FLAAR

Why it's good for Students to attend Trade Shows

An example of GraphExpo '07

Dr Nicholas Hellmuth

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GraphExpo is held every year in the autumn at McCormick center, overlooking Lake Michigan in Chicago. It's a gorgeous view of the lake from the fourth floor, and overall a beautiful convention center.

Outside view of the McCormick Center and overlooking at the Michigan Lake in Chicago.

UV-curable wide-format inkjet printers at GraphExpo '07

Agfa :Anapurna M

Agfa rebrands printers made in Korea by Dilli and pretends they are Agfa printers. Dozens of other companies don't manufacture their own printers and openly rebrand printers made by other companies. So why does Agfa pretend these are not Dilli printers? Printers made in Korea area high quality; FLAAR finds Dilli, Keundo, and IP&I printers (all made in Korea), completely acceptable in all aspects.

But Agfa declines to allow its printer to be photographed, and clearly is defensive and very confused with how to handle the fact that it's own UV printer (the :Anapurna 100) did not function adequately and was discretely withdrawn from the market. Afga spent millions of dollars helping Xaar develop its grayscale printheads, and used this Xaar variable droplet head in a truly innovative printer that was shown behind closed doors at FESPA '05 in Munich, Germany.

But this printer used a previously untried "walking feet" system of moving rigid materials. Everything in the printer was untested: the Agfa UV ink, the curing system, the media transport system, and the printheads. This was a recipe for indigestion (and disaster). If no one part worked adequately the entire complex system was doomed to failure.

But Agfa still had millions of dollars invested in developing its own UV-curable ink. Since no other printer manufacturer was willing to switch from Sericol, Sun, or Triangle ink to Agfa UV ink, the only way Agfa could sell its own ink was to create a printer that required Agfa's own ink. Since their own printer failed, Agfa had to find another manufacturer, and rebrand their printer to use Agfa ink.

Agfa Anapurna M, GraphExpo 07

DuPont was in the same quandary. DuPont (and seemingly another ink company as partner, that DuPont does not admit to being in the equation), had an ink: but no manufacturer had any interest in using it: they were already using Sericol, Sun, Triangle or other inks. So DuPont had to create their own printer to use their ink. Unfortunately, since DuPont wants a 100% profit markup, the only way to make that much profit was to have a low-bid manufacturer, namely Chinese.

So DuPont selected the Chinese company that makes Flora printers. Unfortunately Flora had little experience in making UV printers and Flora solvent printers did not function adequately either. But DuPont poured millions of dollars into Flora (as did Raster Printers in California). Sadly, all this money simply enriched Flora. Their printers were still barely usable.

Fortunately Agfa was intelligent enough not to use a Chinese printer manufacturer, but instead to use a Korean manufacturer. Koreans are light-years ahead of even Taiwan printer manufacturers. Taiwan manufacturers, such as GCC, are significantly better than Chinese factories, but not as good as Korean.

Agfa keeps trying hard to get noticeable market share with wide-format inkjet printers. Their Agfa-branded Mutoh printers were sold by Agfa as proofers and for indoor prints during at least 2002-2006. When interest in water-based printers waned as people wanted more durable output, Agfa tried for several years with their versions of various Mutoh printers. The final attempt, the Agfa GrandSherpa Universal M failed when Agfa's own eco-solvent ink turned out to be a poor chemistry for the Epson printheads. It would have been too costly (and embarrassing) to return to Epson's ecol-solvent ink that is used by Mutoh, Roland, and Mimaki (Epson does not make this ink, but requires that printer manufacturers that use Epson heads buy their ink from Epson).
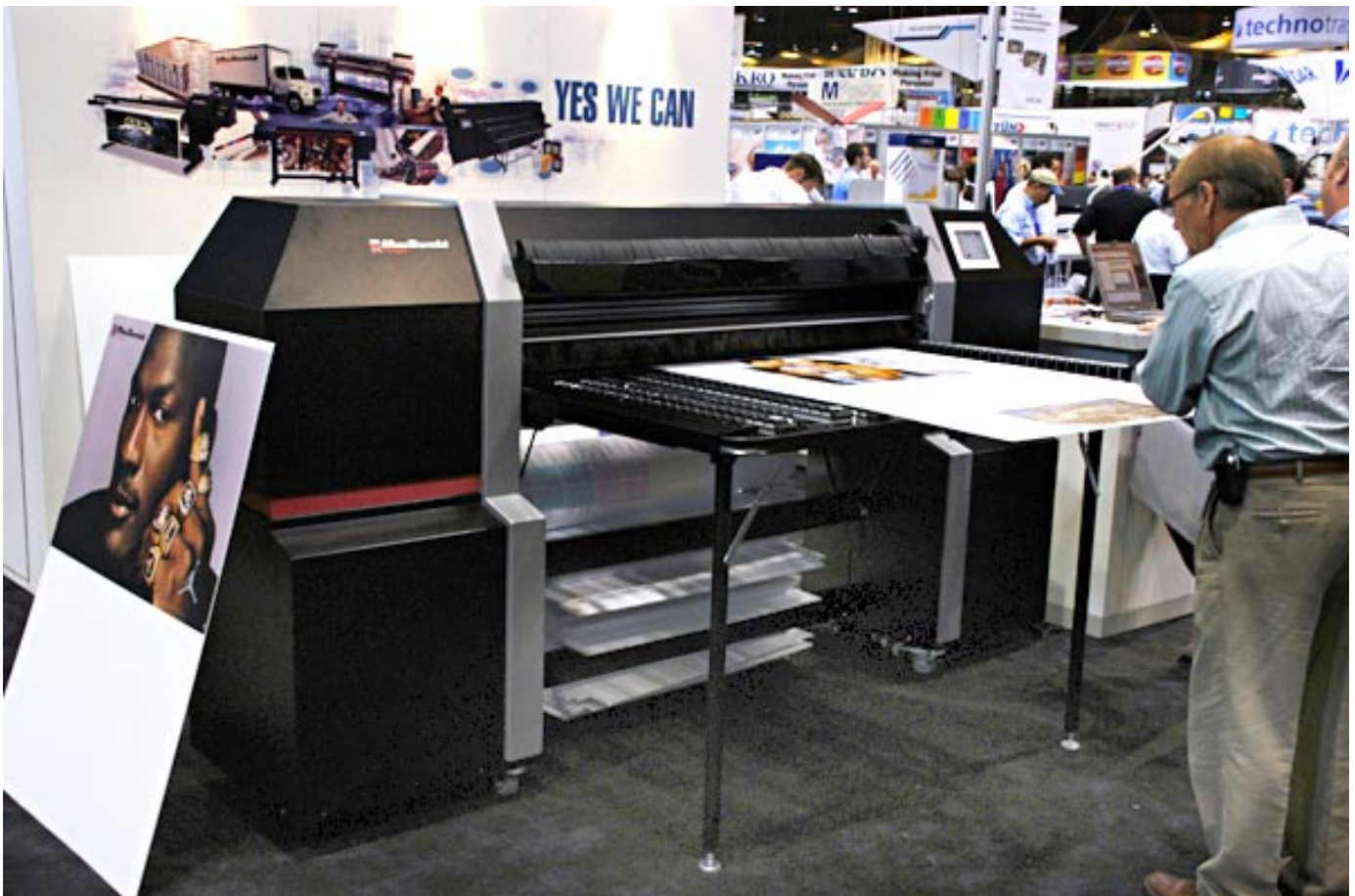
ColorSpan

Two days before GraphExpo I had already heard rumors that ColorSpan had been sold. Most people guessed it was HP. At FESPA '07 HP had tried to interest over a dozen different manufacturers to OEM their UV printers to HP, but not a single company wanted to. In part because of the debacle of what happened when Seiko allowed HP to rebrand their solvent printers. In part because most manufacturers can make more money selling 100 UV printers directly themselves than selling 1000 UV printers at wholesale prices to HP. Plus, manufacturers did not want to have to finance manufacturing 1000 UV printers themselves up front (they would only get paid after they delivered them to HP). So, one by one, every manufacturer politely turned down the request to sell their printers to HP.

So the only way HP could get a UV printer quickly was to buy an entire company up front. They selected the company with the best sales record, namely ColorSpan. I have inspected the ColorSpan 72uvX and 72uvR in printshops and their owners are more than content. Over 900 of these printers were sold (next runner up is Zund; they sold about 400 of their model 215, but sales fizzled out after ColorSpan launched theres).

Unfortunately for HP, about a month after they purchased ColorSpan, Gerber came out with the most innovative and technologically exciting UV-cured flatbed printer ever offered at a price under $100,000 range. There was no hint of this at the Gerber booth during Graph Expo.

ColorSpan 5440 UV printer at GraphExpo 07

Dilli Neo Titan

The Dilli Neo Titan is the same identical UV printer as the Agfa :Anapurna M. But the Titan costs $5,000 less. Why?

Because Dilli is the Korean manufacturer of both printers. Agfa has no manufacturing plant or printer design and production experience: Agfa is a pre-press company and ink manufacturer. Agfa has its own UV ink, but no other manufacturer is using this ink (everyone else uses Sun, Sericol, Triangle, etc).

So, the only way Agfa can sell its ink is if there are UV-curing printers that need specifically Agfa ink. So Agfa has to somehow create such a printer.

DuPont was in the same quandary. DuPont wanted to sell UV ink (DuPont claims it's their ink, but word on the street suggests that aspects of "DuPont" ink really come from elsewhere). But irrespective of who actually developed the ink, DuPont would be the distributor. But DuPont has no equipment manufacturing facilities, and when you saw the first iterations of their UV printer, it was clear that it was developed primarily by Chinese engineers.

Agfa invested millions of dollars in Xaar printheads to develop the 760 with grayscale technology (grayscale technology is an entire dissertation unto itself; it's a different way of creating different droplet sizes; its variable droplets but nothing like how Epson creates their variable droplets). Agfa then invested money in Mutoh-Europe to produce a completely new concept in how to move the material through the system "walking feet."

This remarkable Agfa :Anapurna 100 was exhibited at FESPA 2005.

Agfa intelligently recognized that having a printer made in China would be asking for tech support nightmare and bad publicity when these printers had issues. So Agfa selected Dilli to manufacturer their UV printers. Dilli is a Korean company associated with D.G.I. (that makes solvent printers that were especially popular from about 1995-2003, in other words, before cheaper Chinese solvent printers became available.).

Dili Neo Titan UV printer
at GraphExpo 07

FLAAR

FujiFilm/Sericol

Their booth exhibited Inca printers. Inca has made only dedicated flatbed printers from the beginning: no combo style (transport belt); no hybrid printers (pinch rollers on grit rollers to move materials, with roll-up tables to handle flat and rigid materials.

In the past the main competitor of the Inca Spyder 320 and Inca Columbia Turbo were the various dedicated flatbed printers by Gandy. Then Oce came out with their Arizona 250 GT flatbed printer.

Inca Spyder 320 UV exhibit in the FujiFilm booth at GraphExpo 07

Gandinnovations

Gandinnovations is gradually becoming the world leader in sales of dedicated flatbed UV-cured inkjet printers. In this field (of dedicated flatbeds) their main competitor would be Inca, which did not exhibit at GraphExpo nor at VISCOM Germany a few weeks later.

Gandinnovations dedicated flatbeds (without any attempt to run roll-fed material through the flatbed system) are competitors to VUTEk. VUTEk's name is so well known, because it was selling solvent printers for almost a decade, that it is market leader. But VUTEk produces only combo-style printers (with a conveyor belt). VUTEk lacks dedicated roll-to-roll or dedicated flatbeds. This will change at SGIA in October, but at GraphExpo VUTEk showed only their combo UV printers.

