



Digital Dots

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Spindrift

...Serving The Graphic Arts Industry Since April 2003

News Focus • Opinion • Reviews
Techno-Babble • Attitude

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Foresight

N. *foresight*, anticipation, foretaste; foreknowledge, second sight, clairvoyancy, premonition, presentiment, foreboding, forewarning.

Vb. *foresee*, divine, prophesy, forecast ---*warn*; see or peep or pry into the future, look into one's crystal ball, read one's palm, have second sight; be forewarned, know in advance

(From Roget's Thesaurus of English Words & Phrases)

Dear Reader,

Five years ago at a boozy dinner at Cliveden in the UK, Heidelberg's then CEO Hartmut Mehdorn told us that the company's biggest competitors in years to come would be HP and Xerox. At the time Heidelberg was sitting on a mountain of cash and was hell-bent on dominating every link in the digital print production chain. Surely the idea was mad: some viable competitor must exist within the graphic arts and printing industries? But of course there was none and as HP and Xerox reach out to printing and publishing, Mr. Mehdorn's prescience looks less like speculation and more like shrewd foresight.

For Heidelberg is undoubtedly struggling. Ragged and ineffectual, both Heidelberg's empire and market are plagued with overcapacity and high velocity change. Change ought to mean opportunity and growth but unfortunately for Heidelberg both require investment, investment the company is unable to make just now. Heidelberg is a beast shackled with history, entangled in a web of competitive and market threats, and saddled with an unsympathetic major shareholder in the form of RWE. To survive, Heidelberg needs to move quickly and lay claim to its future. Otherwise that future lies in someone else's hands, most likely those of HP and Xerox.

We've recently met some of the top dogs at both HP and Xerox (mind you, Xerox CEO Anne Mulcahy, though certainly the top, should never be referred to as a dog – she is a woman of amazing integrity, unstoppable enthusiasm, rare humility and a silly sense of humour to boot. We're fans.) We've attempted to get behind all the spin – as we would – to give you some idea of where these two giants are headed, where their strengths lie and what they need to get serious about, if they are to count in the world of colour printing.

Enjoy – we'll be back in August.

Cheers from the Spindrift crew,

Laurel, Cecilia, Paul and Todd

In This Issue

HP Sauce and Xerox Frappé

Laurel Brunner writes: "Digital imaging and printing, digital publishing, infrastructure and workflow management. This blah blah mantra, so familiar to the graphic arts, is now HP's incantation too. Xerox is humming a similar tune and unlike traditional graphic arts developers both have the money to put actions to the words." And there are a lot of words. Not to mention figures. Apparently the colour market is going to get so big it will reach outer space before the next decade. It's one thing knowing how big your potential market is going to be, however understanding and meeting it's needs requires slightly different skills. Have HP and Xerox got it right? Find out...

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Digital cameras put to the test

From being reasonably good, the professional high-end camera backs now surpass analogue film in terms of actual pixel quality and colour depth. This we know, but does it matter which camera back you pick? In a bid to find out we set up a test at the most experienced digital photography studio in Sweden...

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We hope you are reading Spindrift with interest. We have a special message for readers who are nonsubscribers, so if you are not a subscriber please turn to the last page or visit our website (www.digitaldots.org)

News Focus

Quality Control for ICC Profiles

Alwan Colour Expertise has introduced ColorPursuit 1.0, a profile assessment tool for checking the quality of ICC colour profiles and assessing the overall quality of a colour production workflow. Based on three parameters, ColorPursuit 1.0 uses sophisticated metrics and algorithms to build automated ICC workflows based on various devices and colour spaces.

ColorPursuit assesses ICC profile quality by calculating profile accuracy based on errors introduced by profile tables in colour transformations. Device profile quality is calculated according to analysis of the device profile using both colorimetric and perceptual gamuts. The software also evaluates the specific reproduction of a source colour or image according to a given device and profile combination. Alwan's technology uses error analysis and ΔE deviations in order to identify data that could create colour inaccuracies at output, but it can also be used to improve overall quality and as a means of monitoring complex colour workflows to mitigate colour errors.

Certifiable

EnFocus has finally announced its CertifiedPDF.net. This online resource for PDF specifications provides secure file exchange using a subscriber model. Contributors provide

file interchange specifications to the CertifiedPDF.net website (www.CertifiedPDF.net) along with access for subscribers. It's extremely clever, with considerable potential for improved file management across a range of applications. Free to subscribers, the annual fee for contributors depends on the number of specifications uploaded and how many subscribers a contributor wants to support. Up to 50 costs €500 a year, up to 500 is €1500, and up to 5000 is €35000.

Enfocus also announced a new OSX compatible version of Pitstop Server, based on new version of Enfocus' PDF library. Enfocus' other applications including Pitstop Professional and Instant PDF will go OSX in the coming months. Further details on the Enfocus announcements to come.

Agfa's Elite CtP Platesetters

Agfa is to supply versions of its Xcalibur VLF and Xcalibur 45 8-up thermal platesetters with Sublima hybrid high end screening technologies.

The Xcalibur Elite models are based on Silicon Light Machine's Grating Light Valve imaging systems, a technology that can image very precise and accurate dots. Thus these platesetters can image advanced screens for rendering fine details on ordinary substrates at moderate imaging resolutions. Sublima is used for contone reproduction in images with a high dynamic range, rendering 1 to 99% dots on plate and in print. Sublima uses ABS technology to handle the midtones and CristalRaster for the highlights and shadows. All halftone dots in a stochastic screen have the same size, but they are imaged with varying frequency and spatial distribution depending on the tone value to be reproduced.

