DSLR Autofocus Modes Explained

JANUARY 8, 2011 BY NASIM MANSUROV155 COMMENTS

Most modern digital SLR cameras are equipped with advanced autofocus systems that are often hard to understand. Whether you are shooting with an entry-level or professional DSLR, knowing how to use autofocus system effectively is essential to get sharp images. A badly-focused, blurry image can ruin a photograph and you cannot repair it in post-processing. Some professionals often end up converting their images to black and white, to hide their focusing problems. If you learn how to focus correctly, you do not have to resort to such measures and you can deliver much better results to your clients and family. Simply put, accurate focus translates to sharper images and that is something everyone is looking for in photographs today. I know some photographers will argue with me on this, saying that sometimes image blur yields a "creative" look, but it is one thing when you do it on purpose and another, when you consistently mess up just because you don't know how to focus well with your camera. Once you learn how to properly focus with your camera, you can then decide whether you want to blur something on purpose.

In this article, I will teach you everything I know about focus modes on modern DSLRs. Since autofocus functionality depends on what camera type and model you are using, I obviously cannot go over all available AF modes, so I will only go through a couple of examples. Since I am a Nikon user, I will put a little more emphasis on Nikon DSLRs. Please note that this article is for more advanced DSLR users, since I go through each mode in plenty of detail.

1) How DSLR Autofocus Works

The nice thing about digital cameras today, is that you do not have to manually focus like people used to before, back in the early film days. Digital photography is much more forgiving in this regard, because unlike film, you can see the results instantly and you can easily change your camera settings and take many exposures without worrying about film cost and replacement. Autofocus has gotten better and better over the last decade and even the cheapest entry-level DSLRs are now equipped with rather complex autofocus systems. So, how do the modern camera autofocus systems work? Let's go over a few basics.

1.1) Active vs Passive Autofocus

There are two types of AF (Autofocus) systems – Active and Passive. The "Active AF" system works by shooting a red beam on your subject, then bouncing that light back to your camera to figure out the distance between the camera and the subject. Once the camera knows what that distance is, it instructs the lens to adjust focus based on this information. The nice thing about Active AF, is that it can be used in very poorly-lit environments, where normal (passive) AF does not function. The bad thing about Active AF, is that you can only use it for stationary, non-moving subjects and it only works for close subjects within 15-20 feet. If you use a Nikon or a Canon speedlight that has an "AF Assist" function, it will use an Active AF system.

On the other hand, the "Passive AF" system works very differently – instead of relying on the red beam to find out the distance between the camera and the subject, it either uses special sensors within the camera to **detect contrast** from the light that goes through the lens (known as "Phase Detection"), or uses the camera sensor itself to detect contrast in the image (known as "Contrast Detection"). What does "detect contrast" mean? Without going into complex terminology, this simply means that it tries to look for sharpness in a particular part of an image. If it is blurry, the AF system will adjust the lens focus until sharpness/contrast is achieved. That is why the Passive AF system requires that you have enough contrast in your frame for it to be able to focus properly. When a lens starts to "hunt" for focus on single color surfaces like white walls or gradient/blurry surfaces, it happens because the camera needs objects with edges (contrast) that stand out from the background to be able to acquire focus. If you would like to find out more about this subject, see my detailed article on Phase Detection autofocus.

By the way, if your DSLR has an "AF Assist" lamp in front of the camera, it is not an "Active AF" beam – all it does is fire direct light at your subject like a flashlight would, so it still relies on your camera's "Passive AF" system.

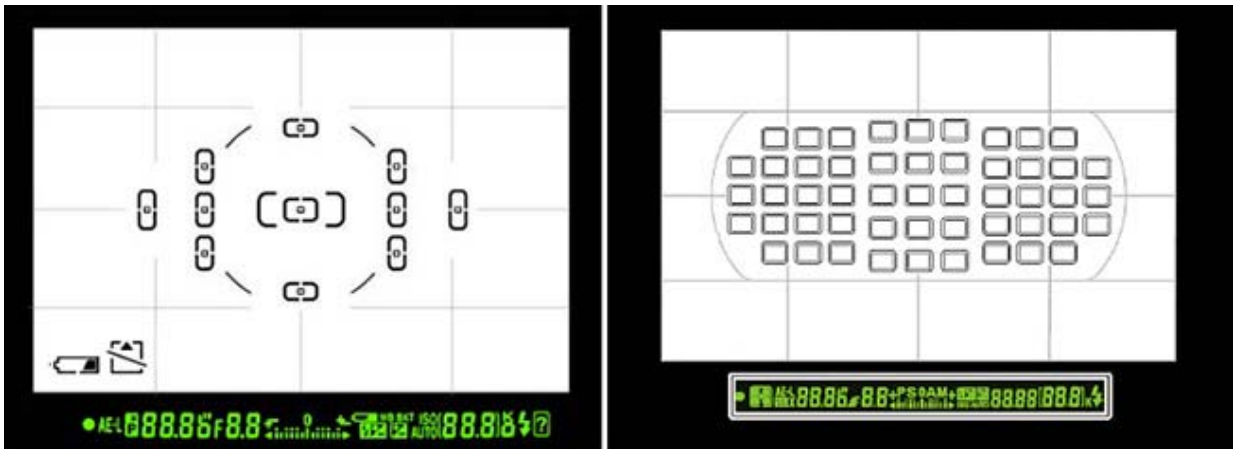
Many digital cameras such as point and shoot cameras, video cameras, etc. often use the "Contrast Detection" AF method to obtain focus, while most modern DSLRs can use both Phase and Contrast Detection to acquire focus. Since the "Contrast Detection" AF method requires light to actually hit the sensor, DSLRs must have their mirrors raised in order for this to work, which means that contrast detection autofocus in DSLRs can only be done when the camera is in "Live View" mode. The Phase Detection AF is great for tracking moving subjects, while the Contrast Detection AF is great for stationary subjects. Contrast Detection is often more accurate than Phase Detection, especially in challenging or low-light situations. The nice thing about Contrast Detection, is that you can use any part of the image (including extreme corners) on your sensor to acquire focus, while with Phase Detection, you must use one or more of the focus points on your DSLR. The disadvantage of Contrast Detection on DSLRs at the moment, is that it is quite slow. I'm sure manufacturers will soon catch up with this, since the speed of autofocus while capturing videos is getting more and more important on modern DSLRs and some

mirrorless cameras (particularly Micro Four Thirds) already have fast Contrast Detection autofocus. Modern high-end mirrorless cameras combine the two autofocus systems, utilizing fast Phase Detection in good light and slower Contrast Detection in low-light situations. Some manufacturers even found ways to integrate Phase Detection pixels right on camera sensors, which greatly enhances the accuracy of Phase Detection AF when compared to traditional DSLR Phase Detection autofocus.

