

***CeBIT Trade Show
Hannover, Germany (March 2001)
Large Format Printers, Inks, Media, and RIPs***



Regma Booth in CEBIT, Hannover.

This report covers printers from Agfa, Canon, ColorSpan, ColorWings, Epson, Encad, Graphtec, Hewlett-Packard, Kodak, Konica, Mutoh, Roland, and XES.

ColorSpan, Epson, Encad, and Graphtec presented new printers. These had never been seen at any earlier trade show. Most, however, were simultaneously shown at ISA trade show held in Las Vegas precisely the same days as CeBIT. FLAAR has a separate report on the ISA sign trade show (by Maru Mayen, another of the FLAAR editors).

The present report also offers the following awards:

“Best improvement of a new model over the earlier model of the previous generation”
(two printers won this distinction).

“Best potential of any prototype showed at CeBIT”

“Most popular overall printer for multiple uses”

“Most Innovative Printer Features”

“Most Unexpected Technological Combination”

“Highest Quality of any Printer”

“Fastest Printer of its Class”

“Best Solvent Ink Printer”

“Most Honest Advertising”

“Most Common Misleading Ad Claims and Hype”

CeBIT is the world’s largest computer trade show, roughly the equivalent of Comdex, Seybold, ISA, SGIA, PMA, DPI all put together. Actually CeBIT is probably twice the size of all those combined. 90% is computers, cell phones and things like that. Only 10% is digital imaging.

Since FLAAR has an office in Germany we attend CeBIT every year. However in 2002 rumors stated that inkjet media would no longer be accepted for exhibit at CeBIT. Hence in 2002 FLAAR editors skipped CeBit 2002 and attended IPEX in England instead.

RIPs (Raster Image Processor PostScript software)

For a description of what a RIP is and why you might need this software, just ask for the FLAAR Report entitled *RIP+Help* (help for first time users).

Shiraz is one of many successful RIPs developed in England. Applied Image Technology, Ltd. is the parent company. Shiraz works on both Mac and PC, can handle six colors, and otherwise can do much more than any EFI Fiery RIP. Shiraz is one of the few RIPs that are available for 24” printers such as the Encad Chroma 24 or the older 36” HP DesignJet printers such as the 450C and 750C. Unfortunately they don’t yet have a distributor in the USA, which means no telephone support.



BEST color management RIP was clearly the #1 RIP at CeBIT, especially noticeable at the Epson booth. BEST is the fastest growing RIP company in the world. It has already taken over Europe and is popular in the USA as well. BEST has the largest American office of any European RIP company (BEST is German). Contact Richard Dannenberg, rd@bestcolor.com. BEST is also private labeled by other companies under their own brand. I believe DuPont is one such version.

Image Technologies, the company that makes Wisp, now has their "Trafik Business RIP." It's virtually impossible to figure out which RIP is better than others (except for EFI, which is close to hopeless). Thus FLAAR will be initiating an evaluation center for RIP software later this year.

All kinds of companies are now producing RIPs for large format printers. SCP Software GmbH and everyone and his uncle. One product is called "Jack the RIP," probably not very amusing to any of the victims of Jack the Ripper.

PosterShop is still reportedly the #1 selling RIP in the world but is aging. No particular booth; no particular fanfare. Wasatch, the #2 RIP, was not present, or at least not visible, at CeBIT. It's mainly the newer more agile companies which are producing good products.

PosterJet has always been one of our favorites but it was not until after CeBIT that PosterShop opened an office in the USA. This means you can now get tech support in America. PosterJet is the RIP which FLAAR uses at both universities. Contact is PosterJetUSA@aol.com. If you are in Canada contact is via www.dwiinc.com.

ColorGate has undergone some restructuring in Germany but they assured me they are on target. This is one of the four European RIP companies with an office in the USA.

EFI is abandoning hardware RIPs. Actually their home page has virtually nothing on large format printer RIPs any more. Too many people now realize that hardware RIP is mainly air inside the computer case. FLAAR has been in the forefront of informing end users that software RIPs in most cases are better than any hardware RIP.

The new software RIP from EFI, Fiery Spark Software RIP, however, is an exception. EFI has a rigid policy of dead-end upgrade path. Zilch. Furthermore, most EFI RIPs will not handle any other printer besides the one they are tethered to. Kind of ridiculous when virtually all other RIPs (which usually cost less than EFI), can handle dozens of different printers. Indeed many other software RIPs can handle several printers simultaneously. Not so with EFI's RIPs as of last year. Makes it kind of tough for a reviewer to recommend a product that has this policy. If the new EFI version adds the missing features we will be glad to report this improvement.

But at least the newer EFI RIPs can hopefully do a few rudimentary things like tile (which earlier versions were incapable of). Of course everyone who bought an earlier version is stuck, because they can't upgrade. That's right, you have to pay another X-thousand dollars for an entire new RIP (which of course probably won't run your old printer anyway if the RIP is from EFI).

EFI makes its fortune in color controllers for copiers and laser machines, so they don't seem to worry about the large format market. Sure is nice that the competition, such as every other RIP company, offers better choices.

We have two older EFI RIPs so learned the hard way. Now we prefer BEST for color management, PosterJet for production speed, but we are now beginning to experiment with the other good RIPs such as Wasatch.

Inks

The DicoJet ink booth had an interesting system called the Perfect Ink Link. This is a universal refillable system. The ad states that it is for all conventional large format printers on the market. If this were made with German precision it would be worth trying out. This is the sort of clever gadget that FLAAR looks forward to testing. For info e-mail info@dicojet.com.

Several ink companies had their booths at CeBIT though clearly the most successful were the two booths of Lyson. This impressive presence suggests that Lyson is a rather successful ink company. Lyson offers a variety of solvent inks for grand format printers such as Nur, Salsa, and Vutek. Telephone Lyson USA, (847) 690-1060, fax (847) 690-1067, e-mail sales@lysonusa.com. Now Lyson has partnered with a company that adapts the Roland printer for allowing a Roland to use solvent inks.



