How to photograph your models in the DIGITAL AGE

Megapixels, JPEGs, color space – oh my!

By Mark Thompson

Just a couple of years ago, the most-common question we received about photography here at FSM was, "Do you guys accept digital images?" Funny how things change. Now the question is, "Do you guys still take film?"

The digital imaging revolution has changed the landscape of photography, and FSM has changed with it. To be clear, we accept (and now prefer) digital images, but we are still quite happy to receive your prints and other film-based photos.

One thing is as true in this brave new digital world as it was in the days of film: There's much more to getting good photos of your models than simply running out to buy the latest camera. You may be prepared to face a learning curve for that new digital camera, but you also need to learn a whole new set of tools. What do you do with the images once you capture them? What format should they be in? What about editing, storing, displaying, and printing? All these demand new ways of working.

The good news is that after a hectic few years in camera development, it seems the market has settled down to the point where you can get a feature-filled camera at a reasonable price that's more than capable of taking great pictures of your models. So we thought it was time to revisit the subject of model photos in hopes you'll give your digital camera a workout and send the results to us for Reader Gallery and in images to illustrate your construction stories.

What camera should I buy?

We wouldn't presume to tell you what camera to buy, but we think you'll get the best, most-predictable results with model photography for FSM if you use a camera having some manual control of shutter speed, lens opening (sometimes called aperture), and flash. Just about everything else about cameras is a matter of features, convenience, quality, and price that only you can decide. However, knowing your camera has control of the three items just mentioned gives you the tools to avoid some of the common causes for model photos to be rejected at FSM. A great Web site for comparing features and for reviews of the current crop of cameras is: http://www.dpreview.com/.

You can divide the digital camera market into three broad categories, **1**. First come the simplest of point-and-shoot models. Oriented to ease of operation, many of these little wonders may not have much in the way of manual controls. Instead they tend to feature menus of icons and scene modes that may accomplish the same thing – if you're lucky. Imagine one of the shiny little cameras about the size of a deck of cards, and you know the ones I'm talking about. I won't say a point-and-shoot camera won't work for model photography, but without settings for "shutter-preferred" and "aperture-preferred," or "manual mode," your model photography will be hit or miss. Also, look for the ability to turn off the flash or greatly reduce its output.

Next comes a class of cameras we'll call the all-in-one. Not quite as miniaturized as point-and-shoot cameras, they're still more compact than full-size conventional cameras. All-in-ones do not take interchangeable lenses, but they do have built-in zoom lenses covering from moderately wide angle to mid-length telephoto that will probably handle most of the situations most of us ever care about. They also have most of the features and manual controls and settings found on the more-expensive digital single-lens reflex (DSLR) cameras. With the near-pro features and big megapixel counts at up to hundreds of dollars less than their DSLR big brothers, the all-in-one class offers a lot of value.

Finally, DSLRs may be familiar to you

You can do it! All it takes is a digital camera and some good lighting. This is William Lawlor's 1/48 scale Canadair Mk.6 from Hasegawa.

The simple, automatic point-and-shoot camera at left is not likely to have manual controls. At right is an example of a mid-level "all-in-one" with a decent selection of controls. This five-megapixel model is a couple of years old now. In the middle is *FineScale*'s DSLR – more than enough control for model photography.

if you had a high-quality film camera in the last few years. They're the digital version of a full-featured camera body with a choice of lenses to help empty your wallet.

So which one do you need to take pictures of your models? Certainly the DSLR will give you all the control and the most options, especially a greater range of lens openings (aperture, measured in f-stops) and shutter speeds. However, photography of subjects the size of most models, which aren't moving and won't be reproduced in huge enlargements, don't demand a high-end DSLR.

The main reason to buy a DSLR is to have a choice of lenses and a greater range of settings. If you don't think you're likely to invest in a range of lenses, you might want to think twice about the expense of a DSLR system. On the other hand, if you're used to that kind of camera, and you simply like the idea of buying a camera you can build on, there are some great choices out there.

