FLAAR Reports

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Selecting Which Equipment, Hardware & Software

Is advisable for Professional Production of Giclee

Giclee Workflow Part 2

Nicholas Hellmuth

FLAAR Reports

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Introduction

This is a companion volume for the FLAAR giclee workflow "textbook." This educational material is designed for commercial giclee ateliers, publishers, and production oriented print shops. The workflow is intended for high quality giclee and can also be used effectively to produce décor.

If you produce primarily fine art photographs, rather than giclee or décor, most of our giclee publications apply as well to fine art photographs. But you may prefer to acquire the FLAAR Reports on printing photographs, since photos are handled slightly differently than oil paintings or watercolor paintings. At FLAAR we do all three, and have been doing fine art photography for decades.

If you are an individual artist the information will assist you to understand the differences between printing for yourself at home, printing for your friends, family, and local area as compared with serious commercial printing for other artists from your entire region or the entire country.

At FLAAR we handle giclee at a national level. Artists, collectors, and giclee publishers send their paintings to BGSU in Ohio to have them digitized. In some instances the resulting scan is sent back to the artist to print in their home town. For most paintings we print the giclee also in Ohio.

We also print for local artists in our area of Ohio. Indeed if you attend the Black Swamp Arts Festival, most of the giclee prints of all the artists were each scanned and printed in the BGSU+FLAAR labs.

And we print our own fine art photography. The BGSU lab manager, Brent Cavanaugh, does fine art photography as does Nicholas Hellmuth. So we are familiar with all three levels of giclee production: national, local, and personal. Not also that we print all three levels of digital fine art too: giclee, fine art photos, and occasionally décor. However we specialize in the first two categories.

If you intend to get into giclee, at any level (personal, professional, or national), it sure helps to know what hardware and software to acquire. Even more it's a godsend to learn what equipment to think twice about before acquiring. It would be a bummer to invest a ton of money and then have someone else tell you that you had bought all the wrong stuff.

First: Learning the differences between Giclee, Fine Art Photos, and Decor

Giclee is often called fine art giclee, which is okay. But a fine art photograph is slightly different. What is the same is that both a giclee print and a fine art photographic print aspire to be absolutely the best quality possible.

The minute you cut-corners: a cheap scanner, cheap Chinese paper instead of German or French artist's papers, lack of color management; then your print is décor. Or simply a low end giclee.

A giclee tends to be a print of an oil painting on inkjet canvas, or a watercolor painting on inkjet watercolor paper. You can also have giclees based on pastels, charcoal, or any viable art medium. Although probably 95% of all giclees are printed on canvas or watercolor paper, these media is not absolutely required. You can print mixed media giclee on rusty tin cans if this is your preferred art style. Yes, I know, I smirk too, but nowadays with UV printers you can print on rusty tin cans, either flat, or the Aellora can print on a round container (it is made to do customized wine bottles).

A fine art photograph can also be printed on canvas or watercolor paper, but will tend to be printed on photo satin, photo matte, or rarely on photo glossy media.

Understanding Décor and how Décor Prints differ from Giclee

Décor is a low-cost mass-produced form of giclee and may also include fine art photography.

Décor prints are used to decorate hotels, motels, casinos, cruise ships, homes, offices, anywhere the decoration is changed every few years.

The workflow of giclee and décor will tend to appear identical up to the point that the ink, media, or print quality mode is selected. But in reality a décor print will tend to have cheaper shortcuts from the very beginning. If you are selling 1000 prints to Home Depot or Kmart, they buy on price alone. The people who buy from Home Depot will never see the original, so color fidelity is realistically a waste of time (if you are the décor factory). What counts is that the print be pretty, and cheap, and look like a work of art nonetheless.

Digital capture (scanner or digital camera), selected & certified camera equipment

The first and foremost digital capture device for giclee in the US is the BetterLight large format tri-linear scanning back. I don't have any inside information on how many BetterLight systems exist in giclee studios today, but I would guess that it is the best selling large format tri-linear giclee digitizing technology in the US.

FLAAR has employed a BetterLight large format system for years; it is ideal for digitizing oil paintings and watercolor paintings (and all kinds of flat artwork). Companies such as Squirt in California and Fine Art Impressions in North Carolina (two different but equally giclee technology leaders) both use and definitely favor BetterLight systems.

However it is obviously that just as several different brands of printers can produce handsome giclee output, so also that viable options exist with parallel technology to digitize oil paintings. Indeed many of the leading giclee ateliers already used a Cruse tri-linear capture system. And some giclee production places used medium format cameras, either on a copy stand or on a tripod. Since our tasks as an evaluating institute is to ascertain all reasonable solutions, it is not appropriate to exclude these additional systems.

