

# UKIVA news

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The International Centre, Telford  
UKIVA will be running **FREE** seminars at  
the event on 3-4 November 2010

## 'Aspects of Imaging'

### Product-orientated presentations including:

- New camera technologies that solve real world problems
- Time Delay Integration (TDI), the answer to demands for increasing frame rate/sensitivity

### An introduction to machine vision:

- How to specify a vision system
- Lighting and lenses
- Machine vision tools

### Application stories:

- Data transmission technologies for machine vision
- Food inspection using product 3D profiling

For more details of UKIVA seminars to go  
[www.ukiva.org/pages/latestnews.html](http://www.ukiva.org/pages/latestnews.html)

Visit the website at [www.photonex.org](http://www.photonex.org) for  
more details of the exhibition.

## A year of change

This has been a year of change. It is just one year since the UKIVA changed from being an independent organisation into a Special Interest Group of the PPMA, bringing with it much greater resources and the stability ensuing from the arrangement. In May there was further change with the 'Total' packaging event including several members from both UKIVA and the British Automation and Robotic Association having a dedicated area for the first time.

An new event for the calendar, the Sensor Technology Exhibition – Birmingham NEC – 28 & 29 September 2010, has taken place with a seminar for UKIVA offered on 28 September.

Looking forward there is a change of both date and venue, with Photonex moving to Telford and an early November timing rather than the now almost traditional date of mid-October. As usual UKIVA will be putting on a mixture of topical news, application stories, and informational seminars.

The following week there will be a mass exodus for many UKIVA members making their annual pilgrimage to the Stuttgart Vision event, which promises to be even more successful than during the difficult economic times of last year. With the new fairgrounds just walking distance from the airport, don't forget that a visit to the event can be quite usefully made within a single day.

One of the highlights of the Stuttgart Vision show is the Vision Prize, which is awarded each year by Imaging and Machine Vision Europe, and it had been my intention to retire from the jury this year after serving ever since 2000, but with a certain amount of arm-twisting I was persuaded to continue for yet another year provided I found some extra people to add to the current four members.

Next year the PPMA show reverts to late September in 2011 having been part of 'Total' as happens in 2010 and every third year, with no doubt prospects of a good complement of UKIVA and BARA members exhibiting.

# Synergy between solar cell and machine vision technologies

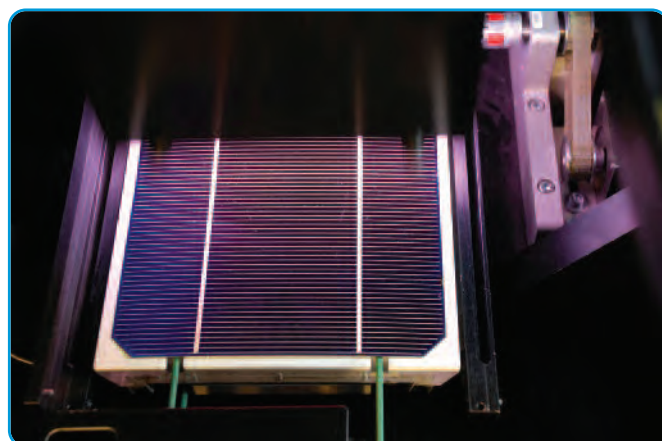
It is interesting how two technologies can be mutually beneficial. Machine vision inspection has been used to provide real-time process feedback in the manufacture of solar cells, while solar cell technology has been used to develop a machine vision sensor that offers exceptional dynamic range for demanding vision applications.

## Improving solar cell manufacture

ECKELMANN AG, located in Wiesbaden, Germany has developed a vision system based on line scan cameras for laser edge detection as part of the edge isolation process in solar cell manufacture. It was designed for the ASYS Group (Dornstadt, Germany), a leading manufacturer of handling systems, process machines and special machines for the electronic and solar industries, and is fully integrated to provide feedback control to the production process. Edge isolation provides electrical separation between the active front side of a solar cell and the rear side. A laser cuts a small groove along the cell edges, the depth of the groove depending on the cell doping. The difficulty lies in positioning the groove as close as possible to the outer contour of the cell in order to maximise the active surface and thus the efficiency. The edge isolation control system features a line scan camera with 4,096 pixels, optics and customised LED illumination supplied by STEMMER IMAGING. The image processing system measures the outer contours of the cell and feeds them back to the control system of the laser equipped with a deflection mirror to provide an active feedback system. If the edge damage is within tolerance levels the laser will ignore it and proceed with the cutting process. Image acquisition and analysis take place in just 800ms and the resolution of the system makes it possible to ensure that the distance to the edge during laser cutting is below 100µm. The calibration and qualification of the laser and camera have been automated so the system can easily be commissioned or recalibrated after maintenance work.

## High dynamic range cameras based on solar cell technology

The new patented FX4 HDR sensor from German camera supplier IDS features miniaturised solar cells rather than the photodiodes used in conventional CCDs to produce extended dynamic range. High dynamic range (HDR) machine vision sensors aim to mimic the capability of the human eye to image details in scenes that contain both very bright and very dark areas. While the eye can perceive all brightness levels, conventional CCD sensors



suffer from overexposure and therefore lose image data. HDR technology, on the other hand, enables fine differences in brightness to be imaged even in very bright scenes. A conventional image sensor with a dynamic range of 60dB could image a scene dynamic of 1,000:1, i.e. the highest brightness value is 1,000 times brighter than the lowest brightness value. The human eye can perceive a dynamic range of up to 100dB within a scene, which corresponds to a brightness ratio of 100,000:1. The new HDR sensor has a dynamic range of 120dB, 1,000 times greater brightness ratio than conventional CCD sensors. Traditional photodiode sensors generate a linear current proportional to the amount of light, while solar cells output a logarithmic voltage based on the amount of light falling on them. The logarithmic response of this sensor not only means that large changes in brightness in light areas of a scene cause only small changes in image brightness, but also prevents saturation in the image and 'blooming'

(where charge from overexposed pixels 'overflows' into neighbouring pixels, causing whole areas of an image to appear white with the loss of image data). The new sensor does not use integration methods and so operates completely in real time. High dynamic range applications include automotive/traffic, welding, paints/glossy finishes and payment kiosks. For example, in traffic applications the sensor may need to identify detail in the dark interior of a vehicle while the headlights are on.

