



Aircraft Photography: The Advanced Settings

IT'S BEEN two months since the last issue of KiwiFlyer and I hope in that time you have all read the manuals for your cameras, become familiar with how you use the Aperture size, Shutter Speed and ISO sensitivity to make your exposures and, most of all, have been snapping merrily away at anything that flies!

In the previous issue we talked about basic equipment and theory, so this time I'll cover some of the more advanced modes of operation available on your camera (and recap briefly on previous notes for readability as we go). One problem is that every manufacturer goes about naming the 'same' features and modes using different creative techno-babble, so I'll use the terminology of two of the most popular camera makers, Nikon and Canon and you should find some variation of what we discuss here on your camera.

Exposure Modes

Let's expand on the 'Exposure Modes' we talked about in the last issue.

Aperture Priority mode (A on a Nikon, Av on a Canon) and Shutter Priority mode (S on Nikon, Tv on a Canon) are the two you will use the most often. Which one you apply and when will depend on the situation you are photographing your aircraft in.

In 'Aperture Priority' mode you select the aperture you want and the camera will automatically select the correct shutter speed to make up the exposure. This mode is used when your priority is to control the 'Depth of Field' in an image. An example of this could be when taking photos of detailed parts of an aircraft, such as a gun port or an insignia while deliberately keeping the rest of the aircraft out of focus. This involves employing a large aperture, such as f4 (remember the 'f' value given to the aperture decreases



LEFT: Using Aperture priority and a wide aperture allows close-up details of an aircraft to be sharp, while blurring the nearby background. P-40 KittyHawk - Warbirds over Wanaka 2010: f/3.2 - 1/320s - ISO 200 - 70mm - Aperture Priority.



RIGHT: Using Aperture Priority and a narrower aperture allows you to keep more of the Aircraft in focus, but be careful as your shutter speed slows, you still need to avoid camera shake. The Red Arrows - Royal International Air Tattoo 2007: f/11 - 1/160 - ISO 200 - 140mm - Aperture Priority.

Contributed by Chris Gee

as the opening of the lens' iris becomes larger). The camera would increase the shutter speed to control the amount of light coming into the camera. Conversely, if you were taking photos of an entire aircraft on the ground in a static display using your wide-angle lens, and you wanted the entire aircraft from the nose to the tail to be in



Continuous Shutter Release allows you to capture those fleeting moments that pass in a split second... but watch as your memory card fills up and your battery empties! Red Arrows - Royal International Air Tattoo 2007: f/8 - 1/800s - ISO 200 - 240mm - Shutter Priority.

focus, you would employ a much smaller aperture (ie: f/16). The shutter speed would lower to allow this to fall within the correct exposure.

When using 'Shutter Priority' mode, you select the shutter speed you want, and the camera automatically makes up the aperture necessary to match the exposure. This is a great mode to use for aircraft in flight, and allows you to quickly set your shutter speed for the different types of aircraft, depending on whether they are jets, helicopters or have propellers. Remember

that to achieve interesting motion in your images you need to allow some movement in the propellers of aircraft, and in the rotors of helicopters. It's important to remember that your shutter speed needs to be faster than your focal length is long. You can happily shoot a jet with a long lens and high shutter speed since it has no moving parts, but as you reduce your shutter speed to allow prop blur you run the risk of falling under the focal length of your lens. This is especially a problem with helicopters, whose rotors need a comparatively slow shutter speed to achieve a blurred rotor in your image. Getting a sharp image of the fuselage of a helicopter using a long lens and a slow shutter speed can be very difficult!

