Digital Dots

Spindrift

Snuggling up to the Graphic Arts industry since April 2003

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News Focus • Opinion • Reviews • Testing • Interviews • Brain-teasers • Techno-babbling

Never apologise for having high standards. People who really want to be in your life will rise up to meet them.

– Anon.

Dear Reader,

We recently asked the industry to complete a short survey on the market perceptions of ISO 12647-2 http://svy.mk/1fNkZhK. What started out as a bit of fun has become more serious, with over fifty surveys completed within the first couple of weeks. We thought it might be useful to invite other organisations to share the survey too. UNIC, the French printing industry association, and ABIGRAF, its equivalent in Brazil, were interested. See **http://svy.mk/1hOQIQB and svy.mk/1esuwpZ**

But apart from the UK's BAPC, industry associations in the US, Germany, the Netherlands and the UK all declined to encourage members to complete the survey. Why? We looked again at the questions and found nothing contentious. Is it because of a fear that we might find that ISO standards are irrelevant for many printers?

This could be a well-founded worry. National standards bodies are cagey about releasing sales figures and the global certification rate for ISO 12647-2 is patchy. Is this a problem with the whole idea of standards, or is it a problem within the graphic arts? Based on work we've done with printers over the last couple of years it is more likely to be the latter. There is a curiously widespread reluctance to embrace the basics of efficient digital production, namely colour management, workflow automation and standard formats.

Printing companies unwilling to fully exploit digital production are compromising their own futures. They should not forget that publishers have plenty of alternatives, on and off the page.

Enjoy!

Laurel, Nessan, Paul and Todd

In This Issue

News Focus

Xerox has announced a new mid-range production printer, the Versant 2100, said to be a brand new platform. It has a new compact belt fuser and can run at up to 100 pages-per-minute for single-sided A4 pages. It takes media from 52-350gsm and sheets up to 330 x 488mm. The printer is rated for a monthly duty cycle of 660,000 sheets.

EFI has developed two Fiery digital front ends for the new Xerox printer. These use a new 10-bit, 1200 dpi processing technology, which EFI claims help produce sharper edges for clean appearance. There's a new Fiery Ultra Smooth Gradients feature that eliminates 'stair stepped' gradient shades sometimes associated with vector images. The EX-P 2100 Print Server includes Fiery HyperRIP technology, which processes complex files up to 40% faster than other DFEs.

EFI has also bought Group Rhapso S.A, a printing and packaging software solutions developer based in Les Ulis, France. Rhapso has two software products that were of interest to EFI. The first, the Rhapso Graphisoft MIS, is primarily marketed in the French-speaking countries, while the second is the Rhapso PC-Topp scheduling and production control solution for the corrugated industry. EFI hasn't said what the deal cost, other than to say that it won't affect the company's Q2 or full-year 2014 results.

Kodak has signed a deal with Manroland Web Systems for the German company to integrate and sell Kodak's Prosper S20 and S30 imprinting modules into the Manroland web press lines. This means that Manroland will become the first worldwide reseller and OEM partner focused on the newspaper industry using Kodak Stream inkjet technology.

Vistaprint is to acquire 97 percent of Pixartprinting for a base price of €127 million, with Matteo Rigamonti, who founded Pixart printing retaining 3 percent. The agreement also includes a sliding-scale earn-out of up to €10 million for Pixartprinting, subject to the achievement of revenue and EBITDA performance targets for calendar year 2014. Vistaprint will also keep the Pixartprinting brand name and invest further in the company.

Xerox's earnings for the first quarter of this year show a slight downturn in revenue at $5.1 billion. This is two percent lower than the first quarter of last year, while revenue from the company's Services business was $2.9 billion, flat year over year. Revenue from the company's Document Technology business, which is 40 percent of total revenue, was $2.0 billion, down four percent, or five percent in constant currency. However, Xerox generated $286 million in cash flow from operations during the first quarter and repurchased $275 million of its own stock.

EFI has reported the figures for its first quarter of this year, ending March 31, 2014. EFI had a record first quarter, with revenue of $188.7 million, up 10% compared to first quarter 2013 revenue of $171.4 million.

Stratasys, which makes 3D printing systems, has bought two American companies, Solid Concepts and Harvest Technologies. Solid Concepts, which earned revenues of $65 million in 2013, focusses on particular areas such as medical and aerospace. Harvest Technologies has experience in parts production, as well as materials and systems. The two companies will be merged with RedEye, Stratasys' existing digital manufacturing service business.

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Stratasys has added support for a new material, Endur. This is an advanced simulated polypropylene material that has both high impact resistance and elongation at break, resulting in tough parts. It's suitable for various objects such as moving parts, flexible living hinges and snap-fit parts.

The merchant banking division of **Goldman Sachs,** together with a subsidiary of **Koch Industries** is to acquire the Flint Group from private equity firm CVC Capital Partners. Flint Group is a major supplier of inks and associated print consumables, which is hoping to expand into packaging printers. The sale remains subject to customary closing conditions and should be completed by the second half of 2014.

Epson has announced a new range of high-speed, four-colour large-format printers, the SureColor SC-T series. These aqueous roll-fed machines are aimed at the CAD and GIS markets. There are three sizes - 24ins, 36ins and 44ins - and a range of configurations including double paper rolls and scanners.

Mutoh is to demonstrate three new wide format printers at the Fespa Digital show. This includes the 610mm wide ValueJet 628, an eco-solvent roll-to-roll printer aimed at the entry level market. There's an A3+ sized flatbed UV LED printer that is designed to print to solid objects up to a thickness of 7cm. The third of these new printers is the 165cm wide VJ-1626UH, a hybrid LED UV printer which prints on a wide variety of rigid and flexible materials. It can run two sets of CMYK inks for higher speed, or CMYK plus white and a clear varnish. Maximum resolution is 1440dpi and the fastest print speed is around 33sqm/hr.

Kodak is to add a new plate line at its Columbus, Ga., facility in North America to increase production of its Sonora processless plate. This is in line with its plan to cut costs by expanding production at existing plants that are reasonably local to the main customer sites. Kodak claims to have over 800 customers worldwide for this plate.

Canon has updated its range of ImagePrograf printers with two 610mm devices - the iPF680/iPF685 - and two 914mm devices - the iPF780/iPF785 - which are aimed at the technical document market and are faster and cheaper to run than previous models. There are also new MFP versions, the iPF780 MFP and iPF785 MFP and an MFP version of the iPF8400SE 6-colour pigment device. Canon has also updated its Direct Print & Share workflow software, which allows users to collaborate and print via the cloud.

Screen has launched a faster HS edition of its Truepress Jet W3200UV flatbed printer, adding more printheads to increase the maximum throughput from the 85 sqm/hr of the standard model to 150 sqm/hr. Better still, customers can upgrade the standard edition to the faster spec. It's configured as a six colour + WW machine.

