

Tinkerbell Taking Flight

The Tinkerbell project, as it was originally code named, was always about more than just the HP Inkjet Web Press (IWP). Tinkerbell is about comprehensively leveraging a series of technologies derived from HP's core expertise in printing and in data management. The IWP is just the start and over the next few months HP has scheduled a series of installations, starting with O'Neil Data Systems. This story is as much about HP's business development as it is about O'Neil's.

O'Neil Data Systems

O'Neil Data Systems and HP recently held an Open House event at O'Neil's facilities in Los Angeles, California. In the printing and publishing industries relatively few data-driven companies can be described as long in the tooth. It is only fairly recently that printers have started to embrace digital data processing, in order to satisfy client requirements. And data publishers tend to specialise in the bits and bytes end of the business, preferring to rely on third party service providers for output.

O'Neil Data Systems is one of the exceptions: this data driven publisher has been around for over thirty years, providing data management and production services for its own publications and those of clients such as Visa, Federal Express, Blue Cross Health Care and Toyota. The company has expertise in print production and data-driven applications making it an ideal candidate for HP's IWP.

One of Wall Street's most successful investors, William J. O'Neil, founded his data and printing company in 1973 to produce time-sensitive investment research publications. Throughout the seventies and ever since, O'Neil Data Systems has been a pioneer in the field of database publishing and automated composition. The company produces reports from O'Neil's extensive database of information on publicly traded US companies.

Of the IWP William O'Neil said: "William O'Neil & Co., Investors Business Daily and O'Neil Data Systems are all based to some degree on the successful management and reporting of data. With the HP IWP, O'Neil Data Systems reinforces that legacy by going to what is truly the leading edge of graphic arts technology."



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Today the company provides data-driven publishing and marketing communication services to a blue-chip client list as well as publishing the Investors Business Daily newspaper, which it founded some 20 years ago. A personalised copy of the day's newspaper was delivered to our hotel rooms, prior to the start of the Open House. It had been almost entirely printed on the IWP with personalisation on the front page and on one other page in the newspaper. A single sheet had been printed offset and inserted during finishing. No one noticed the offset sheet, which is good, but unfortunately only a very few people noticed the personalisation which is a pity, still it was there and no one doubted the credibility of the print.

O'Neil's relationship with HP dates back to the early days of Tinkerbell and has been very close throughout the new web press's testing and evolution. The machine installed in Los Angeles is currently shared between the two companies, with HP using it two days a week for testing, development and demonstrations. It's printing commercial work (health plan benefit materials, transactional documents and the O'Neil Database financial reference book) two days a week but once development and testing are complete, O'Neil expects to produce 3.4 million impressions over

▶ two shifts per day on the new machine. Twenty percent of these will be colour pages, growing to 35 - 40% of overall volumes over time. Because of this combined usage, the ROI picture is still pretty fuzzy for O'Neil's but the ROI and cost of ownership will need to be demonstrated, as at a little over \$2.5 million this is not a trivial investment.

Solving Problems

O'Neil provides data and output management for an array of industries including finance, healthcare, retail, travel, transport, manufacturing and trade publishing. It specialises in high volume data-driven print media and is a heavyweight when it comes to electronic processing. O'Neil has moved gradually, building its expertise in data management and output, then to offset printing. From there it's moved into digital, with its six-colour Komoris still used for long run static colour work and a Goss Community press still printing O'Neil's newspapers.

The move into digital print started with monochrome output before moving to colour and more recently high volume colour variable data output. Offset printing has become a secondary service, and O'Neil's is gradually shifting all conventional digital mono and colour work to the new press, so it is expected to produce high volumes of pages.

In scaling up to a combined monochrome and colour press, O'Neil's is replacing four Océ 7650s and a couple of 9020s. The company wants to offer improved colour services to existing customers and is gaining interest from new ones because of the IWP investment. Apart from the performance and the fact that this machine meets O'Neil's quality requirements, the cost model was central to the company's decision to invest with HP. O'Neil's is throwing out Océ in part because of Océ's adherence to the click charge rather than a consumption-based model. O'Neil's CEO Jim Lucanish speaks on behalf of printers everywhere with his request to click charge diehards: "Can you just treat us like printers and just sell us some ink?"

During the testing phase O'Neil's has experienced three or four head failures per month out of a total of 140 heads. Each head has 10,560 nozzles, with 1200 nozzles per inch across the 4.25ins print head width and there are 70 heads per print station; the heads can be snapped in and out

by the operator. Jim Lucanish is firm in his belief that "a toner box isn't going to keep up with one to two million personalised pages per month". He's also very keen on HP because "HP stick with you through the good, the bad and the ugly". Such is their confidence in HP and in this technology that O'Neil's plans to install a second IWP at the beginning of 2010.