Gandy also offers solvent roll-fed and UV roll-to-roll printers. The main competition on UV RtR is NUR, which is probably market leader in roll-to-roll UV (in part because they were the first to offer a roll-to-roll UV system, at DRUPA 2004).

*Gandinnovations 1224 UV at GraphExpo 07*

Gerber

Gerber has tried year after year to enter the world of solvent inkjet printing. They tried with rebranding Mutoh printers. Each printer Gerber tried, they appeared at two or three trade shows but then these were dropped quickly, without explaining why.

Then Gerber tried at trade show after trade show to feature Teckwin Chinese-made solvent printers. The build quality was inadequate; another wasted year. Finally Gerber gave up on eco-solvent, mild-solvent, and full-solvent, and produced the Solara. It was a humble UV hybrid printer, most politely described as rudimentary and rather slow.

But so many printshop owners have Gerber Edge label printers, or have Gerber vinyl cutters, that clearly the brand name has value. And a surprising number of faithful Gerber customers actually bought the Gerber Solara 2UV rather than a ColorSpan (although overall ColorSpan probably outsold Gerber about 10 to 1).

The Gerber Solara was exhibited at GraphExpo, though most of the booth space was taken up with their new acquisition, a flatbed cutter.

There was no Gerber Solara UV printer that I could notice at VISCOM Europe a few weeks later in Germany (meaning that Spandex did not exhibit). But then Gerber announced they were producing for upcoming SGIA show a combined dedicated flatbed with a dedicated roll-fed system on one end. Wow, what a neat design. Only trouble is that they are trying to use cationic UV chemistry, which has been a total failure with everyone else who tried it: read Durst and Zund.
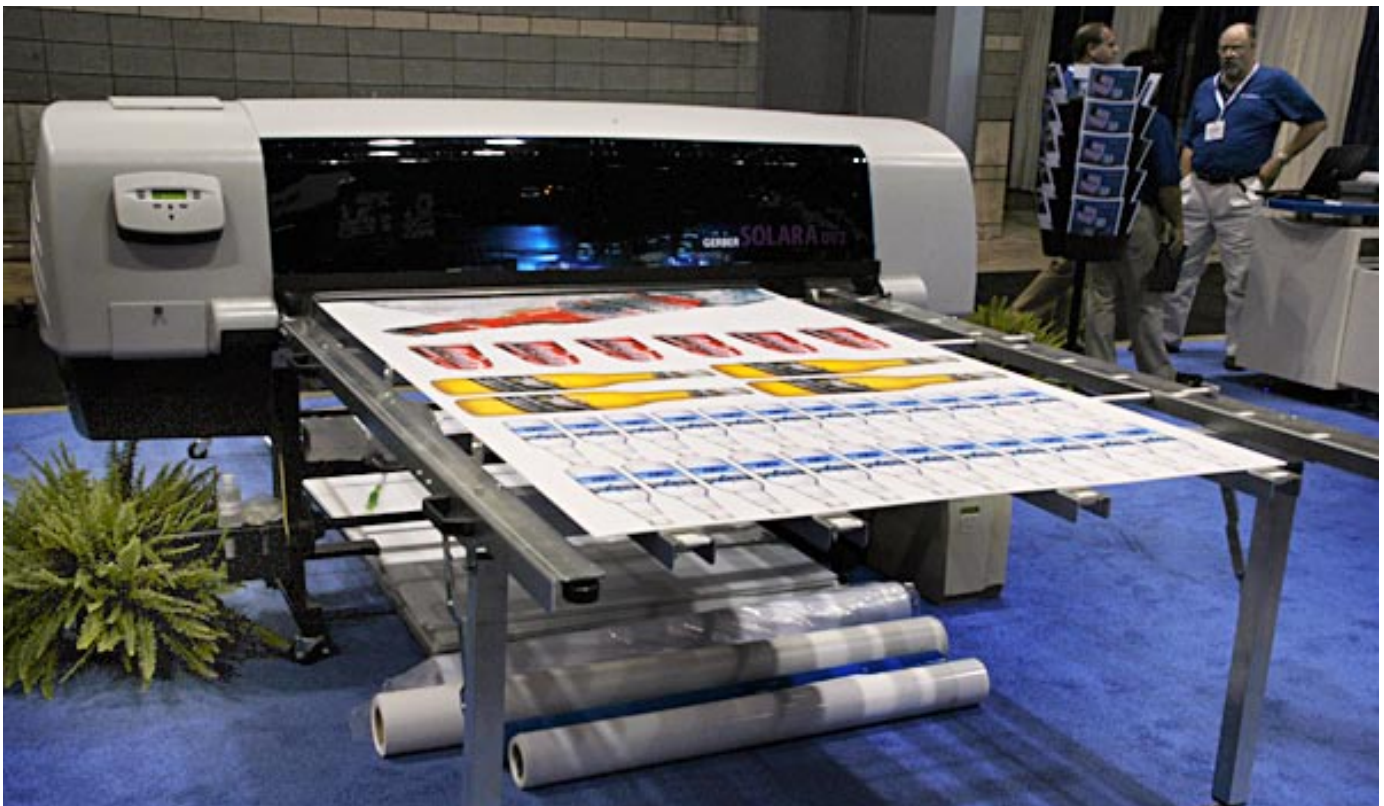
Gerber UV Solara printer at GraphExpo 07

Mimaki

Mimaki 605 cII UV printer at GraphExpo 07

Oce Arizona 250 / Fujifilm Acuity

First Mimaki came out with a dedicated flatbed. It looked nice. But then Oce came out with a dedicated flatbed at SGIA '06 and it looked nicer (and now Gerber comes out with an even newer flatbed and it looks nicer than the Oce).

Ouch, competition can hurt. I would not like to own stock in Mimaki after the Oce came out; and the value of Oce just collapsed when the Gerber came out three days ago.

Just calculate what else will come out in two months? And imagine what will be available by ISA '08, by FESPA Digital '08, and by the time of DRUPA '08?

What if you were a new manager and you recommended to your company that they buy a brand new Mimaki printer? The day after it was delivered the Oce is announced.

This is why FLAAR spends so much time with our antennae up in the air listening for news of new technologies. This is why FLAAR visits as many of the manufacturers as possible. As a result I already know of the four next UV printers that have not even been announced. This is valuable knowledge.
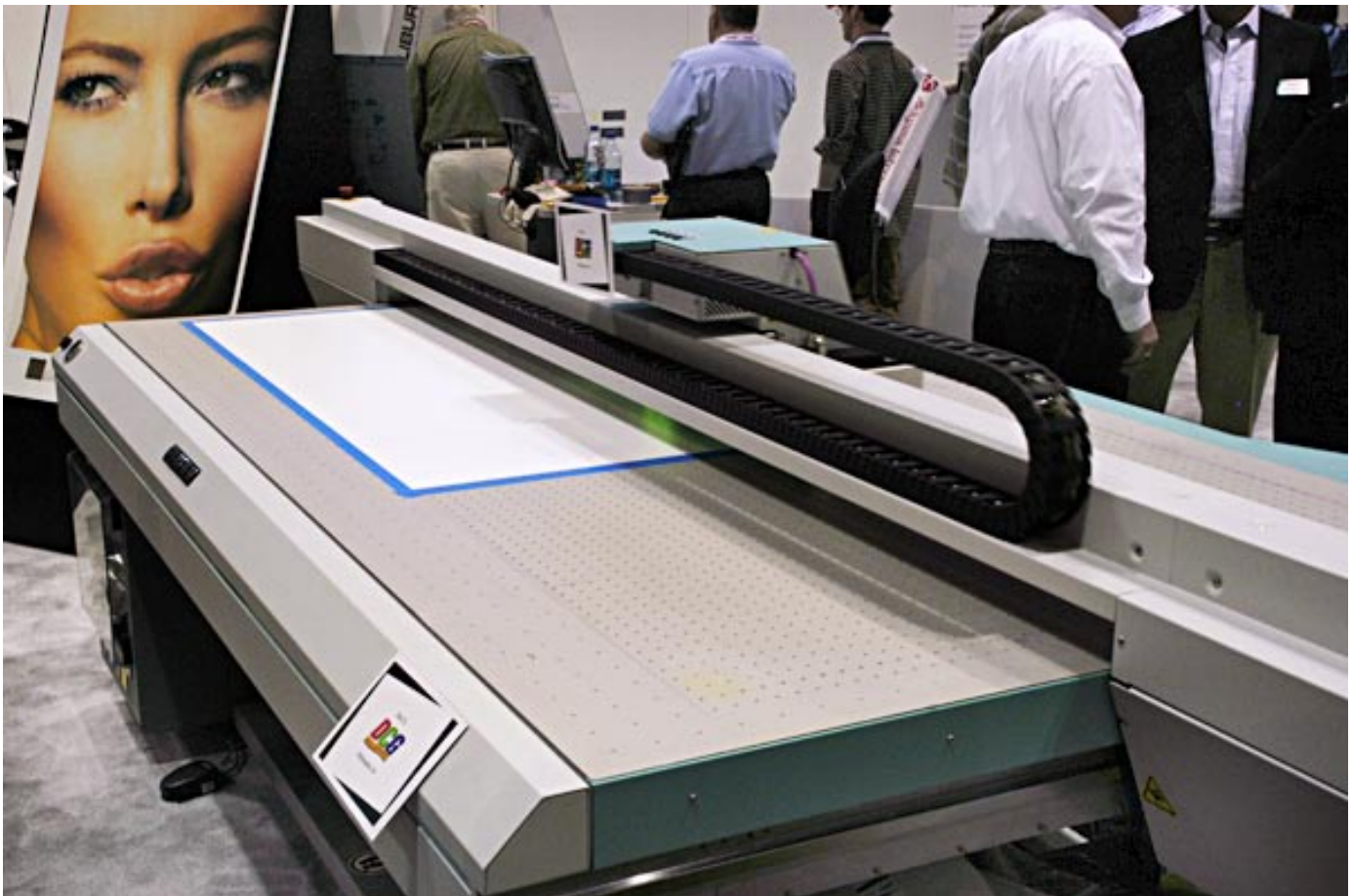
Oce 250 Fuji Acuity UV, GraphExpo 07

Raster Printers

Raster Printers had two booths: one in the INX booth (Triangle Ink). INX owns the ISI factory where the new model of Raster Printers are manufactured. INX also owns Triangle ink.

The second booth exhibited the Chinese made Flora printer retrofitted and rebranded by Raster Printers as the 720UVZ and the dual CMYK version, the Daytona. One of these versions was exhibited. Reportedly these Chinese printers today are not as poorly constructed with cheap inadequate parts as they were two years ago. Indeed reportedly over 100 have been sold. Nonetheless, it is worth noting that his second model was made in the USA because he got tired of dealing with so many uncertainties with Chinese made printers. You never know from one day to another what parts substitutions will be found inside your printer.

Raster Printers booth at GraphExpo 07

Teckwin

Teckwin's booth was in front of the FLAAR booth. They had solvent ink printers and their reseller, Nazdar Source One, had the Teckwin UV printers.

Teckwin solvent printers at GraphExpo 07

VUTEk QS

VUTEk has made only combo-style UV printers from the beginning: no dedicated flatbed and no dedicated roll-fed UV. This is unusual, since even Durst has branched out into roll-fed printers. But VUTEk sells their combo QS so well that they have not really needed to change their policy until now. Now Gandinnovations has a huge new factory, dedicated to dedicated flatbed and dedicated roll-fed printers. And NUR is very successful with their dedicated roll-fed philosophy.

