Computer Color Your Model
By
Steve Gardner

Got a favorite airplane you have always wanted to model, but have never had the nerve to start because of its complex color scheme? Maybe an Albatross D-V with its pretty lozenge pattern and colorful personal markings. Maybe one of the super colorful modern aerobatics aircraft like the hot pink Sukhoi 31 or an Eagle bipe with its nine color feather motif. Scale modelers have long lists of models they want to build, but many are never started because of difficult color schemes or complicated lettering. Things like odd colors, light stripes on dark backgrounds, lettering, panel lines, and other details can make a simple model very hard to build. We have a new and powerful tool to help with these neglected models, the computer/ink jet printer combo.

Say you have a plane picked out that is lime green with maroon stripes and powder blue registration numbers on top of everything. The computer can solve all of your problems (except your horrible taste in colors!) with this paint scheme. Getting the maroon stripes onto the light green background without the layers of tissue making the maroon look black is practically impossible. Trying to get very light colors like powder blue to cover darker or contrasting colors is almost a lost cause. If you have an extra year you can always airbrush the model. This is still the most realistic way to finish a scale model, but I really like the watercolorish look of raw tissue and paint is very heavy. For a modern ink-jet style printer this color scheme is absolutely no problem. You can have any part of the tissue any color you like from white to black. The lime green will not have maroon layered over it and the powder blue letters will be the only pigment on the tissue where the letters are. The printer can give you tissue in any color or as many colors as you can imagine. With the right graphics program you can have lettering that will amaze you. You can put photos onto the tissue, or scan in the color three view of your model and simply print it into place. You are gona LOVE this!

You will need a computer and printer, although if you do not have these things you can rent them for a pretty low hourly rate at Kinkos or a similar place. A good graphics program is a must, but you can find one of these practically anywhere. There is the limit of how wide a piece of tissue you can print, but most modern printers will do what is called Banner printing that will allow you to print to almost any length.

I hope that this article will answer all of your questions about this neat new technique and that you will experiment with these new toys yourself. If you discover anything nifty please send it to us here at INAV, we are always after stuff like this.

Tissue

You can print onto any tissue at all from Gampi to heavy Silkspan, but there are differences from one to the next. My personal favorite is Japanese silk tissue bought from a paper specialty store

here in St Louis. It is cheap enough at 1.70 a sheet of 18X24 paper and it is very light at around 6 mg per square inch. The Esaka tissue available these days runs around 8-9 mg per square inch. After printing this tissue to a deep green the tissue weights around 6.4 mg per square inch, so weight is no problem. The Silk tissue is very soft compared to Esaka, and it has no shiny side. This tissue takes ink better than any other stuff I have tried. I have also printed Esaka tissue and even tested some domestic tissue. I can see no reason to ever have to deal with domestic tissue again since I can now have any color silk tissue I want. If you use a tissue with a shinny side, print on the dull side to prevent the ink from beading up on the tissue sizing. If you are going to pre shrink the tissue do so before printing and iron it out really well. If there are a lot of wrinkles in the tissue you will have trouble getting it onto the paper it rides through the printer on. I have not tried condenser tissue yet, but I can see it working well except for the base color being beige instead of white.

Printers and inks

I have used several brands of printer to print tissue and they all work very well. Some of the inks are better at resisting bleeding and some are more water resistant than others. There is even a brand of printer that uses a dry film based ink system that will allow metallic and opaque inks. After a fair bit of experimenting I have settled on the HP722C printer. Its main advantage is that it can vary the size of the drops of ink it uses to print. Say you want a nice light and delicate shade of pink on your tissue. If the printer uses a standard size dot of color (red in this case) to get a light shade it must use very few dots of its fixed size. This can make the color grainy. The HP 722c will use more dots of smaller size to get the same color. The beautiful gradation from one delicate pastel color to another with a jillion intermediary colors is really nice. Other printers can get very close, and some have better absolute resolution, but this is the one I like best. Its color ink cartridge also outlasts any color printer I have ever used by at least half.

While I am an obvious HP fan, this method will work with all ink jet style printers and I suspect all laser printers as well. You may have to experiment on the settings concerning quality of printing to prevent bleeding and to get good strong colors. Use the printer you have and do not worry about it.

The Method for Printing Tissue

Some of the first people to use these printers for tissue tried to simply tape the edges or corners of a sheet of tissue to a piece of paper and run this through the printer. Sometimes this will work great and I used the tape all the way around the edges method for a year or so before I figured out a better way. The major problem with this method is that the ink wets the tissue, which swells up and buckles into very fine wrinkles, which stick up and allow the passing print head to rub them. This can ruin a sheet of tissue pretty quick, and it is worse with darker, stronger colors due to greater amounts of ink.

This method is also kind of picky about the paper path through the printer. Printers with paths that bent the paper a great deal gave the tissue a good chance to jam the works since the tissue is loose on the paper. I did some experimenting and the very first way I tried turned out to be the winner. I start with a sheet of ink jet paper. It is a bit stiffer than bond paper and works best. I spray one side of this paper with a very light coat of 3M #77 Sprayment and then I stick it onto a clean scrape of cardboard and rub it down so that it is in good contact everywhere. I then immediately peel it up taking care not to crease it. The cardboard will take off the majority of the glue and the remaining tack is perfect for holding tissue. I have the tissue spread out on a flat surface and ready. I apply the paper to the tissue with a kind of rolling motion, to get it onto the tissue without wrinkles. I rub the paper down onto the tissue and then I trim the tissue to the edge of the paper. I now have a sheet of tissue ready to run through any kind of printer. Paper path is no longer important since the tissue is attached to the paper everywhere. Even if a gross over application of ink results in buckling, the glue will hold the tissue down and the print head will not touch and smear the color. I now make up several sheets of this to have on hand incase I want some colored tissue for a new project.