Don't worry about all this if it sounds too confusing – the technical information above is just provided to help you understand how autofocus functions. Just remember that the default autofocus behavior on your camera relies on the light that passes through the lens and the type of focus mode you pick (as explained further down below).

1.2) Focus Points

Focus points are the little empty squares or dots that you see when you look through your viewfinder. Manufacturers often differentiate entry-level DSLRs from professional ones by implementing different types of autofocus systems. Entry-level DSLRs generally have simple AF systems with a few focus points for basic focusing needs, while pro-level DSLRs have complex, highly configurable AF systems with lots of focus points. These focus points are a part of "Phase Detection AF", so each one of the focus points can be used by the camera AF sensors to detect contrast. The focus points are intentionally laid out in certain parts of the frame and the number of focus points, along with the layout vary not only by the manufacturer, but also by camera models. Take a look at these two types of autofocus systems with a different number of AF points and different layouts:



Nikon D5000 (Left) vs D300s (Right) AF Points

As you can see, Nikon D5000 has a total of 11 AF points and Nikon D300s is equipped with a total of 51 AF points – a big difference in the number of AF points. Is the number of AF points important? Of course it is – not only do you have more AF points to use while composing your shot and focusing on a particular area of an image, but also the camera AF system can use those different AF points for subject tracking (extremely useful for sports and wildlife photography). However, it is not just the sheer number of focus points that make a difference – there are also different types of focus points.

1.3) Types of AF Points

Let's talk about different types of AF points now. As I have pointed out above, the number of focus points is not the only most important factor in autofocus systems – the type of AF points is also very crucial for getting accurate results. There are two types of AF point sensors available – **vertical** and**cross-type**. Vertical sensors are one dimensional and they only detect contrast on a vertical line. Cross-type sensors are two dimensional and they can detect contrast both on vertical and horizontal lines, which makes cross-type sensors much more accurate than vertical sensors. What this means, is that the more cross-type sensors your camera has, the better and more accurate autofocus is going to be. That's why when new cameras are announced, you will typically see something that says "x number of focus points and x number of cross-type sensors" – manufacturers proudly state the number of focus points and the number of cross-type sensors, especially when those numbers are high. For example, this is what Nikon lists under "Key Features" on theNikon D7100: "Building on the acclaimed autofocus system from the D300s, the D7100 uses 51 focus points, including 15 cross-type sensors for detecting both vertical and horizontal contrast variations, to achieve fast, precise focus". This means that the total number of focus points is 51, 15 of which are more accurate, cross-type sensors. Whenever you shop for a new camera, pay close attention to the total number of AF points, along with the number of cross-type sensors, because those two are important, especially if you want to shoot sports and fast-moving wildlife.

1.4) Other factors that impact AF performance

As you can see, both the total number of focus points and their types are very important. However, those are not the only two things that are needed to get accurate results. The quality and the amount of light is another important factor that can seriously affect autofocus performance. By now, you probably already know that your camera autofocus works great when you shoot in daylight, under bright sun and starts to suffer when you move indoors to challenging light. Why is this the case? Because in low-light conditions, it is much tougher for your camera to detect contrast. Remember, Passive Autofocus completely relies on light that passes through the lens. If the quality of that light is poor, so is autofocus performance.

Talking about quality of light – lens condition, its quality and maximum aperture are other important factors that affect AF performance. If you have an old lens with all kinds of physical problems such as mold, dirt, too much dust or back-focus/front-focus problems, your AF performance will surely suffer. In terms of lens maximum aperture, there is a reason why pro-level f/2.8 lenses focus much faster than f/5.6 consumer zoom lenses: f/2.8 is a sweet spot for autofocus systems, as the lens aperture is neither too wide, nor too narrow. Fast f/1.4 prime lenses are usually slower than f/2.8 lenses, because they require more rotations of lens elements to achieve precise focus. Precision is key at such wide apertures, as depth of field is extremely shallow. Ideally, the lens aperture should be between f/2.0 and f/2.8 for best autofocus performance. Smaller apertures like f/5.6 mean less light passing through the lens, making autofocus operation more difficult. Therefore, larger apertures are better than smaller apertures for better autofocus operation, with the exception of very fast f/1.4 prime lenses. It is also important to mention that all modern digital cameras focus while lens aperture is wide open, so whenever you change the lens aperture to a higher number like f/16, the aperture actually gets changed only when you take a picture.

Lastly, the overall quality and robustness of the AF system in a camera is an extremely important factor. For example, the top-of-the-line professional Canon 1D Mark III camera designed for sports and wildlife photographers was dreaded with autofocus problems when it was released and it took a while for Canon to release firmware updates to improve autofocus performance, which angered a lot of professional photographers. Many of them ended up switching to Nikon just because of this problem. The camera was packed with all kinds of autofocus features, but AF just did not work right under certain conditions. If you are looking for the best AF systems in modern DSLRs, especially if you shoot sports and wildlife, Nikon and Canon offer the most advanced and robust autofocus systems (other manufacturers are catching up pretty quickly though).

2) DSLR Focus Modes

Nowadays, most DSLRs are equipped with several different focus modes for various situations. It is one thing to photograph a still subject's portrait, and another to photograph a running person or a bird in flight. When photographing still subjects, you generally acquire focus once and take a picture. If the subject moves, you reacquire focus again and take another picture. But if you have a subject that is continuously moving, you need your camera to readjust focus automatically as you take pictures. The good news is that your DSLR has the built-in functionality to handle such situations. Let's go over these focus modes in more detail.

2.1) Single Area Focus Mode

The "Single Area AF", also known as "AF-S" in the Nikon world or "One shot AF" in the Canon world is a pretty straightforward way to acquire focus. You pick one focus point and your camera will look for contrast just in that single focus point. When you half-press the shutter or press a dedicated AF button (if you have one), the camera will snap into focus once and if your subject moves, it won't reacquire focus even if you continue half-pressing the button. Hence, the focus remains "locked". The Single Area AF mode often requires the camera to lock into focus before allowing you to take a picture, so if focus is not acquired or your subject moves, pressing the shutter will do nothing (due to focus error). Some cameras allow you to change this behavior though – on the Nikon D810, for example, you can set the "AF-S Priority Selection" under "Autofocus" custom settings menu to "Release", which would let you take pictures even when focus is not acquired properly. A couple of things to note about the AF-S mode – if you mount an external speedlight that has an "AF-Assist" red beam, you will need to be in AF-S mode for it to work. The same is true for the "AF-Assist" lamp in front of your camera, it will only function in AF-S mode.