Lyson Textile Inks

Media

Media is the material that is coated with an inkjet receptor layer. Most inkjet printers require the material to be so coated. Some uncoated fine art papers, and for proofing, uncoated newsprint, can be used by a few printers.

Most people complain about the high cost of the media sold by the printer manufacturers and quickly go for low-bid media. What they don't realize is that you can't simply feed anything into the printers. Some piezo printers take only media for piezo printheads. Some thermal printhead machines take only media for that kind of technology, and so on.

But the fact that usually comes as a surprise is that the quality of the output is conditioned by the ink plus media combination. Some inks on some media in some printers simply looks better than the identical ink on other media in another printer.

You can take the identical image, in the identical printer, with the same ink, and the colors will be different depending on what media you use.

Now you know why it's best to stick with the media which has been tested on your printer. That's because your printer has software already built in that knows the intimate chemistry of the inks and media. If you do use an aftermarket ink or someone else's media, then you need to use ICC color profiles to assist your color management.

All this said, in many cases, especially for mass production of signs, posters, or banners, then after-market media may be perfectly okay. Also, sometimes media from another company is simply better. Kodak's EI media is considered tops for using with dye-based inks on the HP 5000 and ColorSpan printers, for example. There is a Rexam backlit media which frequently gets high marks from sign shops.

About a dozen media companies exhibited at CeBIT. It's very expensive to test media since it takes lots of ink. Evaluating media is labor intensive as well. So we won't begin testing media until we have set up our new facility later this year.

We offer more general information in the FLAAR reports on inks and media. There is one for fine art and photo-realistic printing; another report on inkjet printing of signs.

Large Format Printers from Gretag

At 54" the Bellise is wider than any Epson but not as wide as the 62" Mutoh or the newer 62" Roland. At previous trade shows the output from the Bellise "Digital Picture Press" never impressed me. At CeBIT the prints were actually rather nice. I did not detect any banding. Possibly this is because they had the printer set at 720 dpi? Perhaps at other trade shows they attempted to show the speed, which requires settings of 360 dpi, which tend to result in less attractive prints.



Bellise printer

The brochures for the Bellise, however, make claims for piezo printheads and statements in contrast to thermal printheads that are not substantiated in real life. The brochure claims that piezo printheads are permanent. That is not the fact in many piezo printers of other brands, and so on. FLAAR has prepared an entire report on myths such as this, *Piezo vs Thermal, fact vs fiction, pros and cons of each printhead technology*.

The speed claims look rather strained and were obviously written by someone who had never seen the new ColorSpan Mach 12. The Bellise uses the same Epson printheads as the Epson 9000 which is one of the slower printers on the market. In most cases the output from Epson piezo printheads at draft speeds are of pathetic appearance. People who have seen draft prints from any Epson printhead at 360 dpi (such as from Mimaki or even Roland) consider them as throw-aways, too ugly to sell. It is possible that Gretag, a giant Swiss company, has the engineering capability to get these poky printheads to move less slowly. But to document this it will be useful to have an actual in-house evaluation.

At 720 dpi most piezo printers slow to a crawl, but you only get the acceptable quality at this slow pace. Whoever wrote the Bellise ad seemed unaware of all the new thermal printhead systems that use double CMYK such as the Encad NovaJet 850 or the newer Graphtec printer. And the fastest printer at CeBIT was clearly a thermal technology, not any piezo machine.

The Bellise accepts only dye-based inks. If you ever need to use pigmented inks you have to buy the Bellise Plus (which does not accept other kinds of ink). So it's one, or the other.

The ad neglects to mention that with thermal based printhead systems you can switch back and forth between dye and pigmented inks.

Summary: Bellise is a more sophisticated housing for the piezo printheads. Otherwise the printheads themselves are somewhat similar to those in most Epson 9000 or Mutoh printers of that early generation. Only the more sophisticated design of the mechanism, the structure of the printer, might make the Bellise last longer. Over the course of this year we will track down end-users who actually own this printer and try to get a broader perspective. Gretag has put considerable know-how into this printer so surely it can do various tasks better than cheaper printers.

The Bellise may be a perfectly acceptable printer, it's just that the ad writer got over-enthusiastic and made too many claims that verge on bait-and-switch. FLAAR judges advertising claims in order to assist the end-user make a choice based on fairness, honesty, and valid product comparisons. Indeed it is as important for the consumer to be aware of potentially misleading ads as it is for a consumer to be aware of quirks, foibles, and glitches of a printer. In the case of the Bellise the basic printer is okay, which makes the advertising claims all the more unnecessary.

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The same Gretag company also produces the Carolina textile press and the RasterGraphics Arizona "digital screen press." The Arizona is our favorite solvent ink printer. The quality of the output from the Arizona is considerably better than the Mutoh Albatross (Mutoh Tomahawk). The Arizona is faster and superior quality to the Gerber Orion as well. So if you need a solvent-based ink printer for under \$150,000, then we highly recommend the Arizona. No exaggerated ad claims needed for this printer, it can survive on its inherent merits.



Carolina Textile Press

In 2002 Gretag was sold to Océ.

FLAAR has an "actual-factual end-user report on the Arizona." Just ask for it; no cost, but please fill in the Inquiry Form and indicate what kind of solvent ink printing you do, or intend to do.

MacDermid ColorSpan

ColorSpan continues to flourish under the new MacDermid management. Two years ago ColorSpan was owned by a venture capital company (usually nicknamed Vulture Capitalists). They reportedly had interest in cash flow at the expense of customer support or technical assistance. We received countless complaints from owners who felt abandoned by the company.

Then MacDermid graphics bought ColorSpan. Today you get a free 2-day training course at company headquarters. There is ample technical help. I have personally witnessed the degree to which ColorSpan has worked hard at assisting customers.

