

## INPUT TO ACHIEVE OUTPUT IN FINE GICLÉE PRINTING

by **Nicholas M. Hellmuth**

Every month more than 17,000 artists and over 26,000 photographers come to the [www.FLAAR.org](http://www.FLAAR.org) website to ask what digital imaging hardware or software they should buy. Many of these individuals and companies ask which printer is the best to reproduce giclées, fine art photos, or decorative prints.

They believe that they need a new and better printer to achieve high quality giclée results. But there is much more to the making of a quality giclée print than a quality printer. The process of capturing the image through use of the best scanners and cameras is critical to the process. The reason they approach FLAAR for guidance is that, with its 23 wide-format inkjet printers, it is the largest university or museum institute in the world dedicated to research and resultant preparation of information about inkjet printing specifically applied to art and art history.

Located at Bowling Green State University, Bowling Green, Ohio, FLAAR is an independent institute dedicated to pre-Columbian art and iconography of Latin America, and digital imaging as a means to record this cultural patrimony. Most of our interactions on campus are with the College of Art, and with our official home there, the College of Technology. FLAAR came to BGSU after previously being engaged in giclée printing on canvas from its offices in Germany and Guatemala; this experience was introduced to BGSU, where it has expanded. FLAAR at BGSU is now one of only two university institutes in the U.S. that has a Cruse scanner and also a BetterLight digital camera, the two premium capture devices for digitizing watercolors, pastels, and oil paintings.

In addition to our own research in-house at the university, we learn a lot by visiting shows. We have seen examples of prints that are slightly out of focus in one, two, or sometimes in three corners. We notice images that are flat, and featureless, with not much relief. They look like a simple photograph, not like an original painting with vibrant brush strokes and texture. A really good shot with a Cruse, and also capable digitization by a master using other camera technologies such as BetterLight, and you can see every brush stroke and cracklure of the original painting.

### Alignment: Precision Is All

A comment I sometimes hear from artists is, "I use the best photographer in town; they have lots of professional looking equipment." Yes, a million dollar studio for photographing weddings, graduations, or proms may indeed be the best photographer in your town. But this is by no means the best place to have your paintings digitized for subsequent giclée production.

Almost invariably when I ask, "What alignment system do you use, or does your photographer use?" I get either a look of confusion, or a look of "I don't need to worry about alignment." I give you an example of lack of awareness in this respect at a print shop I visited. They had a professional photographer and professional equipment (BetterLight). They had used industrial grade scaffolding to build a room-sized scaffolding system to hold the camera at one end and the painting at the other end. Their concept was that by using the same length scaffolding poles on each side, that naturally the painting would be parallel to the camera, since both were centered and the side poles were identical in length.

But scaffolding is not a precision instrument; especially not the joints at the corner, which can easily be off 1 or 2 millimeters. And the angle can be off a few seconds, too. Indeed, the photographer, who had been using this system for digitizing oil paintings, pastels, and watercolors, was perplexed, "I don't under-

stand, after I spent all this time and money making this rigid system of parallelism, why the image is not fully in focus on all four corners!"

Well, it's because a large-format camera depth of field is quickly off if the sensor is not absolutely parallel



**Artist Jacqueline Jasionowski, left, and Bowling Green State University lab personnel preparing an original work of art to be scanned on the Cruse.**

to all four corners of the painting. We did a test at the University of Malta, Malta Centre for Restoration. They had been photographing paintings and other flat works of art for years, so we asked them to do their own typical set up, and let us look at the results. We enlarged the image, looked at all four corners, and showed them that three of the corners were out of focus. This simple test demonstrates that jerry-



**Testing use of a Zig-align system with the BetterLight being used on a project of the Malta Centre for Restoration, as part of a joint project with FLAAR.**

rigged attempts to align the camera back with the painting tend not to work. With film it was not as critical; but with a good digital back, you can't be off more than a millimeter or so. We installed a Zig-Align system, a brand new Sinar camera with a BetterLight back. Between

Martha Martinez, of the FLAAR staff, and David Frank Bujega of the Malta staff, they got all four corners focused the first time around.

