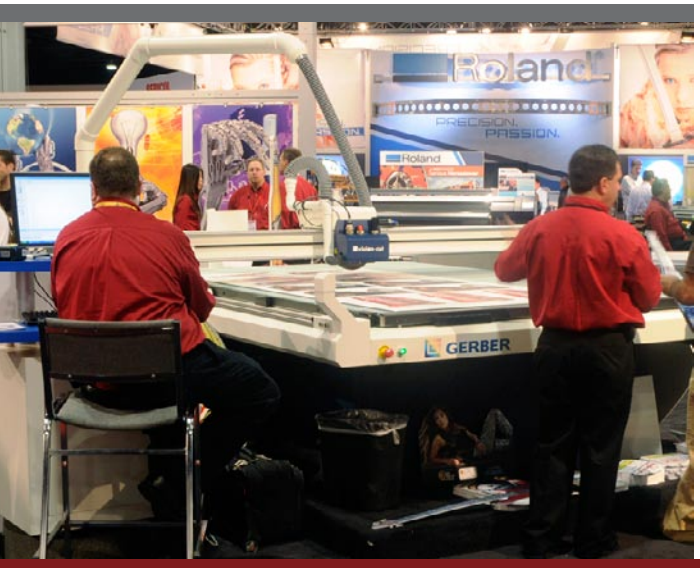
FLAAR Reports

November 2008

Flatbed Printing (UV-Cured)

& XY Flatbed Contour Cutting

Nicholas Hellmuth



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Introduction

Once you have a flatbed printer you quickly understand the need to have a flatbed cutter to finish many of your printing jobs. You may need a cutter to trim your prints, or you may need to contour cut a figure, such as a beer bottle, or a human figure. Trimmers we consider in other reports (such as Keencut or Fletcher-Terry); this present report is for professional level cutters for signage.

There are two main kinds of serious cutter for flat and rigid materials; of each kind of cutter there are many brands.

- XY flatbed cutter, such as Zund or Kongsberg.
- CNC router, such as MultiCam, AXYZ

Of the scores of manufacturers of flatbed printers, there are now two well known brands who also offer their own flatbed cutters or routers: Mimaki and Gerber.

If you ask printshop owners which cutter they have and which other cutter they wish they had bought instead, you get a babel of diverse (and often conflicting answers). Then there is also the price vs performance reality check: it is nice to have an elite cutter, but what if your budget simply won't stretch to the hundred-thousand dollar range? What if you can only afford a more economical cutter?

And should you buy a CNC router that can also cut, or a flatbed XY cutter that can also rout?

Since over 270,000 printshop owners and managers read the FLAAR web pages and FLAAR Reports each year (in over a hundred countries around the world), we thought it would be helpful if we begin to evaluate the different options.

Gerber M series at ISA 08.

Why is FLAAR interested in flatbed cutters?

Since FLAAR is a non-profit research institute, we do projects based on research interests. Our projects tend to be related to museum display, museum signage, and outdoor signage for national parks, especially archaeological parks in Central America. We also work with botanical and zoological institutes to assist them in digital imaging (the entire workflow, from digital photography to informational signage).

But the same awareness and knowledge about which CNC router or XY contour cutter is best for these needs of ours, can be transposted to assist sign shop owners and managers so they can understand which router or cutter is best for them to consider for signage and POP displays in malls, grocery stores or airports. In other words, FLAAR projects turn into a veritable primer for the entire industry.

Currently FLAAR has the following projects that are related to UV-cured flatbed printers and XY cutters and routers:

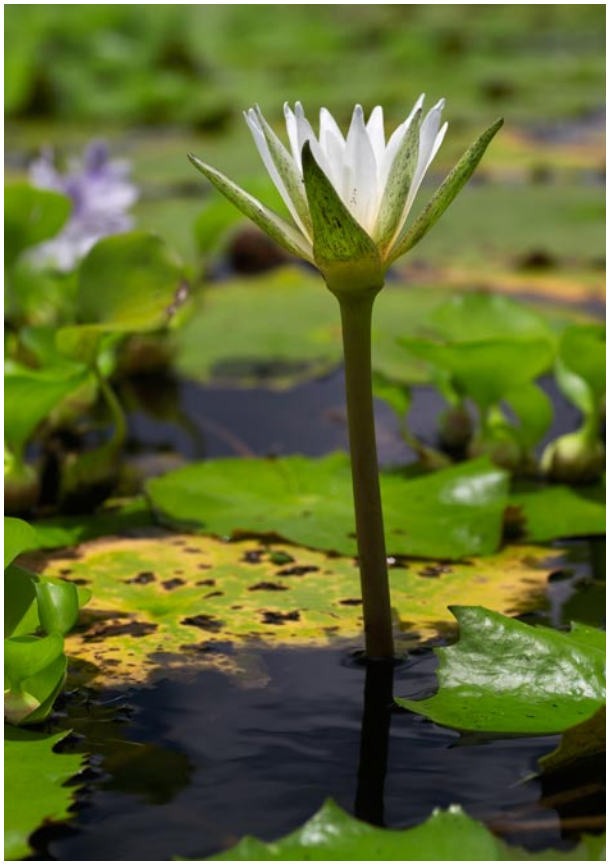
Projects for CNC routers and XY cutters

Reproducing, for traveling museum exhibits and displays, 8th century bas-relief hieroglyphic panels of Mayan inscriptions (which can best be handled with a CNC router due to the relief on the original carvings)

7th-9th century sports and athetic attire in the sacred ballgames of pre-Columbian Guatemala, Mexico, Belize, and Honduras.

Cacao and chocolate: Maya ethno-botany.

The sacred water lily.



Projects for CNC routers and XY cutters

Iconography of the "virgin birth" tree in the Popol Vuh.

The "World Tree" of the ancient Maya which today is still the national tree of Guatemala: the Ceiba. This project is also related to the study of ceramic incensarios which replicate the spines of the World Tree.

The Crocodile Tree, an iconographic and visual pun between the bumps of the crocodile hide and the nearly similar bumps on a certain species of sacred tree (similar to the Word Tree but a different species).

Cut-outs of personages from rollouts of Maya funerary vases.

Cut-outs of kings and their ceremonial regalia from life-sized portraits on stone sculptures ("stelae").

Our initial idea is to test different printers and different cutters on these scenes. The images which will be the most difficult to cut may be the spines of the sacred tree.

This is a long range project, since it will take time to be provided access to test the different printers and cutters. We also need to do the photography, and have our staff prepare the special images for testing. Plus there is the expense of processing and publishing all this, and then maintaining our web sites so that the resulting FLAAR Reports will be available worldwide all year.

Thus we appreciate funding from the different printer and cutter manufacturers.

Kinds of cutting, creasing, etc.

If you need to create a low-relief image in concrete, a CNC router is a good option. If you need to cut fibrous materials such as textiles, and XY flatbed cutter would be considered. So there is not always one single machine that will perfectly satisfy every need.