[www.stemmer-imaging.co.uk](http://www.stemmer-imaging.co.uk)



9-11 November 2010  
in Stuttgart, Germany

Visit the UKIVA stand in  
Hall 6 6B75

<http://cms.messe-stuttgart.de/cms/index.php?id=66323&tL=1>

## New book announcement



*Sparse Image and Signal Processing  
Wavelets, Curvelets, Morphological  
Diversity*

by Jean-Luc Starck, Fionn Murtagh,  
Jalal Fadili

Cambridge University Press, 2010

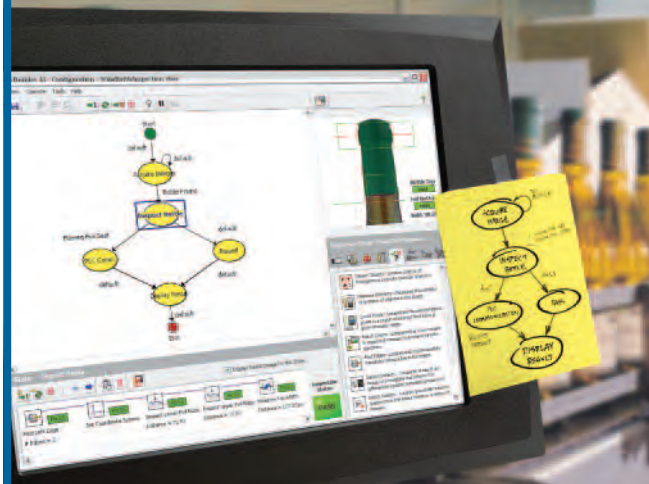
For more details go to  
[www.SparseSignalRecipes.info](http://www.SparseSignalRecipes.info)



Look for UKIVA and several of its  
members on Twitter.

<http://twitter.com/ukiva>

# Inspect Faster with NI Vision Builder AI



**Make your vision a reality.** National Instruments Vision Builder for Automated Inspection (AI) now features an innovative state machine editor, taking you from initial design to deployed vision application faster than ever. Take advantage of more than 100 included image processing steps, acquisition from thousands of cameras and easy integration with existing industrial control hardware to make your deployment faster and easier – no programming required.

### NI Smart Cameras

This all-in-one industrial vision solution combines a high quality image sensor with a real-time, embedded processor in a small, rugged package, enabling image processing directly on the camera, and ships with free Vision Builder AI software.



Watch a video overview at [ni.com/smartcamera](http://ni.com/smartcamera)

>> Explore NI vision  
resources at  
[ni.com/vision](http://ni.com/vision)

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# Members news



Editorial material in this section is provided by UKIVA Members. The UK Industrial Vision Association does not take responsibility for the accuracy of any statements

## FLIR SYSTEMS LTD

**FLIR A615 infrared camera.** This is the world's first 640x480 focal plane array, uncooled infrared camera to be fully compliant with both GeniCam and GigE Vision protocols. Compact and eminently affordable, the FLIR A615 comes complete with built-in Gigabit Ethernet. The FLIR A615 is supplied as standard with a 25° lens. FLIR remains the only infrared manufacturer to produce its own lenses, an important benefit as it ensures the lens is optimally suited to the application.

<http://www.flir.com/thermography/eurasia/en/content/?id=31439>

### Guide to Infrared in Automation.

FLIR infrared imaging, it's great for process monitoring and control, quality assurance, asset management and machine condition monitoring. It can also minimise fire risk and help you cut power consumption. FLIR's new IR Automation Guidebook tells you more. It is designed to provide a roadmap through the major issues that should be addressed in IR-integrated system design and is available as a download from the Flir website.

### Flir offers SC655 camera for infrared research.

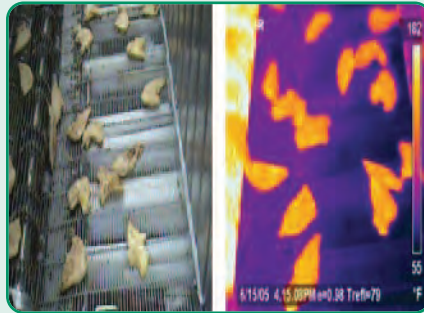
The Flir SC655 high-resolution uncooled infrared camera can be used for infrared research, product development, non-destructive testing and range phenomenology.

### World's first for automated infrared.

Affordable, compact and powerful, the new FLIR A615 infrared camera is designed for process automation. This combination makes this high resolution, high speed, fixed-mounted model instantly ready for quick and easy network installation and plug-and-play with all major machine vision software.

### IR cameras enable food quality assurance.

Flir discusses the use of infrared (IR) cameras in automated



systems for food quality assurance. IR cameras are being increasingly used in automated systems.



## SCORPION VISION

**Build a machine vision system for less than 1000Euros - £850.** Do you have a project that needs

machine vision? Announcing our starter kit package which includes everything you need including training, for not much money. The perfect introduction for jump-starting your own vision system - includes Scorpion Vision Software and a first class Unibrain Firewire camera.

