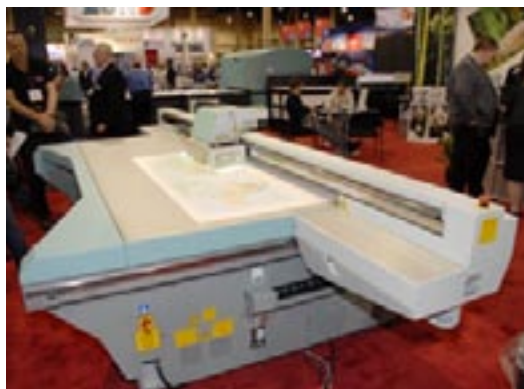


Flatbed Printers with UV-Curable Ink

Printing Directly on Thick and or Rigid Materials





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Flatbed Printers with UV-Curable Ink

Printing Directly on Thick
and/or Rigid Materials

Introduction

The present FLAAR Report could be considered Part III of a trilogy on flatbed printers. This Part III is dedicated to flatbed printers using UV-curable ink.

Part I covers water-based flatbed printers such as the Encad NovaJet 850. Water-based printers for signage are covered in the FLAAR Series on printers for signs.

Part II lists and describes solvent-based flatbed printers of sizes from desktop to wide format. The solvent ink flatbed printer report is in the series on solvent ink printers.

As you would expect of a university professor, this FLAAR list of UV-cured flatbed printers is the most comprehensive one we have found so far. Our list clearly identifies which UV-printers are deficient, which manufacturers are defunct, and which companies have been “no-shows” at trade shows recently. We can do this because FLAAR does not depend on advertising money. Yes, we do welcome corporate sponsorship from manufacturers, but we select only those manufacturers whose printers have the highest marks in end-user and industry evaluations. And even if a company is a sponsor, we are infamous for pointing out every single glitch, defect, weak point, and faux pas of that printer. This way you know, in advance, what you are getting when you buy this printer for the specific capabilities that you need. No one printer can do everything so it is crucial to match your needs with the printer(s) that can best produce the work that you require.

So if you are about to spend lots of your hard-earned money on a UV-curable ink printer, and if you want to cut through the smothering hype in the ads and PR releases, FLAAR Reports are a god-send.

When you look at the list below, one thing you may notice is that companies with no prior experience in building their own large format printers suddenly are producing UV-cured ink printers. These vary from companies that have never exhibited in the US as a printer manufacturer whatsoever (Ardeje, Grapo, PIT), to known companies but who never before did their own printer (Gerber, Neolt). Some of these are successful, such as L&P. Actually Inca was a start-up when it began, and Durst came from a background other than solvent ink.

The more companies, the more innovation, and the more likelihood of advancements in technology. But the laws of business reality will occur at some point: there is not room in a word economy for so many niche players. Indeed we heard of two major companies canceling their million-dollar UV-curable inkjet printers during September-October alone. This knocks one manufacturer out of the market all together, and eliminated 50% of the models offered by another major player. Yet at the upcoming albeit delayed SGIA 2005, and by the time of ISA 2006, there will be still other newer UV models, some by companies that have never previously offered any wide-format inkjet printer.

So now you can see why our university institute specializes in UV-cured ink printers. With all these different models there is too much confusion. Thus our FLAAR Reports can assist everyone keep track.

UV-curable ink

FLAAR offers a wide palette of reports on printers that use UV-curable ink. We cover the entire range from desktop size (Aellora) through giant sign printers (Lüscher and Nur). These PDF reports by Nicholas Hellmuth describe what you need to know about wide format printers that work with ultraviolet curable ink.

Beware of the incorrect use of the word "UV ink." Unfortunately Hewlett-Packard uses the designation of UV ink. This is a poor use of the concept of UV by HP several years before UV-curable ink because a moniker for flatbed printers. HP's UV ink is not ultraviolet curable whatsoever; it is just a normal water-based pigmented ink.

The present FLAAR Report could be considered Part III of a trilogy on flatbed printers. This Part III is dedicated to flatbed printers using UV-curable ink.

Parts I covers water-based flatbed printers such as the Encad NovaJet 850. Water-based printers for signage are covered in the FLAAR Series on printers for signs. These printers are all obsolete which is why they are not included in the present PDF.

Part II lists and describes solvent-based flatbed printers of sizes from desktop to wide format. The solvent ink flatbed printer report is in the series on solvent ink printers. In 90% of the cases that a manufacturer started with making a flatbed using solvent ink, when UV technology came along, sales of the solvent version of the flatbed collapsed. So there are not more than one or two flatbed inkjet printers that still use solvent ink. The Mutoh flatbed that features bio-solvent ink is one.

Our annotated lists of UV-Flatbed Printers is Updated Every Year

This report was substantially updated after four days of inspecting and taking notes on UV-curable ink flatbed printers at SGIA tradeshow in mid-October, 2003. It was then updated after Graphics of the Americas in January 2004.

Then we attended a 2-day IMI technology conference on UV-curable ink in early 2004. The next week we attended PMA for four days. Both these events resulted in lots of updates being added to this report.

The present update is after we spent 10 days at DRUPA, in May 2004. But we have also written a separate report on UV-curable ink flatbed printers at DRUPA.

We had estimated that at least 6 new UV-curable inkjet printers will be presented at DRUPA. Three showed up. An integrator at the IMI conference indicated that he personally knew of 20 printers in development. An integrator is a person or company dedicated to designing and arranging everything leading up to the manufacturing of wide format inkjet printers. Yes, the actual "manufacturer" does not necessarily have expertise in everything that goes into a printer. The integrator is a facilitator, a deal maker, who brings all the components together. Usually it works, but in the case of the CrystalJet in the 1990's and the Kodak 5260 in 2002, the design and integration resulted in a printer that could not be manufactured to actually produce the desired capabilities in daily operation.

The following list of printers has been amended and updated after SGIA, mid-October, 2003, and updated several times during 2004, especially after ISA '04 trade show and then DRUPA in May. Several updates came after ISA 2005, FESPA 2005, VisCom Duesseldorf 2005, a sign printing trade show in Milan, Italy (November 2005), and SGIA (December 2005).



At FESPA trade show, summer 2005, we saw many new UV-curable ink flatbed printers. More will be at SGIA in the autumn. By next year it will be too late for new entrants into the market because the market will be too saturated. So both Agfa and Roland are entering late, as are both Scitex Vision and Seiko. The Scitex Vision VEEjet is too old a technology to be competitive today in comparison with the Gandinnovations Jeti 3150 or the competition from Durst, Inca, and Tempo.

Another update came after the postponed DPI-SGIA 2005 was finally held in December 2005. An additional update came after ISA and IPEX, both held during April 2006. The present update is based on attending Outdoor & Indoor (Istanbul), SGIA '06, and Sign Spain '06. Now that we are moving into 2007, we are updating this report again, based on printers noticed at Gulf Print '07 in Dubai and at ISA'07 in Las Vegas.

Which UV-curable ink printer should you consider?

Decisions, decisions. What do you need to look for:

- 4 color vs 6 color
- sheets only or option sheet and/or roll-fed
- is it really a finished product or are you paying to be beta tester
- do your clients mind the slightly banded, slightly splotchy appearance of low dpi models
- can it really print on the specific materials you and your clients need printed on?
- Are the blacks black enough?
- Do you mind the ink being on the surface and not into the material?
- Does it use Xaar printheads or Spectra printheads?
- Does the printer use white ink?
- Is spot varnish available?

These and all the other questions you should ask before buying any \$130,000 to \$450,000 printer are now available in the FLAAR report on UV printer standards.

If you prefer an entry-level printer, your options are fewer. Entry level printers are in the \$60,000 to \$120,000 range. Beware of printers with suspiciously low prices. These printer prices do not include a warranty more than 90 days and do not include replacement print-heads. Be sure to obtain the FLAAR Report on how to understand how to understand the true cost of entry level UV-cured ink printers. Beware of potential bait and switch. Bait is offering a low price; switch is when you get the invoice with thousands of dollars in unanticipated charges, or when, 90 days later, you find out how much more you have to pay for the rest of the year to maintain your printer.

Both Xaar and Spectra are piezo electric printheads. These are industrial strength piezo printheads, as compared to Epson piezo printheads which are more for home and hobby printers.

Durst started out with Xaar heads and then switched to Spectra.

Mutoh used to use Xaar printheads and then switched to Spectra.

Need we say more.



Vutek printers with Spectra printheads produce handsome output. The Durst Rho 600, with Spectra heads, produces attractive photo-realistic output (viewed from 10 feet away as you would expect for advertising signs, and so on).

This list is for graphics printers. We do not cover UV-curable printers for industrial purposes such as Olec, Litrex, iTi, etc, but do include the innovative array technology of Dotrix. We do not cover UV screen printers nor other UV-cured treatment.

3M

All ink companies want to sell their UV-curable inkjet ink. But if they don't make any printers, and if most other printers have alliances with competing ink companies (like Sericol), then if you are 3M you are stuck with your own ink.

So 3M tried to sell the L&P flatbed printers. That did not really work out. There were not only the fact that 3M is not a machinery sales outlet, but apparently there were some issues with the ink in past years. It is probable that these issues have been resolved. Obviously 3M does not talk about any of this, which is why we have to use common sense to estimate the situation.



3M's Scotchprint version of an L&P flatbed printer

Sumitomo 3M is a recent addition. I have not seen this printer in the US nor noticed it in Europe; the name sounds Japanese or something else in Asia.

As of autumn 2006 there is a new version of the venerable Durst Rho 160, the 160R, that uses 3M's UV ink. This has not yet appeared at a major US trade show.

Aellora

Aellora is part of Markem Corporation, a leader in industrial marking and coding solutions. The parent company also owns the company that makes Spectra printheads.

Aellora makes white ink for UV-curable printers. Aellora also makes two turn-key mini-printers themselves. One is a single pass (full width array) for printing on rigid plastic 2.5" wide (by perhaps 8 inches in length). The model name is SureFire. The other printer prints a slightly larger surface in the normal back-and-forth passes as would any normal printer.



Aellora is a UV printer that also uses white ink

The curing unit is a separate machine. You transfer the printed material to this other unit by hand.

Aellora is a label printer, not the size for signage. Aellora uses Spectra heads with a table-top sized printer and UV-curable inks. The resulting quality is excellent. The cost, especially considering the small size, is high. In the beginning Aellora featured white ink. But they realize the market also needs black and the other expected colors too.

As of ISA 2006, Aellora offered printer hardware. They have started with a 1 x 1 meter dedicated flatbed, the SureFire TKMP1000.

By December 2006 Aellora was closed down. They had excellent products but no real sales network other than themselves.

Agfa :Dotrix

Agfa bought Dotrix which earlier had bought the factory printer from Barco. Nice printer but is not selling very many, yet. The original name, inherited from Barco, was the silly designation "the.factory" pronounced "the dot factory." A more mature name is now the Agfa :Dotrix, though the colon is awkward. At Print '05 the output, on ordinary bond paper, was outstanding. This printer technology with a page-array of heads has considerable potential.

Agfa / Mutoh

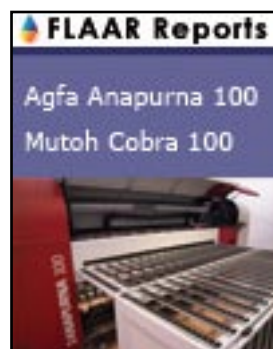
At FESPA 2005 Agfa and Mutoh jointly presented what Agfa will sell as the Anapurna 100; Mutoh will sell it as the Cobra 100uv. This is a very unusual printer. Therefore FLAAR issued a report quickly.

But after FESPA the Agfa-Mutoh printer disappeared from trade shows. This meant they were still working on it. By March 2006, the printer had still not reappeared. By April both Agfa and Mutoh announced that their pre-cocious design would not be finished until 2007. We discuss why in our FLAAR Reports on the :Anapurna 100.

Don't confuse the Anapurna 100 with the Agfa :Anapurna L and XL. The latter two are made in Korea. The FLAAR Reports on the the L, XL, and M models identify which Korean printer it is, and whether the Agfa printer is absolutely identical, or has any improvements or special features.



Agfa: Dotrix



Agfa Anapurna 100 at FESPA 05

Agfa (by itself, without Mutoh)

By 2007 Agfa and Mutoh had at least partially split; Agfa also stopped selling Mutoh solvent printers (the printers are good; this is just a political and business separation, or divorce). There was no Dilli Titan UV printer at the Mutoh booth at ISA 2007, nor any indication that Mutoh America intends to sell any of the same UV printers as offered by Agfa via Dilli.

So the Agfa :Anapurna M is, at least in reality, “Agfa only” in the US. Of course Dilli offers essentially the same printer, but the main distribution network is Agfa.

Ardeje

Ardeje presented a new UV printer at the winter 2005 Visual Communication France trade show, the Ardeje One. This company has not, to my knowledge, exhibited at any US or German trade show. This machine has several unique features, such as printing on objects up to 30 cm thick, showing that building a machine from scratch has some advantages. In many ways this is the kind of industrial machine that I would have expected Tampoprint to produce, but they have only a solvent printer in the flatbed realm. We wish good luck to this newborn Ardeje One printer as it joins the crowded family of UV-curable inkjet machines.

In late April 2006 there has been a FESPA news release that indicates the current model designation is Ardeje 1560Z UV, and that it is associated with VFP Ink Technologies, www.VFP-SA.com. They have not previously been mentioned in US industry reports on international manufacturers of UV inks.

In early 2007, the page www.VFP-SA.com did not load (though that can happen to even a company that still exists).

The website of Ardeje itself is www.ardeje.com.

Azero / Creon (dormant at the moment)

Since this company is no longer actively exhibiting in the US, we have moved them to the no-show section towards the end.

AZON

Azon is a company in Europe, seemingly with partners in China and/or Korea, that appears to sell rebranded Asian printers in primarily Eastern European countries.

I will have to look up my old photos from two years ago, but the printer is either from Flora or Azero/Creon. I would guess the Azero since the “Azon” UV Jet 2500-R 2W has two white inks. Although the Azon printer is a few centimeters larger in overall size, and weighs almost twice that of the Azero, when you compare its spec sheet with that of the Azero Creon, it appears that both use the same parts or at least parts and design with similar specifications.

I did not notice this printer nor this company at FESPA 2005 trade show. DRUPA is so large that it is easy to miss a printer there, but I did not notice an Azon booth.

The printers from Azon and Azero Creon appear to be made by Hypernics. Hypernics has not exhibited at any trade show in Europe that I have ever seen; not even at DRUPA. Same with Azon; if they have been present, they have been well hidden. Be aware that Hypernics seems to have gone totally out of business by late 2004. This may mean lack of spare parts, no updates, and minimal resale value in the future.

For a while the GRAPO Octopus was sold as an Azon printer, but the GRAPO website said that GRAPO has withdrawn this relationship.

B&P Lightbrigade Group

B&P rebrands solvent ink printers with various militaristic names (at least they are consistent). Their re-branded NEOLT UV printer is called the Uniform Commander. But in the supposed B&P booth at Viscom Düsseldorf 2005 (which actually turned out to be a German distributor), there was no NEOLTjet printer.

B&P lists a 1.8 meter version of the NEOLT printer. NEOLT itself no longer sells that width in Italy or Germany.

B&P also rebrands the Dilli; same one as rebranded by Agfa and Mutoh:

B&P Uniform Chieftain G2: Chieftain UV2500DP and Chieftain UV1600DP. The most recent B&P UV printers are rebranded from Teckwin.

It is a challenge to keep up with regional rebranding.

ColorSpan (MacDermid ColorSpan)

ColorSpan DisplayMaker 72UVR is based on the Gator, the ColorSpan solvent ink printer.

ColorSpan DisplayMaker 72UVX, now takes thicker material. Introduced late September 2005 at Viscom Düsseldorf.

A 98-inch version is now available: DisplayMaker 98UVX.

Since May 16th, 2006, a new model is available, the ColorSpan 9840. A FLAAR Report is already available. This new printer is designed for high productivity. The 9840 is the first combo-design from ColorSpan. All their previous printers were hybrid design. The meaning of these terms is explained in various FLAAR Reports that describe the basics of UV-curable inkjet machines.



ColorSpan 5400UV. Report is already available.