Along with these two modes you will often find the need to use

the 'Exposure Compensation' control. When your camera meters the light for an image, it does not know the real world conditions in which the image is being taken, and can easily mis-expose your image. Using the Exposure Compensation control you can quickly tell your camera to under or over-expose the photo. This is important since the amount of light on, or behind, your subject can change very quickly when photographing aircraft in flight. If the aircraft has a very light or reflective skin, or the sky is very bright, your camera will see too much light and will under expose the image meaning your photo will be too dark. In this case you would want to tell the camera to over-expose the image a fraction. If the body of the aircraft is a dark colour, military green for example, your camera will over-expose the image because of the amount of darkness it sees. Here you would pull the exposure back a small amount to stop the sky from blowing out and becoming white. This can be quite a chore as the aircraft passes through patches of bright white cloud and clear blue sky - if you are lucky enough to have any! The way the camera actually achieves the change to the exposure depends on what mode you are in. If you are in Shutter Priority mode, it will alter the aperture to suit; if you are in Aperture Priority mode, it will alter the shutter speed to suit.

Exposure compensation is usually controlled by holding down a button on your camera while moving the Command Dial, which is probably the same dial you used on its own to set the Aperture or Shutter Speed. Presented as "EV +/-", the range of adjustment usually goes from +2 to -2 EV. In some cameras you can adjust the size of each increment, usually as a default it is 1/3rd of an f-stop.

"How do I know if I am going to under or over expose the image?" I hear you ask. Well, when you look through the viewfinder of your camera, you will see an Exposure Meter. This is a graphic that shows you how many EV the camera thinks you are over- or under-exposing the image by. This is a very important item to take notice of, and after a while you will end up seeing it without actually looking at it. But remember it is not necessarily correct, so it is important to view the images you have just taken on your camera every now and again.

Once you become comfortable with changing your shutter and aperture settings quickly enough to suit the light, you could start to use your camera in Manual Mode. This requires you to keep a constant eye on your exposure meter and be very busy changing the settings to keep your exposure right as the light and your subject changes. It's not uncommon to see photographers at air shows pointing their cameras at the grass or a near-neutral grey surface such as the concrete taxiway. What they are doing is getting their exposure correct against a neutral background and then applying these settings to their subject. Remember that when you apply Exposure Compensation in Manual Mode, the settings do not actually change at all: the camera merely changes the Exposure Meter to incorporate the +/- EV you have applied.

Some cameras have an 'Auto ISO' feature, which will automatically alter the ISO sensitivity in order to keep the exposure within range, but you have to be very careful when using this as the lower the ISO, the better the quality of the image. Thus you would usually keep ISO as low as possible, most commonly 200. If it's a cloudy day, you might bring it up to 400. If you have a very long zoom lens and it's cloudy or early/late in the day, you may find that even at the maximum aperture of your lens you are still not getting enough light into your camera without your shutter speed becoming too low and falling under the focal length of your lens. This is when you would bring your ISO up to compensate. Many of the pro cameras have acceptable High ISO performance, and some

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can be brought up to as much as 3200 ISO while still making usable images. Some of the more expensive cameras will give you the useful ability to set the maximum ISO your camera will use when on Auto-ISO mode.

Metering Modes

Modern DSLR cameras use the light that is reflected off your subject back into the camera to gauge the exposure, and they are becoming increasingly good at it. Your camera can never know exactly what you are photographing, however, for example a dark airplane against a bright sky will throw the camera off. There are usually three different types of metering modes available to you and each has very specific uses. These are 'Full Frame', 'Spot' and 'Center Weighted' metering.

The most commonly used is the 'Full Frame' mode, which in many cameras will include a 'multi-pattern' type system that meters the scene and divides it into sections. This allows the camera to come up with the best exposure with the light from the entire image, i.e. everything you can see through the viewfinder. On Canon cameras it's called 'Evaluative' and on Nikon cameras it's called 'Matrix'. This mode will probably be your default setting most of the time.

The 'Centre Weighted' mode takes an average reading from across the whole frame, but biases the overall exposure toward the light reading from the centre of the frame instead of from the edges. You can usually set the width of this 'circle' using a menu on your camera. Quite often though, to achieve the best composition (which we will cover in a later article) you would not want your subject dead in the centre of the image.