Dozens of studios use the Zig-Align system; all with a BetterLight camera. The ones I know the best are Squirt Printing (Andy Wood) on the West Coast and Fine Art Impressions (Gary Kerr) on the East Coast. Realize that if you have a Cruse they have permanent alignment built into their system: a Cruse does not need to be Zig-aligned for each painting.

So no matter how fancy a printer you buy, your 2880 dpi will only reproduce an out of focus photograph, better. But once you realize that you have to align your painting with either a Cruse or a Zig-Align, you still have at least four ways to digitize a painting or drawing:

1. Put the painting directly onto a flatbed scanner.
2. Feed the painting through a wide-format scanner.
3. Photograph the painting with a traditional camera and scan the transparency.
4. Photograph the painting with a digital camera.

Option #1 is possible, and means you don't need an alignment system (because we assume the scanner is aligned to the flatbed surface). But few museums have a scanner large enough to handle most paintings. Not many scanners are larger than 12 by 18 inches. Those that are larger would be very costly. And most curators would not want the surface of an original work of art to touch the glass of the scanner. But the real problem is that you can't control the lighting inside a scanner. So option #1 is not taken seriously by most professional giclée print ateliers.

Option #2 is also possible, and even advertised, but I can't imagine a curator that would let an original painting feed through the mechanism of a wide-format scanner. Too easy to scratch the surface. But if you already have a wide-format scanner, or if you need this scanner for scanning line drawings, you can try it. Contex makes excellent wide-format scanners. Just realize you have the same limitation of a flatbed

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scanner: You can't control the lighting, so you can't do side-lighting to bring out the brush strokes. But to scan a poster, map, or flat work with no texture, this can be readily accomplished by a good wide-format scanner.

Option #3 is still popular. Photographers all across America and around the world for that matter use 4x5, medium format, and probably an occasional 35mm shot to send to a giclée atelier to be scanned and then printed on canvas or watercolor paper.

But once you enlarge the transparency, especially from 35mm size, you start to see film grain. You invariably get dust, scratches, hair, and other clutter. Of course, if you oil the transparency and use a drum scanner, that gets rid of litter, but few photo labs use a drum scanner. If you do, the ones we like the best are ICG from England (also available in the US).

Option #4 is what the best giclée print studios use today, so let's focus on digital cameras. But before entering the realm of the prestige giclée ateliers, let's look at what many people hope they can do in order to cut costs in entry-level giclée shops. Because, once you realize that using a digital camera is the best or at least the most practical way to digitize your painting, you have four options, going from entry level up to top tier.

## Digital Cameras: How to Choose

1. Use a dedicated large-format digital camera back (Cruse).
2. Use a portable large-format digital camera back (BetterLight, Anagramm, Kigamo etc), on a copy stand or tripod.
3. Use a medium-format camera on a copy stand or tripod.
4. Use a 35mm camera on a copy stand or tripod.
5. Use a simple camera.

It is astonishing how many people write and ask us how they can use their 4-, 5-, 6-, 7-, or 8-megapixel digital camera to shoot for giclée. What their camera dealer and the camera advertisement specs neglect to tell them is that the zoom lenses on this kind of point-and-shoot camera will distort almost everything. So let's not take it as a serious option for digitizing paintings.

You can, though, use any point-and-shoot camera for fine art photography, because 6 megapixels and above is plenty for an exhibit

print of 11- by 17-inch size, but not as a basis for giclée reproduction of a painting. It is not the megapixel size, it is the lack of quality of the cheap lenses.

Now a 35mm camera on a copy stand or tripod is an option for some and a necessity for others, or so they think. But a Canon EOS 1Ds Mark II costs \$7,999, without lens. A BetterLight scanning back, large-format, compares favorably in price, though this assumes you already have a large-format camera to hold it (and a lens). But a large-format digital system may cost less than a medium-format system. It is tough to align a 35mm camera: the Zig-Align system works best on a large-format camera, though options are available for medium-format. The Cruse is self-aligned during installation, so you don't have to align it for every shot. This is why the Cruse is more productive: it is all set up, and does not get out of alignment since it never moves out of its home position. But the primary reason why you do not want to attempt doing giclée with 35mm is again the lenses. You need the quality of a Schneider or Rodenstock lens, especially their APOchromatic lenses.