Four new entry-level hybrid printers were described in ColorSpan press releases on February 12th.

- ColorSpan 5440UV
- ColorSpan 5460UV
- ColorSpan 5445UV
- ColorSpan 5465UV

FLAAR had already seen these printers in December 2006 so it was possible to prepare our initial evaluation report. Our FLAAR Report on these four new ColorSpan printers are now available from www.wide-format-printers.NET.

d-Gen

d-Gen is a Korean company that retrofits Roland printers into dye-sublimation systems. But d-Gen (at least in 2005) offered an unusual retrofitting of a ColorSpan 72UV printer. But when you do a search on Google for d.gen Industri you find a Roland-based version (which is neither a UV nor a ColorSpan). The ColorSpan one is shown in a PDF for DPG trade show, 2005, Korea. d-Gen printers are made by Taeil Systems (or rather, are retrofitted by Taeil).



D.gen Teleios textile printer at SIGN Istanbul 06

D.G.I.

At ISA 2004 D.G.I. had brochures for their Neojet UV-1600 series printers:

The brochures in 2004 listed the

- D.G.I. NeoJet UV-1604 (four color)
- D.G.I. NeoJet UV-1606 (six color).

During 2005, the brochures show the models

- Neoplus-1606
- Neoplus-2506
- NeoDeluxe UVD-2506

The excessive number of model designations for printers manufactured in China, Taiwan, and Korea is because the model designations may change based on whether the same printer has 4 colors or 6 colors, and whether it is 1.6 meters wide or 2.5 meters wide.

D.G.I. is one of the more advanced Korean printer manufacturers. This is a polite way to say their printers are several steps ahead of Infiniti. Most of what we see produced by D.G.I. is acceptable for the last two years. Several of the Chinese flatbed printers still have another year or so to go before they can reach this informal standard.

D.G.I. was for many years sold in the US by Steward of International Marking, e-mail (866) 646-7446. The person we know is their President/General Manager, Gong Jin Choi, e-mail ceo@simmagic.com. But D.G.I. now has a new distributor for the US (since autumn 2005). SIM remains with D.G.I. which handle only solvent printers. The master distributor for Dilli UV printers in 2005 is Neo Digital USA, LLC. They exhibited at ISA 2006 and would be expected at SGIA 2006 as well.

D.G.I. concentrates on the markets in Asia, Latin America, and the US; they did not exhibit at DRUPA 2004 in Germany but were present at Viscom Düsseldorf in two separate booths: solvent printers in a D.G.I. booth, and a UV-cured ink flatbed printer in a separate Dilli booth.

From 2005 onward D.G.I. is concentrating on solvent ink printers and Dilli has taken over UV-curable ink printers. So this should end the cross-branding confusion to some degree.

Digirex

This Turkish company rebrands a Chinese printer from Yishan Digital Technology Co. Ltd. as the Digirex Technojet Flat UV. I have not noticed this Chinese company at other trade shows. It was shown only at FESPA (June 2005); but this same flatbed was not present at Viscom Düsseldorf in October.



At that time (2005), the then current Yishan printers were the

- YS2500-04CE
- YS2500-04CG
- YS2500-12BG
- YS2500-04EE

We present their specifications in the FLAAR Reports that discusses them plus the Digirex version all in one report.

Dilli

Dilli Precision Ind. Co., Ltd, Korea, showed a prototype of their Neojet UV-46 at ISA 2003 tradeshow. It offers only 4 colors, not six or eight. Dilli is more or less the same company as D.G.I. Dilli seems to be the name used on their oil-based printer (one model for D.G.I., another for Dilli). With the UV-curable machine they use the name Dilli so far.

After having seen the differences between the Zünd and the Durst Rho, between what you get for \$150,000 in the Zünd and what you get for twice that with the Rho, I am not sure I would wish to buy low-bid for such a new technology, especially not with misting inks and health concerns of UV-curing systems. Nonetheless, Dilli (D.G.I.) has a long and established track record of vinyl cutters and plotters since the 1980's. Thus I am estimating that D.G.I. has the wherewithal to end up with a mature machine.

There is now a new Dilli UV-cured ink flatbed, first shown in the US at ISA 2005. The NeoDeluxe UVD-2506. As best as we can calculate, here is the series of sequential models. In the beginning some were labeled as D.G.I., others Dilli. Some machines had both names. Now the current models are only from Dilli.

DGI NeoJet UV-1604 (four color), discontinued
 DGI NeoJet UV-1606 (six colors), discontinued
 Dilli NeoPlus UVP 1606,
 Dilli NeoPlus UVP 2506,
 Dilli NeoDeluxe UVD-2506
 Dilli UVP-2506(GW)
 Dilli Neo Jupiter, a small and unusual model
 Dilli Neo Venus, not yet shown in the US
 Dilli 1606uv Titan

Dilli replaced SIM with a new distributor for the US, Neo Digital USA, LLC. This was about two years ago. But the Neo Digital web site now pictures only Agfa UV printers (when I checked in early May2007). So it is unclear who, if any, is the distributor directly for Dilli.



Dilli Neo UV flatbed at Pro Digital trade show, Lisbon 06

The Dilli NeoPlus series is now rebadged by Agfa, B&P, and Mutoh.

During late 2006 two new Dilli printers were talked about
Dilli Jupiter, displayed at SGIA 2006
Dilli Venus

There is effectively totally zero available about these two printers on the Internet. Nothing on the English language Dilli web site either. The Neo Venus is a large wide-format UV-curable printer.

Some of the new Dilli printers are available only from Dilli, such as the Neo Jupiter. This was shown only in 2006, and not (so far) in 2007.

At SGIA 2006 a new small Dilli printer was shown and they talked about the new Dilli Venus too. The small Dilli Jupiter looks a bit like some of the Mimaki 605 printers. The Dilli Jupiter uses an off-chassis UV-curing unit, sort of like the concept for Aellora, which also does curing in a separate unit.

The Dilli 1606uv Titan was first shown in the US in the Agfa booth (ISA 2007, April) as well as in Dilli's own booth in the same trade show.

Dotrix (bought by Agfa).

DuPont

DuPont now rebrands what was once the Flora 2200 FUV (Flora 2214 FUV) printer.

You ought to read our comments on this Flora printer from its previous appearances at US trade shows in 2003. It was, most politely put, still in beta stage. We now have a FLAAR First Look report on the DuPont version, based on SGIA trade show, October 2004. We are updating this with a second-look report based on Graphics of the Americas in Miami, January 2005.

Partnership with DuPont will allow the Chinese to create a printer more attuned with the needs of a US sign shop. DuPont has pumped considerable R&D money into this printer.

The full original name of the printer was the DuPont DCC 22UV digital printing system. DCC stands for DuPont Color Communication. By the time of FESPA trade show (summer 2005) the printer was much improved and renamed the DuPont Cromaprint 22UV. As soon as we can see this printer in a demo center and then in a site-visit case study we will consider adding it to our list of mature printers that are worth looking at.

The DuPont Cromaprint 22uv was originally designed by the Chinese company that makes Flora printers (so the same company that makes the Raster Printers 720UVZ and Daytona). Now DuPont itself has designed an entry-level UV printer, the Cromaprint 18. There is already a FLAAR Report on this machine.



Dilli and DGI are associated with each other. Their UV-flatbed printer is considerably more sophisticated than anything from Mainland China. Plus DGI is well established in the US for several years already.



Durst Rho

The Durst Rho 160 is a mature flatbed printer that produces better than merely industrial quality. We first saw it presented at Photokina trade show in Cologne, Germany in September 2000. At that time it was still a prototype.

There is a new Durst Rho 160R with ink sold by 3M. I have not yet seen these at any trade show.

Durst is a reputable Italian company; its products are sold worldwide. The printer is manufactured in Austria. The Durst Rho prints on virtually any kind of material including corrugated cardboard, textiles, vinyl and other media. Cost is several hundred thousand dollars.

Durst makes sophisticated equipment, as you would expect of a European company.

Although this printer was presented in 2000, as of mid-2001 was reportedly still not being delivered, or at least not on a regular basis. Part of the delay was that they abandoned Xaar printheads and switched to Spectra printheads. Several other companies have done the same (for example, evidently the Mutoh Toucan solvent-ink printer switched to Spectra heads).

From autumn 2002 onward the printer has been finished and shipping. The output we saw at Photokina 2002, SGIA 02, PMA '03 and ISA '03 looked fabulous. However in the meantime the Inca and Scitex Vision VEEjet have both matured and the Nur Tempo is now finished and shipping. Since screen printers, photo labs, and large commercial print shops come to FLAAR for our recommendation, we plan to do major scrutiny of these printers in the months to come and for the entire year 2005 also. We need to do more site visits, we need to go to the assembly plant so we can see how well they are constructed, and we need to do our own print samples. In the meantime we have continued our site-visit case study of the Durst Rho 160 that is installed in Toledo, Ohio, near our university in Bowling Green.



Durst Rho 600 at FESPA 05

The Durst Rho comes in two original models, the Rho 160 and Rho 205. The Rho 160 can be upgraded to also print white ink. The Durst Rho 160 Plus and 160W Plus were still being advertised (by brochures) as late as the ISA trade show of late March 2005.

Now (since FESPA 2005), there are two new models:

- Durst Rho 600 (a variety of extra features over the Rho 205).
- Rhopack, for printing on corrugated materials

A feeder-stacker has been available for over a year. You need a feeder-stacker for productivity.

The 2004 version of the Durst Rho 205 flatbed printer has added white ink as an option. Beautiful examples of the white ink were on display at DRUPA 2004. But in summer 2005 this model has been replaced by the Durst Rho 600 (which also offers white and spot varnish). In theory you could still buy a Rho 205, but with the newer Rho 600 there would be not much sense in buying a Rho 205 (or Rho 160) new.

The Durst Rhopac is a special model for printing on cardboard and other packaging material. Its main competition is the CORjet from Scitex Vision (uses Aprion printheads; not UV-curable ink).

By late 2005 Durst offered a roll-to-roll UV-curable inkjet printer, their model 350R.

Eastech

At Graph Expo, Sept 28-Oct 1, 2003, Eastech showed a prototype. It appeared unfinished as though it were a pre-beta stage mock-up. When finished, it will evidently be available in two models: UV 8700, 2.24 meters wide, and UV 6400, at 1.65 meters wide.

At SGIA in mid-October the Eastech UV6400 seemed to be printing more often than previously. However I would still list this as a beta-stage prototype (as really are all the Chinese and Korean UV flatbeds) when compared with the mature products of Sericol, Scitex Vision, Vutek and Zünd.

Eastech offers (or will offer) 2x4, 6, or 8-ink combinations. White ink is being discussed.



Eastech Scutum S UV at Photokina 04

At ISA 2004 Eastech had two different brochures for UV printers. One advertised the Octra e models at 1440 dpi. Model designations were UV644e and UV8740e. The brand name of the printhead was not specified but 1440 dpi suggests it may be an Epson printhead. This is further suggested by a listing of UV ink for Epson in the supplies list.

A second brochure at ISA 2004 advertised the Scutum S, with Spectra heads and 720 dpi. Cost is \$160,000 to \$200,000, FOB Taiwan, so add shipping charges.

The Eastech brochures become more sophisticated with each trade show. Their printers become closer to moving out of beta stage too. However until we can see the printers in action (actually printing) we reserve judgment. Most trade show booths are too small to allow a large printer such as a flatbed to have its feeder table and take up table. And Eastech has two model series: Scutum and Octra. I have not seen an Octra at all. So again, until I can see them all, at work, we are not able to provide further commentary.

It is worth pointing out that Eastech exhibited at DRUPA 2004. This is the world's largest international trade show for printers. DRUPA is held every four years in Düsseldorf, Germany.

But Eastech failed to exhibit at any US trade show in 2005. However Eastech had a successful booth at FESPA in Germany. They are featuring themselves more in European trade shows and less in the US.

An Eastech ad in a European trade magazine listed the following models:

- Scutum light UV 8720-4S (Spectra printhead with 128 nozzles)
- Scutum light UV 8720S (Spectra with 256 nozzles)
- Scutum UV 8740S (Spectra with 256 nozzles)

The plethora of models is because this is a “designer” printer; you can order any combination of options that you wish.

If you look at the Eastech catalogs or handouts you see there are two designs: one has two parallel panes where you can look at the carriage; the other has one single larger pane. It is the latter design that is used for the GO Fuzion UV being offered in the US since SGIA 2005. At ISA 2006 Digital Systems Technology introduced themselves as an Eastech dealer, and showed a heavy version. They applied the designation “Poly-Tech” to some models.

FlatJet

FlatJet Digital Printing System, Budapest, Hungary, developed a UV-cured printer circa 2002-2003. In 2004 they seem to have given up. Their nice website provides details, www.flatjet-technology.com. This is a “spray-on-demand” system, related more to airbrush techniques than drop-on-demand piezo printhead technology.

Flora

ShenZhen Runtianzhi Image Technology Co., Ltd., Runjiang Group, mainland China, offers two models of UV-curable flatbed printers. The Flora FUV 2200 we describe in the DRUPA report series.

The brochure they handed out at DRUPA 2004 also pictured the entry-level Flora FUV 1800. This model evidently does not offer white ink.

At Graphics of the Americas trade show, early 2004, Flora showed a model 22i4FUV. The output was poor. This shows the typical problems of Mainland Chinese printers: you never know how long any particular model will last. This impacts resale value. And if the models change, you have all the less likelihood that you can be assured of spare parts or knowledgeable tech support.

The Flora 2214 FUV was sold in other countries; not merely exhibited, it was sold openly. We have a print out from such a regional dealer, outside the US, advertising the Flora 2214 as recently as early 2006 (though this is surely a left-over ad from late 2003 or early 2004, before DuPont took over development of this printer).



Flora LJII 1800UV at FESPA 2006

Flora exhibited at DRUPA 2004 but the quality did not impress me. At SGIA 2004 a Flora UV printer was shown in the DuPont booth. The quality looked improved but we need to see it in a real-life situation before we can comment on the degree to which it has really improved over its initial weak showing at all previous trade shows. ShenZhen Runtianzhi Image Technology Co., Ltd., Runjiang Group, is a respected company, and we respect their energy in developing these printers. We look forward to the opportunity to be able to see improvements so we can update our comments.

At FESPA trade show in Germany, summer 2005, the entry level Flora printer was alive and well: LJII 1800. It was printing attractive output. This entry level is the prototype of the Raster Printers RP-720 UV, which has had a slow path to maturity in the US. But at least the Chinese prototype has improved, so the US model will eventually get past beta stage.

At the Dubai Middle East show, February 2006, Flora showed only photos of the now renamed LJ 1800 UVS-Pro. No actual printer was exhibited. But this printer was shown at ISA 2006 in Orlando (April 2006).

Flora has switched to Toshiba Tec printheads and gave that model a new name, Flora 180UV. But merely giving a printer new printheads does not make the chassis or engine any better if the software is so-so and if the nuts and bolts don't hold up.

Fuji

One of the Fuji companies (but not Inca or Spectra) is reportedly developing a 24 x 36 inch flatbed. This size has not been successful for Aellora, but they had no sales force really. Fuji has more world coverage.

Fujifilm

Fujifilm, which owns Sericol ink company, is rebranding the Océ Arizona 250 GT as the Fujifilm Acuity HD 2504.



Acuity HD 2504 at ISA 07

Gandinnovations

They announced at PMA 2004 that they would have a UV-curable ink flatbed shortly. The prototype was shown, functioning, at DRUPA in May 2004. An improved version of this UV printer was in action at Photokina 2004 and then again at SGIA 2004 and ISA 2005.

At FESPA 2005 this JETi 3150 UV-cured ink flatbed was printing all day long. Several printers from competing companies, such as PIT and Scitex Vision, were either not printing at all (PIT) or were only printing occasionally, and noticeably slowly (VeeJet+).



Gandinnovations UV-Flatbed at Fespa Digital 06

The Gandinnovations JETi dedicated roll-to-roll printer was introduced simultaneously at ISA 2006 and IPEX 2006: 3324 UV RTR.

For 2007, the Gandinnovations line-up has two widths of UV roll-to-roll and three sizes of dedicated UV flatbed printers. FLAAR Reports cover these in detail, including site-visit case studies.