Vutek QS3200 printer at GraphExpo 07

Thermo-formable UV-cured ink

Gandinnovations

Gandinnovations heatformed 3d, FESPA 07

Hexion Specialty Chemicals

Hexion is a giant Fortune 500 conglomerate, and Hexion offers UV-cured inks. However so far most printer manufacturers stick with Sericol, Son, Triangle, etc.

Hexion 3D plastic booth at FESPA 07
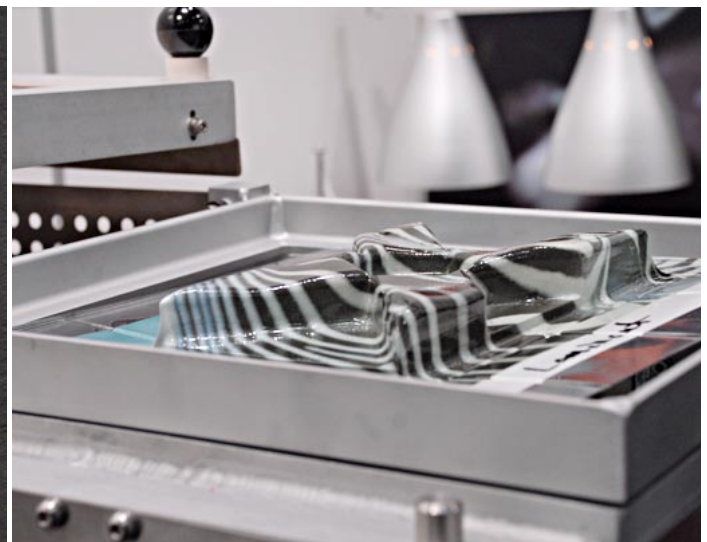
Hexion 3D plastic samples, FESPA 07

Mimaki

Mimaki does not show the actual process of thermo-forming in their booth. The most they do is exhibit some examples.

Mimaki UJF-605C samples, Madrid 06

UV Ink

Collins Ink Corporation is one of the smaller companies that offers a UV ink. When I first saw it three years ago its gamut was better than that of the UV ink of Sun Chemical. But generally no printer manufacturer likes to switch ink, especially not from a big company like Sun to a small company like Collins (unfortunately this is reality).

Rigid materials for printing on with UV-cured ink

Coroplast is infamous for being difficult for some UV ink to adhere to. Indeed one ink company told me point blank that their chemists had not yet developed a formula for making their after-market UV ink stick well to Coroplast. Other kinds of UV-curable ink (in past years) would of course print okay onto Coroplast, but would not stick after several months.

Today most UV-curable inks are greatly improved. Coroplast is a major material (for For Sale signs, and local political candidate advertising posted on people's lawns in suburbia). I visited one sign shop (using a ColorSpan 9840uv printer) that printed primarily on Coroplast. At GraphExpo I noticed that ColorSpan was printing almost exclusively on Coroplast. They use Sun ink (though Sun Chemical has many different versions).

Gandinnovations was also printing lots of images on Coroplast; it even bends and does not break, even fresh out of the printer before 24 hour final cure. Gandy tended to use Sun Chemical uv ink in the past. They are now using a new version. However the thermo-formable ink uses by Gandinnovations probably comes from a company other than Sun Chemical.

Gandinnovations 1224 UV at GraphExpo 07

UV Lamp Manufacturers

FESPA '07 had the best coverage of UV lamp manufacturers. At GraphExpo there was only Heraeus Noblelight, which is used in other industries, but not by more than perhaps 1% of the UV-cured inkjet printers.

Nordson makes UV lamps but Dr Honle, Phoseon, and Integration Technology have about 90% of the market for inkjet use of UV-curing lamps.

Cutters for thick rigid materials

With so many printers that can image onto thick and rigid materials every printshop now needs a sophisticated flatbed cutter. So manufacturing and selling cutters is big-business. Zund and Kongsberg dominate the market; iCut software is the other dominant company. Dominance, especially in software, does not always mean absolutely the best, but obviously any #1 brand is hardly defective or deficient.

Flatbed cutters are an accessory for what's called "finishing." Lamination and trimming are also part of finishing.

Although there are industry specialists in helping people learn about laminating, I don't yet know any independent world expert in flatbed cutting. I am definitely not that person, however I have a personal and professional interest in learning because flatbed cutters are ideal to make museum displays. Indeed FLAAR current has a project with Zund on this aspect, and two separate reports on the first stages: one report on

Gerber cutter

Gerber recently purchased a company that made cutters. The question has been raised, however, how precise these cutters really are when compared with a Swiss-made Zund. I shudder to think of what it would cost to do detailed comparative tests to evaluate such a statement. Sometimes people just repeat what someone else said about a product. Often the error is lack of experience or training in using a product. We consider all products innocent until proven guilty in a site-visit case study, but at least it's good to ask questions and do your own tests.
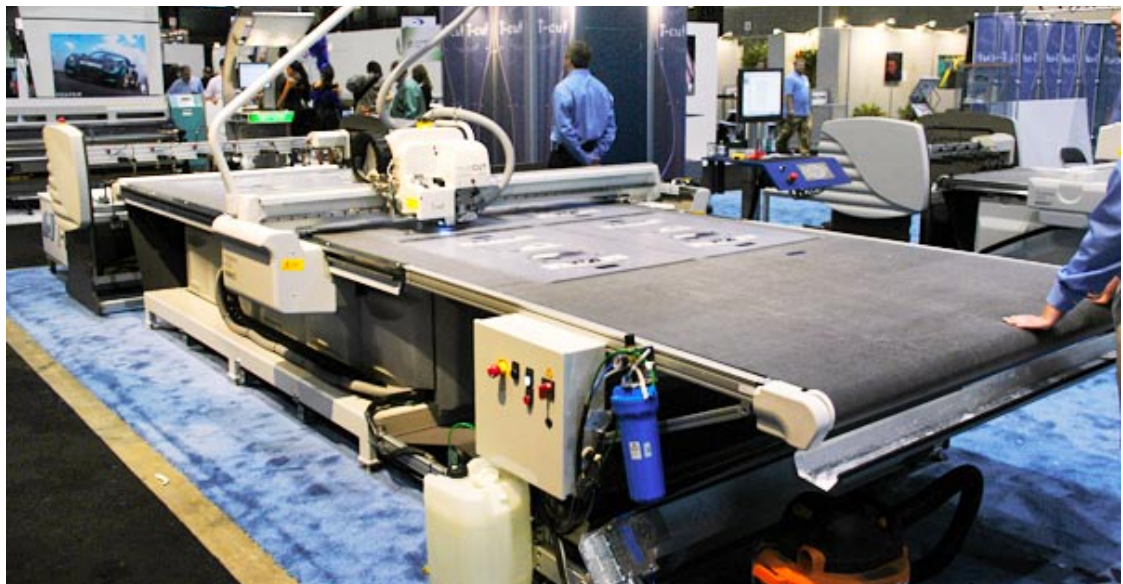
Gerber cutter at GraphExpo 07

MGE iCut

iCut software is sort of like Onyx PosterShop RIP; it's the #1 software that you see at every trade show, but it's not perfect.
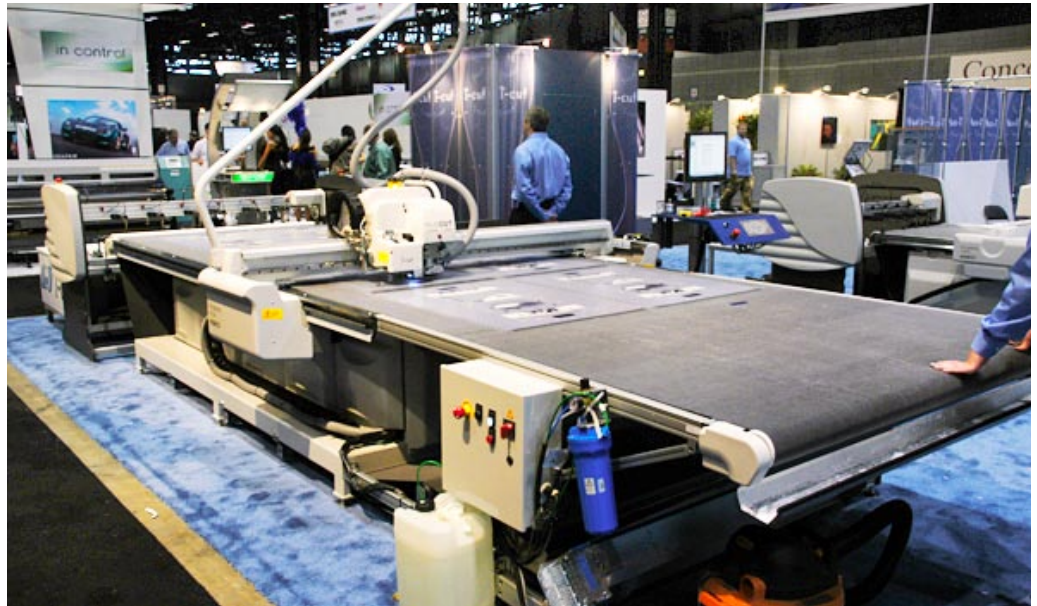
i-Cut cutter at GraphExpo 07

Mimaki cutter

Mimaki is a respected engineering company but every time I ask print shop owners about cutters, they don't include Mimaki in their short list. They don't say its bad, they just consider it entry-level.

Mimaki CF2-1215 cutter at GraphExpo 07

Zund

Buying a Zund cutter is sort of like buying an IBM couputer in the old days; you can't go wrong buying an IBM (of course now the IBM consumer computers are made in China… things do change, but so is the Mac Titanium 17" laptop that this is being typed on). The Zund cutters are definitely not made in China.

I have seen how carefully the Zund cutters are engineered in the factory where they are assembled. I have also visited the adjacent factory where the parts are made for cutters and Zund UV printers. It's kind of obvious that Zund has decades of experience. What more can I say than that you can't go wrong putting a Zund cutter on your short list.

The diversity of tool heads is one of many factors that sets the Zund cutters aside from other brands. Zund has experience for screen printing shops, sign shops and then has entire solutions for packaging, apparel, leather, etc. Since you can print on all of these materials nowadays with a UV-curable or other inkjet printer, you don't want to buy a brand that can't handle everything.

Zund LR-1600 CV cutter at GraphExpo 07

Color Gamut of UV ink is improving

Two years ago Sericol ink could not adequately produce it's own company logo color; nor could the ink used by VUTEk. Today the ink of both companies is significantly improved. Sericol ink (used by the Oce Arizona 250) even has a slight glossy appearance. In past years most UV-cured ink was a dull matte surface. Indeed the ink for the Arizona 60 (three or four years ago) was so matte this was one reason that printer was withdrawn and never actually sold).

The Mimaki UV ink had the best color of any I have seen at the show (since DuPont is not exhibiting itself and since the DuPont distributor, Pitman, dropped DuPont and switched to VUTEk). DuPont had the best color saturation of any UV ink at FESPA Digital in Berlin (summer '07).

At VISCOM Germany a few weeks after GraphExpo the best color ink was that of GCC (for their StellarJet 250uv and 183uv).

GCC StellarJet 183UV, at Viscom Germany 07

Rigid Materials for UV-curable Flatbed Printers

Alcan Composites has cleverly bought almost every kind of other manufacturer of flat and rigid materials except GE with its Lexan.