The Elite versions of the Xcalibur 45 and the Xcalibur VLF will be available at the end of the year. These machines will provide Agfa with a welcome answer to some of the other high-end thermal platesetters on the market. We look forward to seeing how the various technologies, platesetters as well as screens, compare. Any company interested in sponsoring a test should get in touch with us!

Eek it's EKCS!

We generally don't jump out of our collective knickers for content management stuff, but we're making an exception with Express Knowledge an asset management tool developed in Delhi, India. Database driven with Java clients, the software was developed by a printing company and is in use at ad agency JWT. Apart from being an important client for Express Knowledge, JWT are one of the largest ad agencies in the country, indeed the world. ▶

Spindrift

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JWT has a massive task in India to raise the Coca Cola profile, reinforce the brand, and of course to protect it. Express Knowledge Communications Solutions (please change the name!) has developed a digital asset management system for supporting all types of digital media. This is a server based clientless system and so ideal for distributed environments. It comprises modules for different applications ranging from simple online approval tools, through to full on JDF compliant production management.

This is the first content management system we've seen that treats all business and production and content management processes as part of an holistic system. EKCS supports all digital processes from MIS to production in the same environment. All content elements from spreadsheets to high res images are managed within a common standards based environment, using well designed application specific modules. The technology can manage everything from the simplest file delivery to highly complex distributed workflow management. Birdy num num.

Colour Taken to Court

The European Court of Justice has ruled that colour can be trademarked. The judgement was reached following an appeal by Dutch telecoms company Libertel against a ruling by the Benelux Trade Mark Office, which had deemed that the colour orange could not be registered as a trade mark.

The European Court overruled this in its ruling on the basis that consumers can associate specific colours with specific goods and services. It also stated that the number of "different colours ... available as potential trademarks must be regarded as limited".

Undoubtedly this ruling will affect trade mark law, but it also has interesting implications for colour management. Libertel's orange may not be so distinctive on a poorly calibrated screen, so web based businesses beware! The court ruled that "A colour ... may be represented graphically ... using an internationally recognised identification code". It doesn't get specific, but this could be anything from Pantone numbers through to CielAB values, and Gretag Macbeth's cfx.

US Newspapers Take a Stand

Our colleagues at American Editor & Publisher report that the organisation "the National Campaign to Close the Newspaper Gun Loophole" has managed to convince a number of newspapers to stop publishing classified ads from unlicensed gun sellers:

"The Houston Chronicle is the latest in a string of major newspapers to restrict or eliminate gun advertising, at the request of an Iowa-based non-profit organisation

seeking to cut down the number of weapons sold by unlicensed dealers. The Hearst Corp-owned Chronicle has announced it would stop accepting such classified handgun ads."

Perhaps the US newspaper industry is not in such dire straits after all, seeing as it can actually afford to take a moral stand whilst cutting off one of its beloved revenue streams – albeit, one imagines, a somewhat limited one. We salute them! (And hope they don't get shot by disgruntled snubbed advertisers).

JDF-A-Lump

CIP4 has recently conducted its first interoperability test for JDF and announced that 17 JDF "consuming devices" out of 18 succeeded in file exchange. The 18th choked and resisted all attempts at force feeding. Tests were run under controlled conditions and conducted by experienced JDF engineers who had to do a lot of "tweaking and reworking" so it sounds like one not to try at home just yet. The message ought to be that things in JDF-land are coming along just fine. Given the CIP4's description of what went on during the tests, it sounds more as though JDF is still very much a lab project rather than anything useful. But remember progress can only come once lots and lots of mistakes have been made, so this is all in fact good news and a very positive step towards JDF's future health.

Quark 6.0

What can we say? So much. But we won't, we'll save it for one of those Shiraz moments. In the meantime we are working on an article that looks at InDesign 2.0 and XPress 6.0. What a yawn you might be thinking? Quite reasonably too, but remember this is Spindrift. We are shortly starting continuous coverage of the battle between the two with an article tentatively titled "20 Industry Voices". If you want to be part of this, please let us know.

Acrobites

(Something to get your teeth into)

SOAP

Stinky, smelly stuff fit only to keep the sock drawer sweet, in this day of gels and mousses? No. Simple Object Access Profile is an XML protocol that recently got upgraded. SOAP is a key technology for exchanging structured content and information in a distributed environment. It is the thing that makes Web Services work because it handles the heavy duty data movement functions. SOAP 1.2 has an improved messaging framework and resolves more than 400 issues to improve interoperability, so the standard is now considered up to scratch for more general deployment. ►



XForms

XForms was necessary because HTML forms basically don't work very well in database applications, particularly those where online forms and documents are distributed. The XForms specification makes it possible to tie form fields to specific data models rather than to presentation so that local variations such as post codes, telephone prefixes, dates and currencies are handled properly.

More interestingly XForms supports different input types such as scanners, digital pens and microphones. The W3C's XForms working group is now focused on using XML schema to define data models for forms and oh so much more. One day all peripheral devices will have embedded web servers, so this technology will make it possible to configure devices without specific drivers. Platform independent data modelling for access Web Services will be an interesting means of managing print output, to say the least.

Letter From... Grenoble

Mes Amis Spindrifteuxes,

Je suis un student d'engineering et les artes graphiques en France. Aussi comme ça je travail avec mop et bouquet chez une maison de research en Grenoble. C'est très agréable ici mais quelques fois j'ai beaucoup de problème avec mes travail qui est très ennuyant.