- **Gandinnovations JETi 3150 UV, dedicated flatbed**
- **Gandinnovations JETi 1224 UV, dedicated flatbed, 4x8' (popular size for US)**
- **Gandinnovations JETi 2030 UV, dedicated flatbed, 2x3 meters (size for Europe)**
- **Gandinnovations JETi 3324 UV RTR, roll-to-roll introduced at ISA 2006.**
- **Gandinnovations JETi 3024 UV RTR, another name for above printer**
- **Gandinnovations JETi 5024 UVRTR, 5-meter version**

GCC

A new company (for us) exhibited their StellarJet 200UV, a mid-sized UV-cured ink flatbed at ISA 2005. We are issuing a brief FLAAR Fast Facts on this printer. A new brochure available at Viscom Düsseldorf 2005 has allowed us to update the brief Fast Facts. The printer itself is not yet being shown in Europe or the US any more, but is reportedly shipping in Asia. The current model seems to be the 250UV.

At Graphics of the Americas 2006 the GCC Stellar-Jet 250UV printer was exhibited in Miami. We are updating our FLAAR Reports based on information we obtained there.



GCC StellarJet 250UV at ISA 07

At ISA 06 GCC exhibited a prototype for a new entry-level machine. But I did not notice it, and no one else at the show mentioned it. At FESPA Digital the GCC booth was on a main aisle, and the new prototype was out in front of the booth, so it was possible to photograph it and take notes for a new FLAAR Report on this machine.

At ISA 2007 the GCC StellarJet 183 was improved, but still had many aspects that we discuss in the complete report.

Gerber & Spandex

Gerber is the US company; Spandex is their European distributor. They began with a roll-to-roll UV-curable inkjet printer. By November 2005 they added a flatbed capability and renamed this the Gerber Solara UV2.

Gerber does not exhibit at Graphics of the Americas and Spandex did not exhibit in Dubai 2006. Two Gerber Solara 2 printers were at ISA 2006.

Graphics One

The GO Fuzion UV is a repainted and rebranded Eastech Scutum light. They exhibited this for the first time at SGIA 2005 but did not show it at Graphics of the Americas two months later. The Fuzion was, however, exhibited at ISA 2006, but not at SGIA.

GRAPO

The GRAPO Octopus is a UV-curable ink flatbed printer that I first saw at DRUPA '04. The booth manager let me look inside to see the quality of the German fittings and other European quality workmanship. The printer is assembled in the Czech Republic from components primarily from nearby Germany.

Looking inside some printers made in Asia can be a real education: spot welding, jerry-rigged assembly, raw cuts on the edge of metal. But Swiss, German, and now Czech craftsmanship is a pleasure to inspect. In terms of machine build, we give the GRAPO high marks.

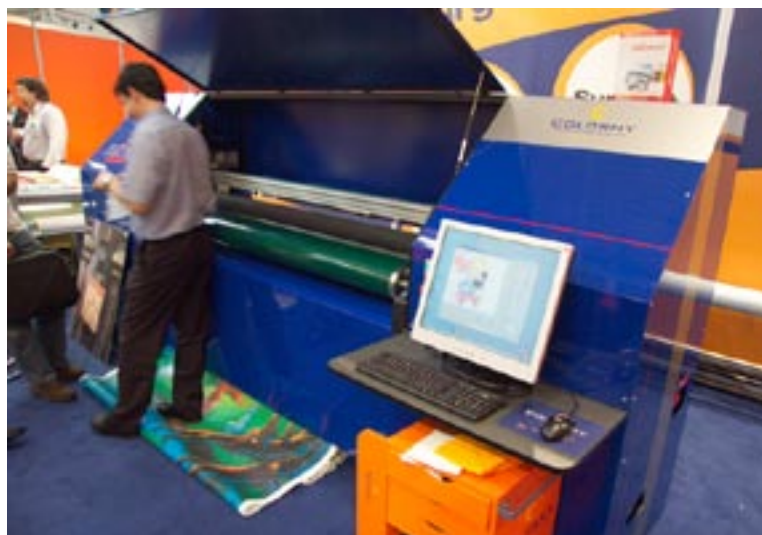
In terms of print quality it uses Xaar heads; not our favorites but considering that over 200 screen printers and sign shops seem content with the Zünd, the output from the GRAPO is comparable. What I especially liked was their impressive diversity of materials that they had printed to, including foam; I don't mean foam core, I mean the sponge-like material with no hard covering. The foam put inside furniture.



Gerber Solara UV2 at ISA 07



GO Fuzion UV at SGIA 05



Grafo Octopus UV at FESPA 05

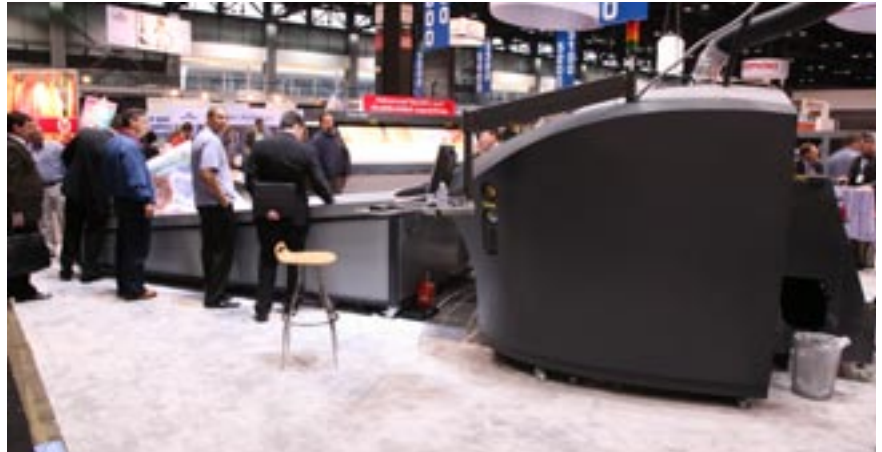
So far GRAPO has stayed in European trade shows, so did not exhibit at SGIA 2004 nor at ISA 2005. GRAPO exhibited in several booths at FESPA 2005, in Munich. The nice folks at BeDigital seem to be the predominant distributors for Europe. Their OEM version is the bedigital domino. GRAPO also had its newer model, Octopus X4, at VisCom 2005 Milan.

The prototype GRAPO Manta was shown at the March '06 trade show in Prague, but not at IPEX. GRAPO exhibits in Europe through bedigital; GRAPO has no distributor in the US.

HP Scitex

HP has two new UV printers planned for 2007. This continued delay lets Durst, Gandinnovations, NUR, and Vutek continue to get far ahead.

The one HP UV printer that is being shown at trade shows is a UV-retrofit to a Scitex Vision roll-to-sheet printer. The other two HP Scitex UV printers are not yet ready to show to the inquisitive public, and are shown only privately.



HP Scitex TJ 8500 at GraphExpo 06

- HP Scitex FB6300, rebadged Scitex Vision VEEjet+
- HP Scitex TJ8500, a UV version of the solvent-ink Scitex Vision TurboJet
- HP Scitex FB6500, upgrade of the VEEjet with MEMS technology heads.

Human

That Human Digital Technology (Shanghai) even exists comes from information from Web Consulting (Steward Partridge), as mentioned at IMI conferences. However there is virtually no information on the Internet about what printers this company may be manufacturing. I have not yet seen any printers identifiable as to this brand at any major trade show in the US or in Germany.

Inca

Inca and Durst have the longest history in UV-curable flatbed printers. One Inca Eagle 44 was printing quite nicely at SGIA 2002. Durst had a prototype of the Rho at DRUPA 2000 (not printing, and still with Xaar heads at that early date).

Inca makes the

- Spyder 150 (this printer is not widely furthered)
- Spyder 320 (a new model was presented at FESPA 2005)
- Eagle
- Columbia
- Columbia 220
- Columbia Turbo
- Inca Onset (page-width array, so far only in beta stage)

If we have missed any models please let us know at
nhellmuth@FLAAR.org.

We discuss Inca printers in the FLAAR Reports under their distributor in the US, Sericol Imaging. Sericol makes the ink for most Inca printers. Sun Chemical makes the ink for the Inca flatbed for packaging material, the FastJet.

The original Spyder and Columbia Turbo were in action at DRUPA 2004. The output was impressive. The new larger Spyder model and the Turbo were in action at FESPA 2005. The crowds around the printers were so large it was not easy to obtain photographs.

Infiniti

The home office is seemingly a Chinese company. Infiniti Europe is distinct from Infinity USA. The European office displayed the Model 6150P flatbed. I will assume this was a UV-model but the kind of ink is not indicated in the trade magazine that pictures the model 6150P. I am assuming that the US model Infiniti UV-1606 is essentially the same.

No UV-version of the flatbed printer was shown at US trade shows in 2005. So far at Graphics of the Americas the Infiniti flatbed has been with solvent ink, with weak colors and low quality. Although the European version UV flatbed was presented at FESPA in June it was not present at Viscom Düsseldorf in October. In early 2006 a functioning but clearly unfinished beta version of the Infiniti UV flatbed was shown at GoA in Miami. By April 2006, at ISA, Infiniti was already selling their renamed UV1612S flatbed.

Infiniti Xterius is the name of the UV hybrid printer in Europe. Fei Yeung Union is the distributor in China. We now have two site-visit case studies of this UV-curing inkjet printer as well as an additional evaluation/review. All FLAAR Reports are available from www.wide-format-printers.NET.

There is a relative newcomer to UV printers making a rebranded Infiniti in Europe. The main issue will be to check with print shops who already have bought Infiniti UV printers: FLAAR has visited two such printshops, each twice. So we will need to find a printshop owner who has an Infiniti, and who actually can make it work, before we can understand how a retrofitted version would work.

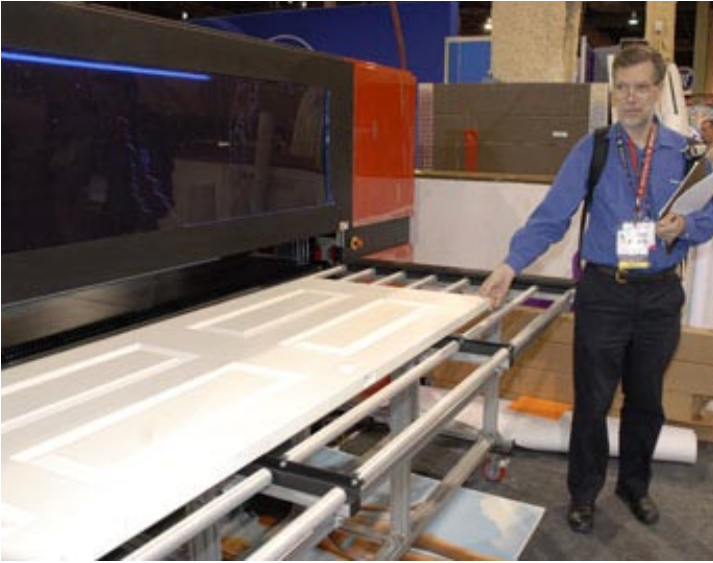
At ISA 2007, Infiniti showed its 3.3 meter roll-to-roll UV printer. This one has two lamps (one on each side of the printhead carriage). All the other Infiniti flatbeds have just one lamp.



Inca Spyder 320 UV at Sign Madrid 06



Infiniti UV 1612S at ISA 06



IP&I Cube 260 UV at ISA 07



IP&I Cube 1606 UV at ISA 07

IP&I

IP&I had a full-page ad about their Revo 160 flatbed UV printer in a Korean magazine that was handed out in the Kosign booth at the Dubai sign trade show (February 2006). I would be inherently curious over how much of this printer was related to the Hypernics / Azero Creon models that existed before Hypernics disappeared from the scene in 2004. This printer sort of looks like the old Azero Creon. But IP&I had not yet exhibited at any US trade show; at least not in 2005 and when they did begin exhibiting, they show only their Cube 260UV.

One IP&I Revo model that is mentioned on various web pages is a 102-inch UV printer.

At ISA 2006, IP&I exhibited a Cube260 UV printer. Their longer spiral-bound brochure listed a 1.3 meter model (if I remember correctly; I am writing this 7,000 miles from my office reference archives).

From photographs on other web sites, the exterior of the Revo-160 looks just like the Cube 260. During April 2007, there was no Revo model listed in Products link on the ip-i.co.kr web site, and no model listed as Revo at ISA '07.

At that SignExpo '07, two models of the Cube were shown:

Cube260 UV

Cube 1606 (either F or S)

The Cube 1606 looks somewhat like a Dilli Titan (this Dilli is rebranded as an Agfa :Anapurna M). All these are open designs, with no protection from ozone, misted ink, and no skirts to protect against light leak.

ISI

ISIJET BlueStreak is the first retrofitted solvent printer. Cost is \$133,000 to take your old NUR Blueboard and turn it into a roll-to-roll UV printer. ISI comes to your shop and does the retrofit.

ISI and Triangle Ink are now both owned by INX.

ISI is the manufacturer of the Raster Printers Daytona T600UV flatbed.

JHF

Beijing JinHengFeng Digital Science & Technology Development Co., Ltd has a link on their website to “UV Flatbed Printer” but it was a link “under construction” at the time I last looked. This suggests that the printer might also be “under construction.” Someone was handing out JHF brochures at SGIA 2004, but I do not remember seeing any UV-flatbed from this company present. I assume that when the printer gets to alpha or beta stage they will show it at ISA 2005 or SGIA 2005.

Until I see this printer at a major USA trade show, we will list this printer in sort of limbo. No flatbed printer was shown at FESPA 2005. The JHF stand at Dubai 2006 trade show (United Arab Emirates) had a brochure listing their UV-flatbed, but no flatbed was in the booth. The model was the Super Star UV.

A trade magazine in India published a JHF ad which shows the Vista F-UV flatbed printer. It looks like a Chinese copy of an Inca flatbed printer of the Spyder series. This appears to be the same printer as the undesignated one pictured in the large JFH booklet handed out at ISA 2006.

No UV printer was in the JHF booth at ISA 2006. ISA was so hectic I did not have a chance to spend much time in the JHF booth at ISA 2007. I did not hear anyone talking about there being any UV printer in that booth.

Leggett & Platt Digital Technologies, Virtu

Leggett & Platt Digital Technologies, piezo, accepts UV pigmented, dye, and solvent inks. Virtu MX, 92”, Virtu RS, 98”, Virtu TX, 138.” Looks like the most innovative new design ever conceived (probably the top price as well, but printer looks worthwhile).

The Virtu comes in several widths, 2.5 meters and 3.5 meters. These printers were originally made to print textiles with textile ink. You can still get the textile version.

I found it strange that L&P itself did not use the printer for doing their own mattress covers, which I had thought was the original idea, to print on fabrics. In the meantime Scitex Vision has come out with their DReAM printer for textiles. Of all the production inkjet fabric machines I have seen (DuPont and various grand format printers, all appear to be modified billboard printers. Only the L&P and the Scitex DReAM appear to be conceived directly as innovative specifically for textile production.

For a year or so 3M distributed the L&P printer. They look very impressive and are correspondingly expensive. I would guess the 3M version of this printer is in the \$400,000 + range. 3M sells this printer to the graphics market. L&P markets this printer to the industrial market. In parts of Europe, Africa, Middle East, and Asia the printer is distributed by Spühl. This Swiss company exhibited the printer at DRUPA 2004. Spühl also exhibited Virtu models at FESPA 2005.

It is not easy (unless you work for L&P) to understand and keep track of the various models, in part because some are modular



LP&I Virtu UV at SGIA 06

updates. This allows the company to update some older models on-site into newer models. Here is are best estimate of earlier models

- L&P Virtu, the original model at DPI trade show 2001.
- L&P Virtu MT; we do not know the difference, if any, between this and the original model
- L&P Virtu RS (current model is seemingly the RS Plus)
- L&P Virtu TX (current model is seemingly the Tx+)
- L&P Virtu FX

If we have missed any models please let us know at nhellmuth@FLAAR.org.