It is the same with wide-format inkjet printers: some offer speed, others offer 4 pt text, others can print on vehicle wrap; some can handle Tyvek (something that solvent printers are not good for). As a result there are 45 manufactures of UV-cured printers with over 101 models over the past eight years. This does not count the probably more than 100 models of solvent printers of diverse ink chemistries.

I also recognize that every printer and every cutter has merit. Each brand and model is ideal for it's target market. Yet there are always issues: the Swiss-made Luscher JetPrint was one of the most problematical UV-cured flatbed printers. This printer was a terrible buying decision for companies that bought it. The printer was so inadequate that Luscher simply dropped it after two years: and never said a word; never admitted why (the reasons were already in the FLAAR Report; so anyone who bought the FLAAR Report probably avoided the half-million dollar mistake of buying the Luscher). The DuPont Chromaprint 22 printer had a high rate of dissatisfaction.

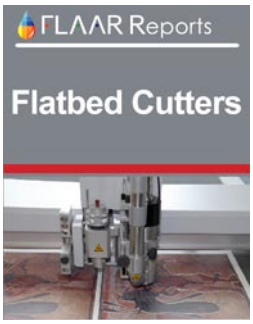
Yet even a printer with issues can become successful: benefits count more than issues. Printshops will accept a few downsides if the printer can achieve something that no other printer can do. So part of our evaluation process, in addition to the downsides, is to find the benefits of a printer, of its ink, and the backup a manufacturer provides to its clients.

It is the same with a router and cutter: none is perfect and even if near-perfect, the price for that perfection may be over $100,000+. If your budget dictates an entry-level price this is where an outside evaluation is even more helpful. It is assumes that the most expensive elite brand names are ideal; it is assumed that the less expensive brand names are lacking something. But our interest is to serve all our readers: to assist our readers to understand the difference between Zund and Kongsberg, to assist our readers to understand the differences between Mimaki and Gerber cutters, and to help everyone know the differences between Zund+Kongsberg and Mimaki+Gerber (as well as MultiCam, AXYZ, etc).

We can't do all this overnight, but we are starting the journey. Our first evaluation of an inkjet printer was the Encad NovaJet Pro 36 in the 1990's: today FLAAR Reports are read around the world and our evaluation of the Encad from 1997 through 2004 assisted thousands of printshop owners to realize it's deficiencies and the advantages of an HP (in those days Epson was not yet in the big time, and Selex printers were not yet the powerhouse that Canon is today). So we initiate our evaluation of CNC routers and XY flatbed cutters with the same long-range interest as with wide-format inkjet printers ten years ago.

Router & Flatbed Cutter Project Progress:

Features and Benefits, Price and Performance



The first XY flatbed cutter that we tested was the Zund. Two days were spent in their impressive facilities in Switzerland. A separate report is available, so we don't need to repeat all that here.

But soon after that the third-generation Zund cutters were issued. We now need to update our reports based on experiencing the G3 digital cutters. In the meantime, we will learn about the entry-level and mid-range cutters, starting with Gerber M Series.

First step: factory visit

The first step of a comprehensive evaluation is to learn more about the company. Gerber makes the Sabre Series 404 and 408 routers for the sign industry. I am more familiar with their M Series flatbed cutters and will concentrate on them in this report. The M Series flatbed cutters are derived from Gerber Scientific Products acquisition of Data Technology in Spring 2007.

My first visit to Gerber Scientific Products was a general familiarization, primarily to learn about cationic UV-curing ink and flatbed UV inkjet printers. I was provided an opportunity to visit two Gerber buildings: factory and headquarters. Since I was heading to inspection of Durst Rho printers in Europe and then other UV printers at Photokina trade show in Germany, there was time available only for an initial survey of the overall corporate situation.

The first thing I learned was the sheer size of Gerber. When you think of a Gerber Edge, it's physically a small product. But when you are at the Gerber facilities you see their textile cutters and other products and learn why this is a multi-million-dollar corporation. At some point in the future I will hope to return to test the M Series flatbed cutters, but so far it is clear that as a company Gerber is a corporation with substance.

I also visited MultiCam headquarters in Dallas, Texas, but since this was the first time with this company it was simply a courtesy visit, not a full-scale day-long familiarization. And no photographs were allowed. In distinction at Gerber I was encouraged to take as many photographs.

Gerber factory visit 2008.

Next step: testing and evaluation

I have seen the Gerber M Series flatbed cutters and router system at trade shows on several continents. But it is a challenge to have time during a trade show to test print-and-cut (either FLAAR or the booth personnel at a busy show).

Gerber M series at ISA 08.

Our own first step is to prepare the images. This entails, for us, two stages: doing the original photography, and then preparing the images in appropriate software to allow them to be cut. In the long run we will wish to test both CNC router and flatbed cutter capabilities, but for the CNC router we will need to prepare files with two-dimensional depth (bas-relief sculpture, for example, which is the traditional way most archaeological sculptures are presented).

To prepare the images involves sophisticated photography with high-end digital cameras. We have an 80-megapixel Cruse reprographic camera, a 48-megapixel BetterLight, and a 22-megapixel Phase One P25+ (on a Hasselblad body). Most of our photography is in Guatemala, Belize, and Honduras, and tends to be over the Christmas-New Year period, since there are no trade shows during this period. FLAAR also evaluates all this digital camera equipment, since obtaining the original digital image is the first step in any workflow.

On the following pages are samples of the test prints we are preparing for evaluating routers and cutters over the next several years. A more comprehensive initial set of test photographs will be finished during December-January 2008.

Test Images for long-range evaluation of CNC routers and XY flatbed cutters

The Classic Maya scribes created thousands of hieroglyphic inscriptions on limestone relief carvings. At some sites outside the Karst limestone area, other types of stone were used.

The ancient Maya had no metal tools, so chert (flint) and other hard stones, including jade, were used as chisels.

The Maya civilization occupied all of Belize, portions of Honduras, most of Guatemala, and about one third of Mexico. There was Maya influence down to Costa Rica but mainly trade objects such as incised jade celts, not actual Maya cities. There are some Maya-related settlements in El Salvador.

FLAAR has spent 39 years doing research in this area. Our web site, www.maya-archaeology.org, is the most visited archaeological web site in the world on these subjects.

Because the original 8th century stone sculptures are very heavy (and fragile) sending the originals for exhibit to other countries is not always realistic. So our idea is to create realistic 1:1 reproductions for traveling museum exhibits and displays. Bas-relief hieroglyphic panels of Mayan inscriptions can best be handled with a CNC router due to the relief on the original carvings.

Our main concern is how to record, digitally, the depth of the sculpture. Naturally it is easier for us to record murals and other artifacts which are relatively flat. However with corporate support, through corporate sponsorship projects, we can gradually acquire the 3D scanning technology in the future to record the hieroglyhphic panels in-depth (pun intended).