Atypical Inks

Eastech Digital Technology Co., Ltd. is a Taiwan company with a factory in Thailand. Aspects of their printers are manufactured by Mutoh Japan.

Solvent Printers at GraphExpo

Students seeking co-op positions in most printshops, including screen printing companies, will quickly be faced with solvent inkjet printers. Students graduating from BGSU and seeking jobs in print management will have their success tested with how they can understand the difference between diverse kinds of solvent ink.

Printshop managers also face issues of workplace health and safety issues. This is one reason why no solvent printer was ever installed at CAT in Saddlemire building. FLAAR felt that the health of students and faculty deserved to be spared these fumes (even with ventilation). Two different printer manufacturers offered FLAAR their solvent printers, but there was no ventilation system and exhausting to outside would have caused the fumes to be sucked back into the same building elsewhere, by the air handler system of the building.

Nonetheless, there are not many alternatives to solvent printing in most cases (UV-cured ink is not exactly benign either; one ink chemist said he felt that UV ink was more dangerous for your health than solvent ink, just that the chemical issues were not yet fully known on human health).

Most printer trade shows include several kinds of solvent ink:

Full-solvent ink (traditional old-fashioned solvent ink, complete with carcinogenic cyclohexanone and VOCs)

Mild-solvent ink, usually without cyclohexanone but still rather vile. This is the ink used by the HP 9000s, etc.

Eco-solvent ink, with fewer objectionable chemicals, so easier on the nose, but still not very ecological nor economical either. This is the ink used by Roland and some Mutoh printers.

Bio-solvent ink, made from maize (in part), but definitely not drinkable! This is made by InkWare (EFI-VUTEk) and used in a variation of one of their printers. In past years this ink has been exhibited with a Mutoh printer, but not as much recently. Other than some new inks by Bordeaux (who does not exhibit at GraphExpo) there is not many other companies yet producing bio-ink, so it's not really a major contender.

ColorSpan still displays brochures on its two widths of solvent printers, but with growing competition from Chinese solvent printers, DGI, Mimaki, Mutoh, and Roland, the ColorSpan solvent printers have not experienced growth the same way the ColorSpan UV printers did.

FujiFilm is a major distributor in the US for Mutoh. They feature the ValueJet (made by Mutoh-Japan). In Europe this is also sold, but the main models are the eco-solvent Rockhopper 3 Extreme and the mild-solvent Spitfire Extreme, since these are designed and manufactured by Mutoh-Europe in Belgium. FujiFilm also has brochures for the FujiFilm Vybrant, which is another Mutoh-made printer, renamed and with a different color when sold by FujiFilm.

Mutoh exhibited primarily solvent-ink printers; they are not yet showing a UV-cured printer. Mutoh, Roland, and Seiko are the most out of synch with the market demand for UV printers.

HP exhibited their standard Scitex Vision printer as the HP Scitex XL1500. They did not show the dye sub version. This printer is competition for the VUTEk 3360, which also has a dye sublimation version, the Fusion. FLAAR offers a separate report on the VUTEk since it has been possible to study this at the VUTEk factory and main demo center in New Hampshire.

HP also offers their 9000s (rebranded Seiko ColorPainter 64s), their HP Designjet 10000s (rebranded Seiko ColorPainter 100s), and HP 8000s (trying to offer a mild-solvent printer at a lower price).

Mimaki had a best-seller in their JV3 solvent printer, but its very slow. As Mutoh and Roland came out with faster models, Mimaki tried to counter with their JV5. This went through a long long gestation period and quickly got a reputation for inability to dry the ink at its printing speeds.

Now Mimaki has come up with two other printers, their JV33, in 1.3 meter and 1.6 meter versions. But these also have ink drying issues, so much that they have to be run at uni-directional mode (which cuts the speed down in half). The colors, however, are very vibrant, indeed remind me of the Seiko ColorPainter 64S (now the HP 9000s, but with a reformulated ink).

FujiFilm bought Sericol ink company. Sericol is the distributor of Inca Spyder and Inca Columbia printers.

FujiFilm/Sericol now is trying to offer aftermarket ink solutions for solvent as well as UV printers. So Sericol rebrands Mutoh printers and gives them new names (that few people can remember).

FujiFillm and Mutoh booth at
GraphExpo 07

Ventilation of Solvent fumes & other issues

Most manufacturers of eco-solvent printers claim no ventilation is needed.

Many manufacturers of UV-curing wide-format printers claim that no ventilation is needed.

Neither of these claims is true: eco-solvent fumes are enough to cause workers in the same room to complain. Mild-solvent is worse. Most UV-curing flatbed printers create an odor that is unbearable for normal office workers (other than for the printer operator who gets used to the smell quickly, and has no other alternative anyway).

But if you are a student that is hired at a printshop, be aware of these issues. Of course screen printing ink is the most hazardous of all, but lobbying and other pressures has kept this issue under wraps.

Two companies in North America (both in Canada actually) are addressing the ventilation issues: PAT and ICA.

PAT Technology Systems emphasizes capturing as many of the fumes at the source as possible. Their ventilators are hooked to the front of the printer.

ICI systems emphasize cleaning the air in the entire room, since they indicate that much of the offensive VOCs and unbearable odor of solvent ink is out-gassing after the print is moved away from the printer. So a printer-ventilation only captures the first part of the unhealthy odor.

PAT offers custom systems for Mimaki JV3 and Mimaki JV5, for Roland Advanced Jet AJ-740 and other printers.

PAT Captivair ventilation system at GraphExpo 07

Chinese solvent printers and Chinese UV printers were noticeably absent

Last year or the year before, if I remember correctly, Infiniti (Aeromatrix) exhibited their Chinese-made Infiniti UV printer. They were no longer at GraphExpo.

Lasts year DuPont exhibited their UV printers that are all contract-manufactured in China. Pitman no longer sells them, and DuPont itself did not exhibit at GraphExpo either. Several people suggested that DuPont was pulling out of offering printers, in part due to the high costs of providing tech support for printers that kept breaking down or wearing out prematurely due to being made in China.

Innovative Inks: Eastech

Eastech booth exhibiting their machines and their inks, at GraphExpo 07.

Page-width arrays: RISO

Often this is called "one pass" printing, meaning that the printheads don't need to go back-and-forth. The printheads span the entire width of the paper size. The ink is jetted constantly as the paper moves rapidly underneath.

I call these a fixed page-width array, because "one pass" brings back memories of a printhead itself moving. A true page-width array never moves; it is Zero pass for the printheads, not one pass.

The Agfa :Dotrix is an example of a page-width array of printheads. This printer is fed from a giant roll. Unfortunately this unique machine is rarely exhibited; the last time I saw it was at Print '05 (every four years GraphExpo is twice its regular size and changes name every four years to reflect this increase in exhibit space).

At GraphExpo '07 the RISO office printer and the Dainippon Screen Truepress Jet520 were the two page-width array printers that I recognized.

At DRUPA 2008 you may also be able to see the 3-million dollar FastJet from Sun Chemical. I spent an educational day at their printer R&D and production facility in the UK inspecting this earlier this year.

But you can get page-width array inkjet printers for $200. Check out all the buzz about Silverbook printers. A Google search will bring up all kinds of information.

RISO HC5500 printer, at GraphExpo

http://texyt.com/Is+Silverbrook+high+speed+Memjet+printer+real

Or Google HP Edgeline Technology. Again, page-width array printheads.

If a student is seeking employment opportunities, you better understand page-width array technology, and MEMS printhead technology while you are at it. Although not all current page-width fixed arrays use MEMS printheads, the smaller desktop units almost have to, because traditional non MEMS printheads are too large for a desktop printer.

It's simple; most of the companies hiring you will be traditionalistic. The owners, and many managers, will be experts in traditional (old-fashioned) printing. Offset, flexo and other traditional printing technologies made them millions in profits in past years.

But these capable, knowledgeable and experienced senior people may either be clueless about new technologies, or may know they exist but not yet have had time to fully research them.

If you, as a student, arrive at an interview, and if you know the jargon, know the basics, and even more, if you have experienced these printers first-hand at a trade show (or in a co-op work experience), you will be viewed as a god-send by a prospective employer.

RISO booth at GraphExpo 07

Water-Based Printers

Epson, HP, and Canon all exhibited water-based printers. Mimaki, Mutoh, and Roland still conceivably have water-based printers available on special order, but for years they have not exhibited them, and when so, primarily for textile inks or dye-sublimation inks. The market has clearly moved away from water-based to eco-solvent and mild-solvent inks.

The Canon booth in past years was primarily copiers for printer shows, or cameras for camera shows. Printers were (in the past) relegated to a side area and not emphasized. Gradually, and especially since Canon invested over 1 billion dollars in creating new thermal Bubblejet printhead technology, Canon is allowing more space in it's booths for their wide-format printers.

Canon iPF6100, 12 ink channels, 24" width

In past years the only printers that could produce top quality were water-based Epson and HP. Today the Mutoh printers (which use the same Epson printheads as Epson printers) can produce the same high quality for fine art photography with eco-solvent ink. Indeed even Epson itself will have an eco-solvent printer within a few months (definitely in time for DRUPA).

In past years Epson was not pertinent to signage because their printers were too slow, the resolution was more than most signage needed, and the printers were limited to 44 inches. So Epson printers were used mainly for proofing, giclee, and printing photographs.

Today Epson has launched a 64" water-based printer and rumors suggest they are trying to prepare a 64" eco-solvent printer (to compete with Roland, Mutoh, and Mimaki). The new Epson printers are not as slow as before (however their piezo heads limit their speed and most thermal printheads are inherently faster).

Canon iPF8000s printer at GraphExpo 07

RIP Software and Color Management

GraphExpo is a good place to go to learn about proofing RIPs. Since color management software and tools is a monopoly controlled by X-Rite, there is not as much action in this area as when GretagMacbeth was an independent competitor. Now X-Rite owns even Pantone. So prices will rise and innovation will slow down a bit, but currently color management is at a good level anyway.

Color Burst is a RIP used for many years on VUTEk and recently by Epson.

EFI

GMG is a German proofing RIP company. They inherited many of the best staff of BEST RIP when that German company was bought by EFI.

ORIS is a German proofing RIP from CGS in the US.

Several color management consultants had booths at GraphExpo.