How many megapixels?

Digital camera makers have been engaged in all-out hand-to-hand marketing combat. Like horsepower in muscle cars, one thing that always sells is a bigger number. Last year, a respectable high-end all-in-one or DSLR camera claimed six or seven megapixels. This year, that number is likely to be eight or nine. But the ever-greater pixel counts may have reached a point of diminishing returns. Some of the early crop of eight- and nine-megapixel consumer cameras actually returned images of lower quality than last year's six- and seven-megapixel versions. It turns out that the extra heat generated by all those additional pixels crammed in the same sensor form factor can create specs or artifacts called noise.

I'm not saying the current high-megapixel cameras are bad; I can think of several that I wouldn't mind owning. Just don't think that you must have the latest, greatest to take good model photos. And be aware that the quality of the sensor is as important as the pixel count.

Where will the megapixel wars end? Currently the momentum in professional 35mm-size cameras is toward a larger sensor form factor, giving more room to dissipate the heat as well as room for more pixels. At the high end, the so-called full-frame sensor – the size of a 35mm image – packs around 20 megapixels and a price tag you would expect to match that high number.

JPEG, TIFF, Raw?

We receive more photos in the JPEG file format than in any other, but that's not to say it's the best for our use. The problem is that JPEG is what's called a "lossy" file-compression format. Every time you open and re-save the same JPEG image, you re-compress its data. Eventually the image can be degraded beyond usefulness.

We see a lot of JPEG files because it's the only or the default format for many point-and-shoot cameras. If you send JPEGs, always choose the "highest-quality" or "maximum" setting when saving files.

Better is the TIFF file format, which is loss-less. TIFF makes a large file however, so its use all depends on your ability to capture, store, and manage big files on your camera and on your computer. However, with cheap storage these days in the form of CDs and higher-capacity flash cards, file size is getting to be less of a problem.

If your camera offers a selection for file formats larger than JPEG, it'll likely be a choice between TIFF and camera-raw. Think of a raw file as the digital negative. Depending on when and where some of the image processing is completed (in-camera or on your computer), raw files are often half the size of TIFF files. Regardless, they do require computer conversion with your camera's software or a third-party raw converter. Sending us your camera-raw files allows us more latitude in adjusting the image in case you accidentally shot it with the wrong white balance. Also, it ensures we have the original image before adjustments were made that may have rendered the image unusable in our printing-production process.

In a nutshell, you have three options. Send JPEGs saved at the highest quality if that's the only format available from your camera. Or send TIFFs. Or, if you can take raw files, convert them to TIFFs and send both the TIFFs and the raw files.

Resolving resolution

Think of resolution as film grain. Remember when you used to buy ASA or ISO 25 film, the really fine stuff for your highest-quality prints? The smaller the number, the smaller (and thus more-densely packed) were the photosensitive silver grains in the film, and the finer the detail possible in a print. The same is true with pixels. The more densely packed the pixels (six megapixels vs. three megapixels for example), the greater the resolution possible.

Purists among you may insist that resolution is actually a matter of the resolving power of camera optics, not the number of pixels. However, a distracting checkerboard pattern of pixels will show up in enlargements sooner from cameras having fewer megapixels than from cameras having more.

I'm amazed when I hear someone who has just purchased a new monster-megapixel camera ask if he can send a file with a fraction of that information. As with almost everything in printing production, more information is better, so use your camera's highest resolution to give us the most pixel information.

How do you know? Some cameras give a choice of pixel dimensions. Some offer a good-better-best choice. Some give the total pixel count. Others have an alphabet soup of settings like SHQ and VHQ. Some call it "finest" or "highest quality." Your manual should give the one representing the highest number of pixels.

For most us, what's out there is already more than good enough. Save your money, buy more models; we'll never use those extra megapixels to their fullest extent. Ask yourself, how many 16" x 20" prints have you ordered lately?