7th-9th century sports and athletic attire in the sacred ballgames

The pre-Columbian Aztec, Toltec, and Maya peoples had a rather brutal ballgame: the head of the loser was used as a ball in the final inning! There are many sculptures and paintings that show this painful reality, and the Popol Vuh documents this in clear detail.

The Popol Vuh is a sacred Maya text that is readily available on the Internet in an edition that is free to download: just Google Dennis Tedlock, Popol Vuh and you should get the download.

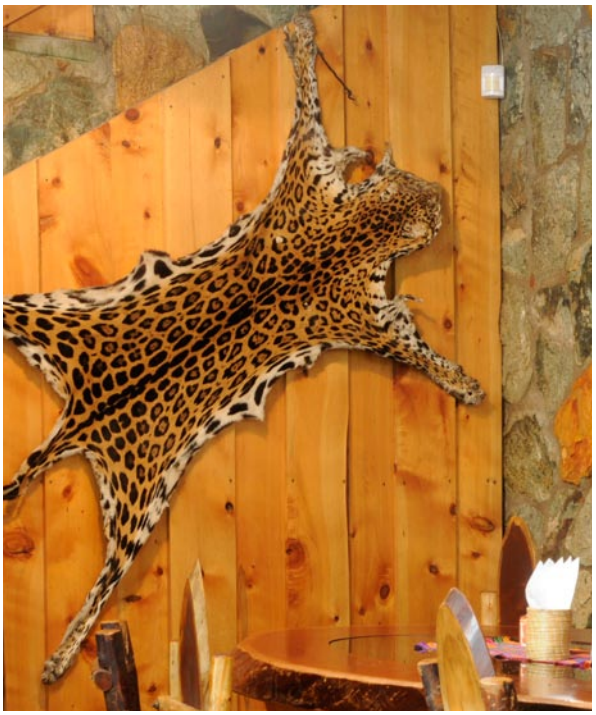
The Maya form of the game was played in Guatemala, Mexico, Belize, and Honduras. The game is still played today in Sinaloa, Mexico (albeit without decapitation). The scenes we show here are also minus the decapitation aspect.

FLAAR has published more than eight reports on the ballgame, but in the pre-digital, pre-PDF era, so you would have to obtain them by Inter-Library loan (sorry we do not have them in electronic format due to the cost of finding all the original illustrations in storage and scanning them, etc).

The examples here are Late Classic (7th-8th century AD), from Copan, Honduras, photographed with permission of IHAH. Because of the complexity of the sculpture, we feel it will be much easier to show the details of the special outfits if we can cut the entire figure out from the background.

These images we already have, taken with a 22-megapixel Leaf digital back on a Mamiya AFD camera. So as soon as we can do the software to separate the figure from the background, this figure will be one of our test images. One reason we wish to cut these out are because five of the figures are wearing Maya ballgame outfits but one of the figures is wearing a Veracruz, Mexico style outfit (about a thousand kilometers north of Copan, Honduras !).

Ballcourt sculptures from Copan museum.



Feline and Deer Hides: Leather in 6th-9th century Maya clothing & upholstery

Although woven fronds (petate) were a common covering for Maya thrones, some thrones used jaguar hides as decoration. Elsewhere feline hides were used as clothing. In most cases these were jaguar hides, but other hides are of ocelot, margay or other tropical cats. Deer hides tend to be worn by hunters and also by ballplayers (some ballplayers deliberately wore the attire of hunters since one of the several games played by the Maya mimicked a hunt: each team "hunted" the other. This is complex iconography and this discussion of CNC routers and XY cutters is not the appropriate time or place to get into the fascinating details.

To go further in our long-range interest in feline iconography naturally we do not intend to shoot any felines in order to get their hides! Our goal is to photograph hides which already exist, print them at full original size on faux leather, and then cut them with XY flatbed cutters. Nowadays there are plenty of faux leather materials that can be printed on with UV-cured flatbed printers.

Cacao and chocolate: Maya ethno-botany

Everyone says that money does not grow on trees. But the Aztecs used cacao beans as a currency. We assume that their ancestors, the Teotihuacan merchants, also used cacao beans as a currency, because incense burners show cacao pods frequently.

The Maya used cacao drink as a sacred beverage, but they mixed it with red achiote seeds as a colorant. The Mayan hieroglyphic inscriptions tell us which ceramic vases were used as cacao drinking vessels.

The Maya of the 7th century AD also made ceramic effigies of the cacao pods, here from Fundacion La Ruta Maya registered collection in Guatemala. What is interested here is that these pods are the pataxte species. Most cacao in Guatemala today is a slightly different species.

So FLAAR does botanical research to show the characterists of each species and how to recognize which species is being shown in the art: if the fruit hangs from the trunk it is not pataxte; if the fruit is high in the branches of a tall tree it is pataxte. The pataxte pods have more of a vein-like structure too.

Since the trees are of interesting shape, we find that a cut-out, at life size, will make an educational exhibit, since most people are not familiar with precisely what a chocolate tree looks like.