ColorSpan still offers its venerable DisplayMaker XII and the newer Esprit. The eight color Esprit is a very tempting price for such an eight color machine. Both produce impressive output at a production speed. If you like the Encad 750 or 850 then the ColorSpan is even faster. On the DisplayMaker XII or the Esprit upgraded to 12-ink version you can use triple CMYK. The quality of even the previous generation HP printheads is better than the output of the newest generation of Lexmark heads used by Encad.

At CeBIT ColorSpan unleashed their new Mach 12 printer. This upgrades the printheads to those used by Hewlett-Packard on its DesignJet 5000. But on the ColorSpan you can use double parallel sets of six, or triple CMYK at a quality superior to that of an Encad.

The Mach 12 was a fully functioning working model, so its past beta tests stage. Additional improvements are being worked on, in order to get rid of horizontal banding defects. Yet we can definitely report it was popular, indeed the organizers of the German trade show themselves evidently bought about four of them. No German would buy a printer unless the mechanical, technical and visual quality features were top notch.

The Mach 12 is designed from scratch for ease of maintenance, since it's a high-tech machine that requires daily cleaning and calibration. Now this is even easier to do than on earlier models.

Now, summer 2002, the Mach 12 has improved to the point that FLAAR acquired one. The quality is noticeably better than the DisplayMaker XII (Mach 12 is less grainy). We have not seen any banding defects with the Mach 12. I suspect that high humidity and trying to run at the faster speeds will result in the problems with banding.



ColorSpan Mach 12 printer

Keep in mind that speed claims tend to forget to mention that quality goes down as speed goes up. Speed claims also tend to ignore the many self-cleaning cycles that a printer may engage in before it even thinks of printing the first line.

Hewlett-Packard DesignJet Printers

The HP booth at CeBIT was a thousand times nicer than at either PMA or at Graphics of the Americas. The primary reason was the better selection of images. This was entirely due to the RIP companies who were allowed to use space within the HP booth. This does not happen in the USA.

ColorGate, PosterJet, BEST, Shiraz, and several other RIP companies were all in a row in the HP booth at CeBIT.

Since the HP DesignJet printers are so well known there is not much new to say about them. Everyone has seen the great quality. Seldom do you get the banding that plagues printers with piezo technology. The HP DesignJet 5000ps is faster than any of the Epson, Mutoh, Mimaki, or Roland printers. The UV pigmented inks seem to be readily available by now. Lots of new improved media is available for these HP pigmented inks.

The HP 5000ps printer was the most popular printer throughout CeBIT. More other companies were using HP printers than of any other printer manufacturer.

Saw lots of HP model 1055 printers for CAD. BEST was using one upstairs in their private display suite in Hall 7, to show off proofing of offset printing patterns on newsprint. The HP 1050 and 1055 can both print on raw newsprint, so are ideal for proofing newspapers. FLAAR has the HP DesignJet 1055 printer. The architects and students on campus love it. It's great for graphic designers who like to do their images on artsy paper such as raw Kraft paper. Downside is that this model is prone to banding defects.

Mutoh

In the USA Mutoh does not really sell direct. Mutoh instead is sold by Accuplot, Agfa, Kodak, Improved Technologies, and by sign companies. In Europe Mutoh sells direct under the model name of Falcon. Evidently this is a popular printer in Europe.

The Mutoh solvent ink printer has not fared well. The new European law that prohibits solvent ink printers without air filters is especially tough on printers such as the Mutoh Albatross. To show it at CeBIT Mutoh was required to build a fancy and probably outrageously costly air filter.

None of that helped improve the lackluster quality of the output. But at least this printer is faster than the Gerber Orion, and a bit less banding and splotchy appearance as well. But if you want a good solvent ink printer you need the Gretag RasterGraphics Arizona "Digital Screen Press."

Fortunately the other Mutoh printers use normal inks; not solvent inks. These regular Mutoh printers are similar to an Epson 9000 but more robust. They are good enough to produce fine art giclee quality. Indeed Improved Technologies prefers the I-Jet version of the Mutoh over the Roland. For information contact iris@itnh.com



Mutoh with Solvent-based Inks

Printers from the camera or photography companies

Canon's printer is evidently finally available for sale. The BJ-W9000 has been shown at countless trade shows. So far PosterJet is one of the few RIPs that can run this printer. BEST can run the Canon 8500 so surely will soon handle the larger model. The Canon printer has been discussed in earlier FLAAR trade show reports. The quality is very nice but no pigmented inks can (so far) get through their bubble jet printheads.

Konica displayed their printer, as they have at DRUPA and Photokina. Difference is that it finally has a name, Iguazu 1044SD. Evidently still not for sale, as happened with the Canon printer for over a year. These companies are photography companies, not large format companies. It takes them a while to get organized in a new market.

The Konica printhead is stated to be made by Konica, however the basic ingredients are most likely from Xaar. The image had a distinct banding pattern, as so typical of Xaar piezo heads and also of Epson piezo heads when they are dirty.



Konica Iguazu printer

The Konica printer offers 8 colors but is not specifically marketed for fine art. Konica presumes that companies who have other Konica equipment will therefore automatically also buy Konica large format printers.

Unfortunately this Konica printer was never able to go into production for sales in the USA. At Print '01 Konica was using an HP 5000 in their Konica booth.

Unless of course they read the FLAAR reports.

Besides, Canon presumes that companies who already have Canon copiers will instinctively buy a Canon large format. Yet their large format can't accept pigmented inks.

Kodak, Oce, Ilford, and HP also hope that companies will buy their printers automatically, just because of the name brand. Yet Kodak, Oce, and Ilford have a meager 4% request rate in the e-mails arriving at FLAAR. That means 96% of the people who want to buy a large format printer ask about Epson, Encad, HP, virtually anything but Oce or Ilford. Oce, Ilford, and Kodak sell perfectly good printers but they are bland.