2.2) Continuous/AI Servo Focus Mode

Another focus mode that is available on all modern DSLRs is called "Continuous/AF-C" (Nikon) or "AI Servo" (Canon). This mode is used for tracking moving subjects and it is a must for shooting sports, wildlife and other non-stationary subjects. The way this mode works, is it analyzes the subject movement and predicts where the subject will be, placing the focus at the predicted point. The nice thing about the Continuous mode, is that it will automatically readjust focus if you or the subject move. All you need to do is continue half-pressing the shutter button or holding the dedicated AF button (if you have one) on your camera and the autofocus system will automatically track any movement. Compared to Single Area AF, the Continuous mode is generally highly configurable (especially on high-end DSLR models) and can do complicated tasks, such as tracking subjects with a single or multiple focus points.

2.3) Single/Continuous Hybrid Mode

Some cameras also have another mode called “AF-A” (Nikon) or “AI Focus AF” (Canon), which is basically a hybrid mode that automatically switches between Single/One-Shot and Continuous/AI Servo modes. The way this works, is the camera detects if the subject is stationary, in which case it automatically switches to Single focus, while if the subject moves, it will switch to Continuous focus. The default method on lower-end Nikon DSLRs is AF-A and it works quite well for most situations. Many of the higher-end/professional DSLRs do not have this mode, since it is designed for beginners.

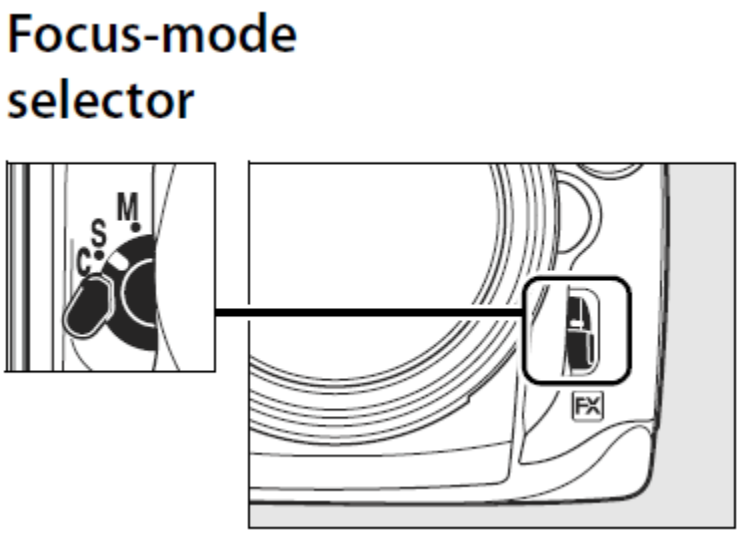
2.4) Full-time Servo Focus Mode

The newer Full-time Servo AF mode, also known as “AF-F”, was introduced by Nikon on such DSLRs like Nikon D3100 and Nikon D7000, specifically for recording video in Live View mode. This mode automatically tracks subject movement and acquires focus during video recording. While it seems to sound like a great feature, it does not work very well for fast-moving subjects and Nikon will have to work on improving this mode to make it faster and more usable. Don’t worry about this mode if you do not shoot video.

I personally leave my Nikon camera on AF-C mode all the time and only switch to AF-S when the camera cannot focus in low-light situations.

2.5) Changing Focus Modes

If you do not know how to change the focus mode on your camera, I recommend checking out your camera manual, because different cameras handle this differently. For example, all entry-level Nikon DSLRs require going into camera “Info” screen to change the focus mode, while higher-end DSLRs have a dedicated switch in front of the camera to toggle between different focus modes. For example, here is how you change the focus mode on the Nikon D700:



Rotating the dial to “C” will switch to Continuous/AF-C mode, rotating the dial to “S” will switch to Single Area Focus/AF-S mode and “M” is for switching to manual focus.

3) AF-Area Modes

To make things more confusing, many DSLRs also have something called “AF-Area Mode”, which allows photographers to choose several options to use while operating in Single Area/Continuous modes like AF-S, AF-C, AF-A and AF-F. Many of the entry-level/semi-professional DSLRs allow you to pick a certain “AF-Area Mode” within camera menu, while pro-level DSLRs like Nikon D300s/D700/D3s/D3x have a dedicated AF-Area Mode Selector on the back of the camera (newer pro-level DSLRs like D810 and D4s got rid of this selector and replaced it with a single button on the front of the camera). So, what do these AF-Area Modes do? Let’s go through them one by one.