What's in a pixel?

Let's go back to the six-megapixel camera for a second because the math is easier for me. The word pixel stands for picture element, a point where light is measured. A six-megapixel camera has a sensor about the size of a postage stamp measuring something like 3,000 pixels in one dimension and 2,000 in the other. (3,000 x 2,000 = 6,000,000 pixels or six megapixels).

Say you want to print to a decent inkjet printer or, better yet, send an image of that great model you just finished to FSM for consideration in Reader Gallery. A typical print-resolution figure given for publishing or for a high-quality ink jet print is 300 dpi (dots per inch). A pixel is a point or one of those dots in "dpi," so that 3,000 x 2,000-pixel sensor will give you a print roughly 10" x 7" (3,000 pixels or dots/300 dpi = 10"; 2,000/300 = 6.67").

Keep in mind that the vast majority of consumer-camera output ends up on a computer screen at 72 dpi or on a 4" x 6" print, so you can see that a camera in the five-, six-, or seven-megapixel range will more than handle the most-common usage as well as take your images to 8" x 10" and beyond. Also, keep in mind that a good photo-print service can skillfully interpolate your data to make the occasional larger print with little loss in quality.

At FSM, we like to see images from cameras with at least four megapixels. Actually some older three-meg cameras will take decent close-up shots of construction processes and parts that we run small in the magazine. However, they won't give us a file big enough for the larger overall, or "beauty," shots to show off your model.

Controlling manual controls

Consumer cameras do one thing extremely well. They take pictures of your friends and family at distances of three to 12 feet with no thinking whatsoever. They're optimized for that kind of use because that's what most people do with their cameras. They do it effortlessly by incorporating a little flash unit to cover that shooting distance in all kinds of lighting situations.

However, the same little in-camera flash that comes on automatically when you need it will create harsh shadows when you put it two feet in front of your model. You've seen those shots: too bright in front, too dark in back, with hard edges on the shadows that don't look at all natural. They remind me of that old picture of myself in the dime-store photo booth – bug eyed, washed-out face, and a background full of spooky shadows. The best thing to do with this little demon is turn it off and learn to provide the kind of light you need. More on that later.

With the flash off, your automatic-everything camera is going to scream for more light. It will make the lens opening as large as possible and slow down the shutter speed. A larger aperture (a bigger hole through the lens) obviously lets in more light. A slower shutter allows more time for the exposure and thus more light. But both of these have consequences. A slow shutter speed will blur action and exaggerate camera shake, and a wide lens

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All about RGB

This may not necessarily be a camera question, but somewhere in the process of setting up your camera or saving and sending us your file, you may be asked by one of your programs to choose a color space. The most common are sRGB, Adobe RGB, and CMYK. Sometimes choices for Apple 1998 and LAB show up.

Explaining color space is way beyond this article, but again, the more information we start with, the better job we can do. A smaller or inappropriate color space means some of the beautiful colors from that fancy digital camera you just bought will be "clipped" – they simply won't be delivered in the file.

Here are a couple of choices. sRBG is the color space of the Web, and many cameras default to it. It's not the largest, but if you must send sRGB, it's acceptable. It's commonly used, and at least we know what we're working with.

If you are able to set the color-space in your camera, please select Adobe RGB. It's the largest common color space and one we can work with easily. Also, if you are able to "shoot raw," you can set the color space when you convert the file to JPEG or TIFF formats.

It does not help to shoot in sRGB, then save up to Adobe RGB on your computer, unless it's a raw file. You're just renaming the information from the smaller color space of sRGB set in your camera. To be of value to us, the selection must be made in-camera or when it's otherwise first tagged.

Whatever you do, please don't send files converted to CMYK, which is the color space of printing. We have an all-RGB workflow here, and your image requires processing, which will be done in RGB before we convert to CMYK for the printing press.