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Keeping Pace

Central to the efficiency of a high-speed variable data press is the speed with which it is fed data. Jim Lucanish understands that "the front end's the whole solution because you can overload a system very quickly" so he was keen to make sure his system has enough oomph. The front end system installed at O'Neil's is HP Exstream, a document composition and automation system working in conjunction with DocuLynx' Mercury. Developed under the aegis of Madison Advisors, which HP acquired last year for \$900m, Mercury is a high volume digital data output

system for encrypted, compressed and secure document storage and retrieval. Madison Advisors specialises in content management, data ingestion, variable publishing, output and fleet management.



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Mercury delivers content via any channel including print and provides a long term digital archive for online viewing, audits and reprints. The system works with HP Exstream to generate and manage variable data documents. Via a special plug-in, HP Exstream's PDF e-driver module feeds XML index files or PDFs generated with HP Exstream into Mercury. This data is then passed to the Ultra RIP for processing ready for output on the IWP. Workflow integration is the next step with this front end, so that multiple jobs can be managed efficiently for fully automated output. Jim Lucanish is keen on this as an added value: "I'm pushing for integration with workflow, because the value to me makes sense".

The SmartStream Ultra DFE has an astounding 144 Harlequin RIPs, mounted three per blade on 48 multicore blade servers. Each RIP parses part of the incoming PDF file, applying colour profiles and generating the CMYK raster Indigo Compression Format (ICF) frame. It takes 0.023 seconds to RIP a fully variable A4 page on the fly, versus ten minutes for the same page twenty years ago. Only the number of RIPs required to complete a job is used, and as this is a scaleable architecture the DFE can have as many RIPs as needed. HP has borrowed Indigo's screening technology as well as ICF, RIP'ing 600 x 1200 dpi with a throughput capacity of 1GB of data per second.

Output

The IWP is an extreme iteration of HP's Thermal Inkjet technology co-invented with Canon in 1979, although only HP has pursued it. The underlying technology is now ubiquitous in homes and offices. Across its 762mm width the IWP can print 2600 US Letter (8.5 x 11ins) or A4 pages per minute with a throughput of 400ft (122 metres) per minute of stocks up to 200 gsm. It has a 125° F (about 52° C) dryer to ensure that the water-based pigment ink sticks to the paper. This may affect the performance of more delicate stocks prone to the effects of extreme heat, and may make it difficult to de-ink.

The IWP is designed for average volumes of 30m to 70m double-sided pages per month. It electronically converts CMYK contones into halftones using proprietary HP halftoning algorithms and generating five halftone planes: CMYK plus the Bonding Agent plane. These are output in two slices, one for each column of 5,280 nozzles (10,560 total per printhead) in the seven-printhead print bar, with slices overlapping for seamless stitching. Each 4.25ins printhead prints 122 million pixels per second per colour with 0.5Gbits per second of control data.

The ink is heated up and at around 100° C per second is jetted at a rate of 48,000 droplets per second. Drop volumes are 6pl for cyan, magenta, yellow and the bonding agent, which is only printed onto areas to which ink will be applied, and 9pl for black. An inline process monitoring module is synchronised with the print engine controllers, with RGB LED light bars that illuminate 46 test patterns used for quality control. Among other things, this module checks for optical density uniformity across the web and nozzle-to-nozzle alignment within a primary and colour-to-colour when printheads are replaced.

According to Ross Allen senior technology specialist at HP's Imaging and Printing Group, the "arched paper path is critical for stabilising paper moving through the print zone [because it] reduces wet cockle effects and controls printhead to paper spacing". The basic architecture can however be organised in different ways. HP has incredible flexibility in how it configures these basic technologies and is working on wider formats, higher productivity and with different stocks for greater image quality. The bonding agent technology, head technology and

▶ media technologies are all HP's, part of its "toolbox of technologies" many of which are already proven, needing only to be adapted for a specific system design.

Ross Allen also reckons this combination of data processing grunt, printing technology, media and ink could be configured to provide production systems for various types of print media. The model of using proven and pre-existing technologies is one that "will allow us to confidently implement HP technologies in our products, like the IWP" according to Ross Allen. He observes: "HP inkjet technology performance has doubled every 18 months following Moore's law". HP is confident that it can use this head for other web widths or different functionality, for example assembling heads along as well as across the web for more colour options and media versatility, higher speeds and greater fault tolerance.

What next for HP & the IWP?