Although there are several brands of copy-stand reprographic tri-linear capture systems around the world, the general consensus, especially across the US and in most European countries, is that the Cruse Digital GmbH system is the premier brand name. The reason is that Ing. Cruse has dedicated his entire life and his whole company to producing this scanner system. With other companies their repro stands are either knock-offs of the Cruse system that appear superficially similar, or the repro stand is merely one of a dozen different products and therefore does not get the dedicated attention that this kind of capture device needs. With printers you can produce a great giclee with a Roland, Epson or HP. With repro stands you can obviously obtain a scan with any reprographic device, but I do not know of a single serious world-class giclee shop that would consider any brand other than a Cruse (or a BetterLight).

The BetterLight is a beloved capture device by many staunch fans. They would only use this brand, and none other. The BetterLight is a component system: you can mix and match dozens of components.

The Cruse is highly regarded by its own faithful users. Most use only a Cruse, and none other. The Cruse is not a component system: everything is totally dedicated to work in unison with each other. There is no guesswork as to

what tripod, what alignment system. The Cruse is completely and in effect permanently aligned during the week that it is installed.

It's sort of like the users of Macintosh computers and people who only use PC computers. Each group really likes their favorite solution, and (since we are all human), each group tends to deprecate the opposing brand.

FLAAR uses both Macs and PCs. Every FLAAR Report that is penned by Nicholas Hellmuth is written on a Mac. Every FLAAR Report is designed and issued as a PDF on a PC. This is because we are a neutral research institute. The Mac has some advantages (it definitely looks nicer on the desk than the clunky PC designs). The PC is a tad less expensive and traditionally slightly faster. We use both computer platforms.

Same with the BetterLight and the Cruse. Each has its beneficial features; each has a few things that it is not as adept at. We cover these when we get into the two systems in detail.

Very few giclee production shops have both a Cruse and also a BetterLight. Thus FLAAR is in a unique position: we have daily experience with both, for years (eight years experience with three models of BetterLight and five years experience with two models of Cruse). We recommend each of these systems because they are each, in their own way, outstanding. It just depends on your needs, your client's needs, and your budget.

Okay, what about other brands or kinds of tri-linear scanning systems?

The same reasons justify singling out the BetterLight as compared with other large format capture systems. No other tri-linear capture system (besides BetterLight or Cruse) has steadfastly dedicated themselves wholeheartedly to giclee. Yes, an Anagramm, Kigamo, or Phase One tri-linear camera back is technologically capable of capturing an acceptable digitization of a painting. But BetterLight happens to be the system that is an international standard. BetterLight is what is used primarily in giclee production shops in California and up and down the East Coast. And BetterLight has been the standard used by FLAAR for almost a decade.

If Kigamo or Anagramm were as widely utilized as BetterLight, then it too would have had a fair chance to be listed in the first round of certification of recommended equipment for digitizing oil paintings and watercolor paintings. But none of the major giclee production facilities that we know have any of those other brands, and all the giclee teams that were integral in furthering giclee production already have BetterLight (or Cruse). Plus all the new software that is being developed for an innovative giclee workflow is specifically for the BetterLight and their partner, NorthLight Products.

What about other brands of dedicated reprographic systems: stands plus camera?

At Photokina 2004 or DRUPA 2004 we saw another brand of repro stand digital capture system what frankly looked like a cheap knock-off of the Cruse. Indeed Cruse GmbH is considering a patent infringement lawsuit. Cruse has the patent on the synchron table concept.

There have occasionally been hand-made digital reprographic systems but none have become an industry standard like BetterLight and Cruse. Both Cruse and BetterLight have fully capable tech support available in the US and in many countries.

And it always comes back to the same basic fact: both Cruse and Better Light are each, on their own, full-time dedicated to giclee and the digital fine art market. With other companies, they make lots of different products: fine art capture is merely a sideline. Thus they tend to copy what they see being successful elsewhere.

What about other brands of reprographic stands, for a piece by piece system?

One primary advantage of the Cruse is that it's a dedicated system: all parts work together. The minute you try to go low-budget with a piecemeal system, you have to add or subtract different bits and pieces to create your entire home-made system.

The Kaiser repro stand is too small for serious giclee production. We have one; it's more rigid and in all respects better than all the cheaper brands, but simply is not large enough. Yes, you can stitch, and we do (with the Cruse also). But this is not very productive if you have to scan large paintings every day.

The only reprographic stand that has the size and quality that we could consider (in addition to the Cruse) would be the tti stand (Tarsia Technical Industries). But we do not have any tti equipment and hence are not a practical source to comment on its pros and cons.

Linhof makes great equipment and its copy stand is okay, but in the US people would tend to select the locally available tti.

DeVere was a name in photographic equipment maybe twenty years ago, but I have not seen (or at least have not noticed) any DeVere copy stand or brand name at a single Photokina or PhotoPlus or PMA and I have been attending Photokina since 1998 and the other since 2000 at least year 2000. But if you happen to have any of these brands, if it works for you great. What's crucial is that it not wobble.