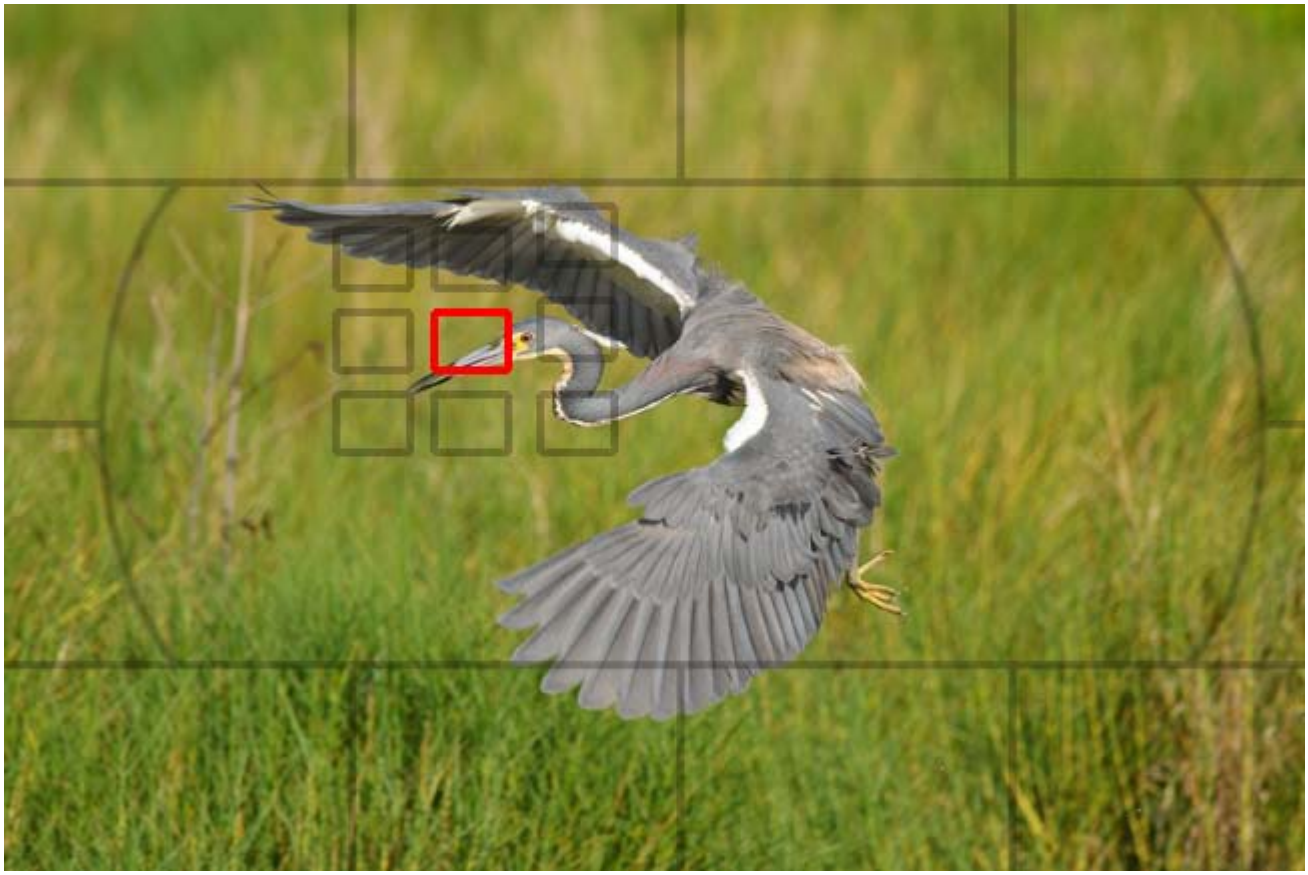
3.1) Single-Point AF-Area Mode

When you choose the “Single Point” (Nikon) or “Manual AF Point” (Canon) AF-Area Mode, the camera only uses **one focus point** that you choose in your viewfinder to acquire focus. So if you move your focus point up/down/left/right, the camera will detect contrast only on that particular focus point, using either vertical or cross-type sensors (depending on which one you have chosen). I use Single Point AF-Area Mode when photographing landscapes, architecture and other stationary subjects.

3.2) Dynamic AF-Area Mode

In “Dynamic” (Nikon) or “AF Point Expansion” (Canon) AF-Area Mode, you still choose one focus point and the camera will initially acquire focus on that particular focus point. However, once focus is acquired, if your subject moves, the camera will utilize the surrounding focus points to track subject movement and keep focus on your subject. You are expected to track the subject by panning the camera along with the subject and making sure that the subject stays close to the initially

selected focus point. If camera selects a surrounding/different AF point, it will not be directly visible inside the viewfinder, but will be visible after the image is taken.



The Dynamic AF-Area Mode works great for fast-moving subjects like birds, because it is not easy to keep focus on birds in flight. Higher-end DSLRs have the ability to control the number of surrounding focus points to activate for this type of shooting. For example, the Nikon D7100 allows choosing between 9 points, 21 points and 51 points in Dynamic AF-Area Mode. So if you only wanted to track a small portion of the scene, you would pick 9 points and if you wanted to track the entire frame, you could pick all 51 points to track your subject. Lastly, many of the modern DSLRs from Nikon have a "3D-Tracking Mode", where you initially pick the AF point and the camera will automatically activate as many focus points as needed to track subject movement. The cool thing about the 3D-Tracking mode, is that it uses a special scene-recognition system that actually reads colors and will track your subject automatically, letting you compose your shot while the subject moves. For example, if you are photographing a white bird among many black birds, the 3D-Tracking system will automatically focus on and track the white bird, even if the bird moves or if you move the camera, letting you compose your shot. If you compare 3D-Tracking to Dynamic AF-Area with a certain number of focus points selected, the 3D-Tracking method will use all available focus points on the camera to track your subject, while Dynamic AF-Area mode divides the focus points to "zones", activating only the surrounding focus points (as many as you selected). For example, if you choose 9 focus points, subject tracking will only work within a zone of 9 total focus points that are surrounding the focus point you picked. If your subject moves away from all 9 focus points, the camera will not be able to focus on the subject anymore. In 3D-Tracking mode, the camera will continue tracking the subject (newly selected focus points will be displayed in the

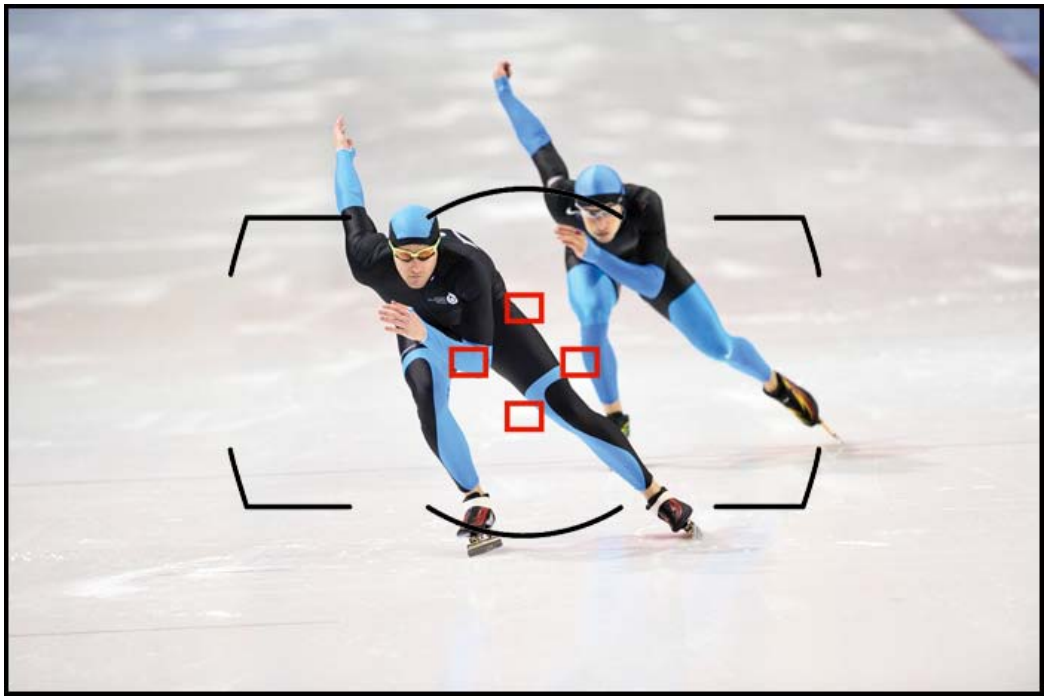
viewfinder), even if it significantly moves away from your initial focus point. I use the Dynamic AF-Area mode a lot when photographing birds and wildlife and typically shoot with a smaller number of focus points activated, between 9 and 21 focus points. I have some mixed feelings about the 3D-Tracking mode for photographing birds hand-held, since it does not seem to be as quick as the non-3D mode, especially when a smaller number of focus points is used.