Pendant le weekend j'étais especially ennuié et j'ai decided to demander une question au sujet de colour management aux un professeur chez une college de printing en Angleterre. Alors je lui ai téléphoné mais le response was no pas bon. Quand je lui ai demandé de savoir comment on fait de digital colour management, ils ne savent pas what j'ai meant. Le prof m'ai répondu: well er, fronkly mon ami we ave you know, you ave ze, er, er, ah well for sure so or maybe you know, fronkly, so we keep zat so en fin uh? You see?

Je ne sais pas pourquoi il was parlying avec une French accent, mais now je suis even more confused than avant. Alors je crois que perhaps beaucoup de people ne comprends pas the sujet de digital couleur? Qu'est-ce vous think? Est-ce vous could assister moi avec colour management? Je suis sure il y a beaucoup de students et professors dans les colleges qui would like to savoir about

colour management et les boffins ICC. A ce moment c'est as claire as mud.

Avec mes sentiments les plus distinguished et multicoloreured,

François de Ciem-Waikay

Etudiant et Cleaneux en Grenoble

Say What?

Iffy Writing Award Presented in the Ether for Obfuscation, Confusion, Misinformation or All Out Pretentiousness. Apart from Spindrift contributors, authors names withheld, because we aren't that cruel!

(from a nameless newspaper journal)

"Offset printing is a very mature technology with high automation and major changes in plant are therefore likely to result from different technology rather than advances in the same technology – the cost to increase both efficiency and quality rises sharply as the technology matures for all types of plant." – *It's all in the breathing!*

Say That.

Quotable quotes this month.

"There are 10 kinds of people in the world. Those that understand binary, and those that don't!"

Spindocs

(Where the spinner gets spun!)

Heidelberg sends a letter to the editor in order to set the record straight in a UK trade magazine:

"Thanks for a very good article on the Duplo System 2100 bookletmaker. However, the headline betrayed a misunderstanding. It is not an inline finishing device but a nearline one. That means that it is integrated in the whole workflow but not actually in the machine itself."

Mattias Hartung

Heidelberger Druckmaschinen, Germany

Perhaps he should have paid attention when the Word spell check let "inline" pass, while a friendly red line appeared under "nearline"? What we want to know is – can he quantify near? Either you're in or you're out, surely!

Driftwood

(Useful stuff washin' in on our shores)

Digital Printing Technologies

Digital printing is the future – this we know. What is less clear is which particular digital technologies will prevail. (And there are more of them than quite frankly really seems necessary.) Starting in this issue we'll look into the various methods, some of which are tied to a single supplier, some of which are more generally employed.

Lesson 1 – Ink jet

Ink jet has interesting possibilities for a variety of applications, not least as an option for digitally printed newspapers. Today ink jet technology is mostly associated with the consumer market and large format photographic quality printing. But there are also a number of ink jet presses on the market, used for high volume industrial printing of, for example, labels and packaging as well as for consumer printing of bills, credit card statements and the like. The output resolution of the ink jet presses is not, as yet, very high, but the production speeds are considerably faster than that of any other digital printing method – certainly where colour is concerned. Of course this is why newspaper printing may prove a successful application – of the handful of digital press suppliers trying to get into the newspaper market today, only Scitex Digital Printing offers colour with its Versamark family of ink jet presses.

There are two main types of ink jet technology, drop on demand and continuous flow, distinguished by how the drops of ink hit the printing surface. Each has different strengths and is suited for different applications.

Drop on demand causes the ink to expand so that droplets are forced through an ink jet nozzle. Expansion happens either through electrical stimulation or as a result of heat and is controlled so that ink droplets are forced through the nozzle individually rather than in a steady stream. A continuous flow ink jet head allows the ink to flow continuously through an electrostatic field. The field charges some of the droplets, depending on what is to be printed so that a second electrostatic field can then direct the droplets to the print surface. This combination of charger and deflector means that droplet placement and frequency can be controlled with extreme precision so this technology is capable of very high quality. It offers a broad colour gamut, colour conformity and overall quality and is used in a wide range of applications. It has been especially popular for proofing applications. However, continuous flow technology is more sensitive than drop on demand and can be vulnerable to clogging particularly if the machine is not in regular use.

To date, ink jet image quality has not been considered good enough for high volume commercial print. However the ink jet research community is working all out and the technology is progressing fast for various uses. It will play an important role far into the future.

Boomerangs

(Your feedback fed back)

Gee Ranasinha of Dalim Software sent an e-mail regarding our article in Issue 1 about RTI and online proofing. It went something like this (well exactly like this actually):

“AARRRGGGHH!!

Laurel says that we're an OEM of RTI!!!!!!!!!!!!!!

ARRRRGGHHH!!!!”

To which we responded:

“Dear Gee,

RTI checked the story. So do tell what's the gig? And of course we'll publish a correction.”

The record was subsequently set straight in rather less guttural terms:

“Just to set the record straight, our TWiST DiALOGUE product, as with all our products, is based on technology that is totally in-house developed. Neither TWiST DiALOGUE, nor indeed any other Dalim Software product, uses any technology licensed from third parties. It's always all our own work, and we're all very proud of that.

“By using our own programming expertise throughout, the TWiST DiALOGUE application is able to be free of requiring any client-side application, either at the local level of via a web browser plug-in. This is contrary to the way of working with most other solutions, and one reason why the streaming/rendering of high resolution images at the client end using our solution yields considerably faster results.

“Best regards,
Gee”



Xerox & HP are both vying for front position in the colour race

It's only just begun

Digital imaging and printing, digital publishing, infrastructure and workflow management. This blah blah mantra, so familiar to the graphic arts, is now HP's incantation too. Xerox is humming a similar tune and unlike traditional graphic arts developers both have the money to put actions to the words. And unlike their competitors they have access to the next boom market for printing and publishing: corporations and information services providers.