<http://scorpionvision.co.uk/catalogue-index/imaging-software/scorpion-vision-software/unibrain-scorpion-2d-vga-vision-kit>

### Scorpion Vision software supports Sick 3D Cameras.

Tordivel AS of Oslo, Norway and Sick AG, based in Waldkirch, Germany, have released a new interface for all Sick 3D cameras with a Gigabit Ethernet interface to enable them to operate with superior performance using Scorpion Vision software.

## ALRAD INSTRUMENTS

### Ultra-compact CMOS cameras for industrial use.

Alrad Imaging has introduced ultra-compact CMOS cameras from The Imaging Source that are suitable for machine vision, automation, quality control, medical, logistical and security applications.

### Alrad introduces compact infrared camera.

Alrad Instruments is offering a

range of infrared cameras from VDS Vosskuhler for applications such as automation, quality and process control and scientific research and development. The new IRC-640GE camera is designed for detection in the range of 8-14um (LWIR) and is ideal for resolving temperature differences smaller than 80mK in a range from -20C to +80C at F/1.0. The compact camera operates at a frame rate of 24Hz and incorporates a maintenance-free uncooled microbolometer detector and onboard real-time image correction, resulting in excellent noise-free and high-resolution images with 640 x 480 pixels via a 14-bit Gigabit Ethernet output.

## NATIONAL INSTRUMENTS

### NI Wins Product, Team Awards for Innovation.

NI has received awards from leading industry trade publications for hardware and software, as well as a company award for excellence in business-to-business marketing.

### NI Announces Embedded Vision Systems with Windows 7 and Camera Link.

NI announces the release of the NI EVS-1463, NI EVS-1464 and NI EVS-1463RT, which now provide engineers with Windows OS support and Camera Link connectivity options.

### National Instruments offers Labview webcasts.

National Instruments (NI) is offering a series of webcasts about its Labview graphical programming language, which is suitable for the development of test, measurement and control applications.

### Interfaces expand NI-XNET to include LIN support.

National Instruments (NI) has launched PXI and PCI interfaces for applications such as hardware-in-the-loop simulation, rapid control prototyping, bus monitoring and automation control.

Continued on page 6 >

# We help to solve your imaging tasks!

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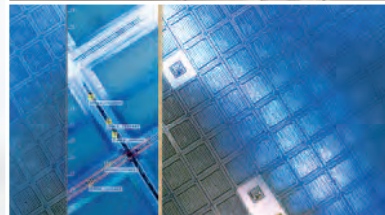
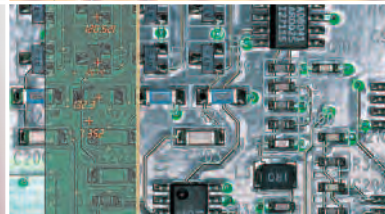
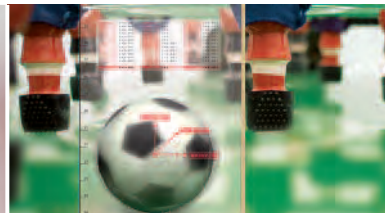
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IMAGING

**NI interfaces improve machine performance.** Interfaces for Profibus, Foundation Fieldbus and Devicenet from National Instruments make it possible for engineers to connect Labview PACs and embedded systems to their existing industrial networks.

**Module for Camera Link FPGA Image Processing.** National Instruments announced the release of a new vision module for the PXI platform that provides a high-performance parallel processing architecture for hardware-defined timing, control and image pre-processing. The new NI 1483 Camera Link adapter module, in combination with an NI FlexRIO field-programmable gate array (FPGA) board, offers a solution for embedding vision and control algorithms directly on FPGAs. Engineers and scientists can use FPGAs to process and analyse an image in real time with little to no CPU intervention. Additionally, using FPGAs helps eliminate the need to design custom hardware.

## STEMMER IMAGING

**Compact Vision PC cuts costs for Multiple GigE camera applications.** The new DALSA GEVA (GigE Vision Appliance) from Stemmer Imaging is an embedded system designed for applications requiring powerful processing, high-resolution or multiple cameras. A powerful dual core processor can tackle the most demanding imaging applications, while the two dedicated GigE camera ports have enough bandwidth to easily support eight 640 x 480 mono cameras imaging 60 parts per second.

**Revolutionary 4-CCD Colour Linescan Camera includes NIR Imaging.** Stemmer Imaging has introduced JAI's novel LQ-200CL prism-based 4-CCD colour linescan camera which can simultaneously image NIR, red, blue and green light through 4 independent channels but the same optical path. This innovative approach enables identification of an even wider set of defects (including sub-surface imaging) on inspected objects.

**'Point and Click' access to unique vision tools for non-specialists.** Stemmer Imaging announces that access to unique imaging tools such as Manto, Minos and GigE Server from its Common Vision Blox imaging toolkit, is now possible through DALSA's advanced Sherlock imaging software. This brings unique tools into a 'point and click' platform that can be readily used by non-programmers.

**High sensitivity CMOS cameras for high speed imaging.** Stemmer Imaging has introduced one of the few global shutter CMOS cameras on the market with a sensitivity 2-3 x that of conventional CMOS sensors. The USB (UI-1240) and GigE (UI-5240) cameras feature a 1.3 MPixel sensor.

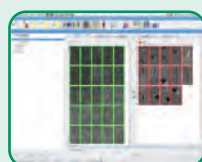
**Enhanced resolution version of BOA Vision System.** Stemmer Imaging can now offer 1280 x 960 pixel, monochrome and colour versions of DALSA's range of BOA smart cameras. BOA offers scalable vision solutions to satisfy a wide range of application needs from positioning of robotic handlers to complete assembly verifications.

**Embedded computer system for imaging.** Stemmer Imaging's new CVS Image Station Compact EOS-1000 is suitable for industrial imaging applications, such as 3D vision robotic guidance and medical imaging.