Morgana has launched the DigiBook 200, which has more automation than the basic 150 model and can bind up to 200 books per hour. Book blocks can be measured automatically for fast setup of different sizes. It can handle spine lengths from 110 to 320mm with a maximum thickness of 50mm.

Heidelberg has launched a new set of Stahlfolders, including the BH range of buckle plate folders and CH range of combination folders, available in 56, 66, 78 and 82 cm widths. They are said to be both faster and cheaper than the existing TH/KH models. They can be custom-tailored with various options and modules, such as automation, feeder types or configurations of fold units.

Ricoh has opened a new European Ink Jet Technical Centre in Telford, UK. It offers localised technical support for OEM ink jet innovators across the European, Middle East and Africa regions. It has laboratories for providing internal testing, evaluation and external training and can help integrators with their design, evaluation and validation of Ricoh's ink jet components.

Hamillroad has been granted US patents for two software components of its Auraia Digitally Modulated Screening. US Patent 8,654,400 is for reduced macro-dots and covers the technology that reduces or eliminates issues with dot gain. The second patent covers the technology that allows Hamillroad to eliminate the noise and bad transition areas traditionally experienced with FM screening, whilst also allowing for improved control of highlight and shadow dot size.

News Analysis

HP has launched three new latex printers - the latex 300 series - all aimed at the lower end of the market. This includes the 360, which replaces the current 260, plus the 310 and 330, which are targeted at design agencies and offices.

These machines use the third generation latex inks that were first introduced last year with the Latex 3000 mid range printer. These are six colour machines – CMYKcm – but with a seventh channel for an optimiser. This is essentially a primer that helps attract the ink to the right spot for greater dot placement accuracy, and hence better image quality, at higher speeds. The inks also contain an anti-scratch additive that forms a film over the prints, which HP claims gives similar scratch resistance to a hard solvent print.

These inks also cure at a lower temperature than previous models, which means they will work with some of the more heat-sensitive media. This should also lower the energy consumption of the printers. Much of the reason for the lower temperature is down to improved airflow, with hot air being recycled so that there's no need to heat the dryers up.

But HP has also improved the heating elements, so that the machine now reaches its curing temperature within less than two minutes, considerably better than having to wait around five minutes or so to use the printer.

HP has also improved the thermal printhead, which delivers 1200 x 1200 dpi resolution. All three printers can be connected to a cloud server that lets operators download manuals or profiles.

The 310 is a 1371mm machine that prints from 5-48 sqm/hr and costs €13,500. The 330 is a larger version, taking rolls up to 1625mm wide and comes with a take-up reel. It runs from 5-50 sqm/hr and costs €17,500. Both of these come with SAi FlexiPrint RIP as standard and have a built-in colour sensor.

The 360 is also 1671mm wide but prints at speeds from 5-91 sqm/hr and includes a built in i1 spectrophotometer. The 360 comes with an ink collector, which can easily be used to replace the ink platen, and makes for better image quality when printing to porous materials, including some textiles, obviating the need for a dedicated dye sub printer.

HP also announced two new 60ins models in its Z range of aqueous ink printers. The Z6600 and Z6800 both print at 140 sqm/hr. But the Z6600 has six colours for reduced ink costs and is mainly aimed at bureaux, while the eight-colour 6800 is capable of better image quality, thanks to the addition of chromatic red and light magenta.

Green Shoots

In the last few weeks the Verdigris Blogs have been following up on the plan in India to ban PET for pharmaceutical packaging, and looked at some heavy duty concerns for environmentalists in the graphic arts. Be warned this months offerings tend to the heavy side. We'll try to lighten things up, in future.

PET Peeves Revisited

A couple of weeks ago we wrote about the Indian government wanting to ban PET packaging because of concerns about its stability. The blog elicited a surprising number of responses, but one from a Verdigris member, got us thinking more about it.

PET containers are recyclable, of course, but there are some negatives associated with them, though none of these negatives support the Indian government's justification for a ban, because PET is undoubtedly durable and stable. But these strengths are also PET's most severe shortcoming when it comes to waste management. Packaging printers should consider this, especially if there are suitable alternative materials that would meet customer demands equally well.

Because they are so robust, PET containers don't biodegrade easily which makes them persistent pollutants. Even though many nations have sound and proactive PET recycling policies, far too many of these containers get tossed away, especially into the sea. Harald Woerner, a senior manager at Heidelberg who is responsible for environmental and sustainability management, explains that in his view marine pollution is mostly man made: "It floats meanwhile all over the ocean. Eighty percent of marine debris is of plastics like PET. As those plastics don't disintegrate over time they are rapidly accumulating. The mass of plastic in the oceans may be as high as one hundred million metric tons. Not all but lots of application of PET could be substituted by cardboard."

Verdigris

The Verdigris project is supported by Agfa Graphics, Digital Dots, drupa, EFI, Fespa, Kodak, Mondi, Pragati, Ricoh, Shimizu Printing, Splash PR, Unity Publishing, and Xeikon.

Given that PET does not biodegrade easily or quickly and can float about in the sea for years, this obviously has an effect on wildlife and can upset fragile ecosystems. There are lots of applications where PET is valuable, but as Woerner points out there are also many packaging applications which could as well use cardboard. Many pills and powders could be delivered in this way, reserving PET containers for liquids and gels.

But the most important point in this discussion is to make it easier for people to dispose of PET packaging responsibly. People need to understand that dropping litter is antisocial and environmentally expensive. More incentives should be in place to encourage the recycling of PET, keeping it out of landfill and especially out of the oceans.

This is a collective responsibility but for India, the world's largest democracy, there is plenty of scope to make a real difference. There may even be financial incentives to improve waste collection and recycling initiatives, rather than relying on an informal waste economy. Regulated, proactive disposal and management of all forms of waste is a far more worthwhile endeavour for the Indian government to consider, than pushing for an ill-advised ban on PET.

Waste collection and recycling services for both cardboard and PET is a business opportunity waiting to happen, particularly in India. It is one that would promote Indian interests both at home and abroad. If its packaging printers encouraged more customers to use resources

more responsibly and to recycle whenever possible, marine pollution might come down. A tidy proposition indeed.

Environmentally Friendly Substrates

One of the biggest concerns with print's environmental impact is disposing of it when it reaches its end of life. Fortunately we have in place robust paper recycling supply chains and there is a thriving industry in paper recovery and reuse.

There is a less well developed model for recycling non-paper substrates such as discarded vinyls and foamboard, which generally go to landfill or get incinerated. However changes to materials come about almost daily as developers strive to meet new customer requirements as well as to improve their environmental performance. Customers want jobs produced more quickly, with quality that matches or exceeds ISO 12647-2 and at low cost. They are also concerned about environmental impact, particularly in regions where there is a cost for disposal or the threat of regulation looms large.

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Materials provide print buyers and service providers with a means of differentiating their products and messages. However, new materials tend to create new requirements for printheads, for instance, faster and more accurate imaging and faster drying times. Such new substrates require stable, consistent and reliable inks, but as more digitally printed materials enter into waste streams these inks must be amenable to deinking processes. As printhead technology evolves, faster imaging and raster image processing will be able to support substrates that can be run even faster, so the whole cycle begins again. None of this would be problematic if the expense were no object, but, of course, it is so materials scientists must be able to invent materials that are cost effective.