3.3) Auto-Area AF Mode

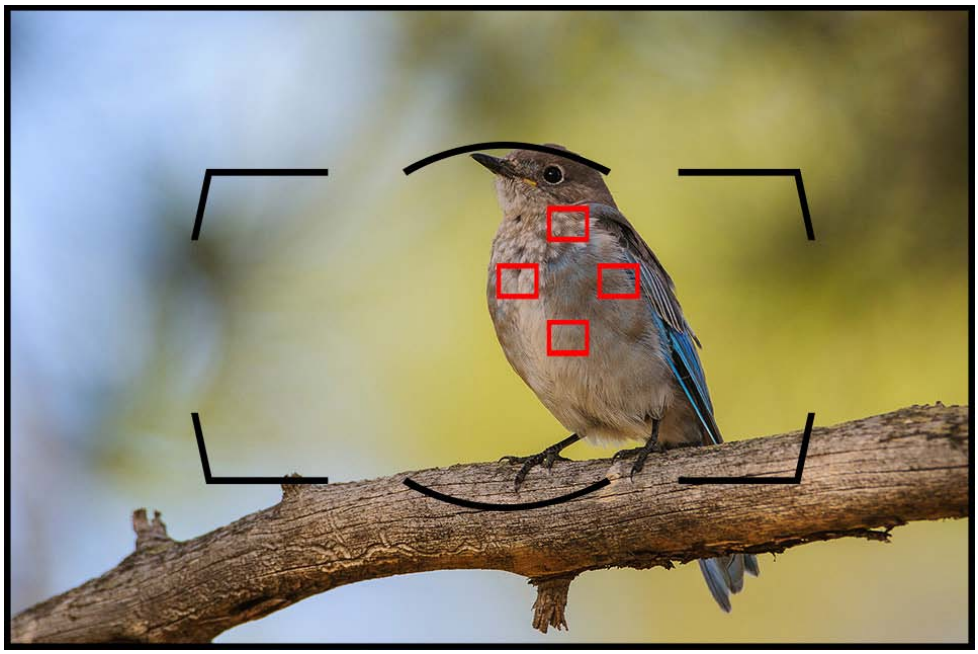
The “Auto-Area AF” (Nikon) or “Automatic AF Point Selection” (Canon) Mode is the “point-and-shoot” method of acquiring focus. Depending on what you are photographing, it will automatically pick what to focus on. It is a pretty complex mode, because it will actually recognize skin tones of a person in the frame and will automatically focus on him/her. If there are multiple people in the frame, it will focus on those that are closest to the camera. If the camera does not detect any skin tones, it will typically focus on the closest and largest object in the frame. If you shoot in Single Area/AF-S mode and select “Auto-Area AF”, the camera will actually display what focus points it will use for a second, allowing you to see and confirm the area the camera will focus on. The same thing can be done on Canon DSLRs, but it is called “Automatic AF point selection in One-Shot AF mode”. I never use this mode, because I want to control where to focus, instead of letting the camera do it for me.

3.4) Group-area AF Mode

The latest Nikon DSLRs like D810 and D4S came with the a new “Group-area Autofocus”. When compared to the regular single point AF mode, Group-area Autofocus activates five AF points to track subjects. This focus mode is great for initial focus acquisition and tracking of subjects when compared to a Single-Point or Dynamic AF, especially when dealing with smaller birds that fly erratically and can be really hard to focus on and track. In such situations, the Group-area AF mode might give better results than Dynamic AF, showing better accuracy and consistency from shot to shot.



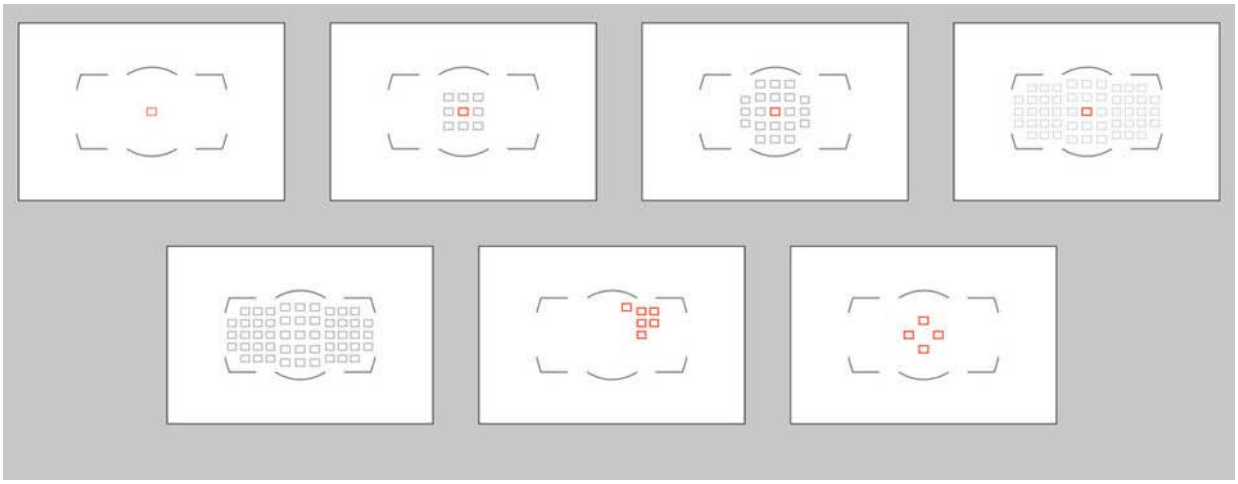
How does Group-area AF work? Basically, within the viewfinder you see four focus points, with the fifth one in the middle hidden. You can move all four focus points by pressing the multi-touch controller on the back of the camera (ideally, you want to stay in the middle, because the focus points in the center of the frame are cross-type and the most accurate). When pointed at a subject, all five focus points are activated simultaneously for the initial focus acquisition, with priority given to the closest subject. This differs from the the Dynamic 9 AF mode quite a bit, because D9 activates 8 focus points around the center focus point, with priority given to the chosen center focus point. If the camera fails to focus using the center focus point (not enough contrast), it attempts to do it with the other 8 focus points. Basically, the camera will always prioritize the central focus point and only fail-over to the other 8 if focus is not possible. In contrast, Group-area AF uses all 5 focus points simultaneously and will attempt to focus on the nearest subject, without giving preference to any of the 5 focus points.