**Cables tested for industrial imaging.** Stemmer Imaging cable partner Components Express specialises in fully tested, moulded machine vision cable assemblies in both standard and custom configurations.

## COGNEX UK

**DMax enables omnidirectional code reading.** The 1DMax is a 1D code-reading algorithm that allows for the accurate reading of virtually every type of code, regardless of the size, quality, printing method or surface the codes are marked on.



**Surface inspection software from Cognex.** Cognex has launched

Visionpro Surface, a vision software package for inspecting the surface of materials. Visionpro Surface is designed to enable accurate defect detection, classification and surface texture assessment during the manufacturing process.

**Advantage Image Engines.** Cognex has introduced Advantage Image Engines, a family of programmable vision devices for OEMs. The systems offer superior 1D barcode and 2D data matrix code reading, plus a full suite of industry-proven Cognex vision tools that make it possible to solve even the most challenging inspection applications reliably. Advantage Image Engines are designed for easy integration into commercial and industrial equipment and feature a modular design that provides more user control over lighting, communication, and optics.

**In-Sight Track and Trace.** Cognex has released In-Sight Track and Trace, an add-on software package for Cognex In-Sight vision systems. In-Sight Track and Trace delivers a ready-to-deploy data capture and verification solution designed to help pharmaceutical and medical device manufacturers achieve unit-level product traceability. Compact, all-in-one In-Sight vision systems are typically easier to integrate, maintain and validate for 21 CFR Part 11 compliance than PC-based vision systems, and are available in dozens of models to deliver the performance needed to meet the requirements of any application or packaging line.

**Complete traceability of surgical instruments using 'White Reader'.** Based on the Cognex DataMan® 100 industrial ID reader, the White Reader offers unrivalled reading performance of Data Matrix codes in a compact format. Equipped with a patented three-colour lighting system specially developed.

**Cognex next-generation DataMan® handheld industrial ID scanner,** the DataMan 8000 Series. The rugged DataMan 8000 Series is designed for the factory floor and offers the industry's most advanced code reading



technology using patented IDMax® technology for reading 1D and 2D codes regardless of size, quality, printing method or surface.

Cognex announced that it has **achieved an important milestone** in the development of its system integrator and distributor partner program. The Electrical Equipment Company of Richmond, Virginia, USA has become the company's 400th channel partner. The Electrical Equipment Company is a leading provider of electrical supplies and automation equipment throughout the southeastern United States.

#### FLUKE UK LTD

**New entry-level Fluke TiS Building Diagnostic Thermal Imaging Scanner.** Fluke, the global leader in portable electronic test and measurement technology, has introduced a new entry-level Fluke TiS Thermal Imaging Scanner for Building Diagnostics. Now Fluke quality, durability and performance are available in a thermal imager



engineered for the value-conscious building professional. Specifically designed for building and home inspectors, electricians, energy auditors, HVAC/R professionals, insulators, roofers and window installers, the Fluke TiS is the perfect tool to identify hidden issues, find moisture intrusion, detect energy losses or missing

insulation, spot overheating in electrical components, identify leaking ductwork, inspect steam traps and check compressors, motors and pumps. [www.fluke.co.uk/ti](http://www.fluke.co.uk/ti)

#### MATROX IMAGING

**Matrox Radiant frame grabber** acquires and processes a whirlwind of data. This high-performance board supports up to four Base or up to two Full mode Camera Link® cameras. The Radiant eliminates lost pixels through a PCIe® x8 host interface and also offloads and accelerates operations such as spatial and temporal filtering, optical and perspective distortion correction, and frequency domain transformations using an Altera® Stratix® III/IV FPGA. [http://www.matrox.com/imaging/en/products/frame\\_grabbers/radiant/](http://www.matrox.com/imaging/en/products/frame_grabbers/radiant/)

**For information about courses and job vacancies look on the relevant pages at [www.ukiva.org](http://www.ukiva.org)**



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# Members directory 2010



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Tel: +44 (0)1763 220981 E-mail: [info@ukiva.org](mailto:info@ukiva.org) Web: [www.ukiva.org](http://www.ukiva.org)

## SUPPLIERS OF COMPLETE VISION SYSTEMS

Active Silicon Ltd <a href="http://www.activesilicon.com">www.activesilicon.com</a> T 01753 650600	Suppliers of leading edge vision technologies to OEM's, integrators and end users.
Capley Marker Systems Ltd <a href="http://www.capleymarker.co.uk">www.capleymarker.co.uk</a> T 01925 765855	Capley Marker was formed in 1991 in response to a need for innovative, cost-effective high-quality solutions. They have since established an enviable reputation as one the UK's leading independent systems integrators.
Cognex UK Ltd <a href="http://www.cognex.co.uk">www.cognex.co.uk</a> T 01908 206000	Cognex is the world's leading vision company, with over 150,000 systems delivered. We offer a complete range of vision solutions, from smart cameras to powerful framegrabbers.
Edixia UK Ltd <a href="http://www.luceo-inspection.com">www.luceo-inspection.com</a> T 01223 510514	A world leader in innovation vision inspection systems based on Machine Vision.
FS Systems LLP <a href="http://www.fssystem.co.uk">www.fssystem.co.uk</a> T 01933 625162	FS Systems is a UK specialist in machine vision. Our product range covers, Vision & Control machine vision components, and GenVis and RoboVis PC-based vision systems and vision training.
Industrial Technology Systems Ltd. (ITS) <a href="http://www.its-ltd.co.uk">www.its-ltd.co.uk</a> T 01642 22232	An independent solution provider, specialising in the design, configuration, and installation of vision systems, validated to comply with the regulatory requirements of the pharmaceutical, food/beverage, medical device, & nuclear industries.
Loop Technology Ltd <a href="http://www.looptechnology.com">www.looptechnology.com</a> T 01305 257108	Loop Technology Ltd provides development and integration services for automated processes involving machine vision systems and/or motion control systems. They produce automation systems for the electronics, automotive, printing and packaging industries.
Machine Vision Technology Ltd <a href="http://www.machine-vision-technology.co.uk">www.machine-vision-technology.co.uk</a> T 01926 422043	The company has an almost unique position of being a truly independent vision systems integrator. MVT specialises in choosing the right tool for the job.
OLMEC UK Ltd <a href="http://www.olmec-uk.com">www.olmec-uk.com</a> T 01652 631960	Olmec supply, install and integrate vision systems into existing, new and OEM machinery processes.
Omron Electronics (UK) Ltd <a href="http://www.omron.co.uk">www.omron.co.uk</a> T 01908 258 258	Omron Electronics manufactures a wide range of vision-based industrial solutions, ranging from cost effective vision sensor products to high-end vision controller and camera products.
Scorpion Vision Ltd <a href="http://www.scorpionvision.co.uk">www.scorpionvision.co.uk</a> T 01590 679 333	Scorpion Vision Ltd is the UK representative of Tordivel AS of Norway. Founded in January 2006, the company has the remit to promote, advise and manage sales and support of Scorpion Vision Software.