Hewlett Packard is not a name generally associated with printing, at least not by printers and publishers. But ask anyone using one of HP's 200 million installed inkjet printers what business HP is in and the answer will probably be "printers". The company's Imaging and Printing Group contributes \$22 billion to HP's revenues, a figure that rises 10% annually. That's an awful lot of money. Dominant at the bottom end of the market HP is looking elsewhere for growth, basing future business on output solutions and services. Printing and publishing is HP's elsewhere, and we're not just talking proofing.

Practising what they preach

Heavy duty rationalisation followed an internal audit of all systems at HP. From purchasing procedures, capital equipment management, print buying and information management, anything that required documentation, HP reorganised workflows, print acquisition processes, information and print management, and updated output production. Producing print on equipment appropriate to run length was just a taste of the rationalisation pudding. HP saved over \$50 million in worldwide print costs. Vague and saccharine HP's workflow rhetoric is not. HP's \$50 million saving is a blast of heavy metal rock straight into the collective corporate earhole. And they're listening.

HP Sauce

HP's combined expertise in IT and digital printing puts the company in a unique position, a position ripe for leveraging. According to Vice President Worldwide Digital Publishing Systems Bill McGlynn, the company is determined "to take it all digital. We go to the CMO or CEO of a company and show how we can save them money. It's a simple proposition and one that we all know about: corporate structures are largely inefficient in how they manage marketing and communications services." Infrastructure services support business critical services and digital publishing, and together they support market communications and so sales revenues. Bingo.

This simple proposition is being presented to the top level corporates and beyond, initially to copyshops and inplant printing operations, but eventually to any business that produces print. This is HP's foundation for the future. Speed and output quality improvements are paramount, both for inkjet printing and for Indigo's digital press technologies. Says Mr. Bill "we see all kinds of opportunities to make it go faster – with quality improvements even as far as banknotes. We see the fundamental technologies lasting for decades, but most of the invention will come in the next 10 years. We're investing heavily in that." ▶

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HP's keen on all types of print production from office print to books, newspapers and security documents. The company is rumoured to be interested in acquiring Scitex Digital Printing, holders of numerous key patents (and a Xerox partner!), and HP is talking to newspapers in the UK with a view to partnering. HP is indeed serious.

Hip Hop HP

So far HP haven't got a particularly coherent strategy, but it has made some key first moves, working with select customers to manage print production systems ranging from corporate brochures and ultimately newspapers. Digital presses loom large in the picture, and several clients are already processing variable data streams.

Rowdy Audi

German car manufacturer Audi has saved over two million Euros in worldwide printing costs, printing variable content manuals on an Indigo press. In 2002 Audi had only fifteen large print jobs requiring over 20,000 car manuals, and so used conventional offset printing. But six hundred print jobs averaged 300 copies each, and around 200 had runs of under 200. All were digitally printed. Documentation manager Mark Tworek said with "30 different language versions and sometimes as few as 50 copies, we need affordable short run printing." Audi has seen print costs fall 50% in the last year and consequently HP has sold an awful lot of Indigo ElectroInk.

More importantly Audi's turnaround time for manuals dropped from fifteen to six days, so cars now leave the factory a week earlier. Audi sold over 730,000 cars last year, so the improved capital deployment and cash flow were enough to set even the glummiest of glum accountants shimmering with excitement. Audi now works with HP to produce additional targeted manuals, including market and language specific versions, plus manuals for in-car mobile telephones, navigation systems and stereos. More ElectroInk revenues flowing into the HP coffers, and better services for Audi and its customers.



HP Indigo Print 3000 and 3200 (below)



Telephone zone

HP has signed a deal with telecommunications company Alcatel (turnover 16.5 billion Euros!) to "audit and redesign Alcatel's installed printing and copying base ... [for] a complete managed print service". Worth \$45 million, the service contract affects over 100 European sites and includes digital printing services. Jean-Jaques Lang, Alcatel's director of corporate purchasing, has "seen a shift in the way HP is looking at the market ... 18 months ago we were not in line with what we were asking and what they were offering". Now it seems the two are very much in line.

Alcatel wanted comprehensive, flexible services "to take advantage of the printing world and the copying one and to get access to the latest printing and copying technologies". In phase one HP replaced Xerox monochrome copiers with new HP MFDs (Multifunctional Devices) and in phase two implemented a complete production service at four pilot sites. Phase three sees the service deployed throughout Alcatel, replacing 1500 copiers with MFDs at 25 Alcatel entities operating at over 100 sites. HP will manage most of Alcatel's print infrastructure throughout Europe and will operate and manage the overall output environment for the next five years. After that who knows, but as Mr. Lang put it "now they [HP] have to deliver and show no complacency".

Works of Art

Working with HP the National Gallery is setting up a kiosk service for printing gallery images on demand in the National Gallery shop in London. Prices range from £10 and up and visitors can select their favourite images from the National Gallery catalogue. Size and format options go from postcards to posters with printing on preferred stocks. The service provides prints of every image in the gallery, although the top 200 will still be printed offset and charged for accordingly. The digital prints will cost more, but who cares if you can get the image you want? As Clare Gough The National Gallery's director of communications and media says "this is about giving visitors the chance to purchase the image of their choice, which wasn't possible before".