Making these materials more environmentally friendly or using alternatives will help improve print's environmental impact. For instance, in many sign and display applications, textiles are replacing vinyl and PVC. Textiles can be more readily disposed of and they can be easier to work with in many signage applications.

The point here is that every technology iteration has a ripple effect that gradually improves environmental impact throughout supply chains. This enhances print's sustainability and broadens the range of environmentally friendly media print buyers can use. It's a slow process, but it is a process that gradually improves the performance of print across applications and its recyclability.

Brought to Book

All the people who chat about print fading away must not have noticed the rising number of book fairs around the world. The Jaipur Literary Festival is one that springs to mind. It started in 2006 and has grown to be the largest event of its kind. An immense endorsement of all aspects of the book, this is just one of many events that at their heart are about communicating ideas, mostly in print for which they are a ringing endorsement.

The London Book Fair is an annual talkfest for writers, publishers, distributors and producers. Ricoh Europe will be there to discuss the evolution of the book industry and present the results of its research into the European book industry. Ricoh is a Verdigris supporter and has been in the top ten of the world's most sustainable companies for many years.

At the show Ricoh will be discussing new technology and innovations for book fans. The company has been working with leading European publishers to get a better idea of what they want and expect for the future. The Ricoh research is not limited to European applications as many big European publishers have operations elsewhere.

There is a common theme that the on-demand model is gaining traction and that there is a definite offset-to-digital conversion. This is great news for the environment because it will reduce the amount of books going to waste. The book industry's production model is changing but there is still too much emphasis on mass production. Ricoh has been asking publishers about the viability of the printed book in an electronic media world and it seems that print is still viable for many trade publishing sectors.

The pressure to switch to a digital production model is not yet acute, but this is mostly a matter of economics and understanding how best to deploy technology. If a publisher knows it will sell gazillions of copies of a title worldwide, offset is the most cost effective production method. But the biography of a much loved but relatively obscure poet is probably best produced on-demand. Matching method to market is key, as is being able to anticipate inventory requirements.

This is all good news for the environment. It sounds like book production is now in Ricoh's sights. If it is, we hope to see more engagement with publishers as well as printers to develop new business models ideally integrated with social media and print on demand. This would reduce the volumes of production waste, and help keep print's carbon footprint down.

Alphabet Soup for Print's Environmental Impact

There are many things that scientists love, but probably none more so than acronyms and absolutes, such as DC for Direct Current or PDF for Portable Document Format. Neither could be anything else, but even though scientists love to deal in absolutes, environmental science is notoriously inexact. Climate change and environmental impact evaluation make absolutism all but impossible: there are just so many variables.

But all is not lost. Environmental scientists may not have many options to be absolute in their field, but they can still pepper it with acronyms. They have come up with the concept of Environmental Product Declarations (EPDs) and Product Category Rules (PCRs) in an attempt to bring some order to the chaos. EPDs are documents that use Life Cycle Assessment to report the environmental data related to a particular product. They are designed to communicate relevant and comparable information about how a particular product impacts the environment.

This is all well and good but for printers and publishers it is extremely difficult to know what to include in such an assessment. Carbon footprinting is hard enough, but how do we quantify the environmental impact of free speech, or new takes on relationships, or political change, or of how knowledge furthers environmental protection? And then there is the Life Cycle Analysis: when does a media product reach the end of its particular line? This is heavy stuff and too hard for most of us to even contemplate. It takes environmental science into the realms of philosophy and social science, and it is up to the bold young feet of tomorrow's generations to march towards something sensible. In the meantime if we want the graphic arts industry to be environmentally accountable, we have to come up with ways to make the development of EPDs easier.

This is a problem not only for printers and publishers, so this is where PCRs come into the picture. PCRs are rules that provide a common basis for the calculation of environmental values. It's all very abstract and hard to get your head around, which is probably why no PCRs yet exist for printed and published products. Work is underway in Japan to try to define what constitutes a particular media product or publication, but it is slow and heavy work. In the meantime printers and publishers are urged to keep managing their environmental impact as best they can. After all, improved resource use leads to improved margins and that has to be a good thing.

For more green news, check out The Verdigris Project:

Verdigris

http://verdigrisproject.com

Raising the Standards Bar

Uptake of ISO 12647-2, which specifies the parameters for process control in offset printing, has been steady around the world since the standard was first introduced over fifteen years ago. Certification for compliance to the standard has gained traction over the last few years; however, there have been no print buyers who have gone for it, that is until now.

Print management firm Charterhouse is the first to gain ISO 12647-2 accreditation for quality control. Charterhouse is a global print buyer working with some of the world's biggest brands. The company chose to go for certification in order to have some benchmark measure of quality management for its customers. The implications of this certification for print media supply chains are serious: if printers want to be in the running for Charterhouse work, they need to consider conformance to ISO 12647-2. Charterhouse isn't mandating it, but certification to the standard will provide an edge. And beyond Charterhouse, print firms should seriously consider becoming ISO colour certified if they want to make the grade with global brands.

Charterhouse's recent announcement that it has achieved ISO 12647-2 certification has to be a wake-up call to the print industry. Colin Osborne MBE, Charterhouse's colour management expert, comments: "Being awarded this prestigious new ISO 12647 certification is a great acknowledgement of our on-going investment in the field of colour reproduction and colour management. It will allow customers across the globe to easily identify us as independently audited printers of the highest quality."

Charterhouse has no presses, but this certification makes Charterhouse the first global print management company to receive formal recognition for its colour quality control procedures. ISO 12647-2 specifies quality requirements for offset printing and has become the global benchmark for print colour quality across the industry. Charterhouse still works with printers without the ISO standard however, by working with an accredited printer it can ensure the final work meets the stringent ISO colour standards and can also offer its clients an ISO chain of custody, if they require it.

Charterhouse (**www.charterhouseproduction.com**) provides print management and production services to global brands. On behalf of its worldwide client base, Charterhouse buys a great deal of print, from commercial work through to sign and display, where the company is in the running for the Fespa 2014 awards.

Colin Osborne MBE, Charterhouse's colour management expert.

Charterhouse's ISO 12647-2 certification confirms that quality management is implemented throughout its business. The certification provides the company's customers with a benchmark of quality assurance, a benchmark maintained through regular in-house audits. Charterhouse has quality assurance procedures in place for all production from digital artwork and file delivery, to colour management and the presses.

However, maintaining compliance to the standard and to Charterhouse's overall policy will inevitably impact the company's supply chains. As Colin Osborne, says:

"Obviously we would like our suppliers to get on board with it". Print service providers who want Charterhouse's business should be seriously considering ISO 12647-2 compliance. Without it they may find themselves off the tender lists.