The 'Spot Metering' mode can be very useful indeed. In this mode, only a very small point of the image is used to meter the light (around 2-3% of the frame), and in most cameras this spot will move around to follow your Focus Point (see Focus modes below). This is really useful if you want your photo to be exposed for just a small part of your image, such as the face of a pilot in the cockpit, or a specific texture or part of the aircraft. Many photographers stay in this mode, and pick the part of the image that seems the closest to a neutral grey. This can be very difficult of course if your subject is moving rapidly through the sky. Also, you have to remember to turn this mode off when you have finished using it. If you are noticing all your exposures have become wildly over- or under- exposed, it's possible you have left this mode on, or the switch has been knocked onto this mode.

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Focus Modes

Achieving a sharp focus on your subject is extremely important in photography, but this can be very difficult especially in the fast moving (literally!) world of aviation photography. While many pro-photographers swear they only ever use manual focus, the Auto-Focus (AF) available on cameras and lenses these days can be

extremely accurate and easy to control. There are two types of Auto Focus mode: 'Single' or 'Continuous'. Usually there are three letters next to the switch 'S', 'C' & 'M' for Manual.

In Single mode, the focus will set once, and will remain constant until the Shutter Release is activated. You can focus on your subject, then move your camera around to compose your shot while the focus you set stays the same. This is excellent for stationary targets, but once your target is moving it's not much help. This is where 'Continuous' AF comes into play. While your finger is pressed halfway down on the Shutter Release button, the camera will continuously try to focus on the subject. As the aircraft moves the camera will compensate and continue to hunt for its focus lock.



Keeping the shutter speed slow enough to show rotor movement, while fast enough to keep the fuselage sharp, is always a difficult compromise with helicopters. RNZAF Seasprite, Warbirds over Wanaka 2010: f/10 - 1/160s - ISO200 - 200mm - Shutter Priority.

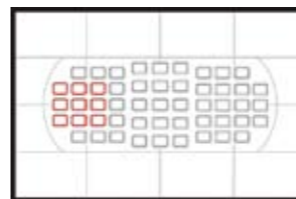
You will probably use this mode all the time if you are photographing aircraft in the air. If your camera has a setting in one of its menus called 'lock-on', you can set how long the camera will wait after it has achieved focus lock before it starts hunting again. I usually keep this switched off, to make this mode truly continuous, but be warned that if you sit there all day with your finger pressed halfway down on 'Continuous' AF, you will run your batteries down very quickly!

Many DSLRs will offer you a number of modes for setting where your focus will be selected within the frame. In your viewfinder, you will see a Focus Grid that consists of a number of small black boxes that change colour to tell you they are selected as the focus point. You can move this coloured box around the frame with a toggle on the back of your camera. It's a good idea to get used to holding your camera in a way that allows you to use your thumb to operate this toggle while still getting access to all the other buttons, and still holding your camera steady.

There are three main types of mode for selecting the focus area: 'Single Area', 'Dynamic Area' and 'Closest Subject'. While it would seem that 'Closest Subject' could be good for photographing aircraft in the air, it is actually a complicated process for the camera to work out, and it can slow down your AF substantially. Also, your camera doesn't know which part of the aircraft to focus on and will focus on the end of the wing, or more often than not, on a nice high contrast cloud in the background.

'Single Area' is probably the most useful and gives you the most control. In this mode, the camera will only focus on the small area you have selected. This is great if you already know what kind of picture you want to compose, and if you know pretty much what the aircraft is going to do next. It may take a bit of practice to get comfortable with moving this point all over the frame quickly with your thumb on the toggle, but it is well worth the effort.

In the 'Dynamic Area' mode, you are able to select a group of focus selection points, and move this whole group around the frame to compose your shot. The camera will automatically pick from the group the focus point that has the most contrast and edges within it: in our case, we hope, an aircraft. This mode is invaluable for photographing formations of aircraft and very erratic



The Focus Area Selector is vital for helping you keep the aircraft in focus. Moving this around the frame in a hurry to cover a particular area you want to focus on can take practice.



The Exposure Meter offers some of the most important information you need right there in the view-finder as you look through it.