Group-area AF is especially useful when photographing birds, wildlife and non-team sports. In the above sample image of speed skaters, if your goal is to focus on the front runner, Group-area AF would do wonders, as it would automatically acquire focus on and track the runner that is closest to the camera. Another good example can be a perched bird sitting on a stick and you are looking at it a little from above, so the ground behind the bird is clearly visible. With Dynamic AF mode, whatever you are pointing at is where the camera will initially attempt to acquire focus. If you are right on the bird, the camera will focus on the bird. If you accidentally point to the ground behind the bird, the camera will focus on the background instead. This can get quite challenging when photographing small birds, especially when the branch or stick they are sitting on is constantly moving. Getting initial focus point is important and the quicker you do it, the better the chance of capturing and tracking action, especially if the bird decides to suddenly take off. As I have mentioned above, with Group-area AF, there is no preference given to any focus point, so all 5 focus points are active simultaneously. In this particular situation, since the bird is closer than the background, as long as one of the 5 focus points is near the bird, the camera will always focus on the bird and not the background. Once focus is acquired, Group-area AF will also track the subject, but again, only if one of the 5 focus points is near the subject. If the subject moves fast and you cannot effectively pan your camera in the same direction, focus will be lost, similarly to what happens in Dynamic 9 AF mode. In terms of tracking, I personally found Group-area AF to be pretty fast, but it is hard to say if it is as fast as Dynamic 9 AF – in some situations, Dynamic 9 AF seemed to be a bit faster.

Another important fact I should mention, is that when you use Group-area AF in AF-S mode, the camera will engage face recognition and attempt to focus on the eye of the nearest person, which is neat. For example, if you are photographing someone between tree branches and leaves, the camera will always attempt to focus on the person's face instead of the nearest leaf. Unfortunately, face recognition is activated only in AF-S mode, so if you photograph fast-moving group sports and you need the camera to lock and track on a subject's face (and not on the nearest object), your best bet will be to use Dynamic AF instead.

Here is an illustrated comparison of each Nikon AF mode (image courtesy of Nikon USA):



Clockwise from the top left: Single-point AF mode, Dynamic-area AF mode (9 points), Dynamic-area AF mode (21 points), Dynamic-area AF mode (51 points), 3D-tracking mode, Auto-area AF mode and Group-area AF mode.

3.5) Other Area Modes

The newly-released DSLRs have additional AF-Area Modes like “Face-priority AF”, “Wide-area AF”, “Normal-area AF” and “Subject-tracking AF” for use in video recording. These modes are probably going to be incorporated into all future Nikon DSLRs with video capability going forward. I’m not going to discuss each one of these in detail, because they are specific to certain camera models and will probably change in the future. Canon also has some AF-Area Modes like “Spot AF”, where you could fine-tune your focus inside an focus point. These extra AF-Area modes are specific to certain Canon cameras like Canon 7D.

3.6) When to Use Different AF-Area Modes

Why do you need to know how and when to use different AF-Area Modes? Because each one of them can be combined with Focus Modes! To make things easier to understand, I compiled a chart with examples for you (for Nikon DSLR Cameras):

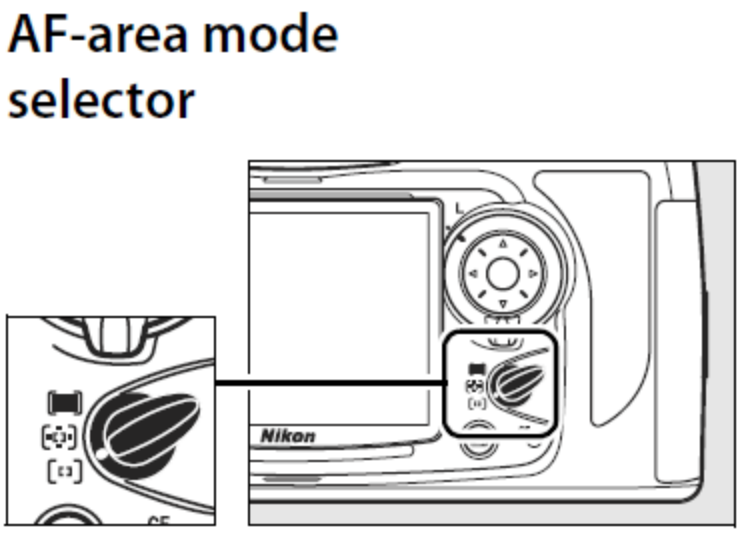
AF-Area Mode	**Nikon Focus Modes**		
	AF-S Mode	**AF-C Mode**	**AF-A Mode**

Note: *Not all of the above focus modes may be available on your Nikon DSLR. The new AF-F and other AF-Area video modes are not included in the above chart.*

AF-Area Mode	Nikon Focus Modes		
	AF-S Mode	**AF-C Mode**	**AF-A Mode**
Single-Point AF-Area Mode	Camera acquires focus only once and on the selected single focus point only.	Camera focuses on the selected single focus point only and will reacquire focus if the subject moves.	Camera detects if subject is stationary or moving and will automatically select whether to use AF-S or AF-C. Only one focus point is used in either case.
Dynamic AF-Area Mode	Disabled, works just like Single-Point AF.	You choose an initial focus point and once the camera acquires focus on the subject, it will engage the surrounding focus points to track subject movement. The number of surrounding focus points to use can be selected in camera menu.	Camera detects if subject is stationary or moving and will automatically select whether to use AF-S or AF-C.
Dynamic AF-Area with 3D-Tracking	Disabled, works just like Single-Point AF.	Instead of using a particular number of surrounding focus points, the 3D-Tracking activates all available focus points and uses color recognition to track subjects. You pick the initial focus point and the camera will track the subject across the frame automatically, letting you recompose the shot without losing focus on the subject.	Camera detects if subject is stationary or moving and will automatically select whether to use AF-S or AF-C.
Group-Area AF Mode	Camera activates five focus points and focuses on the nearest subject. If faces are detected, the camera will give priority to portrait subjects.	Camera automatically focuses on the nearest subject and will track the subject in the frame, as long as the subject remains close to the five selected points. Face detection is disabled.	Not available.
Auto-Area AF Mode	Camera automatically picks a focus point, depending on what's in the frame.	Camera automatically picks a focus point on a moving subject and will track the subject in the frame.	Camera detects if subject is stationary or moving and will automatically select whether to use AF-S or AF-C.