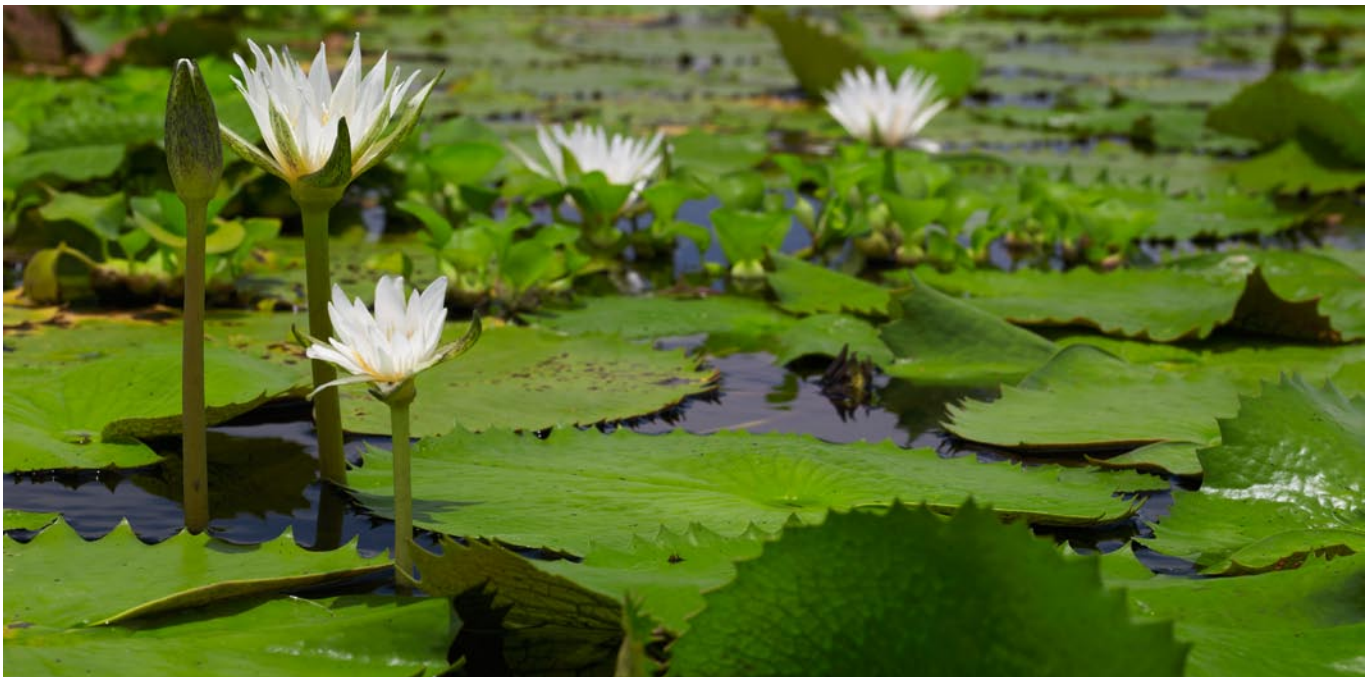
The sacred water lily

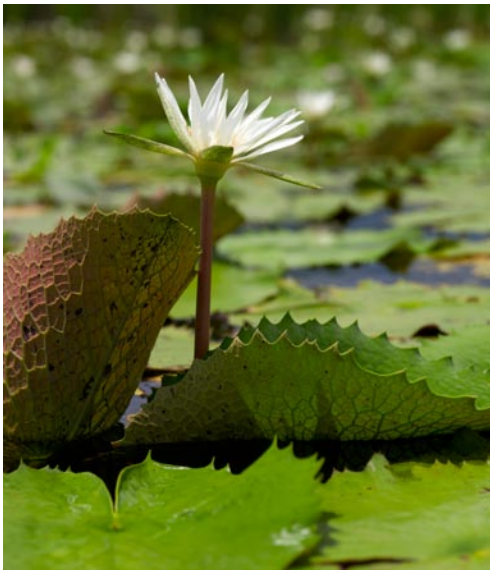
The Maya believe their world here on earth mirrored to some degree the constellations in the sky above us. The priests of ancient times conjured up several schemes to show their cosmology. One feature of the most common representation is an interface between the "real world" and a watery underworld. This is an underworld related somewhat to the sacred caves of Xibalba. The actual caves can be found in the Verapaz area of Guatemala.

But in the cosmology, the interface includes elements of the ocean (sharks) and also fresh water (water lilies). Indeed the white water lily is the dominant species of plant that signifies this sacred interface.

My PhD dissertation identified this "Surface of the Underwaterworld" in 1985. Today I still work on these subjects, primarily to use advanced digital photography to record the ecology of the water lily environment.

Our goal is to show the entire structure of the water lily plant and document how this was the model in nature for the sacred flowers on Maya murals and vase paintings.





Sacred water lily, Flower and fruit.

Iconography of the "virgin birth" tree in the Popol Vuh

In the mythical book of the Popol Vuh, the sacred book of the ancient Maya, the demi-gods are twins, Hunahpu and Xbalanque. These twins are born when the head of their ancester spits into the hand of a curious virgin. The virgin gives birth to the Hero Twins.

The father's head is decapitated because he lost the ballgame, played in an Underworld Cave (Xibalba). The evil deities hang the decapitated head in a tree whose fruit is roughly the size and shape of a small head.

In some murals in the lowland Peten area, the tree is shown as a cacao tree. In some paintings of the adjacent but Highland areas, the tree is shown as a moro.

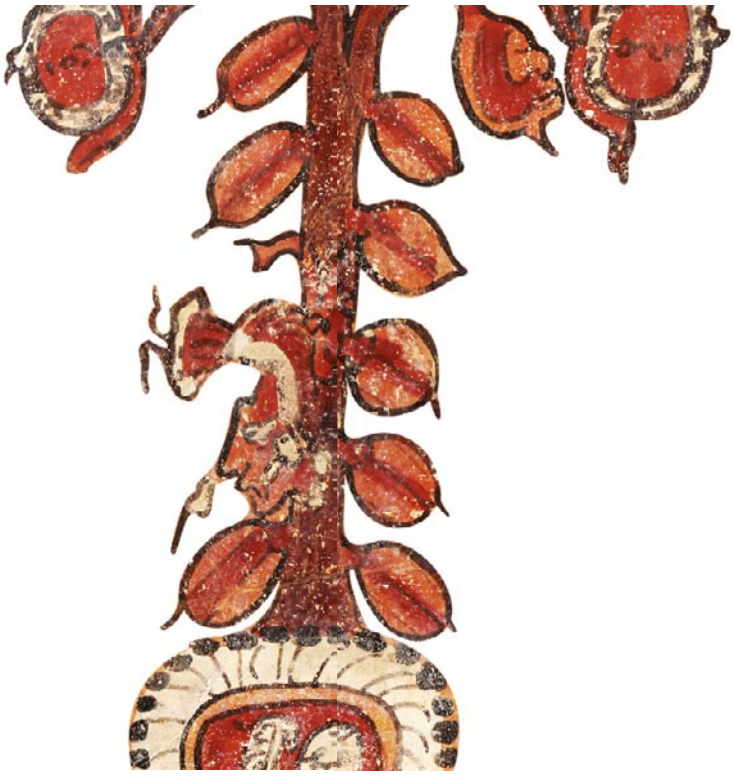
There are three or four trees whose fruit grows on the main trunk, rather than from the upper branches:

- some species of cacao (but not pataxte),
- moro or jicara,
- and papaya.

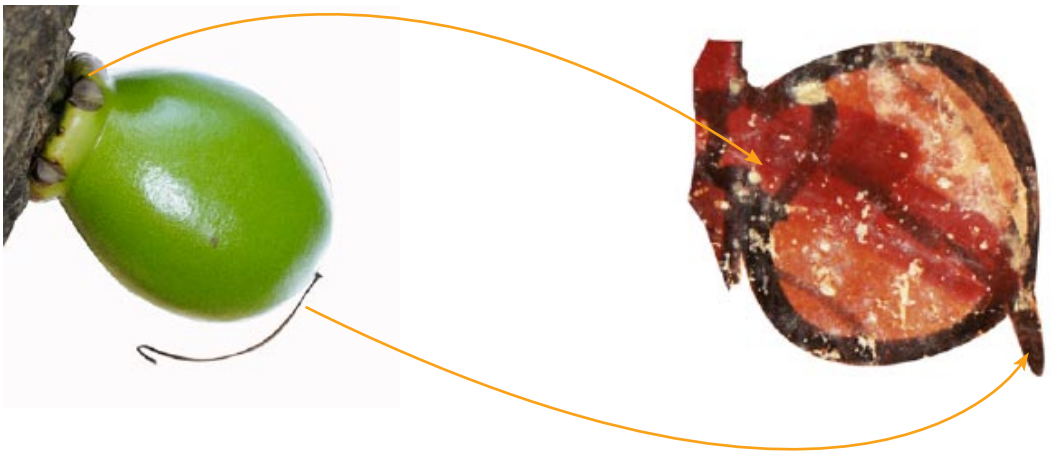
So this project's goal is to find and photograph all indigenous trees in Guatemala whose fruit hangs from the trunk, and compare each tree with the dozen or so representations from murals and painted funerary ceramics. Of these the most important scene is in the Museo Popol Vuh, UFM.

