



CAMERA TIPS: SENSOR CLEANING



Changing lenses is probably the main reason dust gets introduced into a camera body. A few preventative measures, and bit of care - like holding the camera and lens sideways out of the wind - can really help minimise the risk.



I SEE SPOTS!

5 IN-FIELD WORK AROUNDS FOR SENSOR SPOTS

BY DOUG GIMESY

No matter how careful you are, it's inevitable that at some stage you'll end up with dreaded dust spots on your camera sensor. Of course, you could always ignore the issue and just shoot away, knowing you'll have a bit of post-production cloning to do when you get home, or maybe you have access to another camera body. But what if you don't have these luxuries? Here are five techniques that'll help you banish them for good next time you're in the field.



1 SHOOT WIDE OPEN

The thing about sensor spots is that normally they are caused by an object like dust that isn't sitting on the camera's light capturing photo sites per se, but on the protective glass that covers them. Because of this, what you normally see as sensor-spots are the shadow of the offending material being cast onto the photo sites. That's a good thing - contaminated photo sites are expensive to fix, and dust 'on' the sensor is easier to clean when you can. But most importantly if you're in the field, if you reduce your f-stop by opening your aperture, the light coming in is from a wider angle and so the shadow cast will be more diffuse and therefore less noticeable.

2 SHOOT VISUALLY COMPLEX SCENES

It's not uncommon for most people to first notice sensor spots when they shoot something visually 'flat', such as a clear sky or a smooth surface. That's because sensor spots are normally so small, they get lost in the detail of the images. In this case, another in-field work around is to try and shoot images that are visually complex (i.e., with no clear sky, or flat walls). More complexity and texture in your images will effectively hide the spot in the image detail. Alternatively, if you know where your spots are, you can move your frame slightly so at least they are concentrated in a complex location.

3 GET CREATIVE - INTRODUCE MOTION BLUR

Building on my previous tip, you can also try to make a visually simple scene complex by introducing motion blur. There are several ways to do this (and I've written about this before in 'Life in the slow lane', here: bit.ly/3TKMh0f), but basically by slowing the shutter down and either panning, or having the subject move the movement can increase the visual complexity of the image and help disguise the sensor spots. At the time I captured the image at the bottom of page 35, my sensor had over 15 spots.



SPOTS OF A DIFFERENT TYPE

It's important to know two things when thinking about spots on an image. Firstly, not all small spots on an image are caused by dust, and secondly not all spots are caused by something on the sensor. Spots on the sensor can come from other material like grease and water droplets, as well as lint, plastic, and metal shavings - the latter two usually coming from small parts being shaved off when you put on/take off your lens caps and/or change lens. Spots on an image but not from something on the sensor can also come from dust/objects on the back of your lens, and if big enough, in your lens or on your front element.





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LEFT: This crested tern was photographed relatively wide open for a telephoto lens at f7.1. Against a flat sky (the bane of showing sensor dust), wide open, spots weren't visible. However, when I dropped the aperture to f/11, they became noticeable. Nikon D850, 500mm f/5.6 lens. 1/1000s @ f7.1, ISO 400.

BELOW LEFT: Shooting visually complex scenes, like this beach with clouds, can be a great way to 'hide' sensor spots. Sony A1, 24-70mm f/2.8 lens @ 70mm. 1/320s @ f22, ISO 320.

BELOW RIGHT: Using motion blur creates a visually complex scene while also helping hide spots. Nikon D850, 70-200mm f/2.8 lens @ 200mm. 1/125s @ f22, ISO 500.

BEST PRACTICES FOR KEEPING SPOTS AWAY

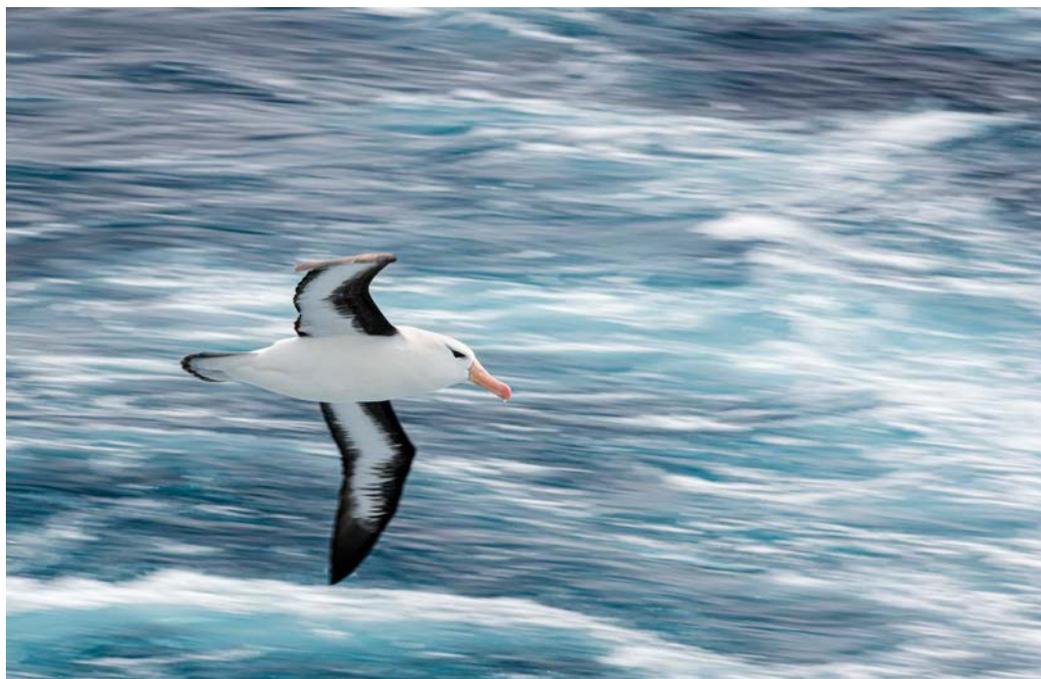
The old saying "an ounce of prevention is worth a pound of cure" certainly applies to camera sensor spots. Although not always preventable, if you're careful and adopt the following practices that I've picked up, as well as some from my go to camera technician, Wayne (from Melbourne's Imaging By Design), you're less likely to get dust spots and need fewer sensor cleans.