3.7) Changing AF-Area Modes

To find out how to change the AF-Area Mode on your camera, again, I recommend checking out your camera manual. If you have an entry-level Nikon DSLR, you can select an AF-Area through the "Shooting Menu", while higher-end Nikon DSLRs have a dedicated switch on the back of the camera. Here is how the switch looks like on Nikon D300/D300s/D700/D3/D3s/D3x cameras:



4) Autofocus Scenarios and Examples

So far you have read a lot of technical information on each focus mode and AF-area modes. Let's now go through different scenarios and examples for you to fully understand and grasp the information above. The camera settings I show below only apply to Nikon DSLR cameras.

4.1) Scenario #1 – Photographing Outdoor Sports

Which autofocus mode and AF-area mode would you choose when photographing outdoor sports like football? Let's start with choosing the right Autofocus Mode. Obviously, using the Single Area/AF-S mode is not going to work, since you need the camera to readjust focus continuously as you half-press the shutter/AF buttons on your camera. Therefore, we must use either AF-C or AF-A modes. I would not let the camera decide how to focus and would therefore switch to AF-C mode in such situations. What about the AF-area mode? Should you use the Single-point AF-Area Mode, Dynamic AF-Area Mode, Group-Area AF Mode or the 3D-Tracking Mode? I would personally choose the 3D-Tracking mode and let my camera deal with tracking the subjects while I compose my shots. If you find that 3D-Tracking is not working out well and it fails to track your subjects correctly, then switch to Dynamic AF-Area mode with a relatively high number of focus points, especially if you are close to the action. Group-Area AF would work great if you only want to track the subject that is closest to the camera. Here is a summary of settings I would use:

1. **Autofocus Mode**: AF-C
2. **AF-Area Mode**: 3D-Tracking, Dynamic AF-Area or Group-Area AF
3. **Custom Settings->Dynamic AF Area**: 21-points or 51-points
4. **Custom Settings->AF-C Priority Selection**: Release+Focus

4.2) Scenario #2 – Photographing People Outdoors

When taking portraits of people that pose for you outdoors in daylight, any of the autofocus modes should work perfectly fine. If you shoot in AF-S mode, the camera will only focus once when you half-press the shutter, so just make sure that you or your subjects don't move once you acquire focus right before taking a picture. By default, your camera should not let you

fire, if focus is not properly acquired in AF-S mode. If you are shooting in AF-C mode, just make sure to acquire good focus before taking a picture. AF-A mode works great for portraits as well. When it comes to AF-Area modes, I would stick with the Single-point AF-Area Mode, since your subjects are stationary.

1. **Autofocus Mode**: AF-S, AF-C or AF-A
2. **AF-Area Mode**: Single-point AF-Area
3. **Custom Settings->AF-S Priority Selection**: Focus
4. **Custom Settings->AF-C Priority Selection**: Release+Focus

It goes without saying that you should always focus on the closest eye of your subject, especially when standing close.

4.3) Scenario #3 – Photographing People Indoors

Photographing people indoors can be quite challenging, especially in low-light. If the light levels indoors are poor, I would shoot in AF-S mode to make sure that my AF-Assist beam helps me when needed. If you are using a speedlight, AF-S will make your speedlight use the AF-Assist red beam to acquire focus. You cannot do that in AF-C mode. The AF-A mode should also work well for these types of situations, but I would still opt to use the AF-S mode instead. In terms of AF-Area modes, I would pick the Single-point AF-Area Mode and choose the center autofocus point for better accuracy when shooting in low-light situations.

1. **Autofocus Mode**: AF-S
2. **AF-Area Mode**: Single-point AF-Area
3. **Custom Settings->AF-S Priority Selection**: Focus

4.4) Scenario #4 – Photographing Birds in Flight

Birds are extremely tough to photograph, since it is hard to predict their behavior and they are often very fast. As I have pointed out above, I would shoot in Continuous/AF-C mode and pick either Group-Area AF Mode or Dynamic AF-Area Mode with focus points between 9 and 21 (I prefer to leave focus points at 21, but 9 is generally faster). I have tried using 51 focus points and also tried shooting in 3D-Tracking mode, but found those to be slower and less reliable than using less focus points. I use the center focus point 99% of the time when photographing birds and only change focus points when birds are perched on something. Again, the center focus point is normally going to give you the best results. If you are dealing with small birds and have a hard time with initial focus acquisition, give Group-Area AF a try (if available).

1. **Autofocus Mode**: AF-C
2. **AF-Area Mode**: Dynamic AF-Area or Group-Area AF
3. **Custom Settings->Dynamic AF Area**: 9-points or 21-points
4. **Custom Settings->AF-C Priority Selection**: Release+Focus

4.5) Scenario #5 – Photographing Landscapes and Architecture

For landscapes and architecture, all focus modes work fine, but I prefer to switch to AF-S mode, since there is nothing to track. In low-light situations, you will not be able to utilize the AF-Assist function on your camera, because of distance

issues. So if your camera has a Live View mode, try to use that instead on a tripod and use the contrast-detect method to focus on a bright object in your scene. Otherwise, the only other option is to turn off autofocus and manually focus your lens. When taking pictures of landscapes and architecture, you have to be extremely careful about where to focus and need to understand such things as depth of field and hyperfocal distance well. You can find more information about these in my Landscape Photography Guide. In terms of AF-Area modes, you definitely want to use Single-point AF-Area Mode in order to focus precisely on a certain part of the frame.