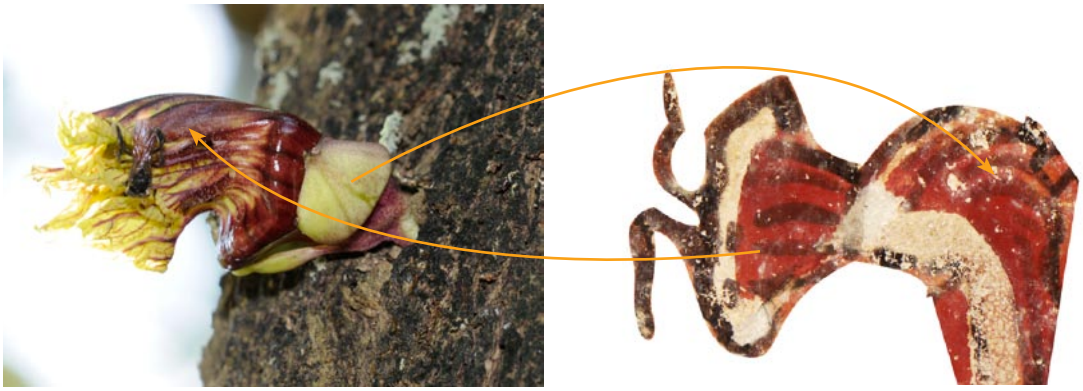
Most iconographers and archaeologists have decided that this paternal tree is cacao, but that is because in the Lowland areas the cacao is common. In the Highlands, and in the Pacific piedmont and coastal area, and in the dry Zacapa area, there are more moro and jicote trees. Botanist Mirtha Cano and iconographer Nicholas Hellmuth have been working together on this project for two years now.

Since it is precisely the profile of the tree and fruit which is important to show, a CNC router and/or XY flatbed cutter are ideal to cut out the comparative examples of the different mythical trees.



Tree drawing of a Maya Polychrome vase Rollout, from the Popol Vuh Museum at Francisco Marroquín University.
Photo: Nicholas Hellmuth.





Comparing fruit and flower of Crescentia alata (jícara or morro) tree with the drawing in the ceramic Maya Vase. Photo: Nicholas Hellmuth. FLAAR photo archive. 2008.

The "World Tree" of the ancient Maya

The pre-Columbian peoples of Mesoamerica believed there were four giant sacred trees. Each held up one corner of their world. This is basic to the cosmology of the Aztec as well as the Maya and other cultures.

This same huge tree is still the national tree of Guatemala: the Ceiba. It is the tallest tree in the Central American tropics, and the fastest growing large tree in the country.

Of the many species of ceiba tree, most have triangular-shaped spines, especially when the tree is young (first 20 or 30 years; the tree grows to over 200 years old, or more).

Since this tree was sacred, and since the spines are the logo of the tree, the Maya priests made ceramic incensarios which replicate the spines of the World Tree (see photo here). These ceramic "buckets" were used to burn incense to the gods.

Actually there are other sacred trees, such as the nance fruit tree, which was the perch of the Principal Bird Deity, the False Sun God (mentioned in the Popol Vuh and shown as a lid handle on Classic Maya ceramic art). However the nance tree has no spines. But our goal is to find all trees that are in any mural or painting or sculpture, and to find the actual tree in nature somewhere in Guatemala today.

As you notice, the FLAAR projects in iconography are to find features in Maya art, and then show the botanical or zoological origins: why did the Maya conjure up the symbolism that they became famous for? Most is based on adapting impressive features of local plants, flowers, birds, reptiles, fish, or animals.

My PhD dissertation is on these subjects, based on 8 years research and 17 years photography of Maya art before starting the dissertation. Most of the FLAAR programs in wide-format inkjet printing are to understand which technology is best to present our iconographic and archaeological findings to the general public.

Incense Burner from Museo Popol Vuh Universidad Francisco Marroquín .

The Crocodile Tree

Iconography is the study of the meaning of artistic symbols, usually in an ancient culture. In Maya art, there is an iconographic and visual pun between the bumps of the crocodile hide and the nearly similar bumps on a certain species of sacred tree (similar to the Word Tree but a different species, bumps rather than needle sharp spines).

So FLAAR has hired a zoologist to help us locate and photograph crocodiles and caymans (there are all together about three species all together) and we have botanist Mirtha Cano on-staff to help locate the trees.

Then we wish to show the photograph of the actual tree, and next to it in an exhibit, the crocodile, so that you can see how the ancient Maya visualized the similarity between the crocodile (a sacred animal) and the tree.

So the idea is to have cut-outs of the tree and cut-outs of the crocodile mimicking the pose of the crocodile tree from two thousand year old stelae sculptures from Izapa, Chiapas, Mexico. These monuments were recorded by the New World Archaeological Foundation of Brigham Young University. But we feel it would help to show the association between the actual "arbol lagarto" and the actual crocodilians.

Cut-outs of personages from rollouts of Maya funerary vases.

Several thousand ceramic vases exist in museums around the world that picture scenes from the throne room, hunting, religious rituals, coranations, and general ceremonies. These vases date from the 4th through 9th centuries A.D. Each vase is about 5 to 11 inches tall, and may show from four to twenty human figures, animals, or deities.

Since the vases are of course round, a museum visitor can see only one side at a time, There is, however, a digital method of unrolling the entire circumference so you can see the entire circumference all at one time.

FLAAR has a specialized tri-linear scanning camera that can rotate round objects (such as archaeological vases) and "peel off" the complete circumference of the round vase and lay it out flat in a rectangular format. We thank Better Light for providing two of these digital circumferential rollout camera systes, one circa 1997 and the other circa 2001 with a significant upgrade about 2003.

Our first project to learn about XY flatbed cutters utilized these rollouts. But we did the cut-outs only at small size, since this was our first try. The long-range goal is to enlarge the figures to life size and cut them out, and recreate each Maya ceremony, such as the dance of the animal impersonators (Way), and the Holmul Dancer dances. Most of the ceremonies were dances. Each ceremony had its own set of custumes. For some dances there are dozens of paintings so we know about these specific dances in considerable detail. But none of this has been exhibited to the public in the manner that we envision.

Photo: La Ruta Maya Archive.