So far 1200 of the 2300 images are digitised and HP has worked with the gallery to design and build a print ordering system interfaced to the Indigo digital press. The National Gallery wants to extend the on demand model to sell its prints at other locations worldwide, probably through print shops with images downloaded from the Gallery's website. This is where it gets stickily tricky and where HP could really blow it big time. Maintaining colour quality in a distributed application of this kind will take more than reliance on the likes of partners EFI, Best and Gretag MacBeth. The National Gallery hasn't committed itself to work exclusively or indeed at all with HP on this so there's plenty of scope for other players. Mr. McGlynn of HP says "we want to do colour management worldwide on all devices -- better than anyone" so this project may be a good place to start.

A Sidelong Glance

HP's "smarter printing solutions" is initially aimed at capturing corporate print, and strengthening HP's position as print technologists. As well as stepping onto the toes of printing press manufacturers, HP's move will also force a change in attitude for many commercial printers, for they depend heavily on this sector. They stand to lose their so called blue chip customers for high volume print production, if they cannot compete with the HP offering or fit into the HP print procurement model whatever it turns out to be. Every time HP convinces a large corporation to let it manage all print related services, the print provider risks losing business if they cannot provide the necessary digital or offset print services. On the other hand HP's strategy is a great opportunity for printers who can demonstrate the digital savvy necessary to support the data management and print fulfillment. It's about culture shift and evolution.

The Flaw in the Ointment

HP has a breadth of unique technologies at its disposal including server and network infrastructures, imaging and printing products, proofing engines and high performance digital presses. Combinations of these technologies are already deployed at plenty of sites and are doing what is expected of them. But turning what's out there into the panoply of HP-based digital print services the company envisions won't be simple. HP estimates that "digital publishing is an 18 trillion page opportunity" and therein lies the problem. Managing data in a distributed production environment mayn't be so very hard, but managing colour data and device behaviour and interaction in a distributed production environment is very, very hard. Colour management knowledge and JDF-based job management ought to be central to the HP vision and its

Page volumes aren't the point. Page quality and colour accuracy in distributed environments are the point. Unfortunately this area does not lend itself to market data collection, which may be why it has escaped HP's and Xerox' attention.

▼ strategic development plans. It isn't clear that this is the case, however in this respect HP is not alone.

Xerox Bouncing Back?

Xerox lacks HP's breadth of technologies, and it isn't as far along in the "new business of printing" but it has an edge in volume print production and enterprise data processing experience. Money and governance have preoccupied Xerox' recently, and may put further wobbles in their wheels, but in the meantime Xerox is in the black and with \$3 billion in cash at its disposal, it is focused on growth. As CEO Anne Mulcahy explains "we're on the offensive, we want to win and we've taken the decisions to be tough and successful in the market." She adds that "growing revenue is critically important to us and that is why we've been focused like a laser on doing that and on generating cash. A stable balance sheet is a lesson learned that will never be forgotten".

Xerox' first quarter saw a 3 percent increase in equipment sales. Colour sales are up 16%, mostly from the office market but 8% coming from what Xerox calls production colour, meaning digital printing. Colour printing is a key market and Xerox is reorganising worldwide to support it at least at the office level. The company is simplifying customer relations, distribution and services to support future revenue streams particularly for colour print.

Document Services

For Xerox, the Document Company document services are the obvious place to start building new revenues. Xerox estimates that there is a \$3.6 billion services market and recognises its relevance for all Xerox sectors. Anne Mulcahy sees that for most companies "documents are part of the problem but documents are also part of the solution ... [and] documents cost companies between 5 and 15% of company revenues. 50% of [corporate] investments are in the services area. We have over 12 000 people on customer sites all over the world and that's a base from which we can grow." She estimates the overall market opportunity in services growing from \$16 billion in 2001 to \$32 billion in 2006.

Services revenues are only a starting point. The company also anticipates that the document production market will grow to \$123 billion by 2006. Most will be printed on colour and MFDs in offices, but digital production colour is estimated to grow at 35% per year, providing returns on Xerox DocuColor investments including iGen3. Anne Mulcahy believes digital printing is crucial for Xerox because "on the high end it's all about gaining share from offset". She adds "there is a lot of internal debate as to whether the graphic arts will lead the transition to digital colour". Indisputably every offset application going digital is a potential opportunity for digital press manufacturers, but the data management opportunities are also substantial which is why both Xerox and HP need to ratchet up their colour and workflow management skills. Xerox like HP is starting with an offering based on its own experience.

Practising & preaching

Xerox is a big fan of Lean Six Sigma management, which produced cost reductions contributing a 42 percent margin improvement in the last two quarters. Lean Six Sigma is about applying common sense to business procedures for ultimate efficiency and customer responsiveness. Ms Mulcahy defines Lean Six Sigma as "all about coming ▶

“There is a lot of internal debate as to whether the graphic arts will lead the transition to digital colour.”

Anne Mulcahy, CEO, Xerox

as close to zero defects as possible” in any process. Xerox has applied Lean Six Sigma internally and is deploying 900 specially trained Xerox managers to work with customers towards improved performance. Ms Mulcahy explains “we’re building an army in Lean Six Sigma and I think you will see some extraordinary results as we deploy Lean Six Sigma at customer locations”. She added that “changing the way we do business will have a dramatic effect on how we do business”. The company has already won a \$50 million contract with Bank of America on the basis of these skills as well as its technology.

Xerox is working with other high profile clients besides. At Ford Xerox is working on service manuals managing “15 million words and 750,000 files” for services documentation. Xerox also manages content updates for Ford, as well as telecomms provider Ericsson and “a worldwide bank” managing multivendor installations as part of a contract worth \$16 million and expected to grow to \$30 million.

