced imaging solutions. We will leverage ams' technical and operational expertise and profit from the global access to potential new customers to realize our full growth potential!"

<http://optics.org/news/6/11/33>



AWAIBA video: endoscopy with NanEye: <https://www.youtube.com/watch?v=8wGvp0VwbGw>

# A growing need

Understanding how plants use water is the key to maximizing crop yields. LemnaTec is leading the way with Scanalyzer<sup>3D</sup>—an advanced system that requires the digital imaging expertise of Allied Vision to span the visible to infrared spectrum.



Read the full story:  
➔ [AlliedVision.com/Growing](https://www.alliedvision.com/Growing)



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