Eizo Nanao Technologies Inc, offers

Pantone was sold to X-Rite just before GraphExpo began.
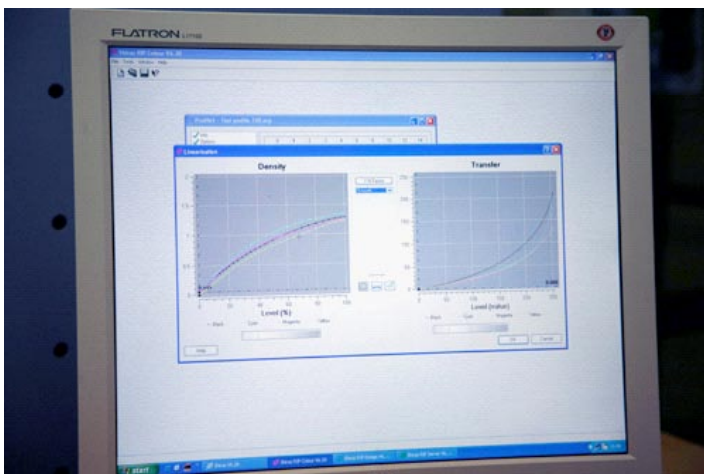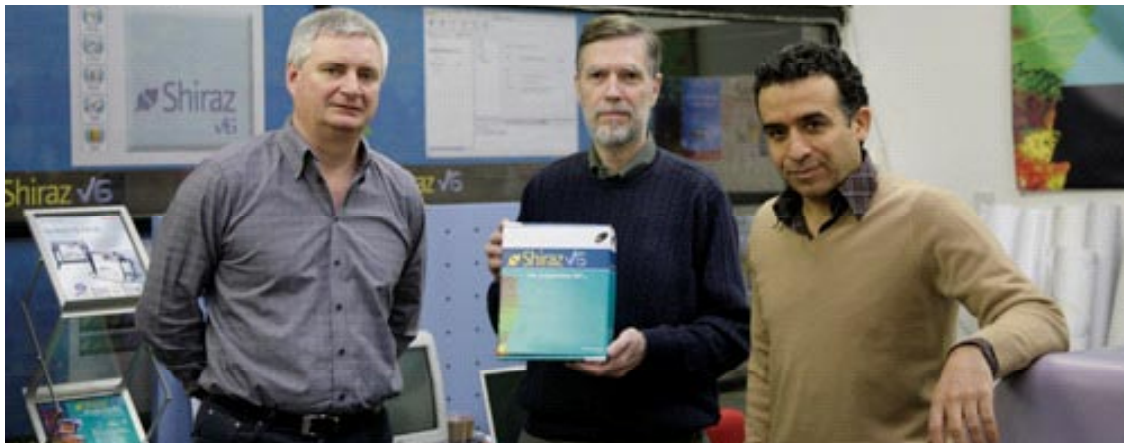
Dr Nicholas at World headquarters of AIT, the company that develops SHIRAZ Rips software for wide-format ink jet printers

Lamination

D&K Group Inc

GBC

PAT Technology Systems

Royal Sovereign International

Variable Data Short-Run Digital Presses

Students who learn about variable data short-run digital presses while they are still in the university will have an excellent chance of obtaining a well-paying job when they graduate; especially if the student learns the necessary software.

In the beginning, the primary short-run digital presses were the

- Indigo (subsequently bought by HP)
- NexPress (purchased by Kodak from Heidelberg)
- Xerox iGen3
- Xeikon

HP Indigo s2000 at GraphExpo 07

Xerox iGen3 at GraphExpo 07

The quality has improved dramatically in past years. At Print '01 the output from the Xeikon was not much better than an average copier. Today it's photo-realistic and one of my favorites.

Reliability has also improved. The original Indigo printers had endless issues and quirks. Today the HP Indigo is significantly better, albeit all complex technologies require a fair amount of tech support and maintenance.

All four original leaders: Indigo, NexPress, iGen3 and Xeikon, are now all mature technologies. This is both positive (they finally work and are predictable) and negative (other newer technologies could surpass them). But for today and tomorrow, the four original short-run digital presses are the most investments that will produce the fewest unpleasant or unexpected surprises. Maturity has many definite advantages.

Now other companies, that missed out in the first era, are trying to turn their copiers into variable data short-run digital presses, especially Canon. Dainippon Screen is another company that has been working on an inkjet-based short-run digital press, their TruePress Jet520. However this is evidently still in beta stage, even though it has been exhibited previously and was prominently displayed.

Screen booth personnel did not allow photographs of inside the printer. Same with the Screen UV printers at FESPA '07 in Germany. But most of the other companies allow me inside their printers, so we concentrate on the printers where full access is encouraged.

Actually you can do variable data with any wide-format inkjet printer that can be operated with Wasatch SoftRIP; this has offered variable data capability for the past two years.

If an angel appeared and asked me which short-run digital press I would prefer, and told me it would be delivered at no cost, I would select the iGen3 with all accessories (cutter, binder, etc).

If I wanted a digital press only for printing photographs, I would be tempted by the Xeikon since it is the only one that can print panoramic photos or circumferential rollout photos (because Xeikon prints much longer sheets than any of the other brands page size).

Indigo had endless technical problems in its first years. Clearly most have been resolved by Indigo and HP technology since then, but I would first want to inspect several printshops that had one and interview both the owner, manager, and printer operator to see what quirks it still had, and whether the ROI was realistic. Xerox and HP are obviously both stable reliable companies. Kodak's digital press division appears to be surviving okay, but associated portions of Kodak has clearly had some serious product failures, most notably in wide-format inkjet (Encad and Kodak 5260 printers). Kodak also got clobbered by Canon and Nikon in the world or professional 35mm digital SLR cameras, and withdrew from that market. Kodak pulled out of the wide-format inkjet market after Encad collapsed and after its own wide-format printer was, unfortunately, a technological failure to an embarrassing degree. Kodak is still trying to develop a new wide-format inkjet printer, but this has stalled year after year. If the project is so iffy that they can't show a printer by the time of SGIA later in October, unless what they show at DRUPA 2008 is spectacular beyond expectation, they have no future in this market.

The truism is: if you don't own enough patents, you can't easily survive merely by being a system integrator. HP, Canon, and Epson each own the printhead technology that they use. Kodak does not own any printhead company. Inkjet media comes from China, so the yellow logo on inkjet media is no longer really from Kodak any more. Ink is effectively a commodity too, so though Kodak can and does make its own ink, this alone is not enough.

Xeikon 6000 variable-data machine at GraphExpo 07

Scanners

Vidar

Vidar scanner at GraphExpo 06

Vidar booth at GraphExpo 06

Trade Magazines

The Big Picture

Cygnus Business Media

Dealer Communicator/Fichera Publications

Digital Output Magazine

Graphic Arts Monthly

Innes Publishing

In-Plant Graphics

Universities

FLAAR has made its booth available and two years there was BGSU participation (participation meaning some BGSU staff were in attendance for some of the hours). This year, with budget cuts in every area of the university, there was none.

Clemson University had a booth, their Institute of Packaging Design & Graphics.

Ferris State University

Fox Valley Technical College

FLAAR booth at GraphExpo 07

LECTURE PROGRAMS

FLAAR was active in two separate lecture programs,

Wide Format Theater (gave two lectures here; the same topic two days)

UV Printer Secrets from the Source: Why You Should Visit Factory Demo Sites.

This popular lecture shows printshop owners and managers what you learn when you visit the demo room, factory, and headquarters of the companies that manufacture and market UV-curable flatbed wide-format inkjet printers.

The second venue was the GRAPH EXPO seminar program. I was recommended by Professor Frank Romano, RIT. The FLAAR presentation was on "New Dimensions in Flatbed Solvent and UV Inkjet Printing."

Dr Nicholas Hellmuth lecturing on "New Dimensions in Flatbed Solvent and UV Inkjet Printing" at GraphExpo 07

Dr Nicholas Hellmuth lecturing on "Why You Should Visit Factory Demo Sites" at GraphExpo 07

Innovation Gallery

I thank ** Currier, EFI-VUTEk for kindly doing the printing. I thank Sonia ODonnell for patience in waiting for me to get back from frequent trips to UV printer factories around the world.

Photos taken by Dr Nicholas Hellmuth, exhibited in GraphExpo 07, this photos where printed by VUTEk

Sonia Odonnell, organizer of the wide format Pavillion

Most recently updated December 2007

First issued October 2007.

As soon as you have your UV-flatbed printer, your printshop will desire to have a cutter or trimmer.

First you need to trim. Simple cutting of the edges of your board so the edges are neat and clean. Then of course some clients will ask if you can do contour-cutting. This means you can offer additional services and earn additional income.

The best way to learn about trimmers is to ask a distributor who has more than one brand. This way they do not push their house brand and denigate brands that they do not carry. Also, you want a real person that actually has experience. Otherwise you get a "box pusher" who is simply an Internet sales person, who does not know trimmer from dimmer.

The person we suggest is **Mike Lind** because his company, **Reprographic Designs**, handles all leading brands: KeenCut, Neolt, Meteor Metoschnitt, RotaTrim, etc. You can contact him at 1 281 492 2714 or malind@msn.com.

His company is also the Master Distributor for Cruse reprographic scanners in the US and adjacent countries.

We have seen Gerber cutters at work during major trade shows, both in Europe and in the US. Gerber has dealers all across the US and Canada, and in Europe is served by Spandex.

XY Cutter Options

In a period of economic recession printshops will tend to ask about options that are priced lower than high-end prices. Thus we suggest two possible solutions at mid-range and/or entry-level price: Gerber M class cutters or DYSS. I have inspected two huge factory complexes of Gerber Scientific in 2008 (especially their cutters for fabrics) and will be visiting their facilities again in 2009.

To contact Gerber:
Phone (US): 800-222-7446, email: cservice@gspinc.com
Fax: 800-227-6228 or 860-648-8064
Phone (Intl): 860-648-8028, email: gspinternational@gspinc.com

When you acquire a UV-curable wide-format printer you will eventually learn that an XY flatbed cutter is a useful accessory for thick rigid materials. The advantage of having an XY cutter is that you are selling not just the print, but a finished work. To stay ahead of the competing printshops in your city it helps to offer your clients a solution for every step of the printing workflow.

DYSS is a thriving company that has exhibited its UV printers and XY cutter both in Europe (FESPA, VISCOM, etc) and in the US (SGIA and ISA). Since mid-2007 FLAAR has evaluated XY cutters and CNC routers at trade shows and by visiting factories such as Zund in Europe and Multi-Cam in the US.

On our next trip to Korea we hope to visit the factory of DYSS. On previous trips to Korea I have already inspected the factory of D.G.I. (twice), IP&I, Dilli, Keundo, and Yuhan-Kimberly (the Korean branch of Kimberly-Clark; Yuhan-Kimberly develops inkjet inks for textiles as well as wide-format inkjet printers). During these inspections I have learned that the quality of machinery made in Korea is equal to, and in some cases better than, UV printers made in Japan and the US).

Planet Digital is the Master Distributor for DYSS XY flatbed cutters and DYSS UV-curable inkjet printers. So in a single source you can learn about both the production stage of the workflow and the finishing stage of the workflow.

Bryan Stringer, CEO, Planet Digital,
Email: Info@Planetdigital.eu
TEL : +44 (0)1963 220900   FAX : +44 (0)1963 220861

This contact information telephone and fax number is for all of Europe, Middle East, and Africa. If you are in the US, you should utilize the e-mail address for contact.

DYSS X7 cutter at VISCOM Italy 2008.
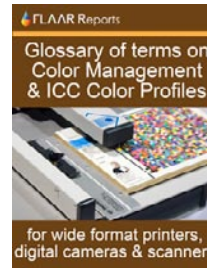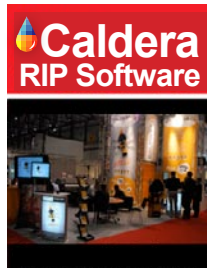
These reports on RIP software and Color Management for serious UV printers are free downloads on all FLAAR web sites (follow the link to 'free downloads')   http://www.wide-format-printers.net/reviews_reports_evaluations/free_download.php

RIP, COLOR MANAGEMENT, and ICC Color Profiles options

Once you have a serious UV-curable wide-format printer, you may prefer to have an equally serious RIP software and color management equipment.

The RIP software for simple water-based printers such as Canon, Epson, and HP may not be the same RIP software that could be most effective and productive on a UV-curable flatbed or UV-cured roll-to-roll production printer.

I first noticed Caldera RIP on Gandinnovations UV printers several years ago, then I saw Caldera being used at the Mutoh Europe factory demo room in Belgium.

When I was visiting the Durst factories in Europe I again noticed that they were using Caldera RIP software.

So I requested access from Caldera so I could visit their world headquarters in Strasbourg, France, to spend several days learning more about their RIP. As a result there is now a FLAAR Report photo essay on this software.