There’s more. One banking customer saw a \$1.5 billion cash flow improvement. Together with Xerox it streamlined new accounts document processing to get its paws on new clients’ money far more quickly. Dow Chemical and Xerox have digitised and indexed 13 different document repositories creating a single database and improving information access for R&D. Telecom Italia is another Xerox document management client, as is Alcatel although this \$5 million order is trivial in comparison to the megabucks value of HP’s contract with Alcatel. The list goes on. Xerox is coy with details, but like HP it is approaching content management from the inside out.

IT consultants IDC forecast that between 2002 and 2006 the worldwide IT services market will expand at a compound annual growth rate of 12.4%, exceeding \$626 billion in 2006.

Colour Growth & Workflow

Both HP and Xerox want to leverage office and production technologies particularly for colour output. 75% of Xerox’ business comes from post sale revenues, with colour yielding five to six times the revenue of mono. Apart from the obvious predictions of the consulting hoards, this is reason enough to believe colour output is Xerox’ greatest growth opportunity. By 2006 Xerox expects colour pages with less than 30% coverage to cost 5 cents per page. (This figure is basically meaningless if you don’t know what it includes, so we are looking at coming up with some sort of benchmark for evaluating the cost per page for digital prints. Your input as always, would be much appreciated.)

Xerox is also focused on workflow and its capacity to drive the shift from offset to digital printing. This an area of huge opportunity and one Xerox is struggling to embrace, rather more energetically than HP. Workflow mapping and analysis for print and content management inevitably lead it to the traditional print market, where workflow has long been a focus of attention and where digital production is a done deal. How Xerox will do when it gets there isn’t certain.

Freeflow

Freeflow is Xerox’ means of migrating legacy technologies to digital workflows and JDF compliance. According to Xerox its 20 000 DocuSP, 15 000 DigiPath and 110 000 VIPP users are prospects for JDF compliant systems and will move in this direction with each system upgrade. XML based, the Freeflow workflow environment provides open interfaces to bridge legacy equipment and more recent technologies. All Xerox workflow and DFEs are being rebranded Freeflow, and Xerox is working

close-ly with Creo and EFI to make sure it all works. Xerox is also working with EDS in order to support the IT suprastructures within which it all plays.

The DocuColor family (including iGen3)

Xerox has invested enormous sums to develop credible colour technologies and has had a tremendous response to its DocuColor line. But it has cost them dearly. As Gil Hatch, president of Xerox' production systems group puts it "the barrier into this marketplace is enormous – you have to have a big will and a big wallet". Despite the eloquence of bullish market commentators and industry analysts, the iGen3 is still not the megasuccess it ought to be by now, but then neither is Heidelberg's Nexpress. With each quarter things get a little better for Xerox as the company learns more about what makes its print production customers tick and although it still lacks a coherent colour strategy at least Xerox is tagging along with its customers. If iGen3 is to gain substantially more than our estimate of the 30 installations it has so far, Xerox must lead its market not follow it.

Xerox' appreciation of print is more cosmetic than ingrained, but Gil Hatch appreciates that offset printing's transfer to digital printing is based on shifting market dynamics. He estimates realisable pages in offset and production colour are worth some \$18 billion and is watching his competitors closely: "we have our eyes clearly focused on HP and Heidelberg and see over 50% per annum growth in page volumes. Freeflow is our lead offer". He adds "we're not about to yield an inch to anybody in this industry".



Xerox DocuColor iGen3

Conclusions

From both HP and Xerox the colour management message is still too vague to be wholly convincing. HP defers to EFI, Best and Gretag MacBeth, and Xerox to EFI and Creo. Both focus colour chat on statistics about page volumes and projections for how many gazillions of colour pages will be printed in years to come. Well what a surprise. Offices have increasingly accurate colour printers, so people can print colour pages. Of course people will print more colour as each generation of printers improves its output, so much so that there will be a \$38 million market for colour pages by next year. This much is clear. One wonders how many little grey cells and large cheques it took the consulting piranhas to work this one out?

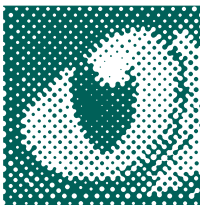
Page volumes aren't the point. Page quality and colour accuracy in distributed environments are the point. Unfortunately this area does not lend itself to market data collection, which may be why it has escaped HP's and Xerox' attention. For these two mighty players ICC compatible workflows are somewhere altogether elsewhere, they are not obviously central to the plan. Owning the distributed, digital colour printing space requires appreciation of the cost of bad colour printing and how to avoid it. It requires awareness of savings potentials and efficiency benefits, and of the technological requirements inherent to accurate colour data transforms.

HP and Xerox face the same direction, but facing the same way isn't taking the same route. Anne Mulcahy says "we are very, very focused on HP. This is a competitor you never take for granted but we are focused on the document space and we work with EDS and we think

▼
that makes us equal. We feel our digital production colour [technologies] are superior to Indigo but we keep watching it and we're confident that we can face against them".

Success for either depends on how well they deploy and manage distributed high quality, high volume colour print production. Knowing what they are talking about will allow both Xerox and HP to take conversations out of the office and into printing plants, digital or otherwise. At the moment both Xerox and HP seem to be equally in the 100% 100% 100% 100% or should that be 0% 0% 0%?

-Laurel Brunner



The Quiet Revolution

The new 10 megapixel+ contenders put to the test

There has been a subtle breakthrough in digital photography over the last few years. From being reasonably good, the professional high-end camera backs now surpass analogue film in terms of actual pixel quality and colour depth.