## ACADEMIC MEMBERS

Cardiff University	<a href="http://bruce.cs.cf.ac.uk/bruce/">http://bruce.cs.cf.ac.uk/bruce/</a>	Cardiff School of Computer Science
Cranfield University	<a href="http://www.cranfield.ac.uk/soe/amac">www.cranfield.ac.uk/soe/amac</a>	Applied Mathematics and Computing Group
Dublin City University	<a href="http://www.vsg.dcu.ie">www.vsg.dcu.ie</a>	Vision Systems Group
Kingston University	<a href="http://dirc.king.ac.uk">http://dirc.king.ac.uk</a>	Digital Imaging Research Centre
Oxford Brookes University	<a href="http://cms.brookes.ac.uk/research/visiongroup/">http://cms.brookes.ac.uk/research/visiongroup/</a>	School of Technology - Computer Vision Group
University of Leeds	<a href="http://www.comp.leeds.ac.uk/vision">www.comp.leeds.ac.uk/vision</a>	School of Computing
University of London	<a href="http://www.cs.rhul.ac.uk">www.cs.rhul.ac.uk</a>	Royal Holloway
University of Sheffield	<a href="http://www.shef.ac.uk/eee/staff/n_allinson.html">www.shef.ac.uk/eee/staff/n_allinson.html</a>	Department of Electronic and Electrical Engineering
Vision Academy	<a href="http://www.vision-academy.org">www.vision-academy.org</a>	Systematic Training for Machine Vision
University of the West of England	<a href="http://www.uwe.ac.uk/cems/research/melsmith/">www.uwe.ac.uk/cems/research/melsmith/</a>	Faculty of Computing Engineering and Mathematical Science
University of York	<a href="http://www.elec.york.ac.uk/research/intsys/visual.html">www.elec.york.ac.uk/research/intsys/visual.html</a>	Department of Electronics, Visual Systems Lab



## SUPPLIERS OF VISION RELATED SERVICES AND COMPONENTS

**Alrad Imaging**  
www.alrad.co.uk  
T 01635 30345

Alrad Imaging is a prime UK distributor of vision products. Products include cameras and sensors, frame grabbers, illumination, imaging software and sub system solutions for OEMs and system integrators.

**ClearView Imaging Ltd**  
www.clearviewimaging.co.uk  
T 0845 606 0457

ClearView Imaging is a supplier of vision components, including a wide range of cameras, frame grabbers, software, embedded systems, smart cameras, vision processors, lighting and optics.

**Flir Systems Ltd**  
www.flir.com  
T 01732 220011

FLIR Systems has been at the forefront of industrial thermal imaging for more than 30 years and is now the technology's world leader. Recent acquisitions have significantly widened its technology base.

**FLUKE (UK) Ltd**  
www.fluke.co.uk  
T 020 7942 0700

The Fluke product portfolio includes a wide range of portable thermal imaging cameras from the low cost entry point models through to high specification units featuring IR-Fusion technology. Prime uses are for predictive maintenance, electrical system troubleshooting, process & control applications etc.

**Framos Electronics Ltd.**  
www.framos.co.uk  
T 01276 404 140

Framos is a specialist distributor of digital and electronic imaging devices and complete cameras. Both area and linear CCD and CMOS devices are offered with full technical support for design and integration.

**Imperx Incorporated**  
www.imperx.com  
T +1 561 989 0006

Imperx, Inc. was founded in 2001 by a seasoned team of senior executives with a proven track record in developing advanced digital imaging products. Imperx designs, develops and manufactures state-of-the-art imaging products for a variety of markets.

**Lambda Photometrics Ltd.**  
www.lambdaphoto.co.uk  
T 01582 764334

Lambda Photometrics distributes a broad range of machine vision products. These include fibre & LED lighting, lens systems, cameras (CCD, linescan, smart CMOS), framegrabbers & software.

**Machine Vision Systems Consultancy**  
www.braggins.com  
T 01763 260333

MVSC was established in 1983 and since then has provided independent technical & marketing consultancy. Remuneration is by fee, not commission.

**Matrox Imaging**  
www.matrox.com/imaging  
T 01895 827280

Matrox Imaging is a leading designer & manufacturer of PC-based hardware & software for machine vision, image analysis & medical imaging drawing on an unparalleled 25 years of industry experience.

**Multipix Imaging Ltd.**  
www.multipix.com  
T 01730 233332

The wide range of products offered includes frame grabbers, cameras, lenses & imaging software together with a highly experienced support service.