Obviously buying by name brand is not the way to select a large format printer. You should buy a solution to your needs, and then see who offers that solution. That's why the FLAAR reports are so helpful for people to reach an informed decision.

Kodak had a booth but since these are just rebranded Mutoh and rebranded Encad printers there was nothing exciting to look at. At least Kodak has nice media, their EI brand.

Ilford had a nice booth. They showed their media on the Hewlett-Packard printer. Otherwise, Ilford, especially in the USA, sells primarily their rebranded version of the Encad printers. The advantage if buying from Ilford and not from Encad is that Encad is interested in the sign market (not photo-realistic museum quality). Ilford in distinction, is into photographic quality, including black and white.

If I were a photographer, however, the Epson, Mutoh, Mimaki or even the HP 5000 would be a better selection for photo quality than an Encad. Ilford also sells the ColorSpan.

Agfa sells the identical Mutoh printers as does Kodak. Agfa adds, however, a 72" model (from ColorSpan) and a 24-inch model which is the Epson 7000 merely with an Agfa label taped onto it. RIP is the standard PosterShop. Thus there is not really much innovation other than perhaps a bit of Agfa ColorTune software. So if everything else in your print shop already has ColorTune you are okay. Otherwise, no particular need to opt for Agfa. In terms of media, it is probable that Kodak and Ilford make some of their own. As a result Kodak has an excellent media; Ilford has great media and inks known for their longevity. I don't know the story of Agfa media or inks.

Today (summer 2002, and actually for some time now), Agfa no longer sells ColorSpan printers.

Section summary: the photography companies such as Fuji, Kodak, Konica, Ilford, held onto their film-based systems too long. By the time digital printing had overtaken the marketplace the photo companies were still too conservative and traditional to understand digital printing. They had none of their own digital technology, so they just had to relabel what the more agile non-photographic digital companies had already developed. The main innovation in large format printing is Epson piezo printheads and Hewlett-Packard thermal printheads. Canon is the only camera company who has its own printhead technology but this company is seemingly too large and inflexible to move fast enough to capitalize on this advantage.

So, if you wish to print your photos, you are better off with an Epson, Mutoh, Roland, HP, or ColorSpan, with pigmented inks. If you need your photo to last only for a trade show, then all of these with dye based inks as well as Canon. If you need to mass-produce your photos, then piezo printheads are too slow. That leaves HP, Canon, and ColorSpan. Encad is okay for signs but is not really fully photo-realistic (too much grainy dot structure).

Printers for Textiles

I did not notice a FabriJet at the ColorSpan booth nor an Encad textile printer at their booth. Mimaki was not really present other than at the DicoJet ink booth. Thus the only two textile printers that I noticed at CeBIT was one by ColorWings and the Carolina textile press by Gretag. Both produce acceptable output. Downside of ColorWings is that they don't have an office in the USA. Gretag, in distinction, is worldwide.

If you wish to print textiles, you need the FLAAR Report which mentions the other printers such as from Stork and so on. Our all time favorite textile printer for sheer quality is the FabriJet by ColorSpan.

FLAAR will be installing a textile printer evaluation facility within our larger digital imaging center at a state university later this year. At that time we can test some of these printers in-situ and update our reports. In the meantime, the FLAAR Report on "Large Format Inkjet Printers for Textiles" is available. Just let us know whether you wish direct printing or via dye sublimation heat transfer (there are two separate reports).

3P Inkjet Textiles had a large and popular exhibit. 3P is a leading source of fabrics for inkjet printing. You can get more information via ThomasPoetz@3P-Inktextiles.com

Printers for Signs

Encad presented a new model, the NovaJet 750. Has eight ink lines but only four printheads. Thus you can keep four dye-based and four pigmented inks on line at all times. Just switch heads. A clever idea but of course nowhere near as clever and convenient as having 8 heads. With the NovaJet 850 you can have four dye and four pigmented and print either automatically. Or you can use dual parallel CMYK for more speed, or use six to eight colors for better appearance. Thus the 750 is definitely better than the model 700, but the 850 is better still. It is probable that the media-feed mechanism glitch that is reported for some early production models of the 850 has surely long ago been fixed.

If you get this or comparable models, be sure it does not have a skewing problem (misalignment of the media).

Encad also re-introduced their 3D CAD printer. We are so content with our HP DesignJet 1055cm for CAD that so far have not been in need to check out any other solutions, especially since the newer HP DesignJet 800ps should arrive any day now.



Encad NovaJet 750

Graphtec showed their new cutter-plotter. Has eight printheads but evidently only accepts double CMYK (not 8 inks like the Encad NovaJet 850). A major difference between the new Graphtec and the older model is that Graphtec stopped using Encad-Lexmark heads and now uses the Hewlett-Packard heads from the HP 2000 series printers. These are good for signs and hold up well. Less problem with clogging than the earlier Encad heads. The Graphtec also licenses the media feeding rollers from Hewlett-Packard. The printers, however, are not listed as otherwise being affiliated with HP in any manner.



Graphtec cutter-plotter

The Graphtec comes in two widths. I got the impression the printer could accept textiles and even material that was thicker than normal media. Overall this clever printer includes countless improvements. Think of it as an HP 2000 with all the accessories, options, and upgrades that any clever designer would have added to the HP 2000 to make it do more things for more people than the original model. Overall the new Graphtec system is such a definitely improvement over their own earlier version of the NovaCut that I award Graphtec the "best new model upgrade over an earlier model." The earlier Graphtec models that I saw at SGIA (Nov. 2000) looked clumsy and had pathetic 300 dpi with antiquated Encad-Lexmark printheads of the oldest generation.

The new Graphtec printer is definitely one that FLAAR would be interested in testing further in the comfort of our own facility.