Most recently I have seen Caldera RIP at the Shanghai printer trade show in China, at DRUPA in Germany, at FESPA DIgital in Geneva, SGIA '08 and Viscom Italy '08.

When I visited a large printshop in Maribor, northern Slovenia, they were using Caldera RIP and the manager of technical services for this company said, "*Caldera does a good job.*" This company in Slovenia has about eight UV printers (about five of them from Durst) and an equal number of large solvent printers. They originally used a GretagMacbeth color man-

agement system but switched to BARBIERI because the BARBIERI spectrophotometer can read more efficiently and can handle textiles, backlit, wood and other materials that are either awkward or difficult on other brands of color management instruments. You can learn about the BARBIERI equipment either from their headquarters in Brixen or their distributors worldwide.

For further information on Caldera
contact Joseph MERGUI
mergui@caldera.fr
If you have questions about color management, if you are in the US you can contact: ImageTech at:
www.ImageTechDigital.com
Mark Spandorf (owner and president),
mark@imagetechdigital.com
or 510 238-8905. If you are in Europe or the rest of the world you can contact BARBIERI directly at: BARBIERI electronic snc,
info@BARBIERIelectronic.com
www.BARBIERIelectronic.com
Tel.: +39 0472 834 024
Fax: +39 0472 833 845

Caldera also offers a highly regarded spectrophotometer from Barbieri, the leading color management company in Italy (they are headquartered in the same city as Durst, the manufacturer of Rho UV-cured printers).

Reality Check

Being a university professor for many years does not mean we know everything. But intellectual curiosity often leads us to enter areas that are new to us. So we do not shirk from entering areas where we are obviously not yet expert. If in your years of wide format printing experience have encountered results different that ours, please let us know at ReaderService@FLAAR.org. We do not mind eating crow, though so far it is primarily a different philosophy we practice, because since we are not dependent on sales commissions we can openly list the glitches and defects of those printers that have an occasional problem.

FLAAR and most universities have corporate sponsors but FLAAR web sites do not accept advertising, so we don't have to kowtow to resellers or manufacturers. We respect their experience and opinion, but we prefer to utilize our own common sense, our in-house experiences, the results from site-visit case studies, and comments from the more than 53,000 of our many readers who have shared their experiences with us via e-mail (the Survey Forms).

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If you wish to distribute this report to other people within your company, please obtain a site licensing agreement for multiple copies from FLAAR by contacting ReaderService@FLAAR.org Substantial discounts are available for licensing to distribute within your company; we call this a subscription. The advantage of a subscription license is that you can opt for automatic updates. You may have noticed that FLAAR reports tend to be updated as additional information becomes available.

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To distribute this report without subscription/license violates federal copyright law. To avoid such violations for you, and your company, you can easily order additional copies from www.wide-format-printers.NET.

Update Policy

Starting in 2008, updates on UV-curable wide-format inkjet printers are available for all individuals and companies which have a subscription, or to companies who are research project sponsors. If you are a Subscriber or manager in a company that is a research sponsor, you can obtain the next update by writing ReaderService@FLAAR.org. If you are neither a Subscriber or a research sponsor, simply order the newest version via the e-commerce system on www.wide-format-printers.NET. Please realize that because we have so many publications and many are updated so frequently that we have no realistic way to notify any reader of when just one particular report is actually updated.

There is a free PDF that describes the UV-curable inkjet printer Subscription system. Subscriptions are available only for UV-related wide-format printer publications.

FLAAR Reports on UV-curable roll-to-roll, flatbed, hybrid, and combo printers are updated when new information is available. We tend to update the reports on new printers, on printers that readers ask about the most, and on printers where access is facilitated (such as factory visits, demo-room visits, etc).

Reports on obsolete printers, discontinued printers, or printers that not enough people ask about, tend not to be updated.

FLAAR still publishes individual reports on solvent printers, and on giclee printers, but subscriptions on these are not yet available; these FLAAR Reports on solvent, eco-solvent, and water-based wide format printers have to be purchased one by one.

Please Note

This report has not been licensed to any printer manufacturer, distributor, dealer, sales rep, RIP company, media, or ink company to distribute. So, if you obtained this from any company, you have a pirated copy.

If you have received a translation, this translation is not authorized unless posted on a FLAAR web site, and may be in violation of copyright (plus if we have not approved the translation it may make claims that were not our intention).

Also, since this report is frequently updated, if you got your version from somewhere else, it may be an obsolete edition. FLAAR reports are being updated all year long, and our comment on that product may have been revised positively or negatively as we learned more about the product from end users.

If you receive any FLAAR Report from a sales rep, in addition to being violation of copyright, it is useful to know if there is a more recent version on the FLAAR web site, because every month new UV printers are being launched. So what was good technology one month, may be replaced by a much better printer elsewhere the next month.

To obtain a legitimate copy, which you know is the complete report with nothing erased or changed, and hence a report with all the original description of pros and cons, please obtain your original and full report straight from www.FLAAR.org.

Your only assurance that you have a complete and authentic evaluation which describes all aspects of the product under consideration, benefits as well as deficiencies, is to obtain these reports directly from FLAAR, via www.wide-format-printers.NET.

Citing and Crediting

A license from FLAAR is required to use any material whatsoever from our reports in any commercial advertisement or PR Release.

If you intend to quote any portion of a FLAAR review in a PowerPoint presentation, if this is in reference to any product that your company sells or promotes, then it would be appropriate to ask us first. FLAAR reports are being updated every month sometimes, and our comment on that product may have been revised as we learned more about the product from end users. Also, we noticed that one company cited the single favorable comment we made on one nice aspect of their printer, but neglected to cite the rest of the review which pointed out the features of the printer which did not do so well. For them to correct this error after the fact is rather embarrassing. So it is safer to ask-before-you-quote a FLAAR review on your product.

The material in this report is not only copyright, it is also based on years of research. Therefore if you cite or quote a pertinent section, please provide a proper credit, which would be minimally "Nicholas Hellmuth, year, www.FLAAR.org." If the quote is more than a few words then academic tradition would expect that a footnote or entry in your bibliography would reference the complete title. Publisher would be www.FLAAR.org.

If you intend to quote any portion of a FLAAR review in a PowerPoint presentation, if this is in reference to any product that your company sells or promotes, then it would be appropriate to license the report

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Legal notice

Inclusion in this study by itself in no way endorses any printer, media, ink, RIP or other digital imaging hardware or software. Equally, exclusion from this study in no way is intended to discredit any printer.

Advisory

We do our best to obtain information which we consider reliable. But with hundreds of makes and models of printers, and sometimes when information about them is sparse, or conflicting, we can only work with what we have available. Thus you should be sure to rely also on your own research, especially asking around. Find another trustworthy end-user of the same make and model you need to know about. Do not make a decision solely on the basis of a FLAAR report because your situation may be totally different than ours. Or we may not have known about, and hence not written about, one aspect or another which is crucial before you reach your decision.

The sources and resources we may list are those we happen to have read. There may be other web pages or resources that we missed. For those pages we do list, we have no realistic way to verify the veracity of all their content. Use your own common sense plus a grain of salt for those pages which are really just PR releases or outright ads.

We are quite content with the majority of the specific printers, RIPs, media, and inks we have in the FLAAR facilities. We would obviously never ask for hardware, software, or consumables that we knew in advance would not be good. However even for us, a product which looks good at a trade show, sounds good in the ad literature, and works fine for the first few weeks, may subsequently turn out to be a lemon.

Or the product may indeed have a glitch but one that is so benign for us, or maybe we have long ago gotten used to it and have a workaround. And not all glitches manifest themselves in all situations, so our evaluator may not have been sufficiently affected that he or she made an issue of any particular situation. Yet such a glitch that we don't emphasize may turn out to be adverse for your different or special application needs.

Equally often, what at first might be blamed on a bad product, often turns out to be a need of more operator experience and training. More often than not, after learning more about the product it becomes possible to produce what it was intended to produce. For this reason it is crucial for the FLAAR team and their university colleagues to interact with the manufacturer's training center and technicians, so we know more about a hardware or software. Our evaluations go through a process of acquiring documentation from a wide range of resources and these naturally include the manufacturer itself. Obviously we take their viewpoints with a grain of salt but often we learn tips that are worthy of being passed along.

FLAAR has no way of testing 400+ specifications of any printer, much less the over 101 different UV printers from more than 46 manufacturers. Same with hundreds of solvent printers and dozens of water-

based printers. We observe as best we can, but we cannot take each printer apart to inspect each feature. And for UV printers, these are too expensive to move into our own facilities for long-range testing, so we do as best as is possible under the circumstances. And when a deficiency does become apparent, usually from word-of-mouth or from an end-user, it may take time to get this written up and issued in a new release.

Another reason why it is essential for you to ask other printshop owners and printer operators about how Brand X and Y function in the real world is that issues may exist but it may take months for these issues to be well enough known for us to know the details. Although often we know of the issues early, and work to get this information into the PDFs, access to information varies depending on brand and model. Plus with over 300 publications, the waiting time to update a specific report may be several months. Plus, once a printer is considered obsolete, it is not realistic to update it due to the costs involved.

For these reasons, every FLAAR Report tries to have its publication date on the front outside cover (if we updated everything instantly the cost would be at commercial rates and it would not be possible to cover these expenses). At the end of most FLAAR Reports there is additionally a list of how many times that report has been updated. A report with lots of updates means that we are updating that subject based on availability of new information. If there is no update that is a pretty good indication that report has not been updated! With 101 models of UV printers, several hundred solvent printers, and scores of water-based printers, we tend to give priority to getting new reports out on printers about which not much info at all is available elsewhere. So we are pretty good about reporting on advances in LED curing. But glitches in a common water-based printer will take longer to work its way through our system into an update, especially if the glitch occurs only in certain circumstances, for example, on one type of media. With several hundred media types, we may not yet have utilized the problem media. While on the subject of doing your own research, be sure to ask both the printer operator and printshop owner or manager: you will generally get two slightly different stories. A printer operator may be aware of more glitches of the printer than the owner.

But even when we like a product and recommend it, we still can't guarantee or certify any make or model nor its profitability in use because we don't know the conditions under which a printer system might be utilized in someone else's facility. For ink and media, especially after-market third-party ink and media, it is essential that you test it first, under your conditions. We have no way to assure that any ink or media will be acceptable for your specific needs in your specific print shop. As a result, products are described "as is" and without warranties as to performance or merchantability, or of fitness for a particular purpose. Any such statements in our reports or on our web sites or in discussions do not constitute warranties and shall not be relied on by the buyer in deciding whether to purchase and/or use products we discuss because of the diversity of conditions, materials and/or equipment under which these products may be used. Thus please recognize that no warranty of fitness or profitability for a particular purpose is offered.

The user is advised to test products thoroughly before relying on them. We do not have any special means of analyzing chemical contents or flammability of inks, media, or laminates, nor how these need to be controlled by local laws in your community. There may well be hazardous chemicals, or outgassing that we are not aware of. Be aware that some inks have severe health hazards associated with them. Some are hazardous to breathe; others are hazardous if you get them on your skin. For example, some chemicals such as cyclohexanone do not sound like chemicals you want to breathe every day. Be sure to obtain, read, and understand the MSDS sheets for the inks, media, and laminates that you intend to use. Both solvent,

eco-solvent, and UV-curable inks are substances whose full range of health and environmental hazards are not yet fully revealed. It is essential you use common sense and in general be realistic about the hazards involved, especially those which are not listed or which have not yet been described. FLAAR is not able to list all hazards since we are not necessarily aware of the chemical components of the products we discuss. Our reports are on usability, not on health hazards.