By SGIA 2004 (October), 3M and L&P had parted company. L&P itself still offered several models, the

- Leggett & Platt Virtu
- Leggett & Platt Virtu RS Plus
- Leggett & Platt Virtu Tx+

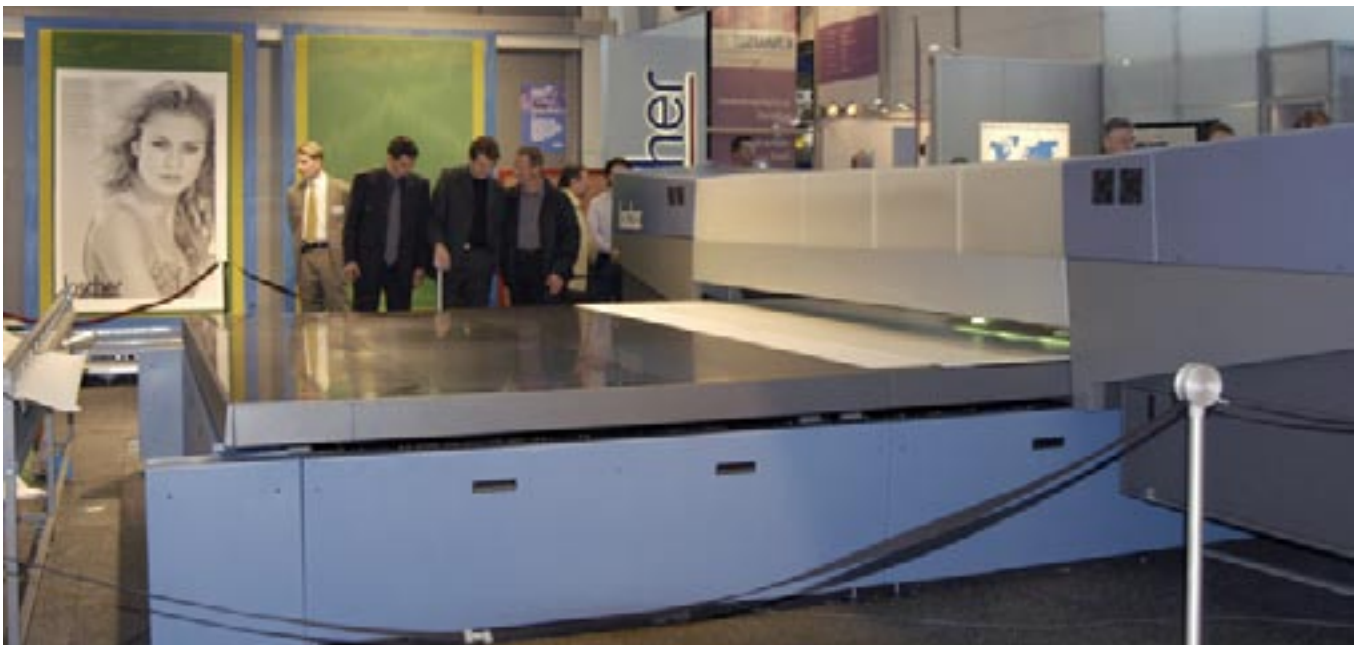
At ISA 2005 L&P seemed to have still another model available, the Virtu 7200.

By the time of ISA 2006 L&P's website listed only the

- L&P Virtu 36
- L&P Virtu 72
- L&P Virtu TX

Lüscher

Lüscher showed a functioning model of their JetPrint UV-curable ink flatbed at DRUPA 2004. It looked just like the Nur Tempo, only larger. Lüscher is a Swiss company so you can expect a corresponding Swiss price, and hopefully precision as well. The Lüscher JetPrint 3530 was available at FESPA 2005 as a machine finished and ready to ship.



Luscher JetPrint UV at FESPA 05

There are now two FLAAR Reports on the Luescher printer, since if you are even thinking of spending more than half a million dollars on a machine, you ought to do serious homework first: we offer an evaluation and also two separate site-visit case studies. To help make your decision, you should acquire both reports.

KOWO did not show any Luscher JetPrint UV machine at ISA 2007. The KOWO booth was only 10x10 feet in size.

Mimaki

Mimaki showed a prototype of a UV curable ink printer at ISA 2003. However it looked like a normal roll to roll machine, not in full-flatbed arrangement.

By October 2003, at SGIA, the printers had advanced to beta stage. And not one but two: UJV-110 is a 42" roll fed UV curable inkjet printer. The UJF-605c is a flatbed, but a tiny size, 23.5 x 19.75. Cost is a healthy \$100,000, but that is 33% less than the Zünd.

At ISA, mid-April 2004, these printers looked ready to go yet at DRUPA they were still listed as beta stage. However they were printing every day, so are clearly fully functioning machines.

At DRUPA 2004 there were two versions of the UJF-605, the "R" version was roll to roll for OPP, PET, and transparent film. Although roll to roll, the printing area was flat, and listed as 60 x 50 cm. This suggests the printing is not continuous as on the Mimaki UJV-110 (which is also 42", 1.2 meters wide).

There is also an RII (R two) and an RH model. The model designations depend on a variety of minor factors.



Mimaki UJ1-100 UV printer at ISA 03

The “C” version of the 605 is strictly for rigid material at 60 x 50 cm only. The Mimaki features high resolution and white ink rather than billboard size. Indeed these printers are targeted for packaging (especially proofing). I saw no statement as to whether the ink was food grade. Of course for proofs the ink does not need to be food grade.

At a June 2004 Sign & Graphics trade show in Indianapolis the flatbed version was having problems with static electricity on some media and problems with overheating on other materials. This is why we do not certify a machine until we have accomplished independent site-visit case studies or have the equipment at the university where we can tell whether it works okay in a typical sign-shop environment. What you see at a trade show (both good and bad) is not representative of how the printer will actually work (or mal-function) when there is no tech support at hand every hour of the working day.

At IPEX 2006 Mimaki showed their functioning alpha-stage UV flatbed inkjet printer,, the IPF-1326. We now have a FLAAR First Look report. This printer was not in the Mimaki booth at ISA 2006. It was shown only privately, in a back booth somewhat far away. You had to know the printer existed and know who to ask to gain entry. Subsequently this printer was shown to the public from SGIA onward. For 2007 the IPF-1326 is being renamed the JF-1631 and JF-1610, depending on size.

We got to inspect the printer in the back room, and also have photos sent by colleagues who attended IPEX. At FESPA Digital it was possible to see the IPF-1326 out in the open. During December 2006 we were honored to be the featured speaker at the presentation of the replacement model for the IPF-1326, the JF-1631 in The Netherlands.

At FESPA Digital (May 2006, Amsterdam), Mimaki Europe had a brochure for a new flatbed for printing on packaging material. It does not use UV inks; but rather water-based inks. A solvent ink version is available on special order.

UJF-605C comes in many versions.

UJF-605CII (II=Roman numeral two) This is an earlier version, but it is still advertised in 2007.

UJF-605RH

Mimaki also offers a turnkey industrial prototype for special uses. The Mimaki DM2-1810, however, does not use UV-cured inks.

Mutoh

People were curious why neither Mutoh nor Roland offered a flatbed UV-cured ink printer. Roland still does not have a model that they show to the public. But as of FESPA, summer 2005, Mutoh now has a potential winner, their Cobra 1000uv. This printer was co-developed with Agfa. Agfa will sell the same printer as the Agfa Anapurna 100.

This is a surprisingly sophisticated printer with features not present in any other



Mutoh Cobra 1000uv at FESPA 05

competing brand. We saw the machine printing at FESPA 2005, in a private “back room” that was open only by reservation. FLAAR had an initial report ready within a few weeks.

As of IPEX 2006, Mutoh Europe is showing their Cobra S65uv and Cobra S100uv. These printers are identical to two Agfa printers and are manufactured in Korea. The FLAAR Reports reveals all the details of who makes the printer, and what its really like.

Mutoh UP-6301 and UP-6302 are a bizarre-looking machine that I have seen only in a Korean trade magazine. I have not seen this at any trade show (they list it as being available only in the Japanese domestic market). Evidently this is primarily to create printed electrical circuits, not signage.

The Mutoh web site that shows these printers was “last updated March 29, 2005.”

NEOLT

The original Neolt models announced at SGIA 2004 were the

- NeoltJet 1800 (1.8 meters)
- NeoltJet 2500 (2.5 meters, 99 inches)
- NeoltJet 3200 (3.2 meters, 126 inches)

The model 1800 has been replaced by the NeoltJet 2050, 81 inches (2.05 meters). The models 2500 and 3200 continue as before.

A new drive system is being added this summer (June 2005). NEOLT is a known and respected Italian company. The NeoltJet printer has a good color gamut, better than some printers costing three times as much. However the Neolt is different than all competing printers of its same price class, so be sure to get your hands on the FLAAR Reports that describe the Neolt UV printers.



NEOLT Jet UV-inkjetflatbed printer at SGIA 04

NUR

At SGIA '02 NUR was forthright about its printer, the Tempo, namely that it is not yet finished or even in beta stage. However when it is finished, its 8-color system looks like it has lots of potential. It takes both rigid materials and roll-fed material both. The printer was first launched as a prototype at FESPA 2002 in Europe. Today, in autumn 2005, the Tempo is very much finished and is a mature product. Indeed if you obtain our full FLAAR Report on the NUR Tempo and compare it with our FLAAR Report on the Lüscher JetPrint, you can see where one is better than the other in several features.

Since NUR's other printers, Fresco and Salsa series, both use Xaar printheads, I am guessing that the newer NUR Tempo does also. But Nur, like other printer companies, has switched to Spectra. I am guessing that the current versions of the NUR uses Spectra heads.

By mid-October 2003, at SGIA '03, the NUR Tempo was finished, and available for shipping. The quality was worth the wait. It took over an hour to inspect the printer inside and out, but after seeing how the machine was constructed I concluded without doubt this quality deserved "Best UV-Curable Flatbed Quality" award.

Our next step will be to initiate site-visit case studies. These are not success stories, because those are just PR releases. A FLAAR case study tells the truth about the pros and cons. When a printer is good, a FLAAR case study is an asset. We don't tend to bother wasting our time if we know in advance from end-users that a printer is a dog. So the fact that we are considering a case study is a good sign.

A slightly lower cost 4-color version of the Tempo is now available, the Tempo L. It does not include the roll to roll capability nor white ink.

For April 2006, NUR has made several tweaks and upgrades to the Tempo, including a new ink. They call this the Tempo II, but it is really the same old Tempo "one" with new firmware. Then a month or so later they created the NUR Tempo Q: with different printheads. Same printer; different heads. At least they allow you to upgrade (like with the L&P) instead of forcing you to buy an entire new printer (as is the case with Durst, Vutek and most other manufacturers).



NUR UV flatbed printer, ISA 05



NUR Expedio 5000 Revolution at ISA 07

Since DRUPA 2004 NUR also offers a roll-to-roll only grand format UV printer, the NUR Expedio. This is not a flatbed, but is very much a UV-curable inkjet technology.

NUR Expedio 3200 (Flatbed Module)

NUR Expedio 5000

NUR Expedio 5000 Revolution (faster machine, with less expensive UV ink) first shown at ISA 2007.

Océ

The original version of the Océ Arizona T220 flatbed was a solvent ink printer, not UV cured ink. But now the same flatbed is outfitted with UV-curable technology and offered as the Océ Arizona T220UV.

The UV version is listed at \$225,000; the solvent version is \$196,000. Uses Onyx PosterShop version 6. These printers are offered together with an optional i-Cut, evidently from Zünd.

In the Océ 220 printer the flatbed table is stationary. This printer uses 24 Xaar printheads.

Some banding, as you would expect from Xaar printheads, but no “scrape” marks (Zünd had linear marks too). However zero banding is acceptable on giclee; I tend not to accept Xaar printheads for museum quality output. Xaar prints, when well behaved, are acceptable for décor on rough surfaces such as artist’s canvas, because the rough surface of the canvas hides the grainy dot pattern, hides some of the splotchiness (which in any even would be less on canvas than on vinyl), and might minimize the visibility of horizontal banding tacks. On the positive side the output did render right colors. The output looked excellent on solid marble. Other examples were backlit on plexiglass.



Océ Arizona T220UV, DRUPA 04

The Océ Arizona 60UV printer was a breakthrough price of under \$40,000. This is a printer that Océ has been working on for many years. It is in the size and shape of a regular 64 inch inkjet printer but it also offers a table for handling rigid substances up to 1 centimeter thick.

The benefits of this printer is that it allows a sign shop to get into UV markets without mortgaging their entire life. Downside is modest speed, matte surface (no glossy), and modest color gamut (like most other UV-inks, it can’t create many reds: they all look like flavors or orange). However some \$450,000 UV-curable printers can’t do glossy surfaces or sunset red either.

Océ offers service and tech support in most countries and obviously you are dealing with a substantial company, not a start-up.

Both Océ UV-curable ink printers were present at DRUPA. The T220UV was busy printing in the PrintCity display area. The 60UV was in a confined area of the main Océ booth and was not well featured.

As of SGIA 2004 the Oce Arizona 60UV was still having some kind of problems (because it was still not shipping). However the Oce Arizona T220UV looked in fine condition, has a better color gamut, and appears to be available for immediate delivery.

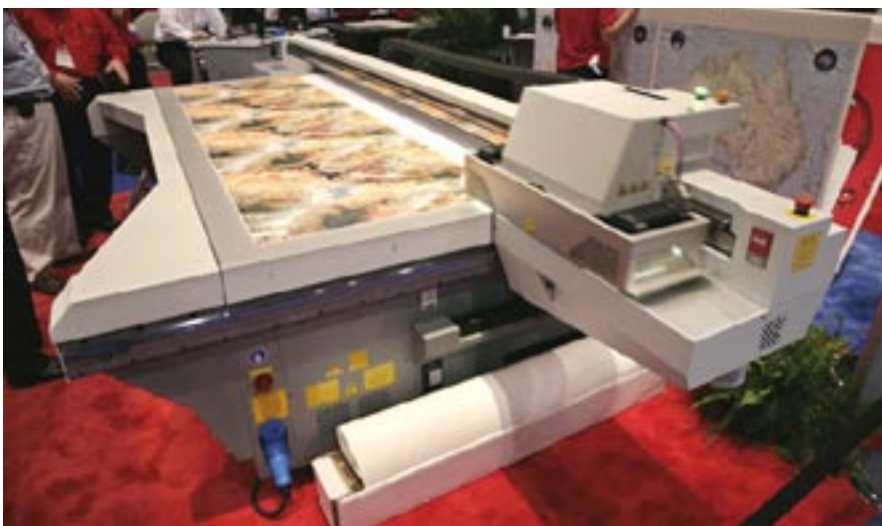
The Oce 60 UV was subsequently withdrawn from the market.

The Oce Arizona T220UV was still an actively available model over the summer, but we are checking on its current status. As of November 2005 (and possibly earlier), apparently the UV version has been withdrawn from the market. This printer was robust and has a good color gamut. It was simply too slow when compared with competing printers. This is what happens when you use Xaar printheads.

Oce has another UV printer on the drawing boards, seemingly a printer closer to entry level than the T220UV. We found out when a sign shop owner came to us at SGIA 2005 and asked if we knew about the new Oce UV printer. A sales rep in the Oce booth had told him not to buy any other UV printer because he should wait for the new Oce model.



Oce Arizona 60UV at GoA 04



Oce Arizona 250 UV at SGIA 06

My reaction to that was to mention that the previous Oce UV printer took over a year to mature and was then cancelled. The other Oce UV printer was well built, but too slow and was withdrawn (which decimates its resale value). The same thing has happened to the several excellent solvent ink printers that Oce has introduced in the last two years: they reportedly sold only about 47 of the most recent solvent printer (can't remember whether it was the model 500 or model 600). Again, resale value would be minimal.

I have a positive attitude towards all the printers that Oce makes, but they don't do very well in the marketplace. This may change now that the Oce Arizona 250 GT is available (shown at SGIA 2006 and ISA 2007, but won't be delivered until into 2007).

The Fujifilm Acuity HD 2504 is the same printer as the Oce Arizona 250 GT.

PIT

PIT, Printing & Imaging Technologies, S.L., is a company in Madrid, Spain that sells a printer manufactured in Bulgaria. With a table dimension of 3.1 x 2.2 the Sprint II printer is in the size-class of NUR.

The Sprint II was not functioning at FESPA. This is typical of prototypes from even large companies. The Durst Rho 160 was a non-functioning prototype at DRUPA 2000 and Photokina 2000, and was still not printing full time at trade shows in 2001, but the printer became a technology success and now has several successive popular new generations.