Seamless backdrop

We've probably had to reject more photos for use in FSM as a result of bad backgrounds than for any other photographic reason. We've seen your water heaters, basement walls, knotty-pine-lined rec rooms, towels, sheets, backyard landscaping – you name it. It's a shame that sharp, well-exposed pictures of good models must be returned because of these distracting backgrounds.

Many times, modelers interpret our advice to put up a paper backdrop to mean covering a table with a clean sheet of paper or a piece of cardboard or cloth. And that's a start, but it usually still leaves a horizontal line or seam running behind the subject at the far edge of the table.

What's needed is a seamless backdrop (also called a sweep) that runs under the model on the table top and gently curves up behind it to be taped or pinned to a wall.

You can get an idea of it from the FSM setup, below. We travel with a roll of paper so we can change it if it gets marred, so we use a bracket of ½" PVC pipe stuck on top of a couple of quick-grip clamps. The roll of paper rests on the bracket, and we pull a length of it down and across the table to be secured at the table's front edge with clamps. You can find this kind of paper at artist's-supply stores, or you can order a roll (about $40) from BD Papers (http://bdcompany.com/paper.htm).

FSM's photo-backdrop setup: A bracket of PVC tubing and "quick-clamps" accepts a roll of paper. You can do the same thing by taping up paper.

The FSM Blues

Many modelers get a little too creative when choosing a photo-background color. Red, orange, green – these brilliant backgrounds almost always distract attention from the model.

Oddly, the opposite of too colorful, white, is too light, so that when you expose properly for the model, your background may appear dirty gray. Under normal settings, the camera will meter white as gray, and that's what you'll get unless you compensate. If you compensate for the backgound, your model will be improperly exposed. The solution would be to light a white backdrop separately, but that's another story.

That's why we have settled on BD Paper's Misti Blue or Alaska Blue for a majority of our work. (I always get a kick out of hearing the whispers as I set up our photo area at shows. "Hey, that must be the FSM table; there's the FSM blue.")

A light sky blue is just enough darker than white that it won't turn dirty in appearance. It gives a little color, but doesn't compete with most subjects. It's true that gray and silver planes don't have as much contrast against the blue, but who wants contrast if it has to be against fire-engine red or lime? Besides I like to see planes with a suggestion of blue sky!

Please note that our setup is pretty wide. BD paper rolls are 53", so we take the whole roll with us to accommodate a variety of subjects, large and small. You could get by with a 24"- or 30"-wide sweep for 1/48 scale aircraft and 1/35 scale armor.

Here's an easy and cheap hardware-store lighting solution: two 8½" bell reflectors clamped to chairs. This series was shot on white.

Try two bulbs of different wattages to create lighting contrast that gives shape and dimension to the image. One bell reflector shines a 100-watt bulb and another a 45-watt bulb.

Or just move one light farther from the subject than the other. Here both are 100-watt lights. A little move gives a dramatic effect: Light falloff is geometric rather than linear.

Having a second light softens shadows. Here, they're a little more harsh than in photo 10, far right, but not bad.

Look around the house for diffusion material. At left is a plastic food container. Foam-board or foil-covered reflectors help fill in the shadows.

More info at finescale.com

See two other inexpensive lighting techniques on the FSM Web site.

Put hardware-store halogen lights to work in your model room. Got some old flash units? We show you how to set them up for model photography. This entire article, plus these two additional techniques can be found at www.finescale.com.

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opening will create shallow depth of field. (With shallow depth of field, a Corsair's propeller and cockpit may be in focus and sharp but its tail planes will be fuzzy or what we call "soft".)

So we want you to turn off the flash and fix the lens opening at its largest f-stop number for the best depth of field. To compensate for having less light coming through the smaller lens opening, you must slow down the shutter to allow more exposure time. And if you must slow down the shutter, you'll probably need to put your camera on a tripod to avoid camera shake. (Many point-and-shoot cameras won't take shutter cable releases or may require an expensive remote shutter-release button. One great trick for a steady shutter release at slow speeds is to use the self-timer, which most cameras have.)