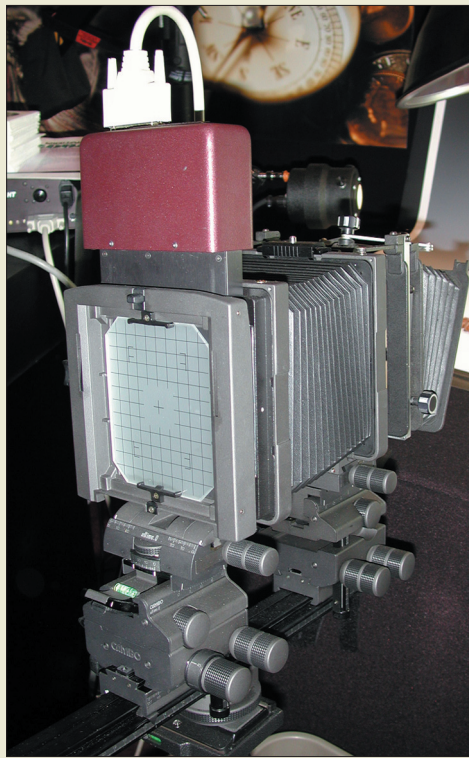
The next step up from 35mm is medium-format. We would like to look at medium-format as a manner to digitize paintings for giclée. A Sinar-Jenoptik, MegaVision, Hasselblad-Imacon, or Phase One system each has strong points. But most full-time long-term giclée production facilities opt for either a BetterLight or Cruse (both are large-format; both use Schneider or Rodenstock lenses). Thus, until we have a Mamiya AFD II, Rollei 6008 AF, or Hasselblad H1 camera to hold one of the medium-format backs, we prefer to wait.

## Copy Stand vs Tripod

Let's continue the discussion by comparing installing a copy stand versus using a tripod. Most cameras lack a viewer at the appropriate angles for looking through the camera when it is up on a copy stand. Any medium-format camera with a fixed viewer (one that is not interchangeable) is not optimal on a

copy stand at all. The exception is if you have a video feed so you can inspect the focus on a computer monitor. A copy stand limits you to the height of the stand and size of the base. With a tripod you simply move farther away and you can photograph a painting as large as a mural. You can't do this on any copy stand, although yes, you can photograph in segments and stitch the segments in software. We do this with the Cruse scanner easily.

A copy stand is not as portable as is a tripod. But a copy stand is, in theory, easier to align. You have the copy area level, you have the digital back and camera leveled. With a tripod you absolutely need to



**BetterLight scanning back in a Cambo Ultima 4x5 large format camera.**

utilize a Zig-Align system (mirrors or laser). Many professional giclée ateliers use the Zig-Align system effectively, but alignment does take time. You have to align every time you move the tripod.

Let's get the comments from two pros the BetterLight system (FLAAR is unique in having both the BetterLight and the Cruse system; because we believe that each has benefits; which you should choose depending on your situation and your clients' needs).

Andy Long of Squirt Printing, Sunnysvale, CA, says, "I could not agree with Dr. Hellmuth more about the importance of capture. This is a true case of garbage in, garbage out workflow. At Squirt Printing we utilize a BetterLight Super 6K scan back mated to a Cambo 4x5 camera body. We use the best Schneider lenses we can buy.

"The Zig-align system is a must. We use it for every capture. An extra half-hour spent getting an image properly aligned can save many hours wasted in Photoshop. Squirt is highly skilled in capturing flat things. Capturing art is an art in itself."

Gary Kerr, Fine Art Impressions, Davidson, NC, says, "The precision we put into digitizing art includes aligning the camera with a laser to 3000/inch in order to achieve perfect parallelism between the surface of the art and the digital sensor plane. This ensures zero distortion

and optimal depth of focus to include the detail and paint texture in the digital capture—a prerequisite for making a convincing reproduction.