I did not hear of any PIT display at IPEX in 2006. There was no PIT printer displayed in VisCom Düsseldorf or VisCom Milan, 2005. Will PIT exhibit at FESPA Digital 2006? If PIT does not appear there, this means the printer failed during the development process, or the companies ran out of investment capital. The last chance for it to appear would be the Madrid sign show (PIT is a Spanish company) or any show nearer Bulgaria, such as in Turkey.

Everything that is known about this giant UV flatbed is in the FLAAR Reports on the PIT Sprint II.



PIT Sprint II UV at FESPA 05

Poly-Tech

This is a name used by Digital Systems Technology Inc. to sell the Eastech Octra and Eastech Scutum. See Eastech and GO Fuzion (all the same printers under different names).

Qumtum

QUMTUM F6 UV printer is shown on the website www.smartsigns.com.au/Qumtum_UV.htm It uses Xaar printheads and prints up to 2.5 meters wide.

I have not seen this printer at any European or American trade show.

The QUMTUM P2 looks like an Inca Eagle.

RasterPrinters

This new American company rebrands a small UV printer, a Flora model from Runjiang, China. We have a FLAAR First Look report now available. After seeing the RP 720 UV at ISA we have updated our report to a “second look” level. We then spent five days in the Raster Printers demo room in California, so we have first hand documentation of what the printer is like, especially inside and under the hood.

If you are considering purchasing this computer, be sure to obtain the penetrating FLAAR comments on this printer at the most recent three trade shows.

Also be absolutely sure you obtain the FLAAR report on how to understand the true price of an entry-level UV printer. This printer was initially advertised at \$55,000, but that is not, not close to, what is the figure that will be on your invoice after you place an order. The same is true for other entry-level printers. The true price is what is on your invoice, and that is much, much, more than the price listed in brochures and claimed at trade shows.

FLAAR has a separate report on how to calculate the true cost of the UV printer.

The Raster Printers 720UV has been replaced by the 720UVZ. The FLAAR Reports explain what the differences are.

Raster Printers Daytona, is a dual CMYK version of the 720UV.

Raster Printers Daytona T600UV, an entry-level flatbed printer introduced at ISA 2007. This printer is made in the USA since the other models (from China) were not reliable enough.

There is no other outside independent information on the Raster Printers machines. Trade magazine articles are publicity releases and are not updated in any event. A trade magazine article can't afford to irritate their advertisers by telling you what a printer is incapable of doing. FLAAR does not accept advertising and we can say whatever we want. Even sponsors have learned that if we find something that does not work well with their printer, we list the glitch.



Raster Printers 720UV

Scitex Vision

VEEjet is their same perennial entry, a 6.5 x 10 foot flatbed. No roll fed capability that I could see. This printer was premiered at SGIA the last days of October '02. Uses Xaar printheads, as do most grand format solvent ink machines of Scitex Vision. The current model is the "+," VEEjet+. The original chassis is seemingly from Sias, an Italian company that still makes screen printing equipment (but no longer makes any UV-cured ink printers).

Like most other UV-curable inkjets there was a tad splatter on the edges of text or any large area of solid color, but the splatter was not visible from a normal viewing distance. If you did not know the splatter was there, and did not look carefully, you might not notice it at first.

The print on wooden boards from Home Depot was excellent quality. The print of a map of the USA was the best quality, far superior to any solvent ink printer in the tradeshow (unfortunately this was not the same National Geographic world map, so the scan of the Scitex map may also have been better).

The output on clear acrylic was excellent. Acrylic is a material which looks like glass but will not shatter. Based on the time I spent at the Scitex Vision demo center and the four days at SGIA '03, I would list the VEEjet as in the same class as the NUR Tempo, Sericol Inca, and Durst Rho. These are the four mature UV-curable flatbed printers if you need serious production, the best quality (minimal banding) and a company that is dedicated to inkjet printing for the long term.

The Scitex Vision CORjet is the new name of what used to be the BEL2000. This printer is intended to print on corrugated cardboard packaging materials. Uses Aprion MAGIC printhead technology. This is not a UV-curable ink system. I saw the CORjet in action at the Scitex demo center outside Atlanta. Everything it



HP Scitex Vision CORjet

printed on looked of the highest quality. Maybe they used an unusually fine corrugated surface to showcase, but the stuff being fed into the printer looked ordinary enough. My PhD is not in surface characteristics of corrugated cardboard, so I can only say that if this is the same stuff you might use in your business, then this quality is fully photo-realistic and ideal for POP stand-ups.

Scitex Vision had an impressive exhibit at DRUPA 2004 but showcased two other printers (CORjet and a solvent ink printer); the VEEjet was not shown.

At FESPA 2005 the VEEjet+ was in an adjacent booth but was not in operation other than occasionally. And when it was in operation it seemed to be very slow. The output quality was excellent; that is one advantage of being so slow.

The HP Scitex FB6500 is the new version of the VEEjet+: it has the same flatbed table as the venerable VEEjet but a new carriage with new Scitex X2 piezo printheads. But this printer has not yet been shown to the public (outside of private viewings by invitation only).

But in terms of sales, Durst, Gandinnivations, Vutek, and even NUR has outsold the VEEjet every year since 2004 (Gandy's company was new before then and did not ship UV printers until about 2005). GRAPO (that does not even sell in the USA) and even upstarts like Korean IP&I sell more of their printers than the VEEjet.

This does not mean the VEEjet is a bad printer (albeit it is the oldest chassis other than the Zund 215). The Océ Arizona T220UV was also not a bad UV printer, but it sold so poorly it was withdrawn.

The HP Scitex TJ8500 is a UV-curable inkjet version of the solvent ink Scitex Vision TURBOjet . The solvent version has been renamed the HP Scitex TJ8300.

HP Scitex has one other new UV printer in the works, a roll-to-roll design, but it has not yet shown them outside of a private event in Barcelona and other behind-the-scenes events (as of October 2006)



The HP Scitex TJ8500, UV printer shown by at ISA 07

Sericol Imaging (now Fujifilm)

Sericol, the ink company, is the distributor for the Inca Eagle flatbed UV ink printer in America. Reportedly the Zünd and Inca both use the same ink. Otherwise there is no connection between the two printers and the quality difference is notable too.

The Inca is a large flatbed with printable area of 96 x 63 inches, for sheets or rigid material up to 1.58 inches thick. The Inca lacks facility for roll-fed media.

The Inca Eagle started using Xaar printheads. Got the best output from a Xaar printhead I have ever seen. Have no idea how they do it, but the prints look very nice. I last saw samples at IMI conferences, May 2003 and at SGIA in October 2003. I believe Inca has switched to Spectra heads for even higher quality. We will check this for sure at SGIA '04 in October.

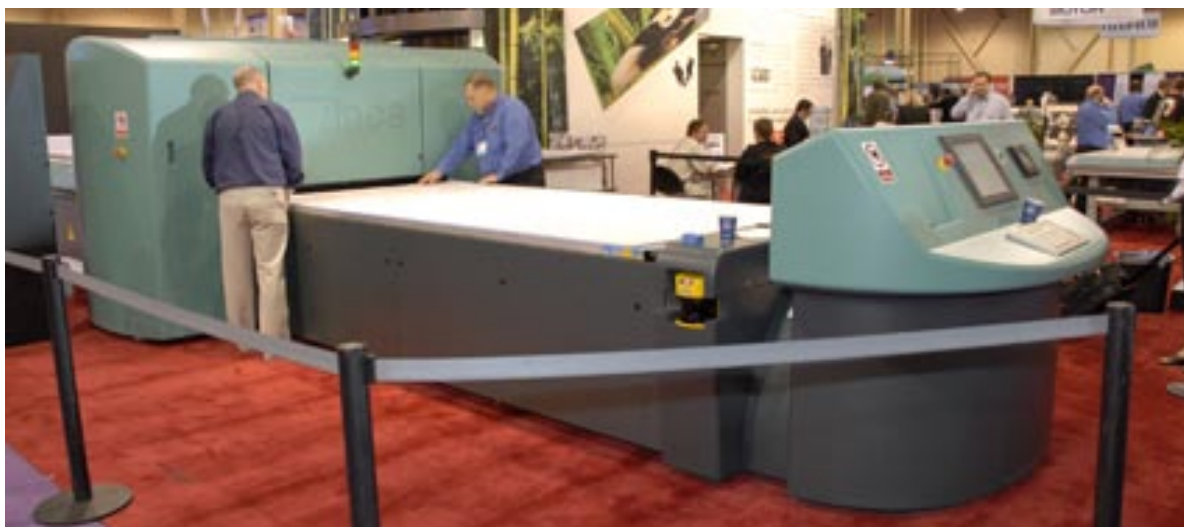
Can print direct to the edge of the material.

Capable pin registration allows for positioning sheets for printing on the other side.

Sericol is the first company to offer direct printing to the lens of lenticular material. Now other competitors are offering this feature as well. You can only do this with a high-dpi printhead.

The main advantage of the Inca Eagle 44 is that several dozen are at work already. In the world of UV cured ink printers this does not mean the technology is finished, but does mean that you get a functioning printer. The Eagle was first launched in 2001.

The Inca Columbia 220 is their next model. It offers 126 x 86" printing, which is a larger version of the original flatbed. The Columbia Turbo offers increased speed. I would enjoy learning about the technology and why they selected to move the entire heavy table back and forth. The wear on the mechanism must be considerable. Yet the engineers obviously are aware of this and still chose this method over that of the Rho, Zund, and other competitors. Note that the Inca Spyder holds the material stationary and has the printhead assembly move gradually down the material in one direction with the printheads going back and forth at their usual 90 degrees to the material.



Inca Turbo UV at ISA 07

The Inca Spyder 150 is a smaller version of previous Inca UV flatbeds. It is listed as a functioning beta stage as of May 2004. I did not see if actually printing at PMA in mid-February 2004 but at DRUPA 2004 in May the printer was printing every day for two weeks. The size is 60 x 40". CMYK is the basic color offering but the results have a glossy finish. Few, if any, other UV-curable printers can offer a glossy finish. However be sure you want glossy, because the Spyder evidently offers glossy only. If you prefer a matte or satin finish, you need another model of Sericol.

So Sericol now offers the following models

- Inca Eagle H (semi-retired but still on Inca website).
- Inca Columbia
- Inca Columbia Turbo
- Inca Columbia 220
- Inca Spyder 150 (my favorite printer but seemingly not actively sold in the US and no longer shown in Europe either; seemingly the bed was too small)
- Inca Spyder 320. This was shown at FESPA 2005 in Germany and probably will be visible at SGIA 2005.

It is amazing the colors that Sericol creates from just CMYK. Most of the competition offer 6 or even 8 colors. But when I am in a Sericol or Inca booth, the colors look great, especially red. The image of autumn leaves from the Spyder 150 has all the reds that you expect; you don't get red on many of the competitor's UV inks, no matter whether they offer 6 colors. Yet Sericol ink on the Zünd printers is not as good in reds, yellows, or greens.

Sericol is now owned by Fuji and Inca was recently bought by a Japanese pre-press company, Dainippon Screen.

Shanghai Yaselan Giant YSL FB2500UV

See Yaselan.

Shenzhen Runtianzhi Image Technology, Runjiang Group

See Flora FUV 2200, 2214, RasterPrinters, and DuPont Cromaprint

Skyjet (Skyair-ship)

A company named Skyjet America exhibited at SGIA '03 for about the first time I have noticed them. The people in their booth were friendly and helpful. Their printer was slightly more costly than the Zünd. I am confused by this company and Shanghai Teckwin Science & Technology Development Co., Ltd. The model seemingly has no model name; instead it is called Skyjet Multi-function Digital Flatbed printer.

My notes from SGIA indicate "edge splatter" (which occurs to varying degree on most UV-curable flatbed systems) and a very heavy dot pattern. The coarse dot pattern would not be visible when 6' away. The printer can handle glass too.

The construction and structure of this machine is extremely simple. That can be a benefit (less to go wrong, less to repair). But it may not have the bells and whistles of a more sophisticated printer such as the Nur Tempo, Sericol Inca, or Durst Rho.

There was no Skyjet UV printer displayed at FESPA 2005, but the booth attendant said it would be at the next Chinese trade show. However there was no Skyjet UV printer at ISA 2006.

Sumitomo 3M UV

This is a rebranded printer; 3M no longer tries to make its own printers. Prints up to 2 meters wide, 4.4 cm high. The sole photo that I could easily find on the Internet is so incomplete that it is hard to figure out the original equipment manufacturer, but I would guess Vutek, PressVu UV 200/600.

3M tried to sell the L&P Virtual printer as the ScotchPrint 2500 UV and did not have much success. L&P withdrew the OEM relationship after about a year.

3M tried to sell a Teckwin solvent ink printer to the South American market. I saw it at one US trade show and then never again. Matan and Gerber tried to sell a similar solvent printer but with better printheads: Hitachi-Ricoh instead of the cheap Xaar heads used by 3M.

3M is once again trying to enter the UV market, in 2006, with a rebranded Durst Rho 160R.

Sun Chemical

Sun is an ink company. They provide the ink for the Fastjet, a printer manufactured by Inca. Although other Inca printers use Sericol ink and are for photo quality, the Fastjet is for packaging, and uses Sun ink. Printers for packaging tend to be one-pass technology. The printer unveiled at DRUPA 2004 was a functioning prototype. It is planned to ship in 2005. This will be direct competition for the CORjet from Scitex Vision; this uses Aprion printhead technology but not UV-curable inks.

I did not notice the Fastjet at in the booth of Sun Chemical at FESPA 2005, though it is easy to miss a printer that is surrounded by many visitors. The Fastjet has not been shown at any trade show since DRUPA 2004, but is still under development (Walshe 2005). By late 2005 the Fastjet was in test phase at one site. The FastJet should reappear in 2007.

Sun (Novosibirsk)

This is an energetic company in Russia. I first met them at Gulf Print (Dubai, April 2 007). They rebrand an Infiniti as the NEO-UV. They rebrand another printer as the Neo-2506UV and Neo-1507UV.

Tampoprint

Most Tampoprint products are screen printers. But they did have a solvent ink piezo too, 300 dpi, up to 4" thick. Yet at SGIA 2002 Tampoprint did not, to my knowledge, exhibit any flatbed inkjet printer. But perhaps I simply missed it. They did exhibit some giant screen presses. One report indicates it is solvent inks, not UV (www.sartomer.com/wpapers%5C5057.pdf)

Like most European web sites Tampoprint's site used to be next to impossible to find in any search engine. Fortunately, once I did, the ability to read Deutsch made it possible to find the solvent ink flatbed hiding in their report. Had to go to a Korean site to find a brochure on the DMD DSP solvent ink printer.

TP-Info #55 reports upon their D.M.D. U1500, a flatbed for thick and rigid material, but using solvent based acrylic inks, not UV-curable.



Tampoprint Applicatons, DRUPA 04

Maybe they felt a solvent ink flatbed had little future and thus did not want to haul one to St Louis? I did not see any inkjet flatbed in the Tampoprint booth at SGIA '03 in Atlanta either. Will have to wait and see what they exhibit at DRUPA '04 in May. Here I found an industrial UV-curable flatbed printer. Results were shown from a prototype of another model that prints on aluminum. This printer for aluminum was not present itself.

One year the Tampoprint web site used irritating pop-up windows that refuse to close. They keep popping up again. Other design aspects of their web site are not professional either. However the printer looks fine.

During August 2003 the Tampoprint web site was still very Germanic, but was easier to navigate and it was possible to find information which pictured and described two versions of what may be a UV-curable ink flatbed printer. But until DRUPA '04, will be unsure whether these exist in reality. Frankly Sericol, Nur, Scitex Vision, Vutek, and Durst are so far advanced with UV-curable printers, it is hard to picture a slow moving latecomer such as Tampoprint producing anything significantly better or less costly or different even: especially if it is designed by the same people or philosophy as designed their web site.

At DRUPA '04 the DMD printer was displayed but there was not enough space to have large enough tables front and back for it to actually be printing. The best known UV-curable printers that functioned flawlessly the entire two-weeks long were the several models of Inca-Sericol and Durst.

DMA stands for Digital Multicolor Decorating. The Tampoprint booth showed several kinds of tabletops printed with UV-curable inks. Trouble was that the quality was not good enough for viewing at such a close distance. If you are sitting at a table you want continuous tone not continuous patterns.