What about tri-linear scanning systems other than large format size?

Kaiser Scando ICOSS, Pentacon Scan 5000, and other line-scanning cameras exist. But they remind me of the clunky Leaf Lumina scanning camera of the same early era. I do not yet personally know any professional giclee atelier in the US who uses any of these systems. The Pentacon Scan 5000 probably has all kinds of nice features but I don't yet see any convenient viewing unit. And a serious giclee production house would surely prefer something better than a 35mm lens.

At GraphExpo 2005 there was a booth with a lone Pentacon Scan camera. All alone, no accessories. I am not convinced that the place selling this was familiar with the demands expected by serious giclee artists.

When you acquire a BetterLight you become part of a family that can share common digital experiences. There are professional BetterLight users around the world. The same with Cruse. I was in Thessalonica, Greece a few weeks ago, and the giclee atelier there was using a Cruse. We could immediately talk a common language.

If you have a Kaiser Scando, or Pentacon, it's a bit embarrassing, because you don't have a circle of colleagues to discuss giclee and learn from them. BetterLight and Cruse are the world standards for professional giclee ateliers.

What about using a medium format camera?

The same reason applies to selecting Hasselblad as the HP partner for medium format. There is no other combined camera+back system. Rollei makes an excellent camera, the Rollei 6008 AF but is not, yet, a digital company had has

none of its own backs. Contax died over a year ago. Mamiya only had its own back since a few months and it is not yet well known. FLAAR has not had one available for use, for example. Phase One and Leaf are both fully professional solutions, but neither is allied with a camera (body) manufacturer. Sinar would be a logical choice based on its prestige factor, but it dropped out of the medium format race last year, with Jenoptik taking over the company. Since in past years none of their cameras were as fully untethered as other brands, so Sinar did not win access to the first round, though I personally could consider a Sinar or Jenoptik back as of the highest professional quality, as I would consider Phase One and Leaf. Surely there will be a phase two, and in that phase all professional cameras will be accepted.

Besides, since it appeared in the 1960's movie Blowup, and since it went to the Moon, Hasselblad has the prestige name that is recognized around the world as synonymous with status and quality. The current camera model is the H2; the new 39-megapixel backs come in three models: CFH-39, CF-39, and CF-39MS. My choice would be the MS (multiple-shot) version. However multi-shot technology is fading, in part due to the high cost, in part because they require being tethered to a computer (and hence are not as portable or spontaneous), and in part because a 39 megapixel camera does not really require much more than a 1-shot take.

Summary: Featured solutions for image capture are:

- BetterLight tri-linear scanning back, large format camera, with Zig-Align
- Cruse tri-linear scanning system on reprographic stand
- Hasselblad medium format back, with Zig-Align

The Cruse is permanently aligned so does not require Zig-Align; has built-in lights; and includes its own integrated copy stand (so no tripod or head are required).

Camera to hold your BetterLight insert

At FLAAR we use Cambo Ultima 4x5 cameras. They are rock-solid. We are aware that many photo studios use Sinar 4x5 cameras, but we do not have one. We find Arca-Swiss 4x5 cameras outstanding, but again, we don't have one so can't comment on using it on a daily basis.

Squirt Printing uses the Cambo Legend. Cambo cameras are hand-made in The Netherlands and have the quality you expect of a European product.

Avoid L-shaped large format cameras: they sag with the weight of a digital back, especially a tri-linear scanning back because they stick out one side, so there is more weight on that one side. This cases an L-shaped camera to sag all the more. So this deficiency eliminates several otherwise excellent camera brands and models.

The worse possible thing is to use a flimsy 4x5 camera.

Tripod, or studio stand, for your camera

Pro studio photographers may use tripods from Linhof, Gitzo, or Manfrotto. I have not yet seen a Sinar-related tripod but I am sure that large commercial production studios use them. By far the majority of studios I visit use a Gitzo. I prefer the MK2 Tele Studex line. I have these tripods in both the FLAAR studios (Ohio and Guatemala). The MK2 Tele Studex has the advantage of being very heavy. This is not a disadvantage in the studio. For working in a studio I would use the heaviest tripod I could find. Or a good studio stand.

For outside on location, if windy you need the weight again; if not windy, and if you don't have assistants to carry

the weight, a Gitzo Mountaineer Studex carbon fiber tripod is ideal. Naturally you can also use a carbon fiber tripod indoors in a studio. Squirt Imaging uses a G1348 Mark 2. The G1325 or G1327 would be equally fine.

Tripod head for your tripod

It is natural to assume that a tripod comes with a tripod head (what you attach your camera to). But in the realm of top pros, you select the tripod and the head separately (though usually simultaneously). I use a tripod from one brand and a head from another brand.