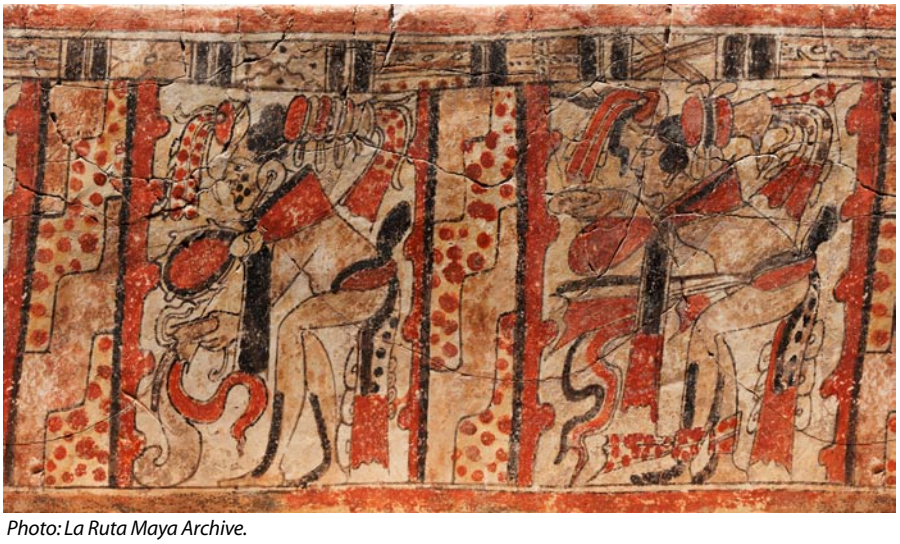


Photo: La Ruta Maya Archive.

Cut-outs of kings and their ceremonial regalia

From 100 BC to AD 900, each Maya king erected stone monuments to show their ritual and sacred importance. On these stone monuments they wear the royal paraphernalia that is often quite complex.

The stone monuments, stela singular, stelae plural, weigh several tons so it is not realistic to transport them for exhibits. Plus often the scenes are so complex that it is hard for lay people to understand what is going on. By cutting out each figure from the background it is easier to show museum visitors what the kings looked like. Plus an exhibit could show a row of different portraits from different sculptures of the same king; or could compare different 7th century kinds from ten different contemporaneous city-states but culturally different regions, etc. Since most stelae show the rulers at life size, the resulting cut-outs will be impressive.

We would also like to colorize the cut-outs, to show what the clothing would have looked like in it's original color. Since the sculptures have been outside in the tropical rain forest for over a thousand years, they have lost most of their original color.

So the FLAAR project to first photograph the stelae and then to cut them out, has considerable merit in terms of assisting dissemination of scholarly information to the general public.

Summary

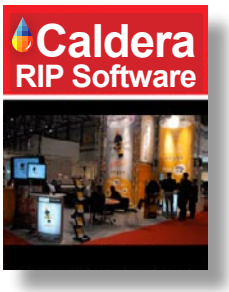
The test images are selected to represent all levels from easy to difficult, from round to squared edges, from sharp to blunt edges. The goal is to reveal how well the entry-level and mid-range CNC routers and cutters perform relative to the Zund and Kongsberg. There is so much talked about, but never have I seen specific and independent documentation, for example, that a Mimaki cutter is inadequate. Yet I have never heard it mentioned as a high-end cutter. I can't believe that a Japanese engineering company is incapable of making an adequate cutter.

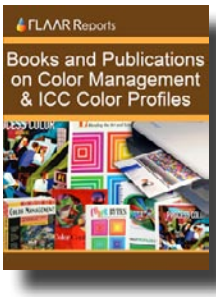
Gerber has cutting experience for longer than other companies; their textile cutters are considered industry standards. So I will be willing to test the Gerber M Series cutters to see how well they perform on the diverse materials that the Gerber Solara ion and other flatbed UV-curing printers can produce.

This evaluation project is initially slated to run for one year. We will concentrate first on the Gerber M cutter because Gerber Scientific has provided access. As access is provided by other companies, they can be added to the comparative evaluation in the future.

This report will be updated at Graph Expo and gradually we will add lists of where the different cutters can be obtained (the regional distributors and dealers in the US and major distributors in other countries).

FLAAR now has web sites in Spanish, and in German. As soon as we can catch up, our evaluations will be in these languages.





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

RIP, COLOR MANAGEMENT, and ICC Color Profiles options

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

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

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

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

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

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

When I visited a large printshop in Maribor, northern Slovenia, they were using Caldera RIP and the manager of technical services for this company said, "*Caldera does a good job*." This company in Slovenia has about eight UV printers (about five of them from Durst) and an equal number of large solvent printers. They originally used a GretagMacbeth color management system but switched to BARBIERI because the BARBIERI spectrophotometer can read more efficiently and can handle textiles, backlit, wood and other materials that are either awkward or difficult on other brands of color management instruments. You can learn about the BARBIERI equipment either from their headquarters in Brixen or their distributors worldwide.

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

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

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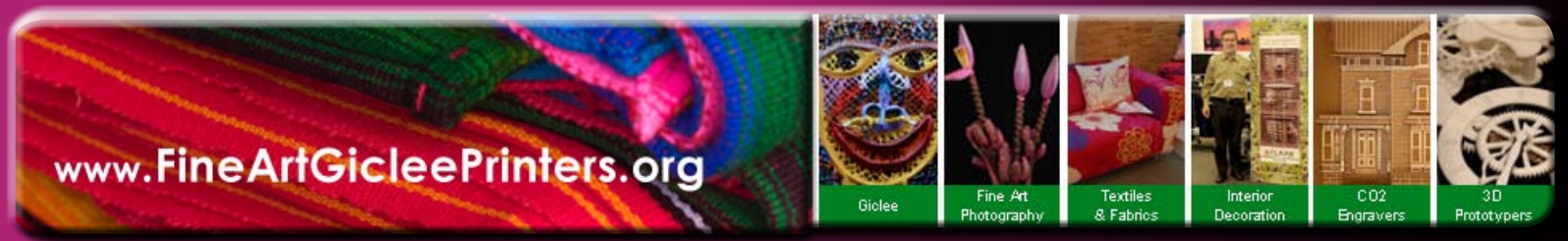
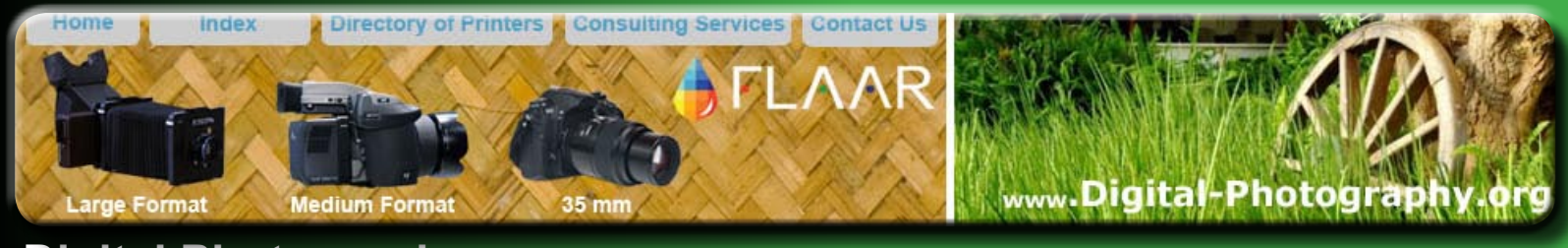