Printers using Oil-Based Inks

Oil-based inks don't have the aggressive solvent chemical smell but do have a few other disadvantages such as ink-bleed through. The oil simply seeps through the media. Some earlier oil-based media was tough to laminate as well, in part because the oil was never fully dry.

Xerox Engineering Systems (XES)

Has largely overcome most of the weak points of an oil-based large format printing system. The weak points were painfully visible in their older model, the XES Xpress. The newer model, the ColorGrafX X2 is decidedly improved. Indeed the Xerox ColorGrafX wins the FLAAR Award for "most improvement from one model generation to the next." In other words, the newer model overcomes the foibles of the prior model.

The new model is fast. The output at draft speed is usable, not throw-away. This aspect is a rarity. Most draft "speed" is pure bait-and-switch because the brochures tout that speed but once you buy such a printer you quickly find out that the output is too lousy to actually use. Of course draft output is precisely that, draft. It's not photo-realistic. But for signs that are hung high, such as banners, or billboards, then the draft output from the XES ColorgrafX X2 is useable.



Any output from any oil-based ink from any Xaar-based piezo printhead, however, is not completely photo-realistic. The images are clouded, sort of out of focus. If you compare with a print from a Roland, Epson 10000, ColorSpan, Encad, Graphtec, or Hewlett-Packard, you see the difference. The dot size from any speedy printer will be large. Of course on a banner no one ever sees the dots. No brochure ever reveals that printheads are actually used but other sources suggested it may be the XJ 128.

The prints were dry to the touch directly from the printer. We rubbed the prints and noted no smear.

The list price that was indicated was the highest cost for any printer of its size that I have ever heard of. Perhaps the price in Europe is more than the price in the USA. We will check this out. But if you can buy two Encad or HP printers that are 60" wide for the price of a single oil-based printer, then the speed advantage of the oil-based printer becomes less. I can't imagine anyone who has access to knowledge of the price and performance of other printers would accept the high list price of the Xerox printers. The price of the RIPs for XES printers is especially out of line, much much more highly priced than essentially the identical RIP for other printers. A RIP should cost the same no matter what printer you use it with. You don't pay more for Adobe Photoshop when you use it with a Macintosh. But if you don't mind the high price, go for it.



Seiko IP-4010 printer

However no Encad or HP offers six months outdoors with no lamination, a definitely advantage of the Xerox oil-based concept. Of course solvent inks could provide three years outdoors on vinyl.

Due to the improvements over the earlier model we will keep track of this new XES printer. This is the sort of printer we would enjoy evaluating in detail, since it's an unusual technology. Hints in the literature suggest the print engine is from Olympus.

Seiko Instruments Infotech Inc showed off its oil-based printer, the IP-4500 (54 inch) and IP-4010 (36 inch). The images looked a bit better than those shown from the prototype at DRUPA trade show (May 2000).

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The Seiko claims, "highest speed in the world in class." Of course every printer claims this. The only other printer in its class (Xaar heads, oil-based inks) is the ColorgrafX X2 from XES.

The output of the Seiko is only useable at distances, for signs or banners that are not viewed close-up. Thus the ad claims "super high image quality" are to be taken with a grain of salt. The image quality shown at SGIA (Nov. 2000) was poor. They showed it as sort of wallpaper and it was embarrassingly weak in detail, focus and had a thick heavy visible ink dot structure.

Seiko should focus on what it's printer does well: it's not as slow as other printers, it's a new product with new technology, the output looks okay at the viewing distance of a banner or far-away sign. And their trump card, the printer can potentially be outfitted for solvent-based inks. As soon as this is feasible we will report that on our web sites.

We do not know if Olympus is also involved with the engine and/or ink inside the Seiko printer.

Other Printers

Roland showed their same usual printers. Some of the output looked very nice. No banding. I did, however, notice horizontal banding on the output of one of their models. Not much had changed since last year at the same booth but now they did show the new 62" model.

PlotDesign is evidently the company that makes the upgrade of a Roland printer to a solvent ink machine, the "Solvent Jet." This uses LOD inks from Lyson. Since solvent ink on vinyl are intended for outdoors signage the perennial banding tracks that typify the Roland are not visually disturbing. After all, you are unlikely to use solvent inks for a museum exhibit. Solvent ink prints do best in the outdoors where there is plenty of fresh air anyway.

We have been told that some solvent inks may dissolve the glue that holds an Epson printhead together. Also be aware that some of these after-market retrofitted solvent ink printers may require expensive coated media for full quality. We will check on all this and put updates in the FLAAR report on solvent ink printers.

Epson presented two models, Stylus Pro 10000 for dye based inks and Stylus Pro 10000CF for pigmented inks. No switching back and forth available. You get one, or the other, period. The quality looked really great, especially since Epson cleverly used absolutely stunning photographs. This is where they beat HP every time. It's not always that the print quality is higher, but it's often in the original image. Epson selected images with perfect focusing. This way you can see that the printer reproduces the flawless focusing also tack-sharp. Most other printer manufacturers use miscellaneous stock photos which are often lousy scans, filled with hair, dust, defects, and excessive grain from scanning into the grain.



Epson Stylus Pro 10000

Main downside that many people noticed was the banding on the new Epson printer. Indeed I was told about this rather quickly. Horizontal banding, same problem as on so many Roland printers. Cause is evidently a dirty piezo printhead. But evidently this is an endemic situation with piezo printheads and less likely with a thermal printhead.

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Most people presumed Epson would label the new printer as 2880 dpi, but perhaps there was rational awareness of possible backlash about such a claim, since after all, the printheads are only 720 dpi. So they stuck with calling it 1440 dpi. One person said Epson counts diagonally to get this fictitious designation. Agfa is the only print company that lists the true dpi, namely 720 x 720 (on the earlier generation of Epson printheads).