Most inks are clearly not intended to be consumed. Obviously these tend to be solvent inks and UV-curable inks. Yet other inks are edible, seriously, they are printed on birthday cakes. Indeed Sensient is a leader in a new era of edible inks. Therefore the user must assume the entire risk of ascertaining information on the chemical contents and flammability regulations relative to inks, media or laminates as well as using any described hardware, software, accessory, service, technique or products.

We have no idea of your client's expectations. What students on our campus will accept may not be the same as your Fortune 500 clients. In many cases we have not ourselves used the products but are basing our discussion on having seen them at a trade show, during visiting a print shop, or having been informed about a product via e-mail or other communication.

Results you see at trade shows may not be realistic

Be aware that trade show results may not be realistic. Trade shows are idealized situations, with full-time tech support to keep things running. The images at a trade show may be tweaked. Other images make be "faked" in the sense of slyly putting on primer without telling the people who inspect the prints. Most UV inks don't stick to all materials; many materials need to be treated.

Or the UV prints may be top-coated so that you can't do a realistic scratch test.

Booth personnel have many standard tricks that they use to make their output look gorgeous. In about half the cases you will not likely obtain these results in real life: in most cases they are printing uni-directional, which may be twice as slow as bi-directional.

Trade show examples tend to be on the absolutely best media. When you attempt to save money and use economy media you will quickly notice that you do not get anywhere near the same results as you saw in the manufacturer's trade show booth, or pictured in their glossy advertisement. Five years ago we noticed Epson was laminating prints to show glossy output because their pigmented inks could not print on actual glossy media. The same equipment, inks, media, and software may not work as well in your facility as we, or you, see it at a trade show. All the more reason to test before you buy; and keep testing before you make your final payment. Your ultimate protection is to use a gold American Express credit card so you can have leverage when you ask for your money back if the product fails.

Images printed at trade show may be in uni-directional mode: so you may not realize the printer has bi-directional (curing) banding defects until you unpack it in your printshop. Bi-directional curing banding is also known as the lawnmower effect. Many printers have this defect; sometimes certain modes can get rid of it, but are so slow that they are not productive.

You absolutely need to do print samples with your own images and the kind provided by your clients. Do not rely on the stock photos provided by the printer, ink, media, or RIP manufacturer or reseller. They may be using special images which they know in advance will look fabulous on their printer. Equally well, if you send your sample

images to the dealer, don't be surprised if they come back looking awful. That is because many dealers won't make a serious effort to tweak their machine for your kind of image. They may use fast speed just to get the job done (this will result in low quality). Check with other people in your area, or in the same kind of print business that you do. Don't rely on references from the reseller or manufacturer (you will get their pet locations which may be unrealistically gushy): find someone on your own.

Factors influencing output

Heat, humidity, static, dust, experience level of your workers (whether they are new or have prior years experience): these are all factors that will differ in your place of business as compared with test results or demo room results.

Actually you may have people with even more experience than we do, since we deliberately use students to approximate newbies. FLAAR is devoted to assisting newcomers learn about digital imaging hardware and software. This is why Nicholas Hellmuth is considered the "Johnny Appleseed" of wide format inkjet printers.

Therefore this report does not warranty any product for any quality, performance or fitness for any specific task, since we do not know the situation in which you intend to use the hardware or software. Nor is there any warranty or guarantee that the output of these products will produce salable goods, since we do not know what kind of ink or media you intend to use, nor the needs of your clients. A further reason that no one can realistically speak for all aspects of any one hardware or software is that each of these products may require additional hardware or software to reach its full potential.

For example, you will most likely need a color management system which implies color measurement tools and software. To handle ICC color profiles, you may need ICC color profile generation software and a spectrophotometer since often the stock pre-packaged ICC color profiles which come with the ink, media, printers and/or RIPs may not work in your situation. Not all RIPs handle color management equally, or may work better for some printer-ink-media combinations than for others.

Be aware that some RIPs can only accept ICC color profiles: you quickly find out the hard way that you can't tweak these profiles nor generate new ones. So be sure to get a RIP which can handle all aspects of color management. Many RIPs come in different levels. You may buy one level and be disappointed that the RIP won't do everything. That's because those features you may be lacking are available only in the next level higher of that RIP, often at considerable extra cost. Same thing in the progression of Chevy through Pontiac to Cadillac, or the new Suburbans. A Chevy Suburban simply does not have all the bells and whistles of the Cadillac Escalade version of this SUV.

Don't blame us… besides, that's why we are warning you. This is why we have a Survey Form, so we can learn when you find products that are inadequate. We let the manufacturers know when end users complain about their products so that the manufacturers can resolve the situation when they next redesign the system.

Most newer printer models tend to overcome deficiencies of earlier models. It is possible that our comparative comments point out a glitch in a particular printer that has been taken care of through an improvement in firmware or even an entirely new printer model. So if we point out a deficiency in a particular printer brand, the model you may buy may not exhibit this headache, or your kind of printing may not trigger the problem. Or you may find a work-around.

Just remember that every machine has quirks, even the ones we like. It is possible that the particular kind of images, resolution, inks, media, or other factors in your facility are sufficiently different than in ours that a printer which works just fine for us may be totally unsatisfactory for you and your clients. However it may be that the specific kind of printing you need to do may never occasion that shortcoming. Or, it may be that your printer was manufactured on a Monday and has defects that are atypical, show up more in the kind of media you use which we may not use as often or at all during our evaluations. Equally possibly a printer that was a disaster for someone else may work flawlessly for you and be a real money maker for your company.

So if we inspect a printer in a printshop (a site-visit case study), and that owner/operator is content with their printer and we mention this; don't expect that you will automatically get the same results in your own printshop.

In some cases a product may work better on a Macintosh than on a PC. RIP software may function well with one operating system yet have bugs and crash on the same platform but with a different operating system. Thus be sure to test a printer under your own specific work conditions before you buy.

And if a printer, RIP, media, or ink does not function, return it with no ands, ifs or buts. Your best defense is to show an advertising claim that the printer simply can't achieve. Such advertising claims are in violation of federal regulations, and the printer companies know they are liable for misleading the public.

But before you make a federal case, just be sure that many of the issues are not user error or unfamiliarity. It may be that training or an additional accessory can make the printer do what you need it to accomplish. Of course if the printer ads did not warn you that you had to purchase the additional pricey accessory, that is a whole other issue. Our reviews do not cover accessories since they are endless, as is the range of training, or lack thereof, among users.

The major causes of printer breakdown and failure is lack of maintenance, poor maintenance, spotty maintenance, or trying to jerry-rig some part of the printer. The equally common cause of printer breakdown is improper use, generally due from lack of training or experience. Another factor is whether you utilize your printer all day every day. Most solvent and UV printers work best if used frequently. If you are not going to use your printer for two or three days, you have to put flush into the system and prepare it for hibernation (even if for only four or five days). Then you have to flush the ink system all over again.

Also realize that the surface of inkjet prints are fragile and generally require lamination to survive much usage. Lamination comes in many kinds, and it is worth finding a reliable lamination company and receiving training on their products.

Also realize that no hybrid or combo UV printer can feed all kinds of rigid materials precisely. Some materials feed well; others feed poorly; others will skew.

Although we have found several makes and models to work very well in our facilities, how well they work in your facilities may also depend on your local dealer. Some dealers are excellent; others just sell you a box and can't provide much service after the sale. Indeed some low-bid internet sales sources may have no technical backup whatsoever. If you pay low-bid price, you can't realistically expect special maintenance services or tech support later on from any other dealer (they will tell you to return to where you paid for the product). This is why we make an effort to find out which dealers are recommendable.

Obviously there are many other dealers who are also good, but we do not always know them. To protect yourself further, always pay with a level of credit card which allows you to refuse payment if you have end up with a lemon. A Gold American Express card allows you to refuse payment even months after the sale. This card may also extend your warranty agreement in some cases (check first).

Most of the readers of the FLAAR Reports look to see what printers we use in our own facilities. Readers realize that we will have selected the printers that we like based on years of experience and research. Indeed we have met people at trade shows who told us they use the FLAAR web site reports as the shopping list for their corporate purchases.

Yes, it is rather self-evident that we would never ask a manufacturer to send a product which we knew in advance from our studies was no good. But there are a few other printers which are great but we simply do not have them in our facilities yet.

So if a printer is not made available by its manufacturer, then there is no way we can afford to have all these makes and models in our facility. Thus to learn about models which we do not feature, be sure to ask around in other print shops, with IT people in other corporations, at your local university or community college. Go to trade shows…. but don't use only the booth…ask questions of people in the elevator, in line at the restaurant, anywhere to escape the smothering hype you get in the booth.

Realize that a FLAAR Report on a printer is not by itself a recommendation of that printer. In your local temperature, in your local humidity, with the dust that is in your local air, with your local operator, and with disorientation of the insides of a printer during rough shipment and installation, we have no knowledge of what conditions you will face in your own printshop. We tend to inspect a printer first in the manufacturing plant demo room: no disjointed parts from any shipment since this printer has not been lifed by cranes and run over a rough pot-holed highway or kept in smeltering heat or freezing cold during shipment.

Taking into consideration we do not know the conditions in which you may be using your hardware, software, or consumables, neither the author nor FLAAR nor either university is liable for liability, loss or damage caused either directly or indirectly by the suggestions in this report nor by hardware, software, or techniques described herein because.

Availability of spare parts may be a significant issue

Chinese printers tend to switch suppliers for spare parts every month or so. So getting spare parts for a Chinese printer will be a challenge even if the distributor or manufacturer actually respond to your e-mails at all. Fortunately some companies to have a fair record of response; Teckwin is one (based on a case of two problematical hybrid UV printers in Guatemala). The distributor said that Teckwin sent a second printer at their own expense and sent tech support personnel at their expense also. But unfortunately both the hybrid UV printers are still abandoned in the warehouse of the distributor; they were still there in January 2009. But Teckwin has the highest rating of any Chinese company for interest in quality control and realization that it is not good PR to abandon a client or reseller or distributor all together.

Recently we have heard many reports of issues of getting parts from manufacturers in other countries (not Asia). So just because you printer is made in an industrialized country, if you are in the US and the manufacturer is X-thousand kilometers or miles away, the wait may be many days, or weeks.

Lack of Tech Support Personnel is increasing

The book of sales in the third quarter of 2008 resulted in many tech support problems.

The recession resulted in even more: some manufacturers may need to skimp on quality control during a recession, or switch to cheaper parts suppliers. Plus they are not hiring enough tech support during a recession. So the bigger and more successful the company, in some cases the worse these particular problems may be.

Any new compiled printer may take a few months to break in.

Any new printer, no matter who the manufacturer, or how good is the engineering ane electronics, will tend to have teething issues. Until the firmware is updated, you may be a beta tester. This does not mean the printer should be avoided, just realize that you may have some downtime and a few headaches. Of course the worst case scenario for this was the half-million dollar Luscher JetPrint: so being "Made in Switzerland" was not much help.

Be realistic and aware that not all materials can be printed on equally well

Many materials don't feed well through hybrid (pinch roller on grit roller systems) or combo UV systems (with transport belts). Banding, both from poor feeding, and from bi-directional (lawnmower effect) are common on many UV-curable inkjet printers.

It is typical for some enthusiastic vendors to claim verbally that their printer can print on anything and everything. But once you unpack the printer and set it up, you find that it requires primer on some materials; on other materials it adheres for a few weeks but then falls off.