Currently at FLAAR we have about 12 different tripod heads and probably 10 or more tripods. This is because each photography situation calls for a slightly different size, shape, and kind of tripod or head. We also have a full-sized studio stand.

The kind of tripod head that works great for photographing weddings, or for commercial photography, may not be ideal for using with a large format camera to photographic artwork. We especially find that 3-way pan-and-tilt heads are a poor choice. First of all, you don't have three hands. Second, some of this design of 3-way heads come from the world of video.

That said, the Manfrotto tripod head we do recommend, also has three controls. But these are not pan-and-tilt heads; they are geared heads. Besides, in a studio setting doing giclee you won't tend to need to use more than two of them at once. Just don't select the smaller lower-priced one: its handles are too short.

A Manfrotto geared head is the head of choice for a growing percentage of pros. Many photographers select the #405 or #410 geared head because they look less intimidating than the giant #3263, and cost less. But you need the one with the longer handles: go for the giant #3263. We have the giant heads at both our locations and have used this model since the late 1980's or early 1990's, whenever it was that they first came out. The #405 or #410 are sturdy but with not intended for constant adjustment (the handles are not comfortable or fast-acting). In distinction the #3263 is truly deluxe in fine tuning. Besides, it is heavier and you want a heavy tripod system to reduce camera shake.

This is a polite way of saying skip the smaller Manfrotto geared heads and select only the larger one.

Custom lighting

Over the last 15 years, all forms of lighting have been used to digitize paintings for giclee. But many museums do not accept strobe (flash) or tungsten forms of lighting. Even though museums may have skylights over their exhibit halls, but curators don't want an iota of UV light from a photography source to get near their precious art.

So fluorescent lighting and ceramic discharge (CD) lighting have tended to be preferred when "cool" lights are needed. Since most fluorescent lighting fixtures are made to hang from the ceiling of TV studios, few have been widely considered for lighting paintings for photography. Most heavy-duty fluorescent fixtures sit ungainly on top of a normal studio light stand. Videssence would be the best example of a light that hangs okay from the ceiling but does not sit well on top of a light stand.

Since most photographers come from the world of strobe or tungsten, they often do not understand how to get used to the less strong light of fluorescent. Plus fluorescent lights were never accepted for traditional studios: indeed having a fluorescent light anywhere on a set was the kiss of off-balanced color in the decades of film-based photography.

Actually fluorescent lighting has many benefits for today's digital photography, and FLAAR uses fluorescent lights from Balcar, Videssence, Westcott, and is considering fluorescent lighting from Lowel, but so far fluorescent lighting has few other champions waving their flag. So CD lighting won out, also in part because of the productive relationship between BetterLight and NorthLight products.

NorthLight is a company somewhat similar to BetterLight: the product of vision of a single talented person, in this case Dave Christensen. North Light Products is located just a few miles from BetterLight (near Silicon Valley) so it is not surprising that the two have pooled their considerable talents. NorthLight makes the lights: BetterLight makes the camera backs.

There is no other lighting company working specifically in the world of museum lighting in general or giclee lighting in particular. So until other lighting companies recognize the potential of giclee, it is unlikely to be much impetus to change the lighting accepted by BetterLight and thus by Hewlett-Packard to get things started. North Light has worked directly with both BetterLight and they in turn with the giclee industry and museum curators to produce lights that satisfy everyone. Since the lights are new, the jargon (abbreviations) are not yet well known: HID stands for High Intensity ceramic Discharge. DeSisti (in Italy) and a few other companies make comparable ceramic discharge lights; BetterLight has a white paper describing the pros and cons of each: for example, evenness of the distribution of the light is crucial. You don't want hot spots.

How you arrange your lighting we will cover in a "how to do it." FLAAR has been dedicated to studio lighting for over 30 years, so we have some experience in how and where to place the lights.

You can use two lights (one on each side) or a light on one side and a reflector on the other. Your choice will depend on your style and the kind of painting, old map, or other item you are photographing. Reflectors come in many brands, sizes, shapes, and colors (which we discuss in the "how to"). We use reflectors from Lastolite and from Westcott.

Light meter

We are neutral as to whether you need a light meter in the era of digital photography. I tend to prefer to bracket, or watch the histogram as I photograph, and manually change the f-stop based on where I wish the histogram to appear. But many pros are so engrained to use a light meter, that they continue even in the digital era. I respect their desire to use a light meter, but since I do most of my photography out on location, a light meter is merely one more piece of equipment to get scrunched in your baggage, or to have some ignorant airport security person assume it's a dangerous instrument.

If you do wish to employ a light meter, we at least have experience in the two major brands: Gossen and Minolta. I used a Gossen Luna Pro for decades. Then I switched to a Minolta. It was so many years ago I can't remember why. But I have happily used the Minilta flash meter ever since.