LEFT: Using Dynamic Area mode for focus helps keep a fast moving formation of aircraft in focus, without accidentally focusing on the gaps between the aircraft. F-4F Phantoms, ILA Airshow, Berlin 2008: f/7.1- 1/800s - ISO 200 - 340mm - Shutter Priority. RIGHT: But when it comes to nine crazy virtuoso Italian pilots, there will be NO gaps between the aircraft! Frecci Tricolori - Royal International Air Tattoo 2007: f/7.1 - 1/640s - ISO 200 - 200mm - Shutter Priority.



aerobatics (Yes, that's you Jurgis!). If you are having real trouble keeping your subject in focus, this is a good mode to use. It is still possible however, that the camera will decide that the clouds in the background are a better subject than your aircraft...

One feature to look out for when choosing a lens, especially on a telephoto, is a feature called 'Auto Focus with Manual Override'. This allows you manually override your camera's AF without switching it into manual focus. This can be very handy if your AF is having trouble locking on to your subject and has begun 'searching'- moving back and forth through the focal plane while trying to get a lock on. With this feature you can simply grab the focus ring on the lens and do it yourself.



Using 'Continuous Focus' allows your Auto-Focus to follow the aircraft as it moves past you. Luftwaffe Panavia Tornado ECR - Royal International Air Tattoo 2007: f/5.6 - 1/800 - ISO 200 - 340mm - Shutter Priority.

Shutter Release Modes

There are two main modes that affect what your camera does when you press the Shutter Release button: 'Single Release' and 'Continuous Release'. In 'Single Release' mode you hold the shutter down half way to focus your lens and then press it down further to take a single shot. You must do this repeatedly for each shot you take. This is useful when your subject is not moving, such as an aircraft in the static display. By contrast, when using 'Continuous Release' mode your camera will keep taking photos as long as you have your finger all the way down on the Shutter Release button, or until you fill the available memory buffer. This mode is extremely helpful when you are shooting fast moving objects like aircraft.

Beginner model DSLR cameras can allow you to shoot up to 3 frames per second (fps), while more expensive models can shoot at up to 12fps. You can usually set your maximum frame rate within a menu on the camera. Note that if you set your frame rate too high, you get only a few seconds of shots before your buffer is full and the process will stop. There are many variables that dictate how many shots you can take in quick succession, including the processing speed of your camera, the type of memory card you are using, and whether you are shooting JPEG or RAW files.

Why take so many photos of the same thing in such a short period of time? Well, sometimes you will find that a photogenic moment can pass in a split second, whether it's the pilot looking up as the aircraft performs a barrel roll, a close head-to-head pass, or vapour forming and disappearing on the wing. Also, when using 'Continuous Focus' mode at the same time as 'Continuous Release' mode, which you will be doing often, there can be times when you will take a photo just as the AF is briefly searching for its next lock. Taking a number of photos helps ensure that the photo being taken, and the subject being in focus, both occur at the same time at least in some of your pictures. This is what the old-timers call 'cheating', or as my one-shot-wonder film using friend would often say as I stood next to him rattling off countless photos: "Why don't you just get a video camera?" Remember that the more photos you take, the faster you will fill your memory cards, the more battery power you will use, and - now this is the biggie - the more photos you have to edit to get the ones you want afterwards!

There are probably more shutter release modes available on your camera such as a Self-timer, Quiet release & Mirror-Up, but these aren't so important for aviation photography. In fact in some more expensive cameras there are countless menus, modes and controls for fine-tuning everything we have discussed above, but until you know exactly what you are changing, try and keep it simple.

Equipment and lenses

In the next issue we will explore in more detail the variety of equipment and lenses that you can use to empty your bank account, such as high-end telephoto lenses, tele-converters and off-camera flash units. We'll also take a look at some of the tools available for viewing information about the photos you are taking, such as the Histogram. Until then, keep out there practicing!

If you have any feedback or critique on these articles I would love to hear it. You can either email the Editor or contact me direct through my website www.stereoisimage.co.nz