**Multivac UK**  
www.multivac.co.uk  
T 01793 42580

Multivac UK is a wholly-owned subsidiary of Multivac Sepp Haggenmüller GmbH & Co, the world's leading supplier of packaging machines.

**National Instruments UK Ltd.**  
www.ni.com/uk  
T 01635 523545

National Instruments manufactures hundreds of integrated software & hardware products, which are used to replace &/or communicate with traditional instrumentation.

**Panther Vision Ltd**  
www.panther-vision.co.uk  
T 01253 713285

Panther Vision provides independent consultancy and bespoke product development and is interested in joint development opportunities.

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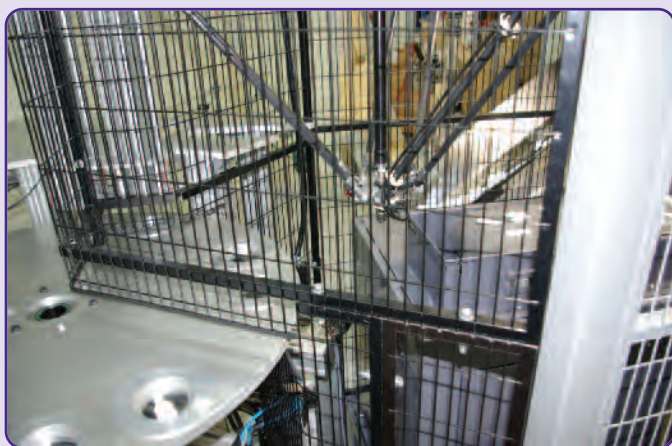
# Application stories

RNA Automation • Multipix • Cognex

## RNA AUTOMATION

### RNA deliver spoon challenge

A specialist supplier of plastic injection moulded components for the food industry approached RNA to automate a production line for disposable plastic spoons. Some of the industry's largest food and snack manufacturers use this type of spoon in ready meals and convenience snacks.



For this particular project a foldable spoon needed to be placed into a cap, which is supplied to a manufacturer of milk-based fast foods. A disposable plastic spoon is very difficult to orient due to the design of the moulding, especially at 120 parts per minute.

The solution chosen was a vision-guided robotic system equipped with an RNA step feeder, a bulk storage hopper and a 6-axis robot.

The spoons are automatically fed from the hopper into the step feeder and then on to a conveyor belt. A brush positioned above the out-feed conveyor separates the spoons under a camera system. The image processing software pinpoints the exact location of the spoons and sends the information to the robot. The robot utilises conveyor tracking software so that the components can be picked without stopping the conveyor belt. In order for the assembly to work correctly the spoons need to be fed with the oval side facing down. Components lying on the wrong side are therefore automatically recycled into the step feeder via camera recognition.

The robot is fitted with a special gripping unit, which picks the spoon and places it into the waiting cap positioned on the existing production line.

The spoon handling system has been running successfully since the beginning of 2009 and the customer is investing in further systems to cut operating costs and improve production.

If you are interested in more details in RNA and robotics handling or have a process that needs improving, please contact Andy Perks ([andyp@rna-uk.com](mailto:andyp@rna-uk.com)).

[www.rnaautomation.com](http://www.rnaautomation.com)

## MULTIPIX

### Machine vision gives optometrists a clear view

Being fitted for your new spectacles, you go to the optometrist and, without time consuming adaptations and measuring, you look at yourself in the mirror, your chosen frame on your nose... job done!

The international glasses manufacturer Rodenstock, Germany, has developed an optometrist service terminal called ImpressionIST® that enables the adaptation of glasses regarding the individual parameters and centre data in an absolutely unstrained atmosphere. Innovative 3D images determine the facial measurements comfortably and accurately, giving the optometrist the information they require and the customer a view of themselves in their new glasses.

This system has been successfully distributed throughout 17 countries. Due to its great success Rodenstock is now developing the second generation of this terminal, the ImpressionIST® Avantgarde.

The ImpressionIST is promoted as having a four-in-one functionality, comprising:

1. A two-camera 3D video centre system, which also measures back vertex distance, pantoscopic tilt and frame wrap angle.
2. A consulting program to assist in the selection of frames and added-value lenses.
3. The ability to capture an image of the patient and demonstrate their appearance with various eyewear options.
4. An interactive product information terminal for the patient.

[Continued on page 12 >](#)



**SCORPION**  
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**Do you have a project that needs machine vision?**

The **Unibrain Scorpion Starter kit** contains a full suite of vision tools that will enable the user to automatically identify objects, read bar codes, write scripts, find angles and lines, measure edges and identify colours.

**The perfect introduction for jump-starting your own vision system - includes Scorpion Vision Software and a first class Unibrain FireWire camera.**

The package also includes:

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- A Unibrain Fire-i camera module
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- A 4.5 metre FireWire cable
- A 1394a interface board
- **Getting started support** by telephone and remote control
- **A comprehensive list of tutorials for various vision tasks with examples**

No programming is required and users can expect to have a camera connected and the software identifying and measuring within 30 minutes.

Please visit our online shop for further information about this offer and for ordering - kits are in stock and ready to ship now:

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It has been designed so that the customer takes centre stage and the experience is comfortable and enjoyable.

The 3D video centre system represents the technical heart of the device. The customer looks into a mirror from a distance of around 75cm. This puts the customers in a relaxed position and gives the optimal posture for the measuring.

Hidden from the customer's view, the imaging system is mounted behind a semitransparent mirror.

## Image processing aided by software libraries

Two images are simultaneously acquired by two machine vision cameras. One image views the customer's face frontally (center camera), another one from below and beside (side camera).