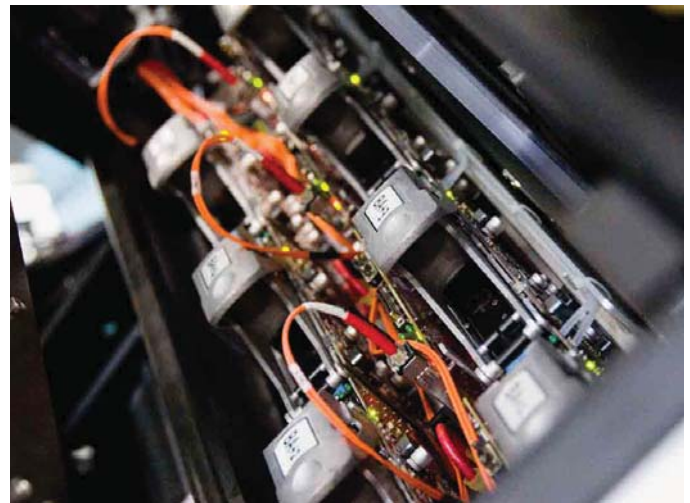
HP has been very clear about its plans for this engine. Since its top brass's announcement at its pre-drupa press conference in Israel that they wanted to strengthen their position in the printing market there has been a string of announcements and products delivered to the market. Next will come news of installations. According to Aurelio Maruggi, vice president and general manager, Inkjet High-Speed Production Solutions Division, Imaging and Printing Group: "Each of these installations has been very thoroughly thought through, from customer order to finished job". He adds: "We could have installed many more units than this". The IWP will be commercially available in the autumn, so the market can confirm or refute this soon enough. A 40ins version of the IWP is coming next year and will increase HP's market scope to tackle the commercial print sector, or catalogue and directory work.

Further installations

Following the successful implementation at O'Neil's, Consolidated Graphics which is already now part of the press's pilot programme, is next on the list for completion. This conglomerate has 50 Indigo presses deployed at several of its 70 printing companies in 27 US states. Consolidated Graphics also has operations in Eastern Europe and Canada. It will take delivery of the

machine this summer and according to a representative of the company "this is the next step for us – it's taking us in a new direction and we can't wait for our press".

The next site, due to go live in September, will be CPI in France where the IWP will be used for book printing. CPI produced 600 million books in Europe last year with an average run length of 8,000 copies, which is about 25% of the European book market. CPI is seeing an 8% growth rate in 1,000-3,000 run lengths, primarily at the cost of longer runs, hence its investment into digital print.



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Courier, the US's third largest book printer is also partnering with HP for an IWP to facilitate its move into digital printing. The Courier's IWP is scheduled for delivery by the end of the year. Courier owns Dover Publishing and in 2008 printed over 175 million books. Courier's representative recognises that "the book industry needs help to reduce inventories and reduce waste". Courier's digitally printed book runs range from 300 to 3000 copies, above which it is more economic to print conventionally. That number is expected to rise to 5,000 as the technology improves.

HP is also working with Taylor Corporation which provides business and personal communications products, technologies and services. Taylor is a very large company with a myriad of operations, so HP and Taylor are investigating if and how the IWP can be economically viable. This complexity may be why progress on this

▶ sale seems to be relatively slow. The two companies are striving “to find the right approach for this technology” according to Aurelio.

Since drupa, HP is on target with its plans to support books, newspapers, direct mail, and transactional printing applications. This last is “gaining momentum” though HP will only say “the European market represents a better and closer potential for us”.



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Book printing is the market most large digital press manufacturers are eyeing up. The general consensus appears to be that books are close to tipping point and that an explosion in digital printing of books is about to happen. In anticipation of this HP has developed various partnerships so that materials can be prepared and printed. For example, it has worked with Ultimate to develop tools to create multiple digital impositions for different formats, such as book signatures and covers in single multistreamed workflow. Ultimate has also recently introduced the Ultimate Bindery tool for automated finishing, using JDF profiles to instruct bindery operations on the fly. HP is also working with companies such as Hunkeler, MBO, Müller Martini and Pitney Bowes so that output from IWP and Indigo presses print can be properly finished and distributed.

HP marketers like to remind people that “the quality is in the system” and mostly they are referring to technology. However the same can be true of HP and its ambitions in the printing industry. Over the last year or so it has become increasingly clear that HP does what it says it will

do, and that its marketing people are in close touch with the science and technologies behind the products. HP has developed the consultative process of system development to a fine art. It includes not only customer collaborations, but extends to include various bits of HP and its partners as needed. Ambitions are high and the machine that drives their realisation is formidable. As Aurelio Maruggi said in Los Angeles: “this is for us, the start of the journey ... we are humble and eager to learn”.

- Laurel Brunner