We expected to see a new and improved UV printer from Tampoprint at FESPA 2005. But instead they showed a solvent ink flatbed printer.

Teckwin (Shanghai Teckwin)

This company makes the Teckjet UV (TeckUV1800) and entry level TeckSmart UV1600. Like most UV printers from Mainland China, they need another year or so to make the printer fit the needs of American sign shops (for less banding, for example). As soon as the quality of this printer improves, and we can document by a demo center visit or site-visit case study, we will update our comments.

At FESPA 2005 Teckwin showed a model “Smart UV” flatbed.

The CD handed out at trade shows in the US lists the TeckUV S2400 but I do not believe I have seen this model in a booth.



Teckwin TechSmart UV 1600

A brochure handed out at the Dubai 2006 trade show (UAE) listed three Teckwin UV printers but not a single UV printer was in the Teckwin booth. At ISA, April 2006, the TeckSmart 1600 was shown in a large Teckwin printer booth.

Thieme

Thieme has partnered with Agfa to create a million-dollar production flatbed printer, the M Press. This factory-sized printer was too large and too new to display at FESPA, so they showed it via video. Very impressive.

But no complete spec sheet is easily available at first (early July 2005).

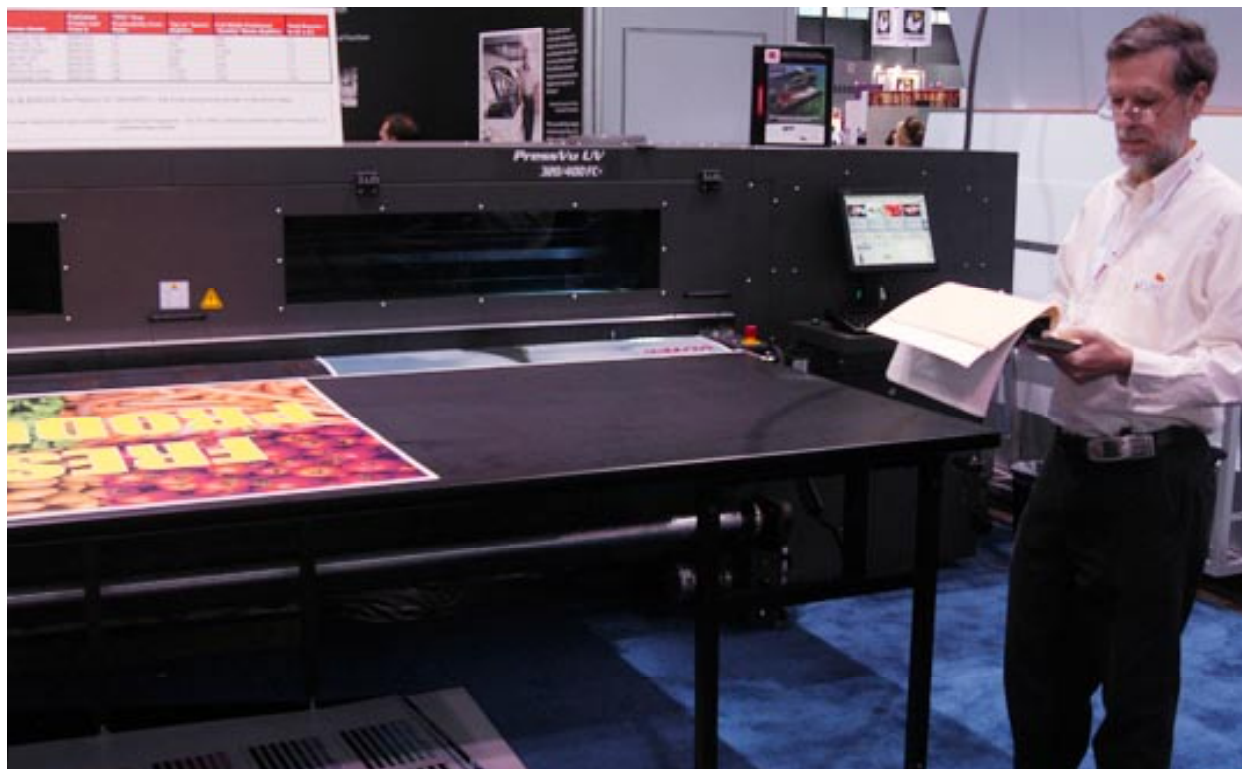
Titan

A Korean trade magazine, DP (2007, 3, vol. 65, page 59), shows a photo of a UV printer identified only as “Titan.” It looks like a GCC StellarJet 183 or some other kind of a copy of the old ColorSpan 72uv. I have not yet found any information on the Internet whatsoever.

Vutek

Vutek offers another industrial strength flatbed, with corresponding industrial sized price. We first saw the PressVu Digital Press at SGIA sign trade show in November (2000). Nice equipment, but downside is that 360 dpi, with solvent ink and solvent ink piezo printheads, is most politely described as of variable quality. Normally such dpi is inadequate for close viewing. Hence this is not a proper selection for half of the usages which the Vutek brochure stakes out for this printer in their attractive brochure.

They claim “superior quality” but you have to translate that. What it means is “Vutek comes from the tradition of 75 dpi billboard printers. Thus 360 dpi is a major advancement and this output is superior quality to anything we have produced before. We are thus proud of this new printer.”



Vutek PressVu UV, Print 05

But if you are producing POP ads, posters, backlit displays, you come from the world of 4000 dpi from LED and other fancy printers such as Durst Lambda and Cymbolic Sciences LightJet. So the quality you expect for bus shelters, backlit and especially for exhibition graphics is 1200 dpi as entry level (HP 5500) and with the ColorSpan's perceived 1800 dpi is the kind of quality you need in an inkjet.

Output from solvent ink printheads is not quite near photo-realistic quality at normal viewing distance. No photographer would accept the ad claims.

Since 2003 the Vutek PressVu UV 180EC and 360 EC flatbed uses UV curable inks. They also use Spectra heads, as does the Durst Rho. Spectra heads tend to be more robust, provide higher quality, and exhibit less banding than Xaar heads. Thus the quality has improved over output of several years ago. Eight colors should help as well. Nonetheless there is serious competition in quality from Scitex Vision and now Nur, now that their Tempo flatbed is finished and shipping. The Sericol Inca is a top quality machine, albeit strictly for individual sheets, not roll fed.

Vutek printers are designed and constructed in the USA but sold in all major countries of the world. Vutek had three UV-curable inkjet printers at work at DRUPA 2004 including a roll to roll and also separately a sheet-fed (rigid) flatbed versions of their newest UV-curable printers.

The first flatbed printer from Vutek that we know of is the PressVu (no number), introduced in 2000. Then there was a Vutek PressVu (again, no model number). This was pictured in brochures, probably late 2000 or early 2001. We do not know if this is identical to the subsequent PressVu 180 EC (either 180/360 EV or 180/600 EC). If you can help us sort out the models, and the years they appeared or disappeared, please let us know at nhellmuth@FLAAR.org.

Vutek offers several models of UV-curable ink flatbed printers, including

- Vutek PressVu UV 180/600
- Vutek PressVu UV 180/360
- Vutek PressVu UV 200/600
- Vutek QS 2000, QS 3200

An upgrade, shown at ISA 2005, now offers white ink, the UV 200/600 W+.

At FESPA 2005 Vutek presented a new model: by lowering the resolution they could increase the speed. This is the model PressVu UV 320. By 2006 they found out that the low resolution was too low! And now they had to raise their resolution all over again, with big PR announcements.

Yaselan

The Shanghai Yaselan Advertising Material Co. Ltd has introduced their "Giant," YSL-FB2500UV at ISA 2004 trade show. It is the only flatbed that I have seen where the entire flatbed portion is enclosed. Also accepts roll to roll.

Some of the specs are 2.5 x 1.36 meter, 12 Spectra printheads, 6 colors but no white ink.

I have not see much of Yaselan recently, at least not a UV-cured ink printer that caught my attention. I did not notice any Yaselan printers at FESPA 2005. Yaselan had a booth at the Dubai Middle East 2006 show but no UV printer was shown.

Yishan Digital Technology Co. Ltd.

This is the original manufacturer of the flatbed printer sold by PIMMS in Turkey as the Digirex Technojet Flat UV. But the Yishan/Digirex has not appeared at trade shows since May 2005.

As of April 2006, the Yishan website offers three B Series flatbed printers:

- YS2406-CB
- YS2512-BB
- YS2406EB

We discuss these in the FLAAR Reports on Digirex and Yishan together.

Zünd

Zünd is a capable engineering company in Switzerland with the best xy-cutter available. Even Durst uses a Zünd cutter to cut output from the Durst Rho UV-curable printer!

But Zünd is not originally a printer manufacturing company. Somehow this printer came by way of a marketing company called Perfecta Print AG. Nonetheless they have worked hard to achieve a UV-curable ink flatbed with installations throughout England, Europe, and the US.

We personally know of one early model Zünd printer at work. The owner was not very happy at first. He says it printed okay for a few hours and then starts banding. I have seen the output. Not what I would pay \$150,000 for. However this was over three years ago. That same printer was completely retrofitted (upgraded) and is evidently still printing in Ohio. The original owner went on to buy a Durst Rho 160 and then a ColorSpan 72UVX.



ZündUV Jet 215, DRUPA 04

More recent Zünd models are improved; just be sure that if you buy a used early model that you are aware it may not be as good as current models. I am guessing that the Uvjet 215-Combi is the current model since 2004. The problem is that they are all called the 215. You may not know what version: what it includes and what features from the factory that did not exist when it was manufactured years ago.

After several months of trial and error, and constant tech support, the print shop in Toledo got the Zünd printer to produce acceptable output. The owner gives Zünd tech support a good report for service, since at this early date he got a printer that was barely out of beta stage. The printer nonetheless evidently produced enough sellable output to show that a UV curable printer was a viable machine. So the two owners went to several trade shows, consulted at several of these trade shows with Hellmuth, and as a result of this and their own experience they bought a Durst Rho. After many months of learning the pros and cons of the Zünd the owner felt more confident that it (the Zünd) was a workable printer, though clearly he prefers productivity of the Durst Rho (roughly twice the cost of a Zünd). Two years later they consulted with FLAAR again, and this time they could not wait for the delivery time of a high-end model so they bought a ColorSpan. This ColorSpan printer has been working since the day it arrived (we know, we were in the print shop when it was unpacked).

When you ask around, the answer is that Zünd is considered as entry level for flatbed printers. If the products you intend to print will be viewed at a far-away distance, you (or the viewers) will not notice banding lines or scraping marks. If the surface of the material is rough to begin with, and if the image is busy, then you won't notice either. Would be interesting to see whether getting rid of the Xaar printheads and replacing them with Spectra heads might eliminate some of the banding, or at least make it less common (since all piezo printheads band, whether Epson, Xaar, or Spectra). By mid-2006 a work-around was developed and current models of the Zünd 215 have improvements that did not exist on earlier manufacturing runs.

Several new models were presented at DRUPA 2004 but they were still in beta stage, albeit functioning prototypes. The Uvjet 250-Combi is their most expensive model to date. Whereas most of the competitors are down-pricing, Zünd is going upscale into the markets dominated by Durst. The new Zünd now even offers white ink. However Durst has an impressive head start.

The Uvjet XY-Flat has Epson printheads to aim for a better resolution than obtainable with Xaar heads. Eastech also tries to use Epson heads on one of its models. It would be necessary to undertake a jury test to see if the quality is distinguishable. Since Epson printheads are legendary for clogging and banding issues, it will be necessary to certify them as to whether using UV-curable ink escapes this inherent problem. Most banding is caused by either air in the ink lines or poor media feed. UV-curable and a precision Zünd feeding mechanism should eliminate both of these problems.

We look forward to learning more about the Zünd though additional site-visit case studies. We hope to be able to improve our coverage of the history of Zünd printers by visiting their facility in Switzerland (Nicholas lived in Zurich for three years, but that was before digital printers existed). As a historian, Dr Hellmuth is particular interested in the history of any technological advance. So far we have located spec sheets for the printers of year 2001 onward.

- Zünd 120-F
- Zünd 215-RF; ACCI states this was called the 215-R, but others call it the RF ??
- Zünd Uvjet 215-C (2001)

We are still confused by other (earlier) names for early flatbed printers and/or its early distributor(s) such as Mechatron and Perfectaprint. In his 2001 article, Vincent Cahill lists the

- Perfecta Combiprint UV120-F for flatbed
- Combiprint 215R, for roll to roll.

We assume these were quickly renamed the “Zünd Uvjet 215-C” as a combination flatbed and roll-to-roll version after Zünd bought this other printer company.

We will continue to update this report in the future. In the meantime we list here all the models we noted at DRUPA 2004 trade show in Germany:

- Zünd Systemtechnik AG UVjet 215-Plus
- Zünd Systemtechnik AG UVjet 215-Combi
- Zünd Systemtechnik AG UVjet 250-Combi
- Zünd Systemtechnik AG XY-Flat (only at DRUPA 2004, not shown at SGIA)

The XY-Flat has been postponed and now appears to be cancelled. The Zünd XY-Flat was not out long enough for much to be written on it. The only article I have noticed is in the Czech trade magazine Sign Signmaking Magazine, Spring 2005, p 26 (published by M.I.P. Group, www.mip.cz).

The UVjet 250-Combi was still being promoted at FESPA 2005 in June and even in September at Print '05, but at Viscom 2005 people were already indicating that it had been temporarily withdrawn due to a host of unresolved problems. Seemingly the few units that were sold in Europe did not function well at all. Reportedly only one model 250 Zund printer is in the US. So presently, the only UV printer that Zünd is actively selling is the 215-Combi. The Zünd 250 is scheduled to be reintroduced to the market in the second quarter 2006. However you might want to check with the FLAAR Reports on the Zund 250 to learn the full story: on why it was withdrawn, and on realistically whether it will ever be retrofitted and reappear.

If you are thinking of buying the Zund 215-Plus or Combi or –C, it is essential that you obtain the two separate and distinctive FLAAR Reports on these Zund UV-curable inkjet printers. There are some facts about this printer that are not in their spec sheet that a prospective buyer should know. All FLAAR Reports are available from www.wide-format-printers.NET. What is unsure about the Zund 215 is how much longer updates will continue to be provided, how much longer this model will continue to be manufactured, and when it might be retired. After all, this is one of the oldest UV printers still available. The only other one of its vintage is the VeeJet.

What about buying a discounted earlier model of any brand?

Earlier models of the Zünd 215 were premature, and had occasional problems. So if these are offered either new or used, be wary. One print shop contacted us recently and said that they were offered, seemingly direct from Zünd, an early model 215. I would want to find another print shop that had this specific model, and ask them whether they recommend it or not. I would also compare the price of an old and potentially discontinued printer with some of the newer improved models elsewhere. UV-cured inkjet technology is rapidly changing, and I am not sure it would be recommended to buy a used printer unless you know the previous owner personally.

If you know the complete previous history of the printer, and if you feel it is better than some of the newer lower-priced models now available, then consider it. But be a savvy buyer, and don't let a huge discount on the high original price tempt you. The main problem with a used printer, especially if that model was then discontinued, is that its resale value will be low to non-existent, and spare parts will be a challenge to find.

Market Shares

I am estimating that in terms of units sold, that Inca and Durst Rho have sold multiple times more than the even more expensive brands. I don't know how many units Scitex Vision has sold, but I would guess that more NUR Tempo's were sold during the 1975 SGIA trade show than the most other brands. Now it is Durst, Vutek and Gandinnivations at the high end. NUR and Scitex have the least market share in new sales for 2006 going into 2007. This is why we have more FLAAR Reports on Durst, Vutek, and Gandy printers: these are the brands that people ask about (and ColorSpan).

Zünd used to hold the sales record, especially in England, but it is not as productive as larger faster machines. ColorSpan became the market leader, worldwide, in units sold, by the end of 2005. Previous market leader was Zünd, but the rise of the Euro has resulted in the Zünd printers costing more than twice that of a ColorSpan. So you can buy two ColorSpan printers for less than a single Zünd, and have more productivity. Plus you can operate one as roll-to-roll and the second in flatbed configuration. Same with the Gerber Solara, but that printer has quickly gotten a reputation for being very slow.