Charterhouse's ISO 12647-2 certification confirms quality control in the company's prepress operations and is based on the certification scheme developed in the UK for the British Printing Industries Federation (BPIF). This certification scheme is relevant for all markets and is UK government-endorsed so it has international validity. The BPIF scheme is not specifically tied to ISO 12647-2: companies can use it for certification to any colour quality orientated standard, such as ISO 15339 for print process agnostic colour quality control. The BPIF scheme is closely aligned with requirements for ISO 9001 for quality management and control. This standard is one of ISO's most popular standards and printing companies who have it already are well on the way to achieving certification for ISO 12647-2 compliance.

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ISO 9001 PDCA

ISO 9001 is based on the principles of the P-D-C-A cycle developed by W. Edwards Deming. The idea is to Plan, Do, Check and Act on all aspects of the business in order to constantly improve processes and business efficiency. ISO 9001 includes another handy acronym: SMART for Specific, Measurable, Achievable, Relevant and Time limited, used in the BPIF scheme to identify colour quality objectives. ISO 9001 is essentially a framework for any colour quality management system and works in tandem with ISO 12647-2 providing the guts and sinews. ISO is working on a version of the BPIF document with a view to turning it into an international standard.

To maintain its compliance to the standard in the future, Charterhouse has fully implemented the principles of ISO 9001 quality management. This will allow the company to maintain product conformity continuously, through internal testing and rigorous annual independent audits. This aspect of a strict certification scheme gives print buyers the assurance that this certification is robust rather than only applying for a limited range of work over a limited period of time.

Making the Grade

Printers who want to make the Charterhouse tender lists have several options. The first is to do nothing in which case they will never know what tenders they are missing out on and what business they are losing. Alternatively printers can scramble to get some basic ISO 12647-2 compliance and hope to sell in their services. Many print companies claim to be able to achieve the requirements of ISO 12647-2; however, the reality rarely matches the rhetoric.

Trying to fake it is an approach that isn't likely to get anyone very far with Charterhouse, which has a solid understanding of ISO 12647-2 requirements. A far better strategy is to put in place the colour management and quality control procedures that can lead to ISO 126472-2 certification and keep their business in the game.

This third option requires a printing company to go through a management process that ensures quality control in prepress and in the press hall. Printers who have their processes under control will find this simple enough to do; however, it is always helpful to get an external set of eyes to evaluate and even audit the workflow. Print & Media Certification, a certification body based in the UK can provide this service as part of the process towards certification.

The easiest approach to meet the requirements of ISO 12647-2 is to follow an industry scheme, such as the one that Charterhouse used for its accreditation. The UK scheme covers roughly the same ground as that of the

Swedish Printers Federation and, because of their close alignment to ISO 9001 requirements, both schemes are much more robust than the certification schemes of either Fogra in Germany or IDEAlliance in the US.

The scheme a printing company chooses is likely to be the one most popular in their country: however, the UK scheme is an easy bolt-on to an existing ISO 9001 certificate. It is also accredited by the UK Accreditation Service (UKAS), a member of the International Accreditation Forum, which is what gives the BPIF scheme its international clout.

Implementing ISO 12647-2

Whatever the scheme, achieving compliance requires an understanding of ISO 12647-2 and quality management processes. Consultants and industry associations can provide useful support for the evaluation and implementation processes and there are some guides for implementing ISO 12647-2 on the market. In France, KEE Consultants, a division of Alwan Software, has put together a Printing Standards Implementation Guide (**http://keeconsultants.eu/images/KEE_Consultants_Flyer_September2012_D1_V6_RGB150.pdf**) and consulting package for €1500. In the many markets IDEAlliance serves, including France and several Asian markets, local consultants offer hands on services.

We at Digital Dots in the UK have developed our own series of ISO 12647-2 implementation guides that are both simple to follow and inexpensive. These are designed to assist both printers and print buyers, and to be useful even without external help. The Digital Dots Standardised Print Production series covers ISO 12647-2 requirements for prepress, press and quality management with an executive summary. All parts are available as individual documents starting at €50 for the Executive Summary (**http://www.digitaldots.org/standards/spp**).

Charterhouse's ISO 12647-2 certification confirms the importance of colour management and process control in print media supply chains. Quality assurance has become vitally important to print buyers who want common colour appearance across media, including digital media. Brand owners use ISO 12647-2 to confirm that printers can reliably and consistently produce work to a high standard. Ultimately, certification to ISO 12647-2 can help print firms remain competitive and improve margins. Getting there is not necessarily easy, but quality control is vital for any business, including printing.

– Laurel Brunner

OKI flexible LED A3-printer ES9541

For most of us OKI is probably best known for its office printers, but the C931 and ES9541 (where ES stands for Executive Series) are designed and aimed at the graphic arts market.

They are toner-based printers using LEDs for imaging, but the really new and impressive feature is that the ES9541 has the capacity to print with white and clear gloss – yes

OKI ES9541 is an LED-toner based A3 printer with the capacity to print both clear varnish and white, beside normal process colour CMYK-printing.

– toner based! The ES9541 is distributed by appointed resellers within the graphic arts only, whereas the C931 is sold through the standard IT reseller channels.

Both the speed and image quality for the ES9541 are at a point where it could be an interesting choice for a smaller copy shop, or as an alternative 'all-round' machine at any printing site, for that matter. It offers 1200 x 1200 dpi resolution and a speed of 50 ppm (A4) and 28 ppm for A3 (or up to SRA3, which is slightly bigger than standard A3). Thanks to the straight paper path the printing speed is maintained for duplex printing, so there's no loss of speed when printing double sided output.

The name, ES9541, indicates the five colour capacity, with five printing units in a row – the process colours CMYK plus one extra spot colour, which at the moment can be white or clear toner. To change the fifth toner unit only takes seconds, and the printer driver automatically detects what the new configuration is.

In the base configuration it has two trays – the multi purpose tray on the side for manual feed, which holds up to 300 sheets, and the standard tray at the bottom of the printer, which holds up to 530 sheets. But there are a number of optional tray configurations, where the extra tray with a High Capacity Feeder can hold up to a total of 2,950 sheets. Maximum paper thickness is 360 gsm, when fed through the multi tray, and 320 gsm when fed from the lower standard tray. The printers will also automatically duplex media up to 320 gsm from all trays.