For the next step, the images are processed by imaging software based on the software library HALCON by MVTec.

While video systems for spectacle fitting have been available for some time, only the ImpressionIST solution makes it possible to truly measure the spectacles in all three dimensions and to transfer these measurements 1:1 in optimum fashion to the later position in front of the eyes.

The 3D coordinates created by HALCON imaging software are computed for calibration. In a log printout, all results are documented with illustrating figures. These details go directly to the workshop to create the spectacles prescription.

MVTec are due to release their latest version of their software, HALCON 10 very soon. This version expands even further on 3D tools and the very latest measuring and matching technologies.



The pupils can be found by the image processing software. Crucial criteria are the three reflections of the illumination around the pupil. After the pupils are found, the position crosses are set by the software.

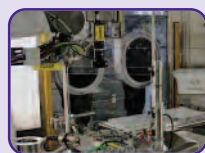
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## COGNEX

### Vision-guided robots help automate vial and syringe filling



Machines that are typically used to fill vials, syringes and other containers for pharmaceutical manufacturers rely on dedicated machinery having hard automation.

Since most automated filling systems rely on exact positioning unique to each container size and type, filling different container formats requires the manufacturer to purchase multiple filling machines, or tolerate lengthy changeovers when switching between container types.

Automated Systems of Tacoma, Inc. (AST) was asked by a life science research company to develop an alternative to conventional pharmaceutical filling machinery having the capability to fill and finish all their small-scale clinical trial products with a single flexible platform. To solve this problem, AST had to develop a machine with the flexibility to be able to handle various sizes of prefilled syringes, vials, cartridges and IV bags with minimal product changeover times.

The basic concept is a system that positions ready-to-use 'nests' of a particular container within the operating envelopes of two robots, the Cognex In-Sight® Micro vision system is used to locate each container and stopper precisely and provide the robots these locations prior to processing. This approach allows for rapid changeover from one container type or size to another by loading a new robot program, replacing the products carriers, and instructing the robot to change out the end of arm tooling. The system's use of disposable materials is used on all process contacting parts, which also reduces the changeover time and eliminates the risk of cross contamination.

## Integration of vision and robotics is critical

AST called in Brian LaFave of Olympus Controls, because of his company's long experience in developing vision applications. 'I took a close look at the application and came to the conclusion that integration between the vision system and robot was key,' LaFave said. 'Mounting the vision system on the robot arm also made it essential for the vision system to be small, light and have very simple cabling. I felt that the Cognex Micro In-Sight 1100 would be perfect for the task.'

The Cognex In-Sight Micro system comes equipped with preconfigured drivers, ready to use templates, and sample code for communicating with most robots. The Staubli TX-60 HE six-axis industrial robot was AST's first choice for this application, because of its ability to withstand aggressive cleaning and bio-decontamination required for the application.

'The robotic filling system is the simplest solution for any organisation looking to increase their product and container filling capabilities, without purchasing multiple machines dedicated to a particular product or container type,' said Josh Russell, Project Engineer for the Life Sciences Group at AST. 'The machine is capable of handling all liquid packaging needs for many pharmaceutical companies, contract manufacturers and compounding pharmacies at hospitals. It fits within a 12 by 16 foot cleanroom and costs far less than the machines that it replaces.'

## The power in the wind: Identification of permanent sensor bolts using Cognex DataMan 100



Larger and larger wind power turbines are bringing the forces of nature under control. The main structures, the powerful tower and rotors, are supported by parts

that play a less obvious, but no less important role: bolts. As simple as it may look, precision tightening of bolts is an art form of its own. Intellifast GmbH is now ensuring perfect support in any weather using ultrasound permanent sensors and Data Matrix codes. At first glance, all bolts look the same. But, when measured by ultrasound, each bolt reveals its individual inner life and a characteristic surface. It may only be in the  $\mu$  range, but no two bolts are exactly the same in shape or length. Scattered friction values in the thread and under the head make it a real challenge to tighten

bolts with precision. As a result, tightening factors of 1.8 to 2.0 (twice the maximum force actually required for pre-tension) are generally used for torque-controlled assembly for safety precautions.

## Pre-tension instead of torque

Bolts can be tightened much more precisely if the target variable pre-tension is used as a reference variable instead of torque. Compared to the 'force times lever arm' of torque, which only takes into account the force required to adequately pre-tension a bolt regardless of friction values. Ultrasound measures the pre-tension of the bolt as it is being tightened. People have been working with ultrasound technology for decades to enable this real target variable to be applied accurately. However, there has always remained a potential source of measured value errors with this method: the transmission medium. Intellifast GmbH from Speyer developed permanent sensors for bolts to eliminate this type of error.

Connecting elements can thus be bolted together at the exact assembly pre-tension required with an accuracy of  $\pm 3\%$ . The result: lighter-weight, smaller, and cheaper bolts and connecting elements, such as flanges, can be used.

Continued on page 14 >

## Alrad can handle Infrared Imaging applications from NIR to Thermal



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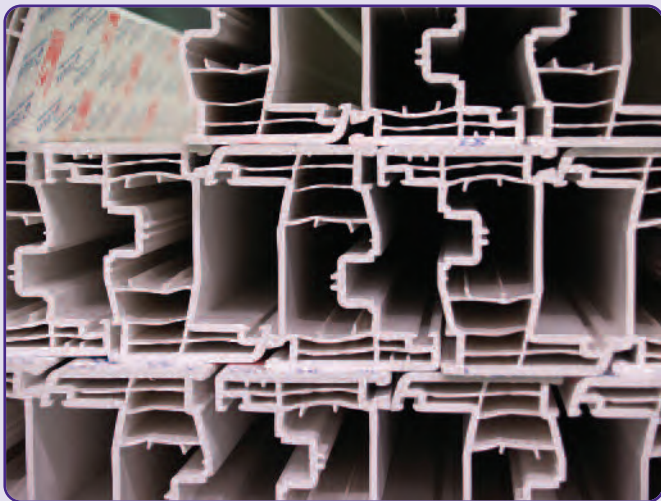
## Bolted to a specification

To be absolutely certain that the bolts have the optimum dimensions, Intellifast GmbH relies on the 'digifast®' track-and-trace solution. This process uses lasers to apply an individual Data Matrix code to bolt heads or ends to indicate their ultrasound measurement.