The most popular RIP at the Epson booth was clearly BEST color management RIP. EFI is still partnered with Epson but downsized to a software RIP. As long as the EFI Fiery RIP offers a zero upgrade path and is dedicated to being incompatible with all other printers there is not much rational reason for buying such a dead-end RIP. All other RIPs offer more options, a clear upgrade path, and usually cost less than EFI on top of all those benefits.

The Epson 10000 looked ready to go, as in comparison to the launch of the 7500 and 9500 at DRUPA last year in May, when those models were still only prototypes. Epson has learned it does not pay to show unfinished printers to the public, especially not to inquisitive journalists. The new Epson looks mature. You just have to decide whether the slowness is a problem. Don't forget, virtually no one actually uses the "1440" dpi setting. Simply too slow (even today when the wide path printheads are 30% less slow).

Hopefully most users will not be so naïve as to believe the "200 year archival" claim. Even Epson admits that the media itself won't necessarily hold up that long, even if the ink does. You have to shield the print with glass and keep it in a semi-darkened room. So if you display your prints on the wall in a normal room with sunlight, don't expect to get 200 years longevity. Besides, mounting a print behind glass can cost \$100, or much more, per image.

Epson, the company, definitely deserves recognition for pushing to the limits of technology. They really do work hard to get the absolute top quality. The degree to which this new Epson 10000 cannibalizes sales of Mutoh and Roland remain to be seen. Those printers (so far) use only the older Epson heads.

It will also be interesting to see how Canon and HP can catch up with dpi and variable size droplets. The photo and fine art market are large, and growing. Every individual photo studio, even every individual photographer, and every art gallery and even hobby painters and weekend photographer is a potential buyer of a large format printer. This market is larger than all sign shops and corporate in-house graphics departments put together. Both Canon and HP lack 24" models with pigmented inks. Only Epson has been clever enough to recognize that a 24" model brings buyers to your line of printers at the entry level. In the meantime, we are quite content with our HP 5000ps, all 60" of it. We find this a trusty printer for photo-realistic photographs as well as museum quality fine art reproductions for limited editions.

Relics

Most printer companies upgrade their technology every two years. Epson actually upgrades its technology every 10 months (Epson 9500 was introduced at DRUPA in May 2000; the Epson 10000 was introduced at CeBIT in March 2001). But Fuji has clung to its original printer model year after year.

The FujiFilm CPP-54 is the old Brady printer. Four colors, a mere 320 dpi. Heavy dot structure, worse than an old 300 dpi Encad. Yet the color is okay and people that own them report it is a reliable printer. I have spoken with two people that actually use them. They say that for signs that are viewed at a distance the output is okay.



Fuji Hunt Brady printer

The brochure, however, lists trade show graphics, window displays, retail signs, POP, and special-event displays as their target markets. Here I would disagree; 320 dpi is simply not adequate. You would be better off with any Encad. Even my old Encad Nova JetPro 36" produces better output for signs. Any newer 600 dpi Encad and especially the better quality HP DesignJet 5000 would be considerably better for signs or posters.

For banners, or any signs up and far away, then the Fuji would be okay. So if you find one at a super low price (and I mean really cheap) if you don't have a nearby competing sign shop that has a better printer, then try out the Fuji. But why buy a technology that is years old and will unlikely ever be upgraded?

But people who already have them praise the few things that this printer can accomplish, so we will no longer award it the "worst in show award." FLAAR editors listen carefully to end-users.

But just as we follow the suggestions of actual sign printers, we also have to judge the advertising claims. The Fuji brochure claims "superior print quality." We come from a background of professional photography and it's admittedly tough to accept splotchy, grainy output as even remotely close to the word "quality." The brochure claims this printer represents "technological advances." That is simply not so, especially not in the year 1999 and even less in 2001. Even the person at the DRUPA booth admitted the printer was past its prime and ought to have been retired years ago.

CAD Printers

The complete range of CAD printers were shown at CeBIT from the old-fashioned ones to the latest inkjet printers. Encad had a re-release of one of their CAD printers the 3D. The smaller of the two models of the XES printer is outfitted with software to handle drawings but images from a Xaar printhead with oil-based inks simply is not as crisp as output from an Oce, Encad, or HP. Since FLAAR has a separate report on printers for CAD and GIS and as there is not really much advance in CAD printer technology, if you are interested in a printer for CAD or GIS then check out our other report. In a nutshell, Encad, Oce, and Canon all produce acceptable output for CAD. The HP DesignJet 500ps and 800ps are the top quality in this market.

Scanners

Wide format scanners were everywhere. Vidar and Contex are the two most popular brands. FLAAR will be expanding our reports to cover wide format scanners later this year.

Well Deserved Awards

"Best improvement of a new model over the earlier model of the previous generation" (three printers won this distinction). The Xerox Engineering Systems ColorgrafX X2 is better than its predecessor, the XES Xpress. The new Graphtec cutter-plotter with 600 dpi HP printheads is a noticeable improvement over the previous Graphtec cutter-plotter with 300 dpi Encad printheads. The new Canon BJ-W9000 is better quality in all respects than the earlier Canon BJ-W7000.

"Best potential of any prototype showed at CeBIT" The ColorSpan Mach 12 was an advanced prototype, a fully functioning version. But the software and other features are still being perfected. Thus we cannot yet judge the final product. Nonetheless the potential is still impressive.



ColorSpan March 12

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“Most popular overall printer for multiple uses” The Hewlett-Packard DesignJet 5000ps was clearly the most popular large format printer at CeBIT. Even competitors admitted that HP had really made a superb printer. Now that UV inks are available, the printer is a run-away success, indeed the 60” model is so popular we have had to wait to get ours. It’s still on order. Hence we had to do all our testing at ColorDNA .

“Most Innovative Printer Features” The new Graphtec cutter-plotter has more innovative options than any other large format printer at the trade show. Thus Graphic deserves a recognition for innovation in printer design.