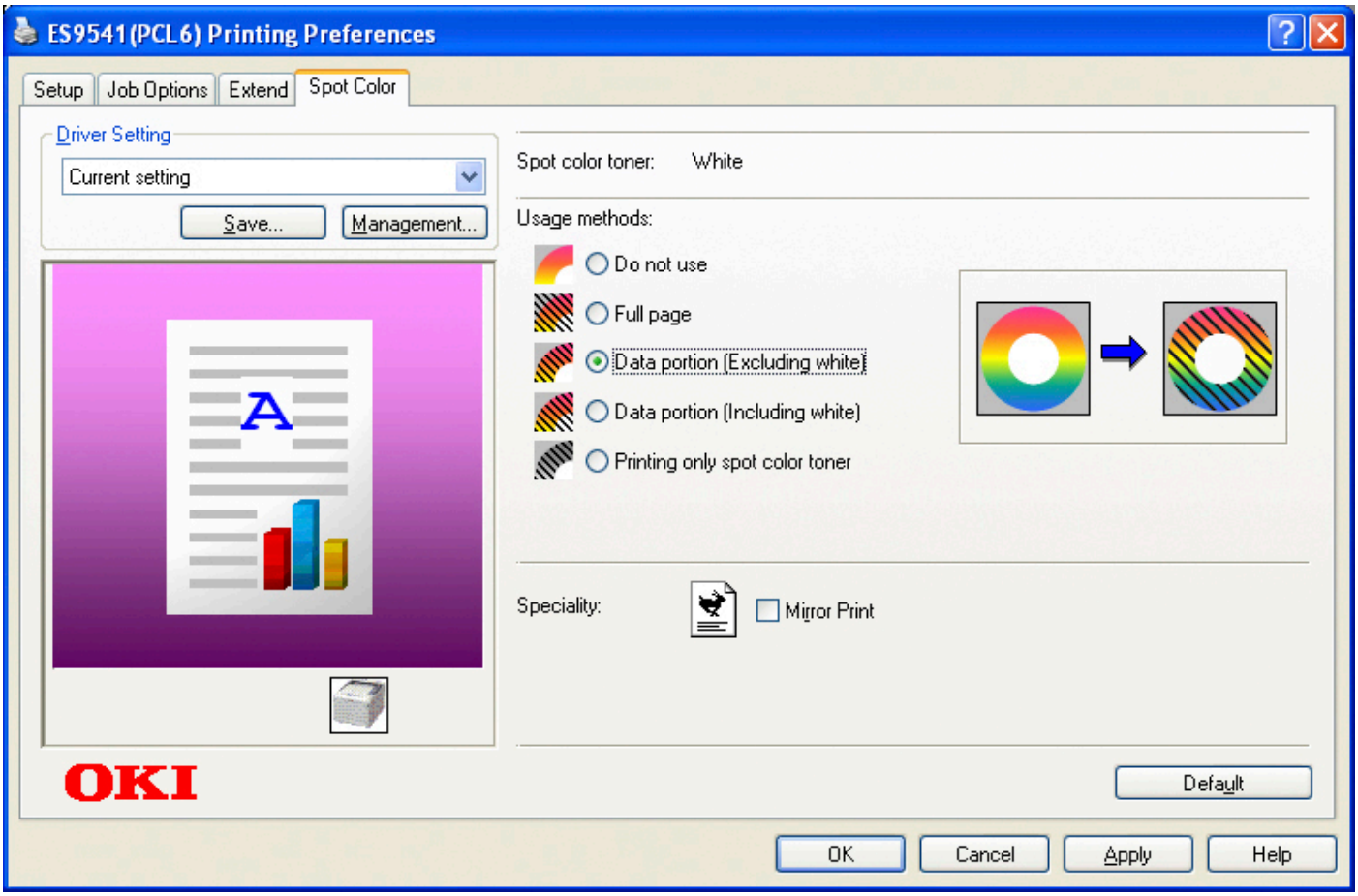
OKI offers three types of printer drivers. The first two are free drivers for PostScript3 and HP PCL6, to use directly from any Mac or Windows PC. The third option is a special version of the EFI Fiery XF RIP, for more advanced colour management and output control. In our test we only used the standard driver, from a Windows-based PC.

The printer drivers are very easy to use and help the user to set the printer up when, for example, printing with the spot colour options. When printing on clear film or back-lit substrates, you may want to print white first, and then CMYK, and perhaps mirrored. All this is clearly shown in the user interface of the printer driver, and illustrated with graphics (see screen dump on the following page).

How the test was done

When we test digital printers we normally look at six areas, referring when possible to established ISO standards for conformance. For the OKI ES9541 we had to add a seventh test, to print white on a dark substrate. The first area is what colour gamut can be achieved, and since there is no ISO standard for digital printing, we use the 12647-2 standard for litho offset as a comparison.

We measure colour gamut by creating a standard CMYK ICC profile from a IT-8 characterisation chart data. This is done using an X-Rite i1 Pro spectrophotometer and professional profiling software. The profile is then



OKI has made it very simple for the user to choose the correct settings when using the varnish or white print option.

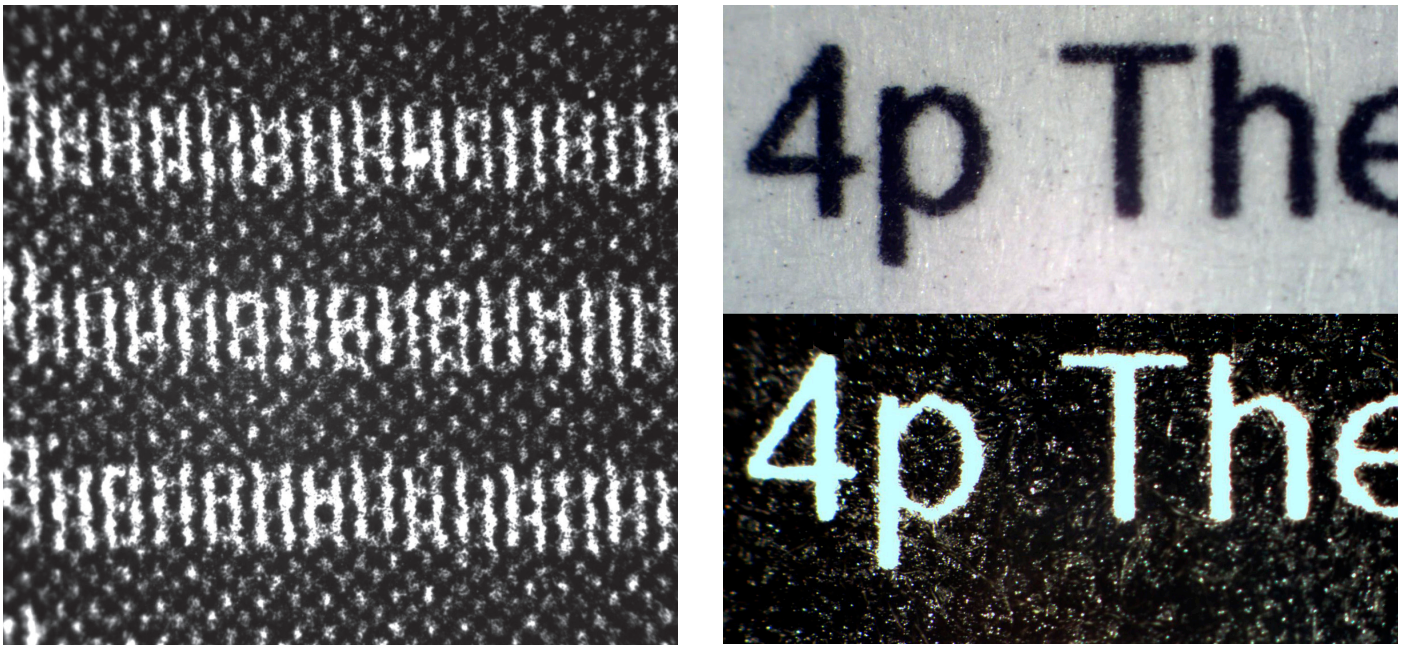
analysed with the Chromix ColorThink Pro software to yield a figure for the total number of discrete colours contained within the gamut. We define discrete colours as separated by a delta-E value of 1, using the CIELab colour space as reference.