There are basically three classes of digital cameras: compact cameras designed for consumers, SLR-cameras for more demanding applications and finally the mid-size or large format studio cameras used in professional photography. We recently tested a selection of the latest crop of cameras in the latter group. All of these cameras have a sensor of at least 10 megapixels and can work in either single shot or multiple shot mode. Currently this is the category of digital cameras of greatest interest to professional photographers. Large format studio cameras with a scanning back can of course produce higher resolution, but the limitations of working with a scanning back – you can't use a flash or take live action images – seriously reduces the number of applications where they can be used.

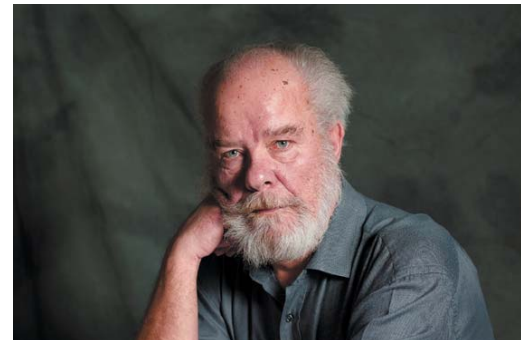
The cameras tested include the DCS Proback 645H from Kodak, the Valeo 11 from Leaf, H10, H20 and H101 from Phase One and finally Sinarback 54 H from Sinar. We also invited Eyelike, Imacon and Megavision to participate. Megavision wanted to postpone the test until they had access to a full format sensor (50 x 40 millimeter or similar) instead of the present 35 millimeter sensors. Imacon wanted to participate in the tests, but had to finish their multiple shot mode first. Eyelike skipped the test since it was conducted at a Swedish photographic studio, and at present they don't have a Scandinavian distributor.

These were the tests

The two most important things to check in a digital camera system are colour depth and resolution. Then there is a whole range of factors to consider, such as the quality of the colour rendition, colour accuracy, ease of use and speed of the control software, portability and so on.

Our tests are based on four different images: one portrait shot, one still life (the breakfast scene), one black and white resolution test (the TU 170 test chart, part of the ISO 12233 resolution test) and finally a colour test chart to evaluate signal processing of colours at high resolution. The portrait image was of course captured in one-shot mode, while the other images also were taken in multiple shot mode where possible. Only Sinar was able to do this as it is the only supplier with the function among the participating vendors. Imacon is working on a multi-shot mode for its Ixpress and we look forward to testing this camera in the next round.

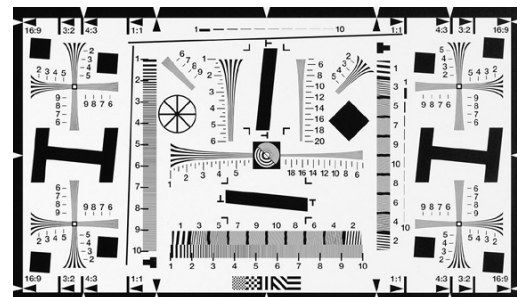
We used Hasselblad's ELD 555 and H1 cameras to provide a common base for all test participants. To get the most out of a digital camera system the lenses of course have to be excellent, so we used the CFi 4/120 lens with the Hasselblad ELD 555, and the HC 2.8/80 with the H1 camera. However test participants were allowed to use any camera and/or lens in addition to this configuration, as an extension of the test. ▶



Test image 1 – Portrait. Besides testing skin tone rendering, the shirt may cause more or less moiré.



Test image 2 – Still life. This image contains a range of checkpoints. The big red flower is deliberately out of focus in order to check the rendering of gradual tones.



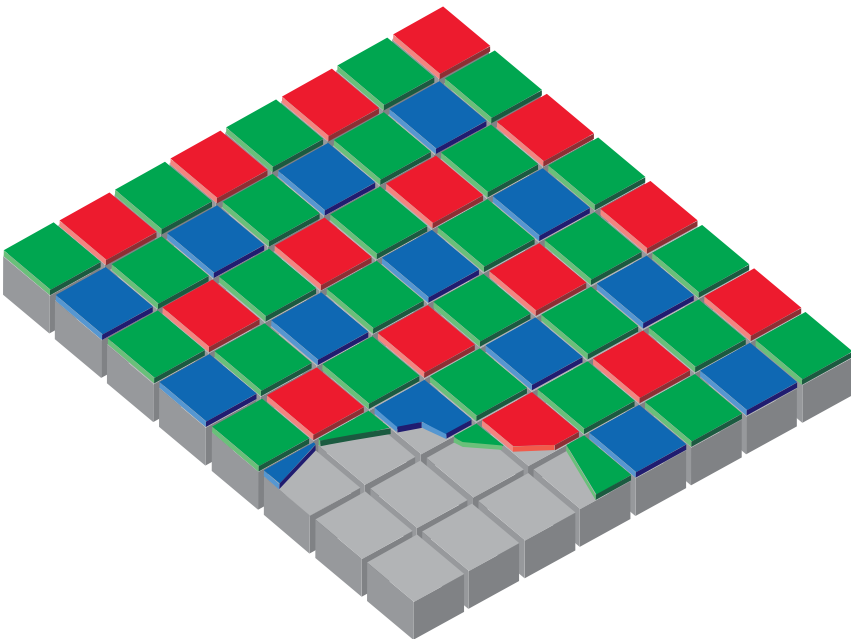
Test image 3 – Black and white resolution test. This image is part of the ISO 12233 test of digital still photos.

▼ The flashes and the power supply systems were supplied by Broncolor and Prophoto.