“Most Unexpected Technological Combination” Lyson inks has cleverly promoted the adaptation of the Roland HiFi as a solvent ink printer. Your local Roland dealer just adds the heater and associated attachments, and voila, you have a solvent ink printer. No other solvent ink printer can match the quality of the Epson printheads that are used in this Roland printer.

“Highest Quality of any Printer” was easily won by the new Epson 10000, however with a notable caveat, namely the pronounced banding that people noticed. The person at the stand said that the dust from the rug at CeBIT caused clogging of the heads which induced the banding blemishes. This is the same problem which plagues earlier Epson heads, especially on the Roland.

“Fastest Printer of its Class” Almost every printer claims to be the fastest. But so far, the new ColorSpan Mach 12 would seem the most likely candidate for the fastest thermal printhead system yet designed. Of course it is light years faster than any piezo system with Epson printheads. Although some grand format printers are fast, their quality is not in the league with that of the ColorSpan, nor are these two classes of printers related in other aspects either. Both need to be judged independently. It would be interesting to compare the speed of a ColorSpan with a XES ColorgrafX X2. For further information on the ColorSpan, contact productinfo@colorspan.com.

“Best solvent ink printer” that we saw was the Gretag RasterGraphics Arizona “Digital Screen Press.” However now that solvent inks work in the Roland, the Arizona has competition. Positive aspect of the Arizona, however, is that it’s completely enclosed and hence its air purification aspect meets the newest European laws which ban open solvent ink printers (even at trade shows).

“Most Honest Advertising” goes to Agfa. Although they use the identical Epson printhead that is in the Mutoh, Roland, and Epson 9000, Agfa refuses to claim 1440 dpi. After all, the print head is only 720 dpi. Thus Agfa deserves the award for most honest statement in a product brochure.

Epson actually deserves an honorable mention, namely resisting claiming their new model 10000 was “2880 dpi” as everyone expected. It’s still 720 native dpi, pumped up to “1440” by counting diagonally (a clever trick). Otherwise Epson deserves the perennial award for most potentially misleading bait and switch for speed claims and 200 year longevity claims. But I will admit, it was a noble gesture to resist temptation not to claim 2880 dpi.

“Most Common Misleading Ad Claims and Hype” the three claims that are consistently either misleading, bait and switch, or outright untrue are “archival inks,” “super quality,” or “photo realistic” or “fastest printer.”

There is no such thing as an archival ink. That would imply that the inks last over 500 years. Even claims of 200 years are unrealistic. If you see such a claim, check the small print.

The only printers that are acceptable for photo realistic are Encad (barely and only the model 850 and only at maximum passes), Mutoh (and all variants such as Kodak, I-Jet, Accuplot, Agfa), Mimaki, Epson, Hewlett-Packard 5000ps, the newest Graphtec, Roland, and naturally ColorSpan. No printer with solvent inks, no printer with oil-based inks is yet fully photo-realistic. The Gretag Arizona perhaps comes the closest for a solvent ink printer.

This means that countless other printers which claim “super high quality” are simply not true if you compare them to dozens of other printers which are notably superior.

In terms of speed, Encad but only at double CMYK, ColorSpan, Graphtec, and HP (60 inch model) are the only models that are relatively fast. All are thermal printheads. Grand format printers are fast but are not intended for photo-realistic quality. If a printer has Epson piezo heads it's by definition slow. This means Roland, Mutoh, and Mimaki. The 8 color Roland escapes the doldrums by using double CMYK at 540 dpi. It's hardly speedy even then, but it's bearable. Print quality is no longer photo-realistic but its okay for signs viewed at a distance.

Notable Trends

There were no thermal transfer (resin or wax) printers to judge at CeBIT. They were all at ISA trade show. Not much new technology in thermal transfer systems.

There were no UV curable systems other than that of FIRST, a French system that can only handle 36" widths and uses very expensive media. UV curable systems, however, are clearly the wave of the future.

Encad decided not to bring any solvent ink printer to market. Of course the cost of such a printer is a tough challenge for a printer company which is short on cash. Thus the “Sheffield” prototype that we heard about last year has been shelved. One of several reasons (other than cost and technology aspects) was the new European requirement that solvent ink printers be either completely enclosed or thoroughly vented. That is a cost factor which makes a sub-\$40K printer unrealistic. Evidently even Encad was unable to get the cost down to \$30K even without an air system.



Encad has also evidently decided not to bring their fine art printer to market. This is not really territory for a printer with Lexmark heads that is okay for CAD and signs. This was a wise decision since the fine art market requires competing against the new Epson 10000 as well as the current and future generations of Roland, Mutoh, and Hewlett-Packard.

The two trends that are notable are flatbed inkjet printers for thick and rigid material and UV curable ink printers. If Encad can bring either of these printers to market before Graphtec or Gerber then it will do quite well.

Encad is our favorite printer company since they were the first manufacturer who provided FLAAR a printer for evaluation, way back in 1997. Our evaluation of that venerable NovaJetPro 36" printer was actually the foundation of the entire program of the Digital Imaging Technology Center. The printer is still parked in our facility. Unfortunately the Lexmark heads have simply stalled and not progressed adequately in comparison to printheads from Epson, Hewlett-Packard, or Canon. Nonetheless, for basic signs, the Encad is a workhorse used around the world. Their dual ink-line system is very clever as is their 8-color printer that can be used at double parallel CMYK. This feature has been popular with Roland printers as well. Since Encad started the entire color large format inkjet world we wish them luck.

Conclusions

Every printer has at least one or two redeeming features. Each printer, even models with defects, can do one or two things quite well. Thus every printer is worthy of your consideration.

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The corollary is also true: even the best of printers are not perfect. And, there is no one single printer that will do everything you need.

Thus most print shops have two or more different printers. Larger commercial sign shops may have three to five different kinds of printers. FLAAR has one set of printers for CAD and another kind of printer for photos and fine art.