The second area tested is the resolution that can be achieved. We call this the resolving power of the printing system, and this is often different from the stated addressable resolution, as per the technical specification. The resolving power is a combination of the native resolution of the print heads, droplet size (or toner particle size) and mechanical precision when moving the print heads and/or media while printing.

To measure resolution we viewed the prints of a test chart with a series of line pairs under a digital microscope. We want to determine the point at which the lines could no longer be differentiated as distinct pairs. As a complement to the line pair chart we also print text, both positive black on white and inverted white on black, in a small font (down to 4p). This is another way to judge what resolving power the printing system has for practical use.

The third area is to evaluate how uniform the print is across the paper surface. We take five measurements of full tone cyan using the SpectroShop software to compare the colour deviation between the first sample and the other four. As a threshold we decided on 2.5 ΔE, the same value suggested in the ISO 12647-2 standard for when printing solid spot colours and expect a close match.

The fourth area is to check colour variation of a print run. For this we printed a short run of 250 copies and pulled samples at every twentyfifth copy, and included the first print. We then use the sheet in the middle of the print run as a reference, and compare the colour for the other 10 copies with this. Again we refer to the ISO 12647-2 print standard for tolerance on this, and will allow a maximum variation of 4 ΔE.



Left: *In the resolution test, the OKI ES9541 showed identifiable line pairs up to the equivalent of 400 dpi, but due to the fact that a screen was applied by the printer driver a heavy moiré occurred. This meant we couldn't determine the true resolution, which should be closer to the stated 1200 x 1200 dpi. The sample shown is as seen using a digital microscope at about 500x enlargement.* ***Right:*** *The OKI ES9541 could reproduce four point text well, both as black on white background, and inverted white on black. Shown here is an image of the sample as seen using a digital microscope at about 500x enlargement.*

The fifth area tested is the printing speed. We print at maximum speed for at least 2 minutes and compare the achieved number of ready pages with the specified pages per minute.

The sixth area we check is the registration between the front and back of a page in duplex mode. Again there is no directly applicable ISO standard defining the tolerances for this, but we use the ISO 11800 postpress standard as a guide here, and the tolerance for different register issues is often defined to be +/– 1 mm.

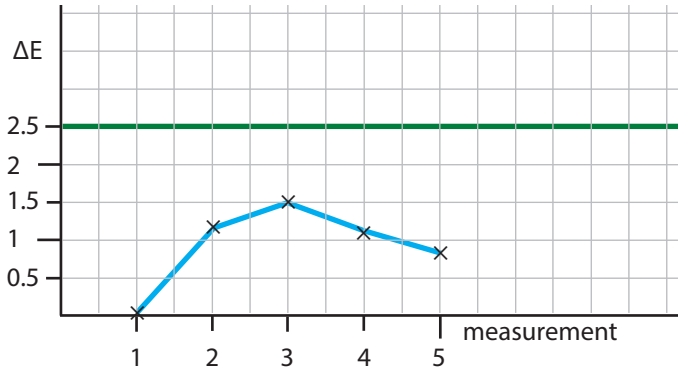
To analyse the opaqueness of the white ink we set up a simple and straightforward formula. We measured the density of the dark substrate, and then the density of the printed white areas. We then divide the density of black with the density of white to get a contrast ratio. For example, a dark substrate of density 2 and a white printed area of density 0.2 will get a contrast ratio of 10. If the density of the white instead was 0.1 the contrast ratio would be 20. The higher contrast ratio, the better opaqueness of the printed white.

Results in numbers

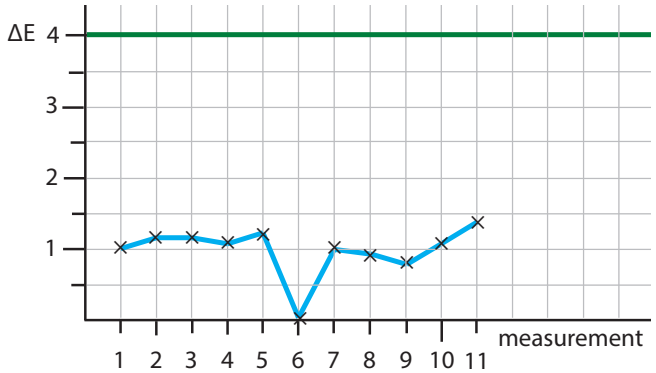
Since the OKI ES9541 is very flexible on what stock to print on, we printed on both coated paper and uncoated. We then compared the colour gamuts achieved with that of litho offset on both coated and uncoated paper. For offset, the colour gamut is around 400,000 colours on coated paper (using a standard ICC profile based on the FOGRA 39 characterisation data set), and around 170,000 colours (FOGRA 47) for uncoated stock.

On the ES9541 we only reached about 310,000 colours on the coated stock, so at first glance actually a slightly smaller colour gamut than for offset. But it could be down to how the printer driver handled the media. We printed without colour management, and normally you should then get full density on paper, but this might not have been the case.

Interestingly when printing on uncoated stock we reached 305,000 colours, well over the gamut of offset on uncoated. This tells us that the OKI toner is quite opaque, so reaches about the same density on both coated and



When measuring all five samples of solid Cyan across the height of an A3 sheet, the uniformity of the ink density was very good. We use a threshold of 2.5 ΔE, as suggested in the ISO 12647-2 standard, when printing solid spot colours. Any colour deviation lower than 1 ΔE is invisible to the human eye. The first sample is compared with itself, so will give a zero colour deviation.



When measuring a colour sample for every 25 copies printed in a print run of 250, the colour variation was very low, which is excellent. We use 4 ΔE as the tolerance, as suggested in the ISO 12647-2 standard. Any colour variation lower than 1 ΔE is invisible to the human eye. The middle sample, number 6, is compared with itself, so will give a zero colour deviation.

uncoated stock. An analysis of some generic profiles from OKI indicated a gamut of about 390,000 colours, so very close to that of offset litho.

The resolving power, where distinct line pairs could be seen, was only 400 dpi, well below the stated 1200 x 1200 dpi. Again this is probably because when printing through the standard printer driver we couldn't force the output to be in true linework mode. Our resolution test chart is lineart created in Adobe Illustrator, and should be output without any screening applied. When looking on the lines through a loupe and a digital microscope we could see a screen applied, and so a heavy moiré occurred. But one can see that the toner particles are actually much smaller than the lines that are reproduced at 400 dpi. So since we lack a more relevant output we estimate that the true resolution of the ES9541 is much higher than 400 dpi, if perhaps not fully the technically possible 1200 dpi. But this will have to be investigated further.