Recently we went back to Gossen, in part because the Minolta was so old. It works fine, but I was curious to see the newer German technology with the Gossen. Either light meter brand is perfectly okay.

Custom color profiling

In jargon, a "tool" is usually a spectrophotometer. "Software" is ICC color profiling software.

Color management entails

- Monitor calibration tool and software.
- A color-calibratable monitor

- Printer profiles (for ink and media, requiring tools and software)
- A viewing booth

Monaco must own most of the patents because they are the most widely used software. GretagMacbeth and Monaco are now both owned by X-Rite, so it would be expected that most ICC profiling software in the future will be from Monaco. However if you already have the ICC profiling software from GretagMacbeth, that is also of professional stature and fully proficient.

Several levels of ICC color profiles exist:

- Canned profiles
- Custom profiles

In jargon of inkjet printing, canned profiles are those produced by the printer manufacturer or the media producer. Custom profiles are produced by the individual printer operator on a daily, weekly, or monthly basis.

There is a completely new kind of ICC color profiling technology, essentially new software that uses at least one slightly different step in the workflow, at the time you take the original digitization. This new profiling system was shown at ArtExpo Atlanta 2005 and then again at ArtExpo New York. The concept is ingenious: instead of doing colors based on a standard chart, the new software uses the colors of the original painting as its color chart.

It is ironic that this software was conceptualized not by Epson, and not by a color management tool manufacturer, but by a printer manufacturer: namely HP Labs. So far few people have had the opportunity to utilize this software, but suffice it to say, they jumped ship very quickly, essentially abandoning their complete current professional workflow, and went to the new workflow. Indeed this new FLAAR Reports is the first publication that even mentions it. And I can only mention the aspects that have been shown to the public at two trade shows.

But first, back to the traditional workflow, the one that works with Epson, Mimaki, Roland, Iris, and also with HP. With HP you can select either the normal color management, or the new concept.

Custom Profiles vs Canned Profiles

In the old days, with 35mm or 120/220 roll film, or 4x5 film, a pro photographer would buy a large quantity of film from the identical "lot" and test one sample roll. Every batch of film from the manufacturer had a lot number. Every roll of film produced that day, week or month with that lot number was chemically identical only to other rolls of the same lot. The next lot was slightly different, yet a pro could tell the difference. So the next time he or she bought a new roll of film, they bought it by the box full, and had to test one roll of the new lot.

Well, don't be surprised: it's the same with ink and inkjet papers. In part this is because the "paper" is not paper. The paper (which is usually synthetic anyway) is not what you print on. The ink interacts with the inkjet receptor layer of chemicals which are coated on top of the paper. That is why the material is called media: media is a substrate with an inkjet layer on top. With solvent ink, or UV cured ink, you can print on the base substrate directly: you normally don't need any chemical coating (hence the base substrates such as raw vinyl are much cheaper, as are the inks).

You never really know when the ink lot or the media container load off the ship has changed slightly, especially if the media is from China (which means much of the media sold by Kodak and actually by many other companies).

Canned profiles are made under conditions at somewhere unknown (at least foreign to the location where the printer using them several months later is located). You, the user, don't really know if the temperature, humidity, or other conditions were the same as where your own printer is situated, or even the altitude.

Printheads age over time. You don't know whether the ink is from the same lot, or how long they waited from the time of printing to the time they took the profiles (some inks change color immediately after printing). Other inks take 24 hours to reach their final color gamut.

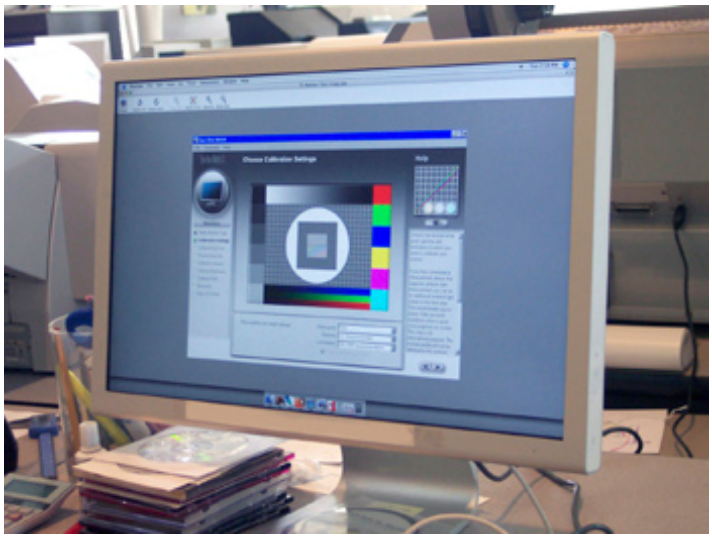
And you don't always know if the canned profiles have a legal license to be used: all profiling software is copyright. This means that all ICC profiles carry an automatic copyright of the profiling software that made them. If your media producer, or printer manufacturer, does not have a license, the profiles could be in violation. Most of the media companies, distributors, and dealers that we spoke with were totally unaware of the copyright issue. It is as if Microsoft word owned a copyright on every book written with their software. This is absurd, but is how the ICC profiling software works. You do not own your own profiles, and you definitely can't sell them or let others use them.