And on most hybrid and many combo printers, some heavy, thick, or smooth-surfaced materials skew badly. Since the claim that the printer will print on everything is usually verbal, it is tough to prove this aspect of misleading advertising to a jury.

Not all inks can print on all materials. And at a trade show, many of the materials you see so nicely printed on, the manufacturer may be adding a primer at night or early in the morning: before you see the machine printing on this material.

We feel that the pros and cons of each product speak more than adequately for themselves. Just position the ad claims on the left: put the actual performance results on the right. The unscrupulous hype for some printers is fairly evident rather quickly.

Be sure to check all FLAAR resources

Please realize that with over 200 different FLAAR Reports on UV printers, you need to be sure to check the more obscure ones too. If a printer has a printhead issue, the nitty gritty of this may be in the FLAAR Report on printheads. The report on the model is a general introduction; if we discussed the intimate details of printheads then some readers might fall asleep. And obviously do not limit yourself to the free reports. The technical details may be in the reports that have a price to them. Our readers have said they prefer to have the general basics, and to park the real technical material in other reports that people can buy if they really want that level of information.

So it may be best to ask for personal consulting. The details of the problems with the ColorSpan 5400uv series are rather complex: namely the center row of the Ricoh printheads. This would require an expensive graphic designer and consultants to show the details. And the design of the printhead would probably be altered by the time we did any of this anyway. So it is essential to talk with people: with other end-users, and with FLAAR in person on a consulting basis.

Since 2006 we do a major part of our evaluations at a factory and headquarters demo room. Since the university does not fund any of these trips, it is traditional for the manufacturer to fund a research sponsorship. In the US this is how most university projects are initiated for decades now, and it is increasing. In fact there is a university in Austria that is not an "edu" but is a "GmbH", funded by the chamber of commerce of that part of Austria. In other words, a university as an educational institution, but functioning in the real world as an actual business. This is a sensible model.

It has been helpful when companies make it possible for us to fly to their headquarters so we can inspect their manufacturing facilities, demo rooms, and especially when the companies make their research, engineering and ink chemistry staff available for discussions. When I received my education at Harvard I was taught to have a desire to learn new things. This has guided my entire life and is what led me into wide-format digital imaging technology: it is constantly getting better and there is a lot to learn every month. Thus I actively seek access to improving my understanding of wide format printer technology so that we can better provide information to the approximately quarter-million+ readers of our solvent and UV printer web site (www.large-format printers.org) and the over half a million who read either our wide-format-printers.org site or our roughly half million combined who read our digital-photography.org and www. FineArtGicleePrinters.org sites.

more detailed information and documentation in our visits than would be provided to a magazine author or editor. Companies have learned that it's a lot better to let us know up front and in advance the issues and glitches with their printers, since they now know we will find out sooner or later on our own. They actually tell us they realize we will find out on our own anyway.

We really liked some of the results whereas some of the other products were a bit disappointing. Providing samples does not influence the evaluations because the evaluators are students, professors, and staff of Bowling Green State University. These personnel are not hired by any inkjet printer company; they were universities employees (as was also true for Nicholas Hellmuth). The testing person for the HP ColorPro (desktop printer) said he frankly preferred his Epson printer. When we saw the rest results we did not include this Hewltt-Packard ColorPro printer on our list of recommended printers, but we love our HP DesignJet 5000ps so much we now have two of them, one at each university.

Sometimes we hear horror stories about a printer. The only way we can tell whether this is the fault of the printer design, or lack of training of the operator, is to have the printer ourselves in-house. Of course some printer manufacturers don't understand the reasons we need to have each make and model; they are used to loaning their demo units for a week or so. That is obviously inadequate for a serious review.

Some of the media provided to us failed miserably. Three printers failed to meet common sense usability and printability standards as well (HP 1055, one older desktop model (HP Color Pro GA), and

one Epson). Yet we know other users who had better results; maybe ours came down the assembly line on a Monday or Friday afternoon, when workers were not attentive. One costly color management software package was judged "incapable" by two reviewers (one from the university; second was an outside user who had made the mistake of buying this package).

So it's obvious that providing products or even a grant is no shield from having your products fail a FLAAR evaluation. The reason is clear: the end user is our judge. The entire FLAAR service program is to assist the people who need to use digital imaging hardware and software. If a product functions we find out and promulgate the good news. If a product is a failure, or more likely, needs some improvement in the next generation, we let people know. If a product is hyped by what an informed user would recognize as potentially false and misleading nonsense, then we point out the pathetic discrepancies very clearly.

This is what you should expect from an institute which is headed by a professor.

Actually, most of our reviews are based on comments by end users. We use their tips to check out pros and cons of virtually every product we discuss. You can't fool a print shop owner whose printer simply fails to function as advertised. And equally, a sign shop owner who earns a million dollars a year from a single printer brand makes an impact on us as well. We have multiple owners of ColorSpan printers tell us that this printer is their real money earner for example. We know other print shops where their primarily income is from Encad printers. Kinkos has settled on the HP 5000 as its main money maker production machine, and so on.

Yet we have documentation of several print shop companies whose business was ruined by specific brands that failed repeatedly. It is noteworthy that it is always the same brand or printer at both locations: one due to banding and printheads then simply no longer printing one color; the other brand due to pokiness of the printer simply not being competitively fast enough. Same with RIPs, we have consistent statements of people using one RIP, and only realizing how weak it was when they tried another brand which they found substantially better. Thus we note that companies which experiment with more than one brand of product tend to realize more quickly which brand is best. This is where FLAAR is in an ideal situation: we have nine RIPs and 25 printers. Hence it is logical that we have figured out which are best for our situation.

Grant funding, sponsorship, demonstration equipment, and training are supplied from all sides of the spectrum of printer equipment and software engineering companies. Thus, there is no incentive to favor one faction over another. We receive support from three manufacturers of thermal printheads (Canon, ColorSpan and HP) and also have multiple printers from three manufacturers of piezo printers (Epson, Mutoh, and Mimaki). This is because piezo has definite advantage for some applications; thermal printheads have advantages in different applications. Our reviews have universal appeal precisely because we feature all competing printhead technologies. Every printer, RIPs, inks, or media we have reviewed have good points in addition to weaknesses. Both X-Rite and competitor GretagMacbeth provided spectrophotometers. Again, when all sides assist this program there is no incentive to favor one by trashing the other. Printer manufacturer ad campaigns are their own worst enemy. If a printer did not make false and misleading claims, then we would have nothing to fill our reviews with refuting the utter nonsense that is foisted on the buying public.

It is not our fault if some printers are more user friendly, print on more media than other brands. It is not our fault that the competing

printers are ink guzzlers, are slow beyond belief, and tend to band or drop out colors all together. We don't need to be paid by the printer companies whose products work so nicely in both our universities on a daily basis. The printers which failed did so in front of our own eyes and in the print shops of people we check with. And actually we do try to find some redeeming feature in the slow, ink gulping brands: they do have a better dithering pattern; they can take thick media that absolutely won't feed through an HP. So we do work hard at finding the beneficial features even of printers are otherwise get the most critique from our readers. Over one million people will read the FLAAR Information Network in the next 12 months; 480,000 people will be exposed to our reports on wide format printers from combined total of our three sites on these themes. You can be assured that we hear plenty of comments from our readers about which printers function, and which printers fail to achieve what their advertising hype so loudly claims.

We turn down offers of funding every year. These offers come from PO Box enterprises or products with no clearly visible point of manufacture. Usually the company making the offer presumes they can buy advertising space just by paying money. But that is not what our readers want, so we politely do not accept such offers of money.

Contributions, grants, sponsorships, and funding for surveys, studies and research is, however, open to a company who has an accepted standing in the industry. It is helpful if the company has a visible presence at leading trade shows and can provide references from both end users and from within the industry. Where possible we prefer to visit the company in person or at least check them out at a trade show. Obviously the product needs to have a proven track record too. Competing companies are equally encouraged to support the FLAAR system. We feel that readers deserve to have access to competing information. Competition is the cornerstone of American individualism and technological advancement.

FLAAR also covers its costs of maintaining the immense system of 8 web sites in three languages and its facilities in part by serving as a consultant such as assisting inkjet manufacturers learn more about the pros and cons of their own printers as well as how to improve their next generation of printers. It is especially useful to all concerned when manufacturers learn of trends (what applications are popular and for what reasons). For example, manufacturers need to know whether to continue designing software for Mac users, or concentrate software for PC users. So the survey form that you fill out is helpful to gather statistics. You benefit from this in two ways: first, you get the FLAAR reports in exchange for your survey form. Second, your comments bring (hopefully) change and improvement in the next generation of printers. When we do survey statistics, then the names, addresses, and telephone numbers are removed completely. A survey wants only aggregate numbers, not individuals. However, if you ask about a specific brand of printer, and do not opt out, we forward your request to a pertinent sponsor so you can obtain follow-up from that brand, since we ourselves do not have enough personnel to respond to each reader by telephone. But we do not provide your personal information to outsiders and our survey form has an opt out check-off box which we honor.
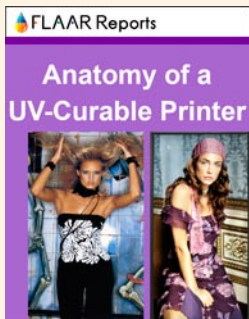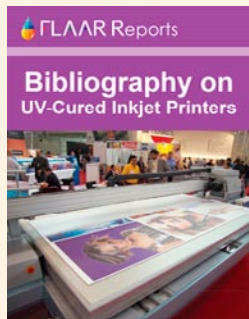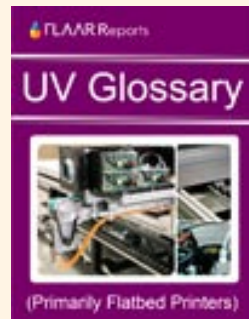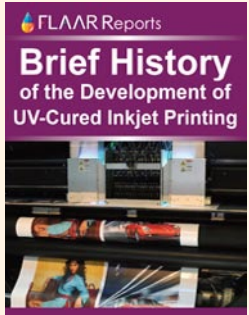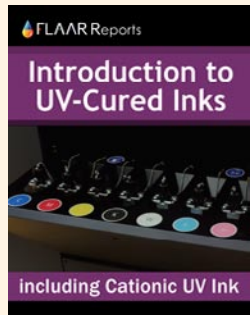
FLAAR also serves as consultants to Fortune 500 companies as well as smaller companies and individuals who seek help on which printers to consider when they need digital imaging hardware and software.

A modest portion of our income comes from our readers who purchase the FLAAR series. All income helps continue our tradition of independent evaluations and reviews of inkjet printers, RIPs, media, and inks.

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Introduction to UV Curable Inkjet Flatbed Printers

FLAAR Reports — Anatomy of a UV-Curable Printer

FLAAR Reports — Bibliography on UV-Cured Inkjet Printers

FLAAR Reports — Classifications of more than 60 UV-Cured Printers

FLAAR Reports — How to Buy a UV-Cured Inkjet Flatbed Printer — FAQs for UV Printers

FLAAR Reports — UV Glossary (Primarily Flatbed Printers)

FLAAR Reports — Brief History of the Development of UV-Cured Inkjet Printing

FLAAR Reports — How does a UV-Curable Printer differ from a Solvent or Eco-Solvent Inkjet Printer?

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Comments on UV Inkjet Printers at Major Trade Shows 2007-2009

FLAAR Reports — Trends in UV Flatbed Printers documented at DRUPA 2008

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