There is also a Pro Q mode using what OKI calls Multilevel technology, for 2400 x 600 dpi printing, but we didn't find that the true resolution was improved by this mode. However, the small text was clearly reproduced down to 4 point, both the positive text and also the inverted text with white on black background. On the small text we could also see a screen applied by the printer driver, where it shouldn't have been, on plain black text.

Regarding uniformity, the ES9541 showed a maximum deviation across the page of 1.5 ΔE (and an average of 0.9 ΔE). A colour deviation below ΔE 1 is impossible for the human vision to detect, so the results for the ES9541 have to be said to be more than satisfactory in terms of good uniformity.

What about variation? Well, here the ES9541 also did very well. Toner-based printing systems are sometimes accused of having a very high variation, but for the ES9541 the colour variation over the print run was maximum 1.4 ΔE (and an average of 1 ΔE), which again has to be said to be very good, meaning low. It is well under 4ΔE allowed in the ISO 12647-2 standard, and on average exactly at 1ΔE, which can't be detected by the human eye!

Regarding printing speed we clocked the ES9541 to produce the promised 50 pages per minutes for A4 sheets, give or take some seconds during the print run where the printer made some short mini-breaks, possibly to stir the toner for an even result.

The registration in duplex mode was judged to be satisfactory, well under +/– 1 mm in average in the four corners of the page, both in the horizontal and vertical directions.

Finally we measured the density of unprinted stock (black carton) and then the density of a printed white area. The black carton board had a density of 1.92, and the printed white had a density of 0.3. This gives a contrast ratio of 6.4, which for the eye works fine – the printed white covers well and is perceived as opaque. For other

Technical Specifications Summary

Vendor/Model	Inkset	Max. Media Size	Resolution	Print Speed (ppm)
OKI ES9541	CMYK+White or clear varnish	SRA3	1200x1200 (alt 2400x600)	50 (A4) 28 (SRA3)

more demanding applications, a contrast ratio of over 10 might be desired, but for general use the ES9541 met expectations.

Conclusions

The possibility to print with white, or add clear gloss on selected areas, opens up an exciting range of applications. This is the first time we've seen white printed with toner, and we weren't sure how well the white would cover, how opaque it really would be. But we were positively surprised as to how well OKI does this! And true white text on dark background will be more readable than if printed as a knock-out white printed with a four colour dark surround in CMYK.

The ES9541 is a compact printer using a small footprint, and reasonably fast. We can understand the excitement this has created when showcased at various printing exhibitions of late, and predict that it will find its way into many printing companies worldwide.

– Paul Lindström

A true RGB printer – LumeJet 200

We were quite surprised when we heard that the UK-based printer manufacturer LumeJet had introduced a new printer design on the market using photo sensitive material based on silver halides. This goes totally against the trend that we have seen in the last 10-15 years, where silver halide-based systems have given way to inkjet systems. But LumeJet is confident that its LED-based imaging system combined with precision fibre optics will attract users who want high colour gamut and true continuous tone imaging.

The imaging heads in the LumeJet 200 printer are based on LEDs. But through a fibre taper, acting as a lens, the original resolution of about 400 dpi is increased to around 4000 dpi, to match the resolving power of the photo sensitive material. It means that the light from an individual optical fibre creates a red, green or blue spot of the size of the silver halide particle itself. This is why LumeJet markets the printer as a true RGB printer, producing true contone images much like photographs from the days before the inkjet printers started to dominate this sector.

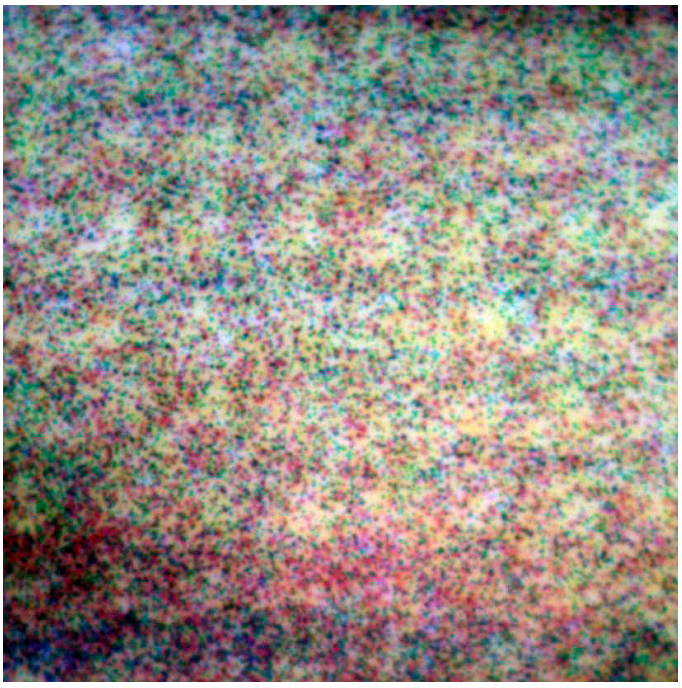
Another benefit of using an RGB-based imaging system, or as LumeJet puts it "writing with light, not ink" is that the gamut should be larger than when using a conventional CMYK ink setup. This assumes that the photo-sensitive material really has a very large colour gamut and contrast, including the capacity to produce a solid and deep black. And when looking at the sample output the imaging quality is superb. Since there is no conventional screen, the appearance of the photos is really photorealistic, and the colours very vivid.

We haven't made an exhaustive test of the LumeJet 200 yet, but a brief analysis of an ICC profile indicates a colour gamut of around 550,000 colours. Compared with the gamut of about 400,000 colours for conventional offset on coated paper, the LumeJet 200 produces a colour gamut that is roughly 40% larger. But a fairer, more relevant comparison would probably be to compare the gamut of the LumeJet with the gamut achieved by a wide gamut inkjet system, with extended ink setups, for example additional Red, Green and Blue ink. We have measured the gamut from such systems to match that of the LumeJet, so anyone considering buying a LumeJet 200 will then have to consider other factors, like total price of ownership and of course printing speed.

It should be said that the LumeJet 200 is the first model targeted at this market to come out of the R&D facility at LumeJet. The imaging head can be modified both to increase speed and/or resolution, so we might see other models and configuration of the LumeJets in a near future. At the moment the maximum output size from the LumeJet 200 is 1000 x 305mm, suitable for Landscape A3 photo books and similar. The printing speed is 200 A4 pph, higher than for wide gamut inkjet-based systems, but lower than that of toner-based systems.

The LumeJet 200 uses what LumeJet calls a "photonic technology" when imaging, meaning writing with light onto a page rather than using ink as for inkjet and toner-based systems. The result is a true RGB system, with a high gamut and a resolution close to the resolving power of the silver halides in the substrate.