We would assume that Epson, Roland, and HP profiles are legal; they pay a license fee. Naturally they know how to profile their media and inks. But most serious giclee ateliers still prefer to do custom profiles. I once spoke with the owner of a photography print shop. They owned two identical Epson printers. But each printer produced a slightly different color range, and each thus required individualized custom profiles. The same would tend to be the case with HP or Roland; this is not a defect with any Epson printer: it is the inherent variability of chemistry of all inks and coatings. But with media from China, the variability is legendary. Actually some media is so bad we stopped using media from Sihl. If they can convince us that the rolls will not have blemishes, we would be glad to start using it again. As a note, not all Sihl media comes from China; they have paper and coating mills in Germany and Switzerland. But Kodak and other companies have closed most of their own mills and tend to buy from China now.

FLAAR has an entire series of publications on color management, so here we can be brief. Although about four companies make software and color management tools, the only brands that are the world standards are GretagMacbeth and X-Rite. Since X-Rite just bought GretagMacbeth, there is not really much competition any more. The primary software will probably continue to be Monaco.

GretagMacbeth Eye-One Photo or Eye-One XT would be the mid-range spectrophotometer. Although the Gretag software to accompany this would normally be ProfileMaker 5, the competing Monaco software kind of became a de-facto international standard. But the GretagMacbeth ProfileMaker is a fully professional and highly regarded profiling solution. PM5 Photostudio would be what would be called for.

For the Mac G5 computer I find the Cinema Display excellent on the eyes: I could not maintain what little sanity I have left without the 23" and will probably move to a 30" version soon. The 22" monitors were flawed. 20" are improved over the 22" but 20" is not enough real estate unless you have dual monitors. And you might as well have a single 30" monitor.



Dell has lagged behind on good LCD monitors, but finally has acceptable models since last year (2005). Otherwise, as a computer, Dell PCs are long ago as good as and in many respects better than a Mac (as even Steve Jobs finally admitted when he switched to Intel chips). I tend to use Mac but most of my staff prefer PCs. To a TIF file it is just a machine, so there is no need to wage war over which operating system you use.

Eizo ColorEdge monitors are potentially as good as the previous standard, which was LaCie which had several years ago replaced the expensive Barco monitors. Today, since you can buy your own monitor calibration tools and software, you no longer need a self-calibrating monitor such as Barco (especially since they cost about $5,000 in their day). Eizo is the first company that made color calibration of LCD monitors a high priority. The ColorEdge CG220 would be the size to go for. 19" is too small by far, unless you have dual monitors.

Viewing booths are made by GTI and JUST Normlicht, among others. European viewing norms are not necessarily the same as American traditions in color temperature.

FLAAR has both GretagMacbeth and X-Rite color management tools and software. But lots of new models have come out recently, such as the X-Rite DTP 70 (we have the DTP 41UV). Then there is the X-Rite Pulse ColorElite System. Figuring all this out is why most print shops call on a color management consultant to get help and/or training.

Proprietary "HP Artist" capture software

This software is so unique, and so new, that it deserves its own dedicated FLAAR Report evaluation, that is under development.

Selecting your printer

Deciding which brand and model and size of printer is obviously a crucial step that will impact your workflow. Thus we have a separate report on this.

RIP software

RIP software can be listed as one step on the workflow. But selecting one single RIP is tough because there are over 70 RIP softwares listed in the FLAAR Reports on Raster Image Processors. Of these several brands come under consideration by cognoscenti, in alphabetical order:

- ErgoSoft for most brands of printers
- Onyx PosterShop for most brands of printers
- PosterJet from the Eisfeld company (for HP Designjet)
- Wasatch SoftRip for most brands

At FLAAR we use PosterJet to produce giclee in Guatemala and Wasatch to produce giclee in Ohio. ColorBurst is a popular RIP for Epson. AIT Shiraz is a RIP we are in the process of evaluating, after seeing it for many years in European trade shows.

Everyone has their favorite wine, and has a preference for a musical style or group. It is the same with good RIP software. All of the five above have their good features and a few things that are still being worked on to improve. At FLAAR we know the CEO and staff of all five of these companies, and have feedback from end-users (pro and con) on all five software packages. We cover RIP in detail in our separate FLAAR Series.