At the assembly location, the DataMan® 100 ID reader from Cognex® recognises the individual bolt by reading the Data Matrix code. In the next step, the bolt's data is passed to the Intellifast LP 3000B measuring device that assigns the hydraulic tool with the exact pre-tension required for assembly. The process is fully automatic. The simple control and rapid check by the permanent sensor system optimises the bolting process. Once in the bolted state, the Intellifast LP 3000B measuring system can also measure the bolt to make sure the pre-tension is correct as a doublecheck.

## Perfect start on the fast track

To become an international player, a business needs two things: top quality and high productivity. Arndt Fenstertechnik GmbH & Co. KG from Gattendorf, Germany, combines both to perfection in its new cutting centre in which the In-Sight® Micro 1100 vision system from Cognex, incredibly small and yet extremely powerful, plays an important role.



Tighter insulation regulations and rising energy prices are fuelling the demand for plastic windows. Plastic combines good insulating properties for both heat and noise with low maintenance costs. Even in terms of aesthetics, plastic windows have overtaken wood and aluminum in popularity, because of their wide variety of colours and designs. Growing variety and rising demand require production lines to be more flexible with higher throughputs.

## A hurdle just before the finish line

Just before completing the planning phase for the new cutting centre, Arndt Fenstertechnik realised that the process had issues in the material feed area, one of the first steps. Incorrectly-fed frame parts could damage the line, resulting in costly down-time. Hundreds of different types of profiles, need to be distinctly identified in a matter of seconds.

The company searched for a reliable, low-cost solution to optimise this important step. After intensive research, they selected the In-Sight Micro 1100 in collaboration with Peter Scholz Software+Engineering GmbH of Weiden, Germany.

## 100 types in seconds

JA central IT unit indicates which tubular profile should be placed upon the conveyor by the operator. The In-Sight vision system recognises the profile cross-section and matches the previously programmed data to ensure the appropriate tube has been put into place. The window frame profiles can differ in terms of both external contour and the internal chambers and many vary only in terms of their dimensions.

The smart vision system, measuring just 30mm x 30mm x 60mm, can guarantee up to 100 profile switches a day, maintaining a reliable process. And equipped with a VisionView® user interface, the operator can monitor the current production process.

## Easy training for high-speed cycles

The In-Sight Micro 1100 is a standalone vision system. A PC is required only to 'teach' new profiles. Arndt Fenstertechnik intends to network the vision system to the company's central IT system to enable authorised employees to access the vision system from any PC within the network.

It is important to Arndt Fenstertechnik to put the maintenance and installation of new profile data in the hands of its own employees. As the extensive product portfolio of window profiles is continuously expanding, the goal is to minimise the costs of frequent reprogramming. One of the great strengths of the In-Sight Micro 1100 is its EasyBuilder® configuration software. New profile detection patterns can be programmed with a few strokes of the keyboard. The intuitive, user-friendly interface leads a user through the entire set-up process until the application is complete. Once configured, the In-Sight Micro 1100 ensures short cycle times and correct parts feed without any PC input at all, enabling successful production of window frames on one of Europe's fastest lines.



# UKIVA Members' Courses

Several of our members offer training, below are details of some that are available.  
Links maybe found on our courses page [www.ukiva.org/pages/courses.html](http://www.ukiva.org/pages/courses.html)

**FS Systems** Independent Machine Vision Training in association with The Vision Academy.

**Scorpion Vision** International training events calendars available.

**National Instruments** A number of scheduled courses and more specialised courses on demand, as well as webcasts and videos.

**Cognex** A wide variety of training courses from online, video based, classroom, on demand custom and onsite training.

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**OLMEC** are a team of professional, creative engineers with expertise in vision systems combined with automation. Olmec's core business is the supply and installation of cost effective

high performance vision systems into existing, new and OEM machinery processes, primarily within the pharmaceutical, healthcare and automotive industries. Committed to the provision of robust quality control systems they specialise in applications requiring vision inspection combined with precise product handling, product rejection, data verification and validation. Dedicated to quality through innovation and simplicity of operation, Olmec have developed a unique series of powerful vision-based products ranging from user friendly touch screen menus through to complete turnkey end of line solutions.

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### New UKIVA SIG Member

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## Technical tips

### • PC performance, bandwidth and power-saving

Some inherent features of the Windows operating system can cause camera systems to suffer from worse than expected performance due to power-state and power management controls. Present in laptop systems to help conserve battery life, they can also be present in desktop systems and can produce symptoms that resemble a lack of bandwidth in firewire or USB cameras or a failure of the CPU to keep up with tasks that should not be too onerous. This tech tip explains these problems and offers ways of overcoming them.

### • Using a lighting controller to get the most out of your LED-based lighting

This tech tip looks at how a dedicated lighting and timing controller can provide a wide range of benefits in a machine vision system and act as a central control and synchronisation hub, that also sits happily in a GigE connected environment. It looks at techniques for strobing, lighting stability, overdriving, LED lighting protection and system-wide control.

To learn more go the **Stemmer Imaging website** at [www.stemmer-imaging.co.uk/en/pages/service/bases.php](http://www.stemmer-imaging.co.uk/en/pages/service/bases.php)



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