What about environmental friendliness and the use of silver halides? According to LumeJet, the Waste Recovery Unit neutralises the hazardous waste by retrieving the silver halides, so the used water can safely and legally be flushed down the drain.



Since the LumeJet doesn't use a conventional screen, but rather exposes the pixel-based RGB image onto photo sensitive paper, what we see in this enlargement is the single silver halide grains. The resolution is equivalent to 4000 dpi according to LumeJet.

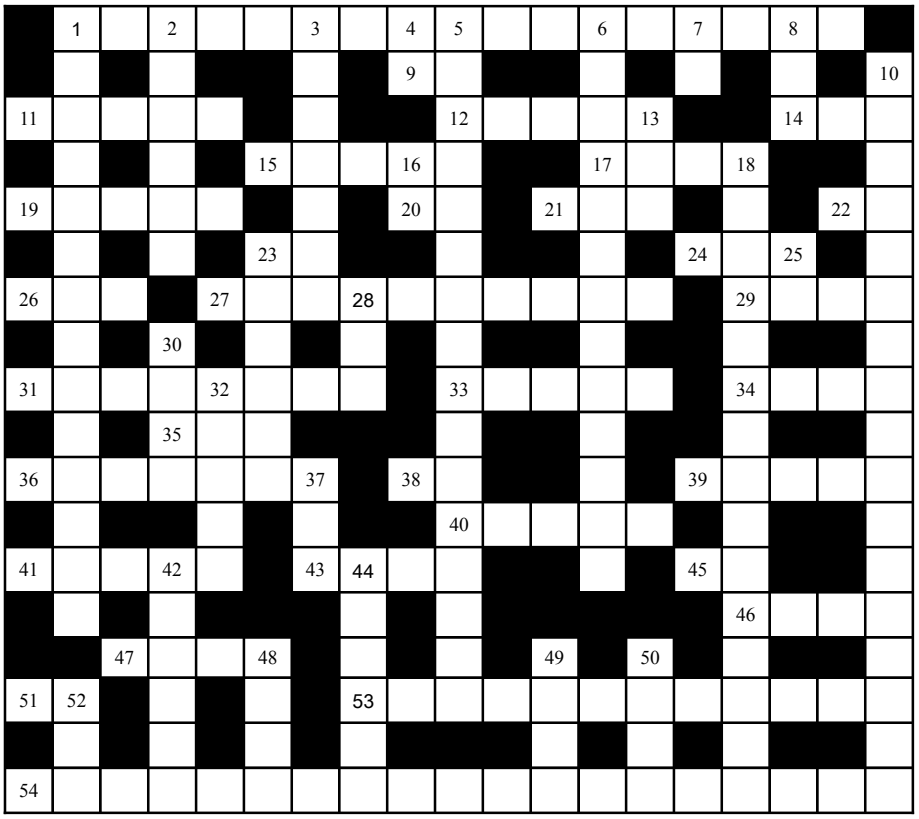
It will be interesting to see the uptake in the market for the LumeJet 200. It will appeal to those who want to have photos and photobooks with the "look and feel" of high quality photographs from the analogue days, but through a modern digital process. According to LumeJet the price per copy will be very attractive, and the stability of the imaging system and low maintenance costs are other key factors as to why photo printing companies should have a closer look at the system.

– Paul Lindström

X-word Puzzle

Number 52*

This month's puzzle is very bitty, with rather too many clues, most of them rather too easy. But be warned, it is trickier than it looks.



Across

1. Mr Landa is very proud of these. (11, 6)

9. Third person singular English male. (2)

11. Something more. (5)

12. To irritate. (5)

14. A policy every company should have. (3)

15. The kind of graphics wrappers dream about. (5)

17. Nuisance and flap. (4)

19. Eskimo's home. (5)

20. Manuscript. (2)

21. Subscriber Identity Module. (3)

22. The other half of DC. (2)

23. Or not? See above. (2)

24. RAM is meaningless with out it. (3)

26. Unit of play in Curling. (3)

27. The stuff entering a digital press that's turned into content on the page. (4, 6)

29. Wisely used to clean up a mess. (4)

31. Process of overlapping two colours to disguise misregistration on press. (8)

33. To provide. (5)

34. True. (4)

35. Not young. (3)

36. One who believes in centralised control and planning. (7)

38. Don't stay. (2)

39. Puts down. (5)

40. Collections of type with common designs. (5)

41. Necessary for inspecting dot formations. (5)

43. Embarrassing error or place to stay. (4)

45. That clever number used in geometry. (2)

46. Objective. (4)

47. Connection or URL. (4)

51. AKA the Common Era. (2)

53. Trivial or irrelevant? (3, 9)

54. From Internet to page the route for printers who want to extend their business. (3, 2, 5, 9)

Down

1. Characteristic of innovative technology. (4, 10)

2. Not wide. (6)

3. Consider, don't absorb. (7)

4. Measure of acidity and alkalinity. (2)

5. Print process commonly used in newspaper printing. (7, 3, 6)

6. The goal of any business. (13)

7. Information Technology. (2)

8. Total Area Coverage. (3)

10. Recyclable, productive and no chemical print forme. (11, 6)
13. Delicious. (3)
16. A dash longer. (2)
18. Not long or analogue. (5, 3, 7)
23. Belongs to Dave. (6)
25. Master of Arts. (2)
28. Pirate speak for yes? It's not clear. (3)
30. Non-process colour. (4)
32. Mountain biker slang for cowards: pussy line. (1, 4)
37. Necessary for XML coding. (3)
42. Easily folded, flexible. (6)
44. One who is against. (2, 4)
48. Save. (4)
49. In my humble opinion. (4)
50. Use with a knife or split? (4)
52. Digital Front End. (3)

***Answers in the next issue**

Number 51 – Answers

I			C	R	A	C	K	E	D		M	A	I	N	T	A	I	N
N	O	A	H			A			I		A			O		D		O
S			E			L			S	E	T	T	E	R		V	I	M
P	R	I	C	E		E	A	S	T		C			T		E		I
E			K			N			A		H			H		R	U	N
C	A	K	E	S		D	O	W	N	L	O	A	D			T		A
T			D			A			C		N			S	K	I	L	L
		S		B		R			E	M	P	O	W	E	R	S		L
P	A	C	K	A	G	I	N	G			R			R		I		E
		R		R		N		I		M	E		B	I	N	N	E	D
D	P	I		B	A	G		N			S	T		A		G		G
E		T	B				G		D		S	O	I	L	L	I	N	E
E			A		G		R		A			T				N		R
P	H	A	R	M	A	C	E	U	T	I	C	A	L	S		S		
E			C		I		A		A			L		A	V	E	R	S
N	A	N	O	I	N	K	S		B	R	I	C	K	S		R		T
I			D		E		E		A			O		H	O	T		A
N			E		D		D	O	S			S				S	I	R
G	L	A	S	S				R	E	L	A	T	I	V	E		N	T