Special HP media and media profiles

No printer manufacturer really makes they own media. Epson, Roland, Canon, and HP buy media from paper mills and rebrand it. Kodak was the only printer manufacturer that used to make their own media: then two things happened. Kodak started buying media from China while still making a big issue of their own media experience; and then Kodak's Encad printer division went belly up (not related to the fact that Kodak switched to Chinese media; Encad failed due to five years of blurred vision, lost opportunities, bumbled management, lack of a good printhead technology of their own, and issues with a legacy ink delivery system that allowed too much air to get into the printheads).

HP has the resources, the chemists, the million-dollar test labs, and the dedication to excellence to define special inkjet media and prepare custom media profiles. I have visited the HP headquarters in Barcelona on several occasions, and the San Diego headquarters on two opportunities. You see acre after acre of huge buildings, each filled with thousands of specialists including color scientists, technical experts, row after row after row of cubicles of professionals of every background you can imagine. Then you see their test labs. My first reaction was to wonder how any smaller inkjet company had survived so long without the huge technological backup of a company the magnitude of HP.

HP has also been working with two large giclee producers in the US (Thomas Kincade and then with Squirt Printing) to create the inkjet receptor coatings and ICC color profiles that are optimal. Their key beta tester is Andy Wood. Wood

was formerly the top technical person at Kincade, Andy Wood is now completely independent and runs Squirt Printing LLC.

Ink selection

Getting into discussing ink is a quagmire. The only after-market ink that we would consider using is the Symphonic Ink from Scott Saltman and Jon Cone's black-and-white inks. Otherwise we use only Epson ink in our Epson printers and only HP ink in our HP printers.

Jon Cone's inks work best in an Epson printer. For a while he was making inks for Canon printers but either the Canon printer or the Piezography ink for it did not work out as well as expected. But the Piezography ink for Epson is popular.

The BGSU+FLAAR labs test ink, but so far all our tests have been for manufacturers or distributors, and under NDA.

Specialized Finishing with topcoating

Finishing is the part of production that no one tells you about up front. But you have to cut, trim, top coat, and then in many cases deckle (the edges) of your print. Lets take these one at a time:

We use Meteor trimmers at FLAAR (Metoschnitt is the model, made by Meteor-Siegen in Germany). Other options include RotaTrim or Keencut. You can obtain these from Mike Lind at www.ReprographicDesigns.com.

Yes, most printers will cut the material, but thick canvas and thick watercolor paper are best cut by hand. Besides, on printers such as the Epson 9800, the debris from cutting floats around the printer and gets in the heads, necessitating frequent flushing of ink (flushing with expensive ink is a necessity of the Epson piezo system). So having a separate cutter is essential, since the on-board cutters are not really made for the heavier papers.

Top coating is jargon for laminating with a liquid or spray. Inkjet canvas needs to be laminated or the inkjet receptor layer will easily be scratched off. Merely rolling and unrolling a rough canvas as you take it from exhibit to exhibit (if not framed) can cause the media to get scratches. One scratch and the entire painting is ruined.

You don't want to laminate canvas with plastic film: the result looks plastic, and cheap. The traditional way is to use a nearly invisible liquid. You can spray it on, you can dip the print in a bath, or you can employ a liquid laminating machine. They are available in all sizes and every price, from simply hand-cranked versions to $15,000 and up for motorized liquid laminators. Squirt Printing uses a Lumina laMMax 76 inch model, with a custom modified bed (Squirt built the bed themselves).

Signage shops use liquid laminators from Neschen-Accutech, Keundo, or other companies. Ten years ago décor and giclee production places used solvent-based lamination but the fumes are vile: worse than a solvent ink printer; worse than the inks used in screen printing of the same generation. So today health-conscious giclee producers opt for non-solvent solutions.

Lumina and Neschen both make liquid laminators of medium size and medium budget. Tests by Squirt Printing suggest that ClearStar ClearShield Eco Print Shield is non-yellowing and non-cracking and not milky. Many other liquids either

- Yellow with age
- Crack with age
- Crack when you stretch the canvas
- Have a milky appearance from the beginning

ClearStar is a well known company that specializes in making liquid lamination liquids. Sometimes you will opt for the machine of one company but not necessarily their own liquids. Usually you will want to test all available liquids and stick with the one that works best for you and your clients. ClearStar, however, makes only the laminate liquid: no machines. In a way this is better: you can be assured they are 100% dedicated to a single product class and thereby

can get good at this.

Be wary of other brand names that claim a fabulous number of years of lamination protection. Trust only a realistic common sense longevity statement. We cannot personally warranty any brand (we do not ourselves warranty any product that we mention because we do not sell the products), but we tend to list only the products that we ourselves use or that HP or Squirt Imaging have tested.