Few companies in the US and Europe are willing to risk \$100,000, much less risk \$350,000, to a manufacturer in far away Asia. Printers manufactured in the US and Europe have a definite plus factor. It will be interesting to see how the GRAPO printer from the Czech Republic fares. They will be competition primarily for the Zünd and NeoltJet.

General Observations on Chinese UV printers

Five years from now we will all be using Chinese-made UV printers. But during 2004, 2005, and still during 2007, Chinese quality is too inconsistent. You never know from one batch to another what the machine will be like.

The same is true with inkjet media from China, Some container loads are okay; other container loads are close to unusable. You have to pay up front, so once a Chinese product arrives in the US, the buyer is stuck. There is no getting your money back, and who is likely to sue anyone on the other side of the world in a legal system that is little understood.

It is rare that we hear of a European or American manufactured UV printer being returned because it does not function. But with Chinese printers we know of several instances, in the last year or so, where printer after printer has been returned. The usual reason is that the local dealer is not able to provide consistent tech support.

Chinese companies, their managers, personnel are all hard-working. So eventually they will both understand what end-users want, and eventually the manufacturers will be able to provide the expected quality, consistently, from one machine to another. But that day has not arrived, not even with solvent printers, which are considerably easier to build and to operate. Gerber, Redhill, B&P Lightbrigade and many other major international distributors have tried to sell Chinese solvent printers, and quickly given up.

We look forward to the day when we can ourselves test a Chinese UV-curable inkjet printer in our own facilities and report back how it holds up. But until we hear back from end-users that these UV printers work, we will rely on the many owners of American or European UV printers who report their printers run 8 hours a day, 12 hours a day, double-shifts of 16 hours a day. One shop ran their ColorSpan UV printers 24 hours a day. SFC Graphics, a hundred-year old print shop in Toledo, put a new 72UVX to work and has kept it printing all day month after month. They say the printer is holding up fine. It has probably already paid for itself. Yet three printshops with Chinese printers have issues with them: two sign shops with an Infiniti UV and one sign shop with a Cromaprint 22uv.

White Ink

Mimaki is the first printer to offer white UV ink that I know of. Then Azero cleverly offered two whites on their Creon, for faster printing. One company which offers UV-curable white ink is Aellora, a Markem Company, www.aellora.com. Durst now offers white ink as an option. By the time of the postponed DPI-SGIA (December 2005) it is probable that several more companies will offer the crucial white ink.

White, Titanium dioxide, is the most difficult pigment to jet and cure, which is why other companies have not yet offered a white ink. White ink must be kept gently stirred or it will settle out. No Inca (Sericol) or Oce printer offers white ink. We cover white UV-cured ink in a separate FLAAR Report.



Durst Rho 160W Plus, a large-format inkjet printer that also uses white ink. Drupa 04

Movement

Some printers are flatbed only, such as the Inca-Sericol models. Most printers can achieve both flatbed and roll to roll, such as Durst, Vutek, and others.

The best registration may be when the material is immobilized on top of the main table. In some printers the table moves (carrying the material under the printheads). The Inca Columbia is this rare type. In other instances the whole table area is stationary and the entire printhead assembly is what moves in X and Y directions. The Oce Arizona T220UV would be an example here.



Oce Arizona T220UV, DRUPA 04

In most other printers the media is moved along by feeding mechanism. Downside is stutter if the coefficient of friction is different on an unusual material that was not thought of when the feeding system was designed. Another potential problem is skew, with the media inching over more in one direction than it ought to.

FLAAR offers a separate report on “Anatomy of a UV-Curable Ink Flatbed Printer” to comment on some of the functionality of these interesting kind of inkjet printer technology.

You need to weigh all these factors by asking end-users who already have the same printer that you are considering.

Beginning June 2006, a separate FLAAR Report itemizes which printer is a hybrid UV, which is a combo UV, which is a dedicated UV, and for what kinds of materials (flat or rigid, or roll-fed).

Uni-directional vs Bi-directional Printing

Because UV-curable ink “freezes” before it can penetrate the substrate, and because most rigid substrates like glass or marble are not porous anyway, the ink drop may have a different shape if printed with the head moving from right to left rather than from left to right. So if the printer prints bi-directionally (laying down ink in both directions), you may get both drop shapes. You may also get one row of ink piled up on top of the previous row (instead of alongside it).

Inca and most Mimaki UV printers are uni-directional only, deliberately. The Infiniti UV is uni-directional because they have not yet developed a two-lamp system.

Out of Business and/or No-Shows

In lists of UV-curable printers, trade magazines tend to include printer brands that popped up in Europe but either subsequently fizzled all together or otherwise did not appear at tradeshow in America. Sias-print and Thieme are examples that should be removed from the list of UV-curable flatbed printers: these companies make primarily screen presses (which may use UV-curable ink; however a screen press is not a UV-curable ink flatbed). These companies should be removed from no-show and added to the main list only if they exhibit a fully-functioning UV-curable inkjet flatbed printer at DRUPA, in May 2004. DRUPA is the largest printer trade show in the world, held every four years. All of the no-show candidates listed here failed to exhibit at DRUPA 2004.

We transferred Tampoprint from no-show to prototype stage since they showed a printer at DRUPA 2004.

Beginning June 2006 we have a separate FLAAR Report that shows the status of all UV printers that are cancelled, withdrawn, stalled in development, or are otherwise "in transition" or already demised.

Azero / Creon

Azero introduced their CreonJet 8250 UV-flatbed printer to the American market at SGIA '03 (October). The Azero web site (www.azero.info/ink.asp) takes you to Creon digital printers. Here they list UV-curable inks.

The Creon Jet 8250 was the most substantial looking of the Chinese, Korean, or Japanese UV-curable inkjet printers in 2003. By 2004 trade shows, Eastech was catching up. All of these Korean, Chinese, and Taiwan models are relatively new, and therefore public opinion has not yet reached a consensus. We will need site-visit case studies that we conduct ourselves, will need to learn about the technology inside out, and will need to learn more about the company, personnel, and tech support.

According to an IMI Europe report, the Creon UV-printer uses Konica printheads,. This could mean it uses heads related to the printhead in the ill-fated Konica Iguazu and equally unsuccessful XES ColorgrafX X2. Of course both those printers may have failed for many other reasons beside their choice of printheads. And the Konica head used today is hopefully not the same one in the Iguazu printer since that model failed between 2000 and 2001.

Azero/Creon are oriented to the market in the US; so they did not exhibit at DRUPA 2004, a German trade show. But when they failed to exhibit their UV-curable inkjet printer at SGIA in October 2004, this set off alarm bells. They were not at ISA either, though I saw their former president attending the show.

There is also a Azero CreonJet UV1600F model on their website. This is the same or similar to one of the Hypernics printers.

It appears that a very similar printer to the Azero/Creon printers is being sold in Eastern Europe under the name Azon. We do not know the origin of the Azon printers because they do not exhibit at European trade shows, but based on the description the machines appear to be designed and with some similar features as the former Azero Creon printers that were exhibited at trade shows in the US during 2003 and 2004.

The question is whether these printers were out of beta stage before Azero and Creon withdrew from the US market. The other question is how to get spare parts and tech support if the company is no longer actively

manufacturing printers. However we do not know the current status of Hypernics, the company in Korea that is often listed as the manufacturer of the printers distributed by Azero in the US under their Creon brand name.

Barco

During past years Barco has been busy merging with another company. This may be one reason its flatbed printer was invisible at SGIA '02 or '03. I did not notice one at Photokina '02 though that tradeshow was so large it would have been easy to miss one company's booth.

Barco was originally the #1 source for color manageable monitors. The #2 source (Radius) went belly up and recently Barco has lost business to the up and coming #3, LaCie. All this trauma has not made it easy for Barco to concentrate on anything more than surviving its merger.

The factory (the dot factory) was spun off to Dotrix. Dotrix in turn sold the technology to Agfa. See listing under Dotrix. And Agfa.

BeDigital

I have never seen or heard of this printer in the USA. But the 29 August 2003 issue of LFP-Newsletter, www.LFP-Newsletter.com, mentions it. The www.beDigital.info web site failed to load on October 27th, but that happens when a server is momentarily down. In May 2004 their web site had only a home page that did not open into any content. Hopefully their printer is better made than their web site, though poorly functioning web sites are often typical of European companies that are otherwise fully capable. A second attempt led to www.lumicolor.com/bedigital/index.html. Their offices are outside Barcelona, Spain.

On their web site I did not see any link to a UV printer, nor any picture of it. Must be there somewhere, but it is not easy to write a review of an invisible printer. If it appears before or during DRUPA 2004 then I will update this section. At DRUPA no booth under either of these names appeared.

At FESPA 2005 BeDigital exhibited an OEM version of the Grapo Octopus printer. This printer was fully functioning, mature, improved since DRUPA 2004, and producing attractive output. The BeDigital booth was large and successful-looking.

I am curious about the original BeDigital UV-cured ink flatbed. It is this early prototype that is in the no-show category. BeDigital as a company, and their Domino OEM version of the Graph Octopus printer, are fully functioning.

By late 2006 BeDigital lost the distributorship for both GRAPO UV printers.

Digital Jet Technologies, DJT

DJT had no printer at ISA 2003; only a brochure offering the DJT400 for \$77,584. At SGIA there was not even a booth (or at least none that we could find in four days). This is a classical case of no-show, since SGIA is a crucial venue for UV-curable ink flatbed printers.

Remember Kodak selling their model 5260 for two years before they even had a functioning model that would function at a tradeshow for more than two days without problems?

Trust a printer which you can see at work, in an actual print shop, producing a profit for its owner.

This is a polite way of suggesting not to buy any unknown brand until it has proven itself. We have not heard a peep about this printer in the last several months.

At SGIA tradeshow, mid-October 2003, I did not notice this printer, nor did I see the name of DJT in the list of exhibitors. Someone mentioned they had seen or heard of the DJT but I was unable to find it myself. The notable lack of significant presence suggests that possibly the printhead technology needs more development or perhaps the company is seeking additional funding. It is my understanding this is the first UV-curable flatbed to use PicoJet head technology. PicoJet is an innovative technology for industrial use.

At ISA '04 Digital Jet Technologies was listed on the trade show floor plan, but when I went there that entire area of the floor was empty. So if they exhibited, it was elsewhere. It is always possible in a busy trade show that a company is on an aisle that I missed, since cross aisle booths are hard to see when you are walking the floor by numerical sequence. It is also possible that a last minute notice indicated they had changed booth location. I am trying hard to give them the benefit of the doubt here.

Not appearing at a major trade show where all other UV-curable ink printers were presented in person is not a favorable sign. This company did not appear at DRUPA 2004. If they show up at SGIA '04, it may be too little, too late. Working with an innovative printhead, no matter how good, is an invitation for problems, as Kodak found out with the Brother printheads in their ill-fated model Kodak 5260 (not a UV-curable ink printer).

If you know anyone who placed a down-payment on this printer, or who has seen or heard anything about progress, or lack of progress, please let us know at ReaderService@FLAAR.org. In the meantime, if evidence that printer actually functions does not appear we will remove this from the "no show" category. In the meantime, check the general advisory before you plunk down hard-earned cash for any printer, no matter how well known the brand is. After all, Xerox's entire large format division failed (XES) as did Kodak's model 6250.

Hypernics

Modern Reprographics magazine listed their HyperJet UV-FR2515 flatbed UV-curable ink printer, but that same trade magazine list has several other printers on our "no-show" list.

Other than the Hypernics website, the Internet is mum about this printer. They did not exhibit at SGIA 2004, nor did I notice them at DRUPA 2004 or FESPA 2005. If they exhibit at SGIA 2005, we will re-instate them in the main list. We do not know their relationship, if any, with the Runjiang Group from Mainland China. But Hypernics is clearly the source of printers for Azero Creon for the US and Azon for Eastern Europe.

At least two models exist, UV-FR2513 and UV-F2525. The latter is similar to the Creon 1600F.

Their contact information used to be

HYPERNICS CO., LTD

Ssangyong IT Twin Tower 6F, 442-17

Sangdaewon-Dong, Jungwon-Gu, Seongnam City,

Gyeonggi-do, Korea

E-mail : tom@hypernics.com

Homepage : www.hypernics.com

Zip Code : 462-120

Since Hypernics does not exhibit at trade shows in the US or western Europe, and since reportedly IP&I was founded by former members of Hypernics, the current status of Hypernics itself seems to be that it ceased to exist during 2004-2005. Azero-Creon ceased exhibiting at trade shows by late 2004. Azon does not exhibit at traditional industry trade shows, so its status is unknown.

In 2006, the survivors of Hypernics formed IP&I. They exhibit at both US and European trade shows, and in general are doing much better than the former Hypernics.

Keundo

This company has exhibited their super-wide solvent ink printers, but so far none of my notes or photos from American trade shows reveals any UV-curable inkjet printer. I don't remember seeing one at DRUPA either, but perhaps they were in a part of the trade show I did not get to during the 12 exhausting days I was there.

As soon as we can see a Keundo UV printer, either in their demo center, at their factory, or in a trade show, we will update this list and move them from "no-shows" back into the list of printers that are available for shipping.

At FESPA 2005 Keundo exhibited a solvent ink flatbed and indicated they have a UV-version under development. Curiously the flatbed portion was only a small fraction of the 3.3 meter width (the chassis is the solvent 3300 model).

Mechatron

Mechatron is seemingly an earlier name for evidently what is now sold under the Zünd name. See Zünd.

Mechatron was the company that made the actual printer. Perfectaprint was the company that sold them.

Raster Graphics bought Perfectaprint (the company that had the rights to sell the UV printer). But only too late did Raster Graphics find out that Perfectaprint not only did not manufacture the printer, their rights to sell it were limited.

Zünd was clever and bought Mechatron, so obtained the actual manufacturing capability of the UV printer. This was the birth of what became the Zünd 215-C.

I thank several people for tidbits on this intriguing story. Reportedly the clever owner of Perfectaprint retired to South Africa with the results of cleverly selling the distributorship.

Perfectaprint AG

Tough to find much information since the company's web site has a neat function, the data on the page disappears! Hopefully their million dollar printers function better than their web site did during April 2001. Reportedly this brand name was the distributor of what is now the Zünd printer.

There were two models, roll-to-roll and flatbed. This printer evolved into the Zünd 215 series.

Siasprint

Sias Digital K1520 uses UV curable inks to print on rigid and thick substances. Another model was the K2030. Their web site seems to be a closely held secret; does not appear in Yahoo search engine. Sort of typical of a European company. At SGIA 2002 Sias did not, to my knowledge, exhibit any flatbed inkjet printer. They showed only screen presses. Furthermore, their US distributor shows no UV inkjet printers, only UV screen printers. Thus until we see an actual functioning UV-curable ink flatbed at DRUPA 2004, we list the SiasPrint K1520 and K2030 as models that no longer exist under this name.

There was no Sias branded UV-curable inkjet printer in their booth at SGIA in mid-October 2003. Thus Sias might best be removed from the list until it is confirmed whether they still have a UV flatbed inkjet printer, or not. Word on the street is that Sias itself is not in condition to complete an expensive project such as a major UV-curable printer.

One reason Sias itself has no UV printer under its own brand name may be that this division apparently went from Ciantec through Sias through Belcom into Scitex Vision. Reportedly the Scitex Vision VEEjet is their version of the older Sias printer.

According to the Seybold Reports, Sias had sold 6 UV units already by the time of DRUPA 2000. This was before the Durst Rho or Inca Eagle were past prototype stage.

Thieme

Thieme is a German company which makes the DataScreen printer. However this is a screen press, not an inkjet technology. These brand names creep into lists of flatbed printers in trade magazines inappropriately over the last several years. We removed Thieme, Sias, and others until we see them at a trade show. At SGIA '03 and SGIA '04 Thieme said they had no UV-curable inkjet flatbed available. But a few weeks before FESPA (late May 2005) Thieme and Agfa jointly announced their million dollar printer, the M-Press. So we have added Thieme to the main list.

UV-Curable ink printers other than Flatbed Style

Dotrix

This company is the one handling the.the.factory printer. Until we find print shops other than beta test sites successfully using a product we can't say much more about it. Evidently this is a label printer now, so not an industrial flatbed. Agfa recently purchased Dotrix so we will learn more about this printer as it is shown more often at trade shows. We inspected two Dotrix the.the.factory printers at DRUPA 2004.