Can't I just select a higher ISO?

There's really no such thing as a free lunch with these cameras, and jacking up the light sensitivity with a higher ISO setting will increase noise (patches of weird color and specs) in your image. Some cameras are better than others at this, but generally speaking, you can shoot at ISO 100 or 200 with little visible difference at small enlargements. You're taking your chances at ISO 400, and even greater ISO numbers should be reserved for rescuing images you just wouldn't get any other way.

Let's go to work

So you have a camera. You know to turn off your flash and set the camera for maximum depth of field. You know to slow down your shutter to compensate for the small aperture. You understand that a slow shutter speed (anything below 1/125 of a second for my shaky hands) may mean you'll need a tripod. And you have color-balanced the camera to your light source (see sidebar at right) – now what? From here on out, it's all about light.

The vinegar jug experiment

The goal of this story is to suggest some inexpensive light setups you could keep on-hand to shoot a finished model, or better yet, a setup that you could leave in place while you build a model for an FSM story. When you come to a critical step you want to show us, you could easily take the assembly or part to your photo setup and capture it. The great thing about digital is you know right away if you got the shot. Years ago, we had to "bracket" exposures (by taking multiple, different exposures) to make sure we had a good image somewhere in the range. Even then, we still might miss the shot for some reason we didn't even anticipate, and by the time we got the film or prints, it could be too late to reshoot.

I stopped by the hardware store one evening after work, and as luck would have it, my home center was featuring a display with really cheap 8.5" bell reflectors on a clamp. With two of them and a couple of daylight-balanced bulbs, I was out of there for less than $15.

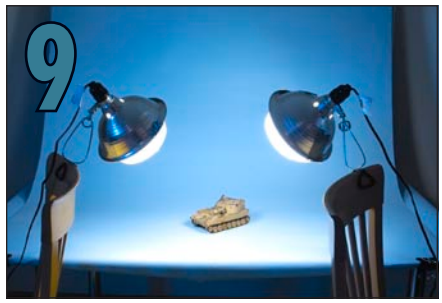
Why two lights? With one light, we might as well stay with the dreaded on-camera flash. A second light can "knock down" harsh shadows and create a more-3D or modeling effect. So, I clamped my low-budget light setup to a couple of dining room chairs, **2**, and I was in business. (Marriage tip: replace borrowed furniture before you-know-who gets home!)

The two-light setup gives us a chance to talk about the concept of lighting ratios, the difference in reflectance between the brightest area and the darkest area of the subject. Studio photographers often work with at least two lights. One, the key or main, is stronger than a second fill light. Figuring out the right ratio of strength between the two is beyond my meager math skills, but we can use the idea of a lighting differential without getting so technical about it.

Again, the great thing about digital is you see your results immediately. Try something as simple as putting a 100-watt bulb in one lamp and 45-watt bulb in another, keeping the lights equidistant from the subject, **3**. You've just accomplished a lighting differential.

Even easier, move one light source farther from the subject until you see some modeling effect, **4** and **5**. You don't have

The bottoms of gallon jugs taped to bell reflectors work as diffusers. Daylight-balanced bulbs give natural results (here on a blue backgound) without a lot of image-editing to correct color balance.



Here's how the $15 bell-reflector-and-vinegar-jug diffuser setup looks in action.

A plea for help

We're just asking for one little favor – please, please, please don't send us your images placed in word-processing, page-layout, or presentation software.

We often spend hours trying to extract them only to find the embedding process has so compressed the files, they are useless for printing.

Thanks!

Our hard-working M109 SPH runway model shot with the jug-bottom diffusers. Notice the white background "shoots" gray unless you light the background separately.

to move it far, since light falloff is geometric. A professional would probably measure the proper distance by figuring out the reciprocal light failure. It's way easier for me to move the dining room chairs.