"Everyone seems to want to photograph their own artwork, but it's a big mistake because it's difficult to do correctly. How the original is digitized determines the quality of the giclée, not the printer make and model. Many artists with a 6-megapixel camera call me to see if that will work. My reply: 'Try driving across the country on one tank of gas, we use 48 megapixels.'

"Interpretively lighting the artwork is the signature of a great printmaker; to ensure the nuance and ambience of the original is retained in the giclée. It's the opposite of what you get with symmetrical lighting employed with automated copy stands. Besides, curatorial standards are violated with vertical copy stand set-ups which is another reason Fine Art Impressions doesn't use them, especially for our museum clients.

"Asking a printmaker what kind of printer they use is like asking the artist what kind of brushes they paint with. Buying a wide-format printer expecting to be a master giclée printmaker is the same as buying a grand piano and expecting to be a concert pianist—it's a big maybe."

## Summary

Since FLAAR has both the Cruse and the BetterLight, I find each great in their appropriate milieu. We use the BetterLight primarily for archaeological photography and panorama photography. The BetterLight is completely portable so is ideal for museums in different countries, as well as fieldwork in remote jungle locations. The Cruse is perfect for our university situation where a new co-op student or intern comes to learn, so the fixed dedicated alignment of the Cruse means that each new trainee does not have to worry about the alignment.

Brent Cavanaugh, the Lab Manager, Center for Applied Technology at BGSU, says, "Speed, and hence productivity, is one of the finer points of the Cruse. Set up time is minimal; the actual scan time is two to three minutes. Focusing is automatic, so there is no struggling to focus; you don't have to labor to make sure the artwork is perpendicular to the camera, and the lighting is automatically balanced by the very design of the system. This university facility needs to produce both giclée, decorative, and industrial scans.

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We do not yet have a medium-format system, so can't yet comment ourselves. We would like to try a medium-format digital back on a professional copy stand, but until we have one in-house to compare, we naturally comment on what we know from four years experience with Cruse and seven years with BetterLight.

Based on our own experience and discussions with other giclée producers, we can summarize by

suggesting that an ideal system would include either a Cruse (which has everything built in; it is a dedicated turnkey solution), or, if you prefer a component system, the options that most professional giclée ateliers have found good are: 4x5 camera: Arca-Swiss, Cambo Ultima, or Sinar would be the choices of most pro photographers. We have two Cambo Ultimas from Calumet, so these are the ones we show since these are the specific cameras that are in our studios.

Lens: Schneider or Rodenstock are your choices. Go for the one

**Lighting the painting during digitization is crucial to the success of the final image. Being able to vary your lighting, both color temperature, angle, harshness or softness, is one of the advantages of the component system. A dedicated turnkey system does not allow you to move the lighting. So each system has advantages and limitations.**

that has an APOchromatic option for the size of lens that you want.

Digital Back: BetterLight is the only scanning back that offers tech support, training, and backup across the U.S. direct from the factory. Since we know they hold up well, produce flawless color balance, and their software is great, this is naturally the one that we commend. Anagramm, Kigamo, and Phase One would be other options.

Don't forget your tripod: the Gitzo Tele-Studex G508 or G509 is what many pro studios use, or a studio stand (we have a Bogen Salon with Manfrotto head). And realize that your tripod head is a crucial ingredient too: we could not survive without our Manfrotto 3263 giant geared tripod head (we have three of them). When you need to precisely position a large-format camera you don't want either a ball-head or a pan-and-tilt head.

Lighting the paintings during the digitization is crucial to the success of the final image. Indeed lighting is so important that it is an entirely separate issue that should best be discussed in a separate article. Being able to vary your lighting, both color temperature, angle, harshness or softness, is one of the main advantages of the component system, with a BetterLight being a crucial component along with lighting. A dedicated turnkey system does not allow you to move the lighting. So each system has its advantages and its limitations.

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