When you go through the headache of deciding what printer is best for your needs, be sure to ask other end users. Don't ask the printer manufacturer to suggest a place to ask. Instead go to a trade show and talk to end-users (not at the booth). Or just telephone people in your own area who already own various printers.

FLAAR does its best to track down information on as many printers as possible. But we come from a background in photography that demands top quality. For banners you may not need such photo-realism. Thus don't decide against any printer just because it does not win a FLAAR award for print quality. That printer may be just fine for your needs.

What is important is whether your clients like the output. This may also depend on what printers your competition have available.

Although we are proud that so many people base their decision on the FLAAR reports, in reality these should be only one of many sources of information for you. You want to find an actual sweat shop, people with ink on their hands. Ask them how their own printers handle the work at hand.

And when you get this class of information, we always welcome hearing from you so we can share it with other readers.

If you like the reports and appreciate this service, if you can tell other people about our web sites, that's a nice way to say "thank you" for the reports.

Follow up

We hope you enjoyed this report. We tried to send it to you quickly. You may notice that we have been going to a lot of trade shows and conferences in order to keep up with the latest hardware, software, and technology.

Eventually our staff and especially the students at both our universities will wish to follow-up with you. They are conducting surveys to check on the effectiveness of our educational programs. We are also working at nudging the printer manufacturers into producing printers that will better serve the needs of you, the end-user.

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 ink and media choices.

Advisory

We are quite content with the specific printers, RIPs, inks, and media we have in the two FLAAR facilities at the two universities. We would obviously never ask for a product that we knew in advance would not be good.

But we can't guarantee or certify any make or model because we don't know the conditions under which a printer might be utilized in someone else's facility. 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 or 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.

Just remember that every machine has quirks, even the ones we like. 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 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. In other cases it 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. 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.

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. If you pay low-bid price, you can't realistically expect special maintenance services later on. Indeed some low-bid internet sales sources may have no technical backup whatsoever.

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 Mimaki printers we would love to have (their flatbed, their textile printer).

We would definitely like to have a Gradco Mammoth (flatbed up to 3 inches). Would like to evaluate an Encad NovaJet 880 to print on thick material (up to half an inch if I remember correctly).

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If Roland were to come out with an 8 color version of Epson's 10000 printhead generation which offered 32 passes, wider than Epson's 44 inch limit and no banding that would be the ultimate fine art giclee printing factory. But since that printer does not exist, the art students on our campus use our HP DesignJet 5000. The art department does museum exhibits and wins awards with the output.

We are also interested in the Western Graphtec cutter-printer with eight heads (their new model as of year 2001).

So again the suggestion: be sure to ask around in other print shops, with IT people in other corporations, at your local university or community college. Go to tradeshow....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 reality into consideration, 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.

Acknowledgements

Fortunately the two universities cover most of the operating costs of FLAAR on their campus, so our budget is lean and cost effective as you would expect for a non-profit research institute. Thus we do not really have much incentive to pocket hush money from producers of lousy products nor special funding from companies who make the better products. We feel that the pros and cons of each product speak more than adequately for themselves. Just position the ad claims on the left: put the actual performance results on the right. The unscrupulous hype is fairly evident rather quickly.

Does not take any money to see which printers function as advertised and which don't. We saw one hyped printer grind to a halt, malfunction, or otherwise publically display its incapacibilities at several tradeshow in a row. At each of those same tradeshow another brand had over 30 of their printers in booths in virtually every hall, each one producing museum quality exhibits. Not our fault when we report what we see over and over and over again. One of our readers wrote us recently, "Nicholas, last month you recommended the as one of several possible printers for our needs; we bought this. It was the best capital expenditure we have made in the last several years. Just wanted to tell you how much we appreciate your evaluations...."

We thank BEST (RIPs), ColorDNA, ColorSpan, DWI Inc, Improved Technologies, Hewlett-Packard (May 2000 to May 2001), Parrot Digigraphic, Perfect-Proof (RIP), Scarab Graphics for providing funding to improve the design and appearance of the web sites of the FLAAR Information Network. We thank ColorSpan and HP for providing wide format printers to the two universities where FLAAR does research on wide format digital imaging. We thank Epson America for providing a printer to our facilities at Francisco Marroquin University and Parrot Digigraphic for providing a different model Epson to our facilities at BGSU.



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We thank 3P Inkjet Textiles, TAL, and HP for providing inkjet textiles so we could learn about the different results on the various textiles. 3P Inkjet Textiles, ColorSpan, Encad, HP, Nan Ya Pepa, Oracal, Tal and other companies have provided inkjet media so we can try it out and see how it works (or not as the case may be; several inkjet media failed miserably). We thank Aurelon, BEST, ColorGate, ColorSpan, HP, PerfectProof, PosterJet, Ilford, ScanvecAmiable, Wasatch and many other RIP companies for providing their hardware and software RIPs.

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

Some of the media provided to us failed miserably. Three printers failed to meet common sense usability and printability standards as well. One costly color management software package was judged "incapable" by two reviewers (one from the university; second was an outside user who had made the mistake of buying this package).

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

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

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

Yet we have documentation of several print shop companies whose business was ruined by specific brands that failed repeatedly. It is noteworthy that it is always the same two brands: one due to banding and printheads then simply no longer printing one color; the other brand due to pokiness of the printer simply not being competitively fast enough.

Grant funding, demonstration equipment, and training are supplied from all sides of the spectrum of printer equipment and software engineering companies. Thus, there is no incentive to favor one faction over another. Every printer, RIPs, inks, or media we have reviewed have good points in addition to weaknesses.

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

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

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

FLAAR also covers its costs of maintaining the immense system of 12 web sites in three languages and its two university facilities in part by serving as a consultant such as assisting inkjet manufacturers learn more about the pros and cons of their own printers as well as how to improve their next generation of printers. FLAAR also serves as consultants to Fortune 500 companies as well as smaller companies and individuals who seek help on which printers to consider when they need digital imaging hardware and software.



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