About the tests

The test set up involved a team of image professionals. Paul Lindström of Digital Dots is a former scanner operator and technical editor for the AGI magazine group. He also lectures in graphic technology at Malmö University. Andreas Bohlin is also a former scanner operator and a devoted amateur photographer. Andreas is part of Binuscan's R&D team, and has built up an impressive knowledge and experience in both image processing and colour management. Thomas Wilke is prepress production co-ordinator at Studio CA in Stockholm with extensive experience in digital photography. The tests took place at Studio CA in Stockholm – a studio that has been working digitally for over ten years.

Besides visual evaluation of the images, we also used a software developed by Kodak to evaluate the pixel quality in the TU170 test chart. Part of the ISO 12233 test of electronic still picture cameras is a numeric analysis of SFR (Spatial Frequency Response) and this is what Kodak's tool does.



The most commonly used pixel filter technology is the Bayer pattern which has alternating rows of red and green filters, and blue and green filters. The human eye has about twice the number of green sensitive photoreceptors as it does red and blue, and the Bayer pattern was designed to take this into account.

The results

When taking images in one-shot mode you normally don't achieve the full resolution of the sensor in all three red, green and blue channels. This is because of the filter pattern on the sensor. The most commonly used filter technology is the Bayer pattern (see illustration) which has alternating rows of red and green filters, and blue and green filters. This means you only have 25% "true" image data in the red and blue channel in one-shot mode, and only 50% "true" image data in the green channel. With the help of signal processing and some clever algorithms, the camera vendors extrapolate the final image from this data set. In ►

The Cameras Tested

Leaf Valeo 11 has an 11 megapixel sensor from Dalsa (formerly Philips) with 4056 x 2684 pixels. The Valeo 11 can be connected to the Compaq Ipaq palmtop computer and in this way is used as a "Digital Polaroid". The control software is Leaf Capture V8.

Kodak is in quite a unique position in that they both deliver sensors for several competitors, and build camera systems as well. The DCS Proback 65H is built to compete with the new Hasselblad H1. The sensor is a 16 Mpixel Kodak built CCD (4080 x 4080) equipped with a removable IR-filter. There is also an optional anti moiré filter and two control softwares to choose from. DCS Photo Desk 3.0 works with both Mac OS (9 or X depending on the configuration) and Windows (version dependant on configuration), and Capture Studio 2.0 is for Mac OS (9 or X depending on the configuration) only.

Phase One uses sensors from both Dalsa and Kodak. The H10 has an 11 megapixel Dalsa sensor (as does the Valeo 11), while the H20 uses the 16 megapixel Kodak sensor (the same model as in the Kodak DCS Proback 645H). The Phase One H101 is specifically designed for the Hasselblad H1 camera, and has the same 11 megapixel sensor as the H10. The control software for the Phase One digital backs is Capture One, which can also process raw image files from Canon 1D-series as well as the Nikon D1- and D100-series.

The Sinarback 54 H contains the new 22 megapixel Kodak CCD (5440 x 4080 pixels), custom made for Sinar which has the exclusive rights to the technology for twelve months from its release at Photokina Autumn 2002. Sinar build their own cameras and lenses, but the 54 H fits onto almost any viewfinder camera through an adapter. In our tests Sinar used the Sinar p3 camera with a Sinaron Digital lens, as well as the Hasselblad camera and lens. The control software is Sinar Captureshop. Depending on the digital back in use, it can handle one-shot, 4-shot and up to 16-shot exposures.

4-shot mode you capture full resolution in all the channels, and in 16-shot mode the signal processing should render the image data with even higher quality. One of the questions we had before the test was whether the 16-bit mode really added any useful image quality, and we found that it actually did. The 4-shot mode offered a dramatically higher resolution than the one-shot mode, but of course you are restricted to still life photography (and forget portrait photography in multishot mode – no one can sit that still!).

The signal processing obviously differed between the vendors, and we could detect significant differences from the same sensor used in different camera backs. The H101 from Phase One and the Valeo 11 from Leaf use the same sensor, as do the DCS Proback 645H from Kodak and the Phase One H20. Yet in all tests these pairs produced different results.

In addition to this the same sensor achieved higher useful optical resolution in different control software and hardware combinations, and colour rendering at high resolution also differed significantly. Image quality was particularly diverse between the Phase One H10 and Kodak DCS camera backs even though they use the same sensor.

Conclusions

Before starting the tests we pondered on what should happen next if there was no significant difference between the camera systems tested. As it turned out we didn't need to worry about that – there are many differences, both in the camera systems' workflow designs, the control softwares' functionalities, and not least resolution and colour quality achieved.

–Paul Lindström

Evaluation is one of the trickiest parts of any testing project. For digital camera backs it is impossible to appreciate the differences, without seeing the high resolution images on screen. If you are interested in the nitty gritty, we are producing a full report describing this project and the results. It will include detailed explanations of the tests, each participant's results in all their gory glory, and all images captured with the different cameras. The whole barrowload is available on a special CD through Digital Dots for €150, or €50 excluding the images. If you are planning to invest in a digital camera, read this first!



Vendor	Model	Resolution (MP)	Multishot	Price (€)
Creo-Leaf www.creo.com	Valeo 11	11	No	12650
Kodak www.kodak.com	DCS Proback	16	No	16000
Phase One www.phaseone.com	H10	11	No	21000
Phase One www.phaseone.com	H20	16	No	26300
Phase One www.phaseone.com	H101	11	No	21000
Sinar www.sinar.ch	Sinarback 54H	22	Yes	32000
Sinar www.sinar.ch	Sinarback 54S	22	No	25000

(prices include the camera back and software)

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