Our other general guideline is to trust companies that regularly exhibit at the major trade shows. With ClearStar you can meet the owners, discuss their products directly with them. Everyone knows who the owners and staff are. Same with Neschen. Lumina I am only gradually beginning to become aware of, but the leading giclee production facility in Silicon Valley uses a Lumina laminator, and that alone is a good recommendation.

Most liquid laminators, and the liquids they dispense, are made for solvent prints on vinyl For giclee you seek a laminate that works best on artist's inkjet canvas.

Your workflow continues…

In the real world you need to add several more steps to your workflow: packing and shipping. You can scratch, ding, or otherwise bruise the print while packing. We recommend including a sheet with your print for your customer, "how to help your print survive unpacking, framing, and usage."

In some states you need to prepare a certificate of authenticity.

Stretching the canvas and framing materials of all kinds is usually at a separate location, namely a framer, though many giclee ateliers offer these services, especially stretching the canvas.

Invoicing, and collecting the payment, are no different in giclee than with any other business.

Common Sense

Test all hardware and software before you decide which to buy. Be sure to find another giclee production shop that is successful and find out what they have learned about the pros and cons of different products. Then be sure that your clients like the results: the "clients" are both the artist of the original painting and the people who buy the resulting giclee print.

We aware that some advertising agencies invent words to cover up defects of a particular technology. So if a piezo printer is good at most things, but is slow, the ads won't bother touting the good features, they will concentrate on claiming the printer has "blazing speed." Or they will claim "twice the speed of the previous model." But in reality that just means it is half as slow as the previous model.

If a printer has trouble producing cyan, blue, and red, the printer ads will feature cyan, blue, and red images in the advertisements.

You get the picture. However in fairness to printer manufacturers, in most cases the printers nowadays are excellent, and sometimes a new model or a new ink will indeed be an improvement, and therefore it is logical that they praise certain features because they realize you may know about the deficiencies of the previous model. But there are several dubious and rather silly exaggerations in the advertising of some printers. Also, just because a printer has one or two weak points, is not always grounds for skipping that and buying another brand. Sometimes the strong points of a printer outweigh the few deficiencies. Realize that every printer, even those that don't shine in evaluations, do something really well.

Contact Information, manufacturers

www.betterlight.com

www.CruseDigital.com worldwide; www.ReprographicDesigns.com, for the USA

Color management tools and software: www.ParrotColor.com

Cutter, trimmer: www.ReprographicDesigns.com.

Manfrotto tripod heads, Gitzo tripods, light stands, Lastolite reflectors: www.BogenImaging.com

Media (artist's canvas, watercolor paper, photo satin, matte and photo glossy) www.ParrotColor.com

Cutter, trimmer: www.ReprographicDesigns.com.

Reflector options: www.fjwestcott.com

Lighting: www.NorthLightProducts.com (also available via BetterLight)

Parallel alignment: www.zig-align.com

Printers: www.globalimaginginc.com (ColorSpan, Mimaki, HP, Dilli, Vutek, Zund), www.ParrotColor.com (Parrot Digigraphic, Epson printers)

RIP software: www.wasatch.com, www.PosterJet.com

Top coating (liquid lamination): www.ParrotColor.com

Contact Information, resources

www.FLAAR.org, www.FineArtGicleePrinters.org

Bibliography

There must be several thousand pages on giclee on the Internet, but not many discussions by labs that have both Canon, ColorSpan, Epson, HP, and Mimaki (and an Iris).

We have separate bibliographies for each aspect of giclee, so don't try to repeat that here. Just have one item that we landed on recently.

www.tasi.ac.uk/advice/creating/camera.html
An extensive discussion of digital camera technology, though not specifically for giclee, it does provide good basic information.

Bibliography: Lighting

One of the things that gets neglected in the rush to buy a new printer is how to photograph the works of art that you wish to reproduce. FLAAR has several web sites related to these considerations, including www.maya-archaeology.org, www.digital-photography.org, and others. Some of them are a bit dated but often the basic techniques of photography are ageless.

The bibliography below is not intended to be complete, and indeed only covers lighting. The complete bibliography is available to participants in the FLAAR courses on digital photography.

BIDNER, Jenni
1997 The Lighting Cookbook. Amphoto, New York (Watson-Guptill).

COLLINS, Sheldan
1992 How to Photograph Works of Art. Amphoto/Watson-Guptil, New York.

HICKS, Roger and Frances SCHULTZ
1998 Learning to Light: Easy and Affordable Techniques for the Photographer. Amphoto, New York (Watson-Guptill).

The main problem with the books listed above is that they do not cover how to photograph paintings to reproduce as giclee. Indeed the kinds of lighting used with digital cameras today did not exist in the 1990's when the three books listed above were written. This is why FLAAR has acquired as much of the new lighting technology as possible, and is working on writing up each kind of studio lighting technology. Each year we have additional publications, especially now that we will be starting giving workshops in digitization of oil paintings and watercolor paintings for giclee.