1. **Autofocus Mode**: AF-S
2. **AF-Area Mode**: Single-point AF-Area
3. **Custom Settings->AF-S Priority Selection**: Focus

4.6) Scenario #6 – Photographing Large Animals/Wildlife

When photographing large animals, I would shoot in Continuous/AF-C mode and use Dynamic AF-Area or 3D-Tracking modes, both of which work great. Animals are normally not as fast as birds (although they can be even faster at times), so unless you are shooting fast action, I would just pick Dynamic AF-Area with the highest number of focus points or use 3D-Tracking.

1. **Autofocus Mode**: AF-C
2. **AF-Area Mode**: Dynamic AF-Area/3D-Tracking
3. **Custom Settings->Dynamic AF Area**: Highest number of AF points or 3D
4. **Custom Settings->AF-C Priority Selection**: Release+Focus

Hopefully the above scenarios will be useful for you to understand when to use which Autofocus and AF-Area modes. Now might be a good time to go back and review the chart above and see how well you can understand it.

4.7) Scenario #7 – Photographing Small Groups

I frequently get asked about how to focus when photographing a small group of people. Before I talk about focus modes, let me point out a few important things here. If you are using a standard or a telephoto lens, you have to be careful about the camera to subject distance when shooting at large apertures. If you stand too close to the group and shoot at large apertures like f/1.4-f/2.8, only one or two people might be in focus while everyone else is blurred, unless everyone is located on the same plane. The solution is to either change your aperture to something smaller like f/5.6 or f/8 or to stand back/move away from the group, so that your depth of field is increased, or do both. If you want to blur the background and shoot at large apertures, your only choice is to put everyone on the same plane, parallel to your camera. Imagine how the group would be standing if they were all touching a flat wall with their heads – that's how they need to stand. In terms of autofocus modes, if you are shooting in broad daylight, any of the AF modes work fine and I would pick Single-point AF-Area Mode for focusing.

1. **Autofocus Mode**: AF-S, AF-C or AF-A
2. **AF-Area Mode**: Single-point AF-Area
3. **Custom Settings->AF-S Priority Selection**: Focus
4. **Custom Settings->AF-C Priority Selection**: Release+Focus

Note: As you may have noticed, I always leave my “AF-S Priority Selection” and “AF-C Priority Selection” to be “Focus” and “Release+Focus”, respectively. Here is why. By keeping “AF-S Priority Selection” at “Focus”, I force my camera to not let me take a picture when I do not have good focus. I do not use the AF-S mode very often, but when I do, I want to make sure that my focus stays good. As for the “AF-C Priority Selection”, the “Release+Focus” mode works great for most situations – the camera will do its best to acquire good focus, but won’t hold up or delay the shutter too much, letting me shoot when I want. I don’t see the point of using either “Release” or “Focus” in AF-C mode. “Release” won’t care if your focus is good or not (what’s the point of autofocus then?) and “Focus” won’t let you take a picture until focus is locked. If I want my focus to be that accurate, I will switch to AF-S mode instead. Just leave these two settings as shown above and forget about them.

5) Tips to improve autofocus performance in low light

As I have pointed out earlier, focusing in bright, sunny environments is often quite easy and our cameras handle that pretty well. But people start having all kinds of problems when shooting in low-light conditions, especially indoors. Here are some tips for you if you have challenges shooting in low light:

1. **Use the center focus point.** Whether your camera is equipped with 9 or 51 focus points, you do not want to use the focus points in the corners of the frame when shooting in low-light conditions, simply because they are not going to be very functional/accurate. The center focus point is often your best bet, because it is a cross-type sensor that works better than any other focus point in your camera. But what about framing and composition if you have to focus in the center? For those situations, the solution is to move the autofocus function from your shutter release to a dedicated button on the back of the camera, then focus on your subject and recompose. This technique is called “focus and recompose“. Most DSLRs, including entry-level ones can do this. Professional-level DSLRs have a button called “AF-On” specifically designed for this and you can easily activate it in Custom Settings menu by going to AF-Activation and picking “AF-ON Only”. But you have to be careful when recomposing your shots after focusing, especially when shooting at shallow depths of field with a large-aperture lens. If you focus and then recompose, your focus plane will most likely change, resulting in bad focus, so keep this in mind.
2. **Use the “AF-Assist” feature on your camera or speedlight.** It is there for a reason – use it every time you have problems focusing in low-light. To activate it, make sure that “AF-Assist” is turned on in your camera menu and the AF-S mode is selected.
3. **Look for contrast and edges.** Instead of trying to focus on plain, one-colored objects, look for “contrasty” objects that stand out from the background.
4. **Add some light/Turn on more lights.** Sounds pretty basic, but if you are having problems focusing, what is simpler than adding a few more lights or turning more lights in the room? Lola and I were once photographing a corporate event and the ballroom was so dim, that we had a hard time getting good shots. We both switched to AF-S and were using our flashes for focusing, but high ceilings and lack of ambient light were making our images look very flat. Lola then approached an event coordinator and simply asked her to turn up the lights and our problems all went away and we came back with beautiful pictures!
5. **Watch your shutter speed.** It might look like bad focus, but it might actually be camera shake that causes your images to look soft. Using a lens with Vibration Reduction technology certainly helps, but still make sure to keep your shutter speed relatively high. If you have to work with slow shutter speeds, work on your hand-holding technique.
6. **Use a tripod.** With a tripod, you can get very accurate focus in low-light, without worrying about moving your camera.

7. **Use Live View Contrast Detect.** If you are using a tripod, try focusing in Live View mode using Contrast Detect. That's how I focused on the moon during the last lunar eclipse, as described in my "how to photograph a lunar eclipse" article. Whenever I use a tripod, I always try to use contrast detect, because it gives me better and more accurate results. Even manually focusing is much easier in Live View mode, since you see a lot more on the larger LCD than inside the camera viewfinder.
8. **Use a bright flashlight.** If your camera does not have a built-in AF-Assist lamp, use a bright flashlight and ask someone to point it at your subject while you try to focus. Switch to manual focus mode once focus is acquired, then ask your helper to turn off the flashlight and take a picture without you or your subject moving. For photographing landscapes at night, a laser pointer works quite well (don't use a laser pointer for photographing people or animals!).
9. **Use manual focus.** Kind of goes against the title of this article, but you should still learn how to manually focus your lenses and not be afraid to do it. Sometimes manually focusing your lens is quicker than trying to use any of the autofocus methods. Many landscape, macro and architecture photographers shoot with manual focus lenses.