When you start printing tissue you may find that you have problems getting the colors strong enough, or the opposite problem, bleeding. To adjust his you will have to experiment with the print quality settings of the graphics program you are using. For the HP I recommend starting with the settings on "normal" or " economy" and the paper choice settings on "plain paper". If you are after very strong colors then the "normal" setting will apply a fair amount of ink to the tissue, and even pail colors will come out smoother on this setting. If there are very fine details or lettering on very high contrast backgrounds you might try the "economy" setting. The various printers may call these settings different names, but the idea is the same. A bit of experimentation and you will know what you need to do to get the effect you are after.

Once you have what you want on the tissue all that remains is to get the tissue off of the paper. You may consider leaving it on the paper until you are ready to cover since the paper makes flat storage easier. Once you are ready to cover the model all you need is some Naphtha (lighter fluid) to dissolve the #77 Sprayment glue. Turn the tissue face down on a very clean surface and dampen the paper with naphtha applied with a wadded up paper towel or cotton ball. All you need is to get the paper moist with the solvent and the tissue will come right off. If you were light enough in the glue application you are ready to go. The tissue will be solvent free in about a minute. If you used two or three times the needed amount of glue you will have to take it off of the tissue with the cotton ball. The naphtha will cut the glue like water through sugar. When the tissue is dry it will be just as it was before gluing, no residue at all. The solvent will not effect the ink in any way.

Graphics Programs

There are any number of good programs out there for putting together the different graphics you will want to use on your models. These programs fall into three basic categories: **Raster programs**, often called "paint" programs, which organize color by mapping the color of each pixel on the computer screen. **Vector Programs**, which use lines defined by direction and distance to make up shapes which are then color filled. **CAD programs**, Which are also vector based but which have easier dimensional control, but which are much less useful for color applications. There is a fair amount of overlap these days with the best programs, with the various methods adapting the best features of the others to make them better.

The best choice for our applications are the Vector programs like *CorelDraw* and *Adobe Illustrator*. These programs are incredibly powerful design tools and have spectacular lettering and color capabilities. They can also use **Raster** art from the major paint programs that almost every computer has built into Windows. I use *CorelDraw 5* for my art and tissue printing and I can recommend it highly. The newest release of this program is #8, but it is expensive and the power it has is not needed anything but the very most complex professional uses. Any version from 3 on up will do the average modeler just fine.

If you intend to use photographs on your tissue then you will want a **Raster program** like *Adobe Photoshop5* or *Paint Shop Pro 5*. If you have *CorelDraw* there is a program built into it called *CorelPaint* which is just fine. If you enjoy playing with computers these programs can be very entertaining. The special effects you can use on any given photo are almost infinite in number and appearance. Warning! This can soak up hours and hours.

Misc. Hardware

If you are after getting a specific marking or logo onto tissue, or if you want to print a color three view onto the tissue for a scale model, you will want a color flatbed scanner. These things are very cheap these days and the poorest ones perform better than the pro models of five years ago. You will want at least 300 dot per inch resolution (optical) and 24 bit color (16 million colors). You will have trouble finding a scanner for sale these days with specs this poor, so do not worry about it too much. One item that is becoming very popular that you will not need is a digital camera. A 70-dollar scanner and a cheap or even disposable 35-mm film camera will make much better pictures for the net or tissue printing than will a digital camera.

Using the tissue

Even though the ink is not waterproof, I use thinned yellow glue (titebond) to attach the tissue. Since the ink is resistant to the water to a moderate extent this works fine with no smearing at all. The new glue sticks will also do a very good job without any water-related problems. The ink is dope proof so you can also use the traditional methods of attaching tissue with dope. The real difference between this tissue and regular tissue is the way you shrink it. To get this tissue to shrink without ruining the colors you have to get it wet without having fluid water on it. Rubbing alcohol with the usual

25% water sprayed from a Final Net bottle (hairspray) can be used with good effect. To get just the finest mist onto the model without heavy droplets, you spray the alcohol into the air in front of you and then pass the tissue cover whatever through the cloud of mist. You can do this several times at one go, just be sure not to get the surface actually wet. It is easy to underestimate the shrinking power of this method and get warps. Go slow and if you need to you can repeat the spraying. Once you have the tissue shrunk to your satisfaction you can add a coat of very well pastisized dope if you so desire. If the model will be flown strictly indoors you can skip this step. The ink is not so easily disturbed by handling as to need dope just for holding the color down.

A very nice feature of using this method of coloring tissue is that if you damage the model or tear the tissue by blowing a motor you can just print up a perfect matching patch. Even if the damaged area is full of very fine details and multiple colors the patch will match perfectly.

Brass washer silver soldered to 1/16"
brass bearing tube

Noseplug is hollowed out
to allow thrustline adjustment

Yoke made from .020 wire

3/32" plywood inserts to support
the bearing and the set screw

Typical brearing positions

#2X3/8" brass woodscrew

Adjustments:
loosen setscrew then
position breaing to desired
thrustline. Carefully tighten
setscrew. Do not overtighten.

Alternate yoke construction
1/16" plywood
1/32" carbon/epoxy
.020 brass sheet

Adjustable thrustline noseplug
by Steve Gardner
3/10/99