Printing Fine Art Giclee
www.fineartgicleeprinters.org

Printing for outdoor use: UV-cured, solvent, eco-solvent, etc.
www.large-format-printers.org

Scanning
www.flatbed-scanner-review.org



Digital Photography
www.digital-photography.org

Reality Check

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

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

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

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

Update Policy

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

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

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

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

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

Please Note

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

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

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

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

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

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

Citing and Crediting

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

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

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

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

Advisory

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

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

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

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

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

FLAAR has no way of testing 400+ specifications of any printer, much less the over 101 different UV printers from more than 46 manufacturers. Same with hundreds of solvent printers and dozens of water-based printers. We observe as best we can, but we cannot take each printer apart to inspect each feature. And for UV printers, these are too expensive to move into our own facilities for long-range testing, so we do as best as is possible under the circumstances. And when a deficiency does become apparent, usually from word-of-mouth or from an end-user, it may take time to get this written up and issued in a new release.

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

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

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

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

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

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

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

Results you see at trade shows may not be realistic

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

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

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

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

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

You absolutely need to do print samples with your own images and the kind provided by your clients. Do not rely on the stock photos provided by the printer, ink, media, or RIP manufacturer or reseller. They may be using special images which they know in advance will look fabulous on their printer. Equally well, if you send your sample images to the dealer, don't be surprised if they come back looking awful. That is because many dealers won't make a serious effort to tweak their machine for your kind of image. They may use fast speed just to get the job done (this will result in low quality). Check with other people in your area, or in the same kind of print business that you do. Don't rely on references from the reseller or manufacturer (you will get their pet locations which may be unrealistically gushy): find someone on your own.

Factors influencing output

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Although we have found several makes and models to work very well in our facilities, how well they work in your facilities may also depend on your local dealer. Some dealers are excellent; others just sell you a box and can't provide much service after the sale. Indeed some low-bid internet sales sources may have no technical backup whatsoever. If you pay low-bid price, you can't realistically expect special maintenance services or tech support later on from any other dealer (they will tell you to return to where you paid for the product). This is why we make an effort to find out which dealers are recommendable. Obviously there are many other dealers who are also good, but we do not always know them. To protect yourself further, always pay with a level of credit card which allows you to refuse payment if you have end up with a lemon. A Gold American Express card allows you to refuse payment even months after the sale. This card may also extend your warranty agreement in some cases (check first).

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

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

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

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

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

Availability of spare parts may be a significant issue

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

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

Lack of Tech Support Personnel is increasing

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

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

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

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

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

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

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

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

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

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

Be sure to check all FLAAR resources

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

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

Acknowledgements

With 15 employees the funding has to come from somewhere, so we do welcome project sponsorship, research grants, contributions that facilitate our educational programs, scholarships for co-op interns and graduate students, and comparable project-oriented funding from manufacturers. The benefit for the end-user is a principle called academic freedom, in this case,

- The freedom of a professor or student to speak out relative to the pros and cons of any equipment brought to them to benchmark.
- The freedom to design the research project without outside meddling from the manufacturer.

Fortunately, our budget is lean and cost effective as you would expect for a non-profit research institute. As long as we are not desperate for money we can avoid the temptation to accept payment for reprinting corporate PR hype. So the funding is used for practical research. We do not accept (nor believe) and certainly do not regurgitate corporate PR. For example, how many manufacturer's PR photos of their products have you seen in our reports or on our web sites?

Besides, it does not take any money to see which printers and RIPs function as advertised and which don't. We saw one hyped printer grind to a halt, malfunction, or otherwise publicly display its incapabilities at several trade shows in a row. At each of those same trade shows 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…."
FLAAR is a non-profit educational and research organization dedicated for over 36 years to professional photography in the arts, tropical flora and fauna, architectural history, and landscape panorama photography.

Our digital imaging phase is a result of substantial funding in 1996 from the Japanese Ministry of Public Education for a study of scanning and digital image storage options. This grant was via Japan's National Museum of Ethnology, Osaka, Japan. That same year FLAAR also received a grant of $100,000 from an American foundation to do a feasibility study of digital imaging in general and the scanning of photographic archives in particular.

The FLAAR web sites began initially as the report on the results of these studies of scanners. Once we had the digital images we began to experiment with digital printers. People began to comment that our reports were unique and very helpful. So by 1999 we had entire sections on large format printers.

FLAAR has existed since 1969, long before inkjet printers existed. Indeed we were writing about digital imaging before HP even had a color inkjet system available. In 2000 FLAAR received an educational grant from Hewlett-Packard large format division, Barcelona, Spain, for training, for equipment, and to improve the design and navigation on the main web sites of the FLAAR Network. This grant ran its natural course, and like all grants, reached its finishing point, in this case late 2005.

In some cases the sponsorship process begins when we hear end-users talking about a product they have found to be better than

other brands. We keep our ears open, and when we spot an especially good product, this is the company we seek sponsorship from. It would not be wise of us to seek sponsorship from a company with a sub-standard or otherwise potentially defective printer. So we usually know which printers are considered by end-users to be among the better brands before we seek sponsorship. After all, out of the by now one million readers, we have heard plenty about every single printer out there.

We thank MacDermid ColorSpan (now part of HP), Hewlett-Packard, Parrot Digigraphic, Color DNA, Canon, Gandinnovations, and other companies for providing funding for technology training for the FLAAR staff and our colleagues at Bowling Green State University and for funds to allow us to attend all major international trade shows, which are ideal locations for us to gather information. We thank Sun LLC, Caldera, Raster Printers (Rastek), DEC LexJet, DigiFab, Barbieri electronic, Mutoh Europe, IP&I, Dilli, Yuhan-Kimberly, InkWin, GCC, Grapo, Durst, Teckwin and Zund for providing funds so that we can make more of our publications free to end-users. During 2000-2001 we had grants to cover all the costs of our publications, and all FLAAR Reports were free in those early years. As that early grant naturally expired after a few years, we had to begin charging for some of our reports to cover costs. Now (in 2009), we are seeking corporate sponsorship so we can gradually make another 20% of our publications free to our readers.