You can greatly improve the lighting effect from any bare-bulb source by placing a translucent diffuser over it, **6**. My high-tech solution was to cut off the bottoms of a couple of one-gallon plastic jugs (vinegar and bird seed, if you must know) and to duct-tape them to the reflectors, **7**, **8**, **9**, and **10**. No math involved!

Exposing exposure

What about your exposure settings? Remember, we said to keep your aperture to the smallest (largest f-stop number) your camera offers. That means your only variable with incandescent lights will be shutter speed. Set your ideal f-stop and slow the shutter speed until you find a range of two or three speeds for a proper exposure.

We haven't talked much about flash lighting, but be aware that you must select a shutter speed that "synchs" with your strobe. Flash durations typically approach 1/1000 of a second. You'll get all the light you need in that time, so the flash duration becomes your shutter speed. Set the camera for the "synchs" speed for your flash, then vary the aperture from a large beginning f-stop number. Again, test until you hit a working range for your setup.

It's OK to be controlling

You'd be surprise at what you can do with a digital camera having a few manual controls and a small expense in lights.

There's no one right or wrong way to do this kind of thing. Think of what you see here as suggestions, not a guide. I hope I have encouraged you to experiment to find what works in your hands, with your equipment, in your room, and on your backdrop.

Good luck, and please send photos.

Color balance

You used to choose between daylight or indoor films, and you had to make sure your indoor film was appropriate for normal lights (incandescent) or fluorescent lights or else you had to compensate with lens filters. Now that's all controlled in the camera. You just need to remember to tell the camera about the light source, usually called setting the color balance or setting the white point.

Common choices are for auto (the camera guesses), incandescent (bulbs), fluorescent, sunlight, shade, overcast, flash, and maybe custom. If you have the ability to set custom balances, you'll do yourself a big favor to learn that part of your camera manual, as it's your way to compensate for mixed light sources in a given scene.

Otherwise, just select the setting on the camera for the strongest light source you see in your scene. In a pinch, auto will usually guess pretty well, and if you shoot raw files, we can always choose another setting after the fact (another great advantage of "shooting raw").

The FSM light show

As long as we're at it, I thought you might like to see the FSM traveling light setup. I know many of you have noticed it at shows.

Until a few years ago, we traveled with a "hot-light" or incandescent setup. All of our light gear except the camera was in one very heavy bag – that is until it failed to return from a staff member's trip to Reston, Va., in the fall of 2003. (We're still looking for it!) In addition to destroying or losing our gear, airlines and security are making it harder and harder to travel with all this stuff, so we decided to lighten our load.

We check as baggage the light stands and miscellaneous hardware, and we switched to these venerable old Vivitar 285 flash units that have been around since flash powder. (We just learned the 285 has been discontinued, although its close relative, the 283, lives on.) They're durable, relatively inexpensive, and three fit in the carry-on camera bag, so we have back-up.

We shoot one flash through what's called a softbox. It's just a big tent having reflective material on the inside with light-diffusion material in front. That's what gives the lovely soft shadows. We fill in for modeling effect with a second light shot either into a small umbrella or directly through a small on-flash softbox. Sometimes we shoot the third light up into the face of the softbox. This isn't for any artistic effect; it just adds light that bounces around and reflects back to get us to somewhere between f16 and f 22 for great depth of field.

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The FSM setup you're likely to see at shows. The large black unit on the center stand is called a softbox, merely a reflective tent with one of our flash units shooting through its front diffusion panel. At left, a flash bounces light into a small umbrella. The third light on the table fires into the face of the softbox to add light.

This time the softbox is supplemented at left by a small on-flash Apollo mini-softbox.

A typical shot from the FSM light setup. The softbox gives soft shadows around the model, and the vehicle's detail shadows are well filled-in. (The self-propelled gun found on FSM's dusty shelves to "model" for this story may be the only armor model Senior Editor Paul Boyer has ever built!)