This printer was first shown as a prototype at DRUPA 2000. It became known as the Barco "the.the.factory" (the dot factory). The technology was taken over by Dotrix who sold out to Agfa during 2004.

The.the.factory is fast because it is one-pass with full-width heads (a page array). They call the technology SPICE (Single Pass Inkjet Colour Engine). Each array prints one color. One-pass machines are fast but if a single nozzle fails to fire a defect becomes evident because there is no second pass to cover over the initial error. Most printers require six or more passes over the same location to achieve photographic quality. Some Roland models require up to 32 passes to achieve their highest rated dpi. This can take up to an hour for a banner-sized print.

This system offers variable data capability. This is an industrial printer for packaging and labels.

Comments on Industrial Printheads

The Durst Rho started out with Xaar printheads and changed to Spectra.

The ill-fated Mutoh Albatross evidently used Xaar printheads, if I remember correctly. The quality was poor. The new replacement, the Mutoh Toucan, uses Spectra heads.

I can't remember if Vutek used Xaar heads at any point, but I did notice that the quality of Vutek printers reached a notable quality last year. I believe Vutek has used Spectra heads since last year.

At SGIA someone mentioned that another of the printer companies was switching from Xaar to Spectra heads. There was also occasional comments that Xaar heads have to be replaced whereas Spectra heads tend to last longer.

Since FLAAR is devoted to professional photography, and we exhibit primarily in museums, we are picky about photo quality. So far we have not seen any Xaar head which comes close other than the Inca. If that still has Xaar heads I am impressed. Otherwise, Xaar quality is improving, but is not quite there yet. Tampoprint tried to use the IJT printhead. This may be one reason for the splotchy output and what looks like banding in two directions.

Although banding is usually blamed on the printhead, banding is also a result of poor feeding mechanism and other factors. If the printer manufacturer is skimping on printheads (meaning trying to save money by using low-cost Xaar heads) it may be cutting costs on other crucial aspects too, such as feeding mechanism. So merely switching to Spectra printheads does not guarantee a total improvement in quality.

One Eastech and one Zünd printer use Epson printheads. The Zünd XY-Flat did not survive alpha-stage.

Hypernics uses Konica heads. Azero Creon was their distributor for the US. Their large Azero Creon printer never got out of beta stage. We are checking to see if the printheads had anything to do with this.

PIT is trying to use Seiko heads in their huge industrial flatbed. We will have to wait and see how this print-head works in the newer Vutek QS 2000 UV printer.

The printheads used by Mimaki are not yet identified, but we will find out sooner or later (it has been suggested by IMI reports that the heads are from Toshiba Tec). It is not appropriate for any manufacturer to keep this information from people who are about to pay large sums of money for a product. People have a right to know the origin of all components inside a printer.

FLAAR now offers additional information and documentation on printheads in a separate FLAAR Report on printheads for UV-cured ink.

General Comments

Common sense would suggest that buying a printer that is unique is not a wise investment. No one has spare parts but one source. If that source won't reply to your e-mails, or goes belly up, you are stuck with a useless piece of equipment. Realize that many of the UV-curable ink printers are still in beta stage, but you still have to pay \$250,000 to \$450,000 for the pleasure of being their beta tester.

Same with a printer whose main source of supply is a distant foreign country. You have no recourse if anything goes wrong. No lemon law to lean back on. And even if supplies are available, it's costly and you never know when to expect parts to actually show up.

Vutek and Durst, however, are solid companies and you can get service in most parts of the world.

It's almost easier to take out the old-fashioned paint brush and paint by hand. In India, for example, I noticed that the majority of the signs were still being painted by hand.

We list the above printers, but do not recommend for, or against them. Although some will print on practically any surface, directly, even glass, there is no testing facility which has attempted to evaluate any of these printers.

Of the above true flatbed printers only the Gradco Mammoth and the Encad 880 potentially have adequate dpi for photo-realistic quality. This is a polite way of saying that the other brands are not made for fine art giclee prints. Don't be misled by the designation "LAC Art Robo." It's output was barely okay if you view from a long distance, but not appropriate for close-up viewing in a museum. Actually it was the worst output I have yet seen. Airbrush printers disappeared from the USA years ago (the first Vutek printers were airbrush). LAC is one of the only airbrush printers remaining.

The 1440 dpi of the Gradco Mammoth, in distinction, ought to be capable of photo-realistic and fine-art quality. But the newer printers today offer even better quality. Encad is limited to 600 dpi by its older generation printheads, but on rough media, or with a "busy" image, you don't notice the lower dpi nor the dot pattern. So at a viewing distance of 15 feet the image looks great.

The ColorSpan Esprit is the top quality of the printers using water-based inks that can handle thick or stiff material. It has a perceived dpi of 1200 with all eight colors. This printer can definitely produce fine art giclee quality if on canvas or watercolor paper. It's also the most reasonably priced of all the printers that can take thick media. But today (2006) the Roland printer is being retrofitted into a flatbed (not by Roland but by many others). The quality of Roland (and Mimaki) both produce an excellent quality (when they can avoid banding). However Epson piezo printheads are a tad slow.

Before you plunk your hard earned money down for a down payment, be sure to know the truthful answers to the questions posed on the FLAAR evaluation standards. A key question is whether the company selling the printer today will exist to provide tech support for the next three to five years. Of the companies now selling flatbed printers, there is one that will unlikely survive in its present form, will either be spun off, divided up, or otherwise sold off. Not all parts will necessarily survive. At least one of the other companies may not make it another 12 months, much less another three years. The surviving portions of these companies may continue, but the model of printer you just bought may be cancelled, since it competes with the comparable model of the surviving company which bought the sad remains of the weaker company.

So you may wish to hire FLAAR as your consultant in deciding which printer to purchase. Our modest consulting fee is definitely worth the investment when you are facing a \$100,000 to \$450,000 dollar decision.

References

We will keep track of future articles on flatbed printers and list them as they appear. We understand that an article is in a recent or upcoming issue of the BigPicture Magazine. Another magazine that covers large format inkjet printers is DigitalOutput. Both these trade magazines have excellent coverage, albeit often in the expected nature of infomercials or PR direct from the manufacturer. Such emissions are, however, a good measure of the honesty and ethicalness (or total lack thereof) of the manufacturer. However these trade magazines do occasionally present penetrating independent or otherwise seriously comparative articles.

A straightforward trade magazine is Electronic Publishing, mainly press releases directly from the manufacturer or from their in-house or regular contributors, which include industry experts.

Once you avoid the PR releases and infomercials, you find additional articles which are informative, even when not always investigative, deeply penetrating or painfully comparative. We recommend all three of these trade magazines as well worth subscribing to.

Consulting with FLAAR and Dr Hellmuth

If you wish for Dr Hellmuth to come to your office, anywhere in the world, for consulting, contact him via ReaderService@FLAAR.org

Lectures on UV Printers

If you wish a colorful and informative PowerPoint presentation by Dr Hellmuth, in person, on UV-cured flatbed and/or roll-to-roll wide-format printers, contact ReaderService@FLAAR.org

Contact Information

Contact for the ColorSpan 72uvr, 727uvx and 9840uv flatbed printers is productinfo@colorspan.com

Contact for Vutek UV printers, all models (in the US), is Greg Lamb, glamb@globalimaginginc.com.

Contact for Gandinnovations UV printers, all models, is Hary Gandy, Hary@gandigroup.com (for inquiries worldwide).

Glossary

We now have a complete glossary on UV-curable ink printers. But the following terms are not related to UV-curable inks, so they are kept here.

piezo-electric, or simply piezo. A kind of inkjet printhead. An electrical pulse in a piezo crystal causes a flexible membrane to oscillate. That flexing pushes out a droplet of ink. Epson makes the piezo printheads used by Mimaki, Mutoh, Roland, Gradco, and naturally Epson itself. The competing printhead technology would be the thermal printhead of Hewlett-Packard or Lexmark and Encad, similar to the bubble-jet printhead of Canon.

pigment Inks, While early conventional inks were essentially dyes, pigment inks consist of tiny chunks of solid pigment suspended in a liquid solution. According to their proponents, pigment inks offer richer, deeper colors and have less tendency to run, bleed or feather. FLAAR has an entire separate report on inks: this report on inks is part of the Report-Series on Inks & Media.

thermal printhead (also known as bubble-jet, especially by Canon). Thermal printheads are made by Hewlett-Packard, Lexmark, and Canon, among others. HP thermal printheads are used by HP, Western Graphtec, ColorSpan, and occasional industrial applications. Lexmark printheads are used primarily by Encad and a few industrial applications, but not many. Canon printheads are used primarily by Canon itself. A thermal printhead heats the ink in a fraction of a second. The heat generates a bubble which pushes an ink drop out the nozzle. FLAAR has an entire separate report on piezo vs thermal printhead technology: this informative report is part of the Report-Series on Survival (since you have to survive all the hype if you go to any tradeshow booth and ask about the benefits of either one. What you are told varies from the humorous to the misleading to an occasional downright tidbit of misinformation. We had students of the university take notes on the nonsense that hawkers were telling people. We review all these popular misconceptions in the Survival Series).

All other pertinent terms are defined in a separate glossary specifically on UV-curable ink printers.

Bibliography

IMI and the Tiara Group are two separate companies which each organize outstanding conferences on wide format printers. IMI in particular has seminars on industrial wide format (which includes UV-cured printers). IMI now has dedicated seminars on UV-curable inkjet technology. Since FLAAR attends these conferences (and occasionally lectures on topics such as digital photography, we have all their reports. These conference proceedings have been utilized as background reading prior to updating the present FLAAR report.

We have a separate bibliography on UV-curable inkjet printers.

CAHILL, Vincent

2001 A Short History and Current Developments of UV-Curing for Ink Jet Printing. RADTECH Report, July/August 2001, pp. 20-24.

DECKERS, Bernard

2002 Applications of UV-Inkjet. IMI conference, Feb.2002, 5th Annual Toner, Ink Jet Ink & Imaging Chemicals Conference, Orlando.

FRITSCH, Eileen

2002 Flatbeds: a platform for new profits. The Big Picture Magazine, July/August 2002, pp. 58ff

OLDHAM, John

2002 Flat out Fantastic. Modern Reprographics, Nov. 2002, pp. 22-23.

SEYBOLD Reports

2000 Drupa 2000, Part III. Seybold Vol 29, Num 15 & 16, July 17, 2000, p. 20

STEIN, Todd

2002 Equipment Manufacturer's Perspective on Ink Development and use. IMI conference, Feb.2002, 5th Annual Toner, Ink Jet Ink & Imaging Chemicals Conference, Orlando.

WALSHE, Paul

2005 The Challenges of Ink Jet Ink Formulation for Packaging. IMI 13th Annual European Ink Jet Printing Conference. Lisbon, November 2005.

This article has excellent coverage of oxygen inhibition, nitrogen blankets, and ink migration relative to printing with UV-curable inks.

A longer bibliography and additional Internet references are in the separate FLAAR UV-cured flatbed inkjet printer glossary.

Sources and Resources on the Internet

www.4djt.com/Vince.htm (Vince Cahill on the DJT printer, which is seemingly still under development.)

http://americanprinter.com/ar/printing_flatbed_digital_pressuvcurable/
Short item on UV curable but ends up as an ad for the Inca Eagle 44.

www.energy.ca.gov/pier/reports/600-00-013.html

In California the days for allowing VOCs from solvent ink printers are numbered. Indeed California itself is pushing print shops to UV alternatives.

www.filmet.com/BigPicFlatbeds.pdf
Big Picture Magazine.

www.ilwooin.co.kr/ilwooin/DMD.pdf
Brochure, in English, on the TampoPrint DMD DSP Digital Screen Press.

www.modrepro.com/pages/issues/2004/204/feature1.shtml
"Flatbed Inkjet Continues to Evolve and Grow," by Steward Partridge.

<http://printhead.net/dynamicweb/articles.asp?cat=2002-03&a=446>
"Friend or Faux unveils new Omniscape."

www.radtech-europe.com/download/deckerspapermay.pdf

Bernard Deckers, Barco Graphics, "Applications of UV-inkjet inks in the Graphic Arts Industry".

www.sartomer.com/wpapers%5C5057.pdf

Jeffrey Klang, et al, New Developments in the Commercialization of UV Curable Inkjet Inks.

www.screenweb.com/digital/cont/odyssey0201.html

Steward Partridge, 2001: A Flatbed Odyssey: Flatbed inkjet printers have finally arrived. Screen Printing Magazine.

www.screenweb.com/digital/cont/odyssey0201a.htm

The Eagle has landed (almost) 2001: A Flatbed Odyssey?

www.screenweb.com/inks/cont/UVCuring.html

The Mysteries and Myths of UV Curing by Bea Purcell.

www.signindustry.com/vinyl/articles/2003-04-15-JL_UVpt2.php3

UV curable ink benefits, Jennifer LeClaire).

www.sgia.org/db/member/dig_flatbed/descriptions.html

Helpful list albeit not very complete and includes many printers which are not in the appropriate class.

www.spectra-inc.com/spectranews/pdf/news_1999/IS&T99UV_Inks_Rich_Baker.pdf

"Practical Considerations for using UV Reactive Inks in Piezo DOD Printheads" by Richard Baker, Spectra Inc.

www.tampoprint.de/dt/wirueberuns/referenz/artikel/festoimagetpT17_3235.pdf

Does appear to show their inkjet printer.

<http://vcesolutions.com/library/uvcuring.pdf>

On UV curable inks, by Vincent Cahill.

Please Note

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

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

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

Citing and Crediting

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 or otherwise notify us in advance. FLAAR reports are being updated every week 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.

Legal notice

Inclusion in this study by itself in no way endorses any printer. Equally, exclusion from this study in no way is intended to discredit any printer. The same is true for the RIP, ink and media choices.

Advisory

We do our best to obtain information that 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 at the two universities. 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 that 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, usually 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 courses 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.

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. 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. And 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.

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. Trade show examples are 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. Two 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.

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, 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 our two universities.

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.

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.

In some cases a product may work better on a Macintosh than on a PC. 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 it is 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. 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. For example there are several solvent ink and UV-cured ink printers we would like to have, but are waiting for new space.

But 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 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.

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.

Most recently updated March 2007.

Previously updated June 2004, after the DRUPA trade show in Düsseldorf, Germany.

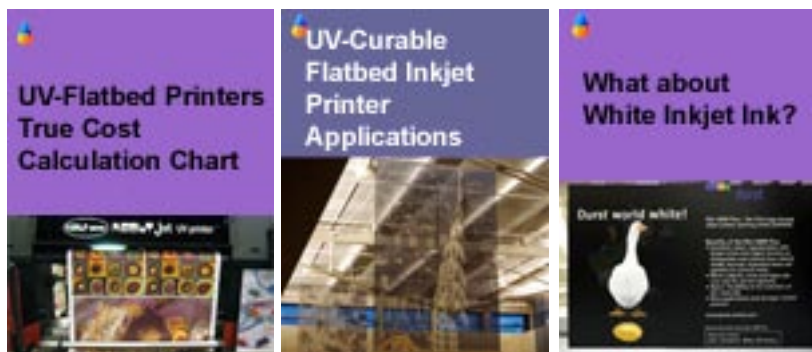
Updated October 2004 after Photokina and SGIA trade shows. Updated again in November 2004 and again in December 2004. Updated May 2005. Updated June 2005 after FESPA trade show. Updated July 2005 and again in October 2005. Updated December 2005 after the IMI conference on UV printers in Lisbon, Portugal. Updated January 2006 after SGIA-DPI in December 2005. Updated February 2006 and again in April 2006. Updated October 2006, Feb. 2007.

Copyright 2001-2006; Issued March 2001; updated April 2001; updated July 2001; updated December 2001; updated Feb. 2002, updated May 2002; updated November 2002; updated January 2003; updated August 2003; substantially updated October 2003 after SGIA tradeshow. Updated January 2004 after Graphics of the Americas. Updated February 2004, after IMI conference and then PMA trade show. Updated March 2004. Updated April 2004, after ISA sign trade show.

2005-2006 Updates on UV-Flatbed Printers



Applications and Tips



UV-Cured Inkjet Printers