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

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

Barbieri electronic (color management), Caldera (RIP), ColorSpan, DEC, Durst, Gerber, Grapo, IP&I, Mimaki USA, Mutoh, Dilli, GCC, NUR, Oce, Shiraz (RIP), Sun, Teckwin, VUTEk, Xerox, Yuhan-Kimberly, Zund have each brought FLAAR staff to their headquarters and printer factories. Bordeaux, InkWin and Sunflower ink have brought us to inspect their ink manufacturing facilities and demo rooms. We have visited the world headquarters and demo rooms of HP in Barcelona and received informative and helpful technology briefings. We are under NDA as to the subjects discussed but it is important that we be open where we have visited. Mimaki Europe has had FLAAR as their guest in Europe to introduce their flatbed UV printer, as have other UV-curable manufacturers, again, under NDA as to the details since often we are present at meetings where unreleased products are discussed. Xaar has hosted an informative visit to their world headquarters in the UK. You don’t get this level of access from a trade magazine writer, and I can assure you, we are provided much more detailed information and documentation in our visits than would be provided to a magazine author or editor. Companies have learned that it’s a lot better to let us know up front and in advance the issues and glitches with their printers, since they now know we will find out sooner or later on our own. They actually tell us they realize we will find out on our own anyway.

Contributions, grant, sponsorships, and project funds from these companies are also used to improve the design and appearance of the web sites of the FLAAR Information Network. We thank Canon, ColorSpan, HP, ITNH, and Mimaki for providing wide format printers, inks, and media to the universities where FLAAR does research on wide format digital imaging. We thank Epson America for providing an Epson 7500 printer many years ago, and Parrot Digigraphic for providing three different models of Epson inkjet printers to our facilities on loan at BGSU (5500, 7600, 7800). We thank Mimaki USA for providing a JV4 and then a Mimaki TX-1600s textile printer and Improved Technologies (ITNH) providing their Ixia model of the Iris 3047 giclee printer.

We thank 3P Inkjet Textiles and HP for providing inkjet textiles so we could learn about the different results on the various textiles. IJ Technologies, 3P Inkjet Textiles, ColorSpan, Encad, HP, Nan Ya Pepa, Oracal, Tara 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, one from Taiwan, the other evidently from Germany!). We thank Aurelon, Canon, ColorGate, ColorSpan, ErgoSoft, HP, PerfectProof, PosterJet, Onyx, Ilford, CSE ColorBurst, ScanvecAmiable, Wasatch and many other RIP companies for providing their hardware and software RIPs.

We thank Dell Computers for providing awesome workstations for testing RIP software and content creation with Adobe Photoshop and other programs. We also appreciate the substantial amount of software provided by Adobe. As with other product loaned or provided courtesy of ProVar LLC (especially the 23” monitors which makes it so much easier to work on multiple documents side by side).

We thank Betterlight, Calumet Photographic, Global Graphics, Westcott, Global Imaging Inc. Phase One, and Bogen Imaging for helping to equip our archaeological photo studios at the university and its archaeology museum in Guatemala. Heidelberg, Scitex, CreoScitex (now Kodak) and Cruse, both in Germany, have kindly provided scanners for our staff to evaluate.

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

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

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

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

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

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

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

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

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

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

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

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

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

FLAAR also serves as consultants to Fortune 500 companies as well as smaller companies and individuals who seek help on which printers to consider when they need digital imaging hardware and software.

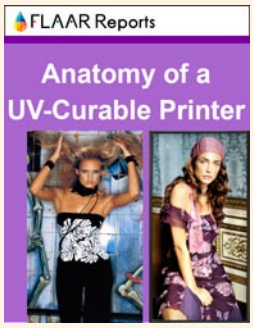
A modest portion of our income comes from our readers who purchase the FLAAR series. All income helps continue our tradition of independent evaluations and reviews of inkjet printers, RIPs, media, and inks.

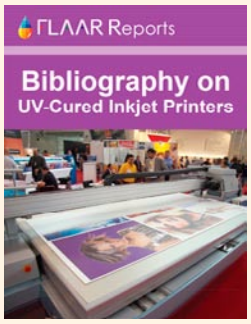
These are some of the most

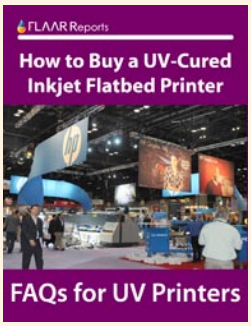
Recent FLAAR Reports (2007-2009)

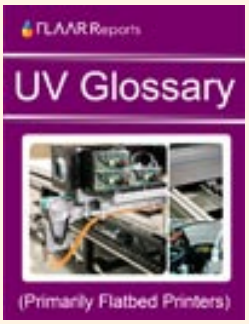
You can find these and more reports at: www.wide-format-printers.NET

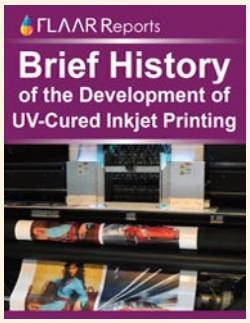
Introduction to UV Curable Inkjet Flatbed Printers

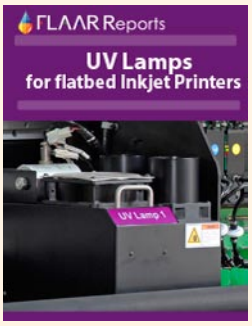


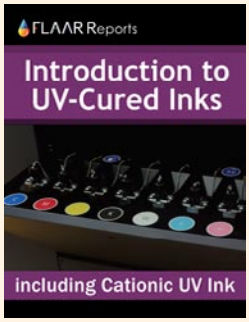












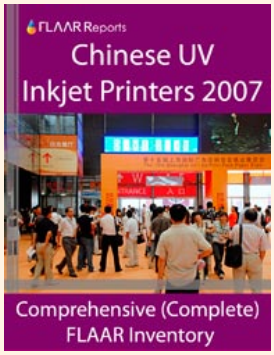
Comments on UV Inkjet Printers at Major Trade Shows 2007-2009

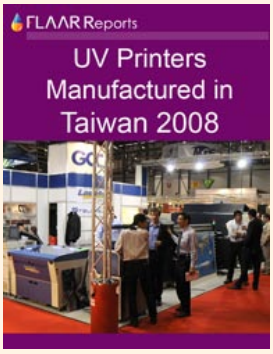
These are some of the most

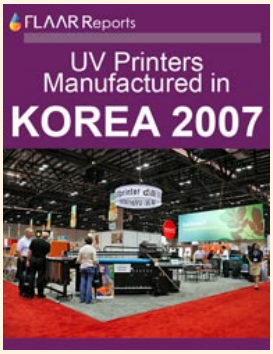
Recent FLAAR Reports (2007-2009)

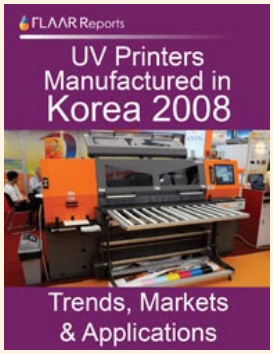
You can find these and more reports at: www.wide-format-printers.NET

UV Printers Manufactured in China, Korea and Taiwan









Most recent UV Printers