- Switch your camera off before every lens change. In theory at least, this reduces the amount of static charge on your sensor and so should reduce the amount of dust it attracts
- Clean around the mount before lens changes. If you have a soft brush or puffer, wipe off or blow around the lens mount before taking off the old lens
- Make sure your camera is pointing downwards or sideways. This helps prevent dust falling in. If I have an assistant, I prefer sideways. For me, changing sideways also minimises the chance of dust falling onto the rear element of your lens whilst exposed, and it then being transferred into the camera body once attached
- Drop the shutter when powered off (mirrorless cameras). Some of the newer mirrorless cameras have the option for a shutter to drop when the



camera is powered off, thereby covering the sensor. Activating this means the sensor is somewhat protected during lens changes, however you must of course remember to turn your camera off first!

- Always keep lens dust caps on. Also, try not to store your rear lens caps in a place where they will easily pick up and transfer dust across when you put them on; A pocket full of lint is a classic example
- Keep your camera, lenses and storage areas clean, including: vacuuming/wiping down the inside of your camera bag and blowing dust off the rear element
- Only use air blowers with filters on them. There is no use blowing dusty air onto a surface you are trying to clean. That would be like showering in dirty water.





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A FEW MORE THINGS FOR THE OBSESSIVE...

- Shoot using electric shutter if possible. Every time a mechanical shutter fires it creates friction which can cause small particles to be created. Shooting with the electronic shutter eliminates this contributing factor.
- Only use prime lenses or zooms with a minimal bellows effect. The 'bellows' effect is what I call the phenomenon of air being sucked in and blown internally every time you change your zoom and is something I especially notice with zooms whose barrels extend out. To see what I'm talking about, try holding the rear end of your zoom (cap off and when not attached to the camera) close to your hand, and zoom in and out: You'll feel some air move against your hand. When attached to the camera, this air is not blowing against your hand but against the sensor. I'd imagine the better the weather sealing on the lens, the less dust that can get in, but I've known people who have never taken their zooms off their cameras, but still end up with sensor dust spots over time
- Keep a 1.4x or 2x tele-converter mounted on the body. Adding a tele-converter effectively seals the body and sensor from the outside world (even when changing lenses), and so effectively eliminates the chance of dust entering from the outside. Of course, there can be optical downsides to adding another piece of glass if you don't actually need it, however I have used this technique when I know I'll be changing lenses in super dusty conditions, and the focal range I'm playing in works (e.g., using a 1.4 x tele-converter changing between a 70-200mm and 100-400mm etc.). And a rant - why don't camera companies make a 1x that can permanently sit there, just like a protective lens filter, but for the sensor!?
- Store equipment in clean zip-lock bags when in the field. I find this a great practice when in the field, not only because it helps keep lenses clean, but also adds another level of protection from water. Don't however leave them in sealed plastic bags when at home, as long term any locked in moisture can increase the chance of fungi growing on elements
- Don't change lenses after moving from a warm environment to a cool environment, or dry environment (e.g., air-conditioned room) to a humid (e.g. outdoor) environment. Whilst this will not cause sensor dust, any temporary condensation that may occur on the inside of your camera and sensor (and you've probably seen this effect when the front element of your lens has fogged when you've rapidly changed environments, can increase the possibility that any dust particles on your sensor stick more securely making them harder to get rid of
- Proactively get a professional clean every now and then. A good professional clean usually involves more than just cleaning the sensor, and should also involve cleaning the area around where the sensor sits. Remember how blowing dust off a sensor doesn't mean it's not in the camera? Well, a full clean means there shouldn't be any dust left lurking around in the body, waiting to drop in just as you are about to take a Pulitzer-prize winning shot.

RIGHT: When I photographed this fat-tailed dunnart (*Sminthopsis crassicaudata*) using an ISO of 7,200, the increased grain meant that most of my sensor spots weren't visible, and were further hidden in post when I applied a little noise reduction. Nikon D5, 105mm f/2.8 lens. 1/50s @ f3, ISO 7200.

OPPOSITE: These two images don't look that different, but one was captured with my Sony A1 in-camera crop mode, which uses a smaller portion of the sensor. In some cases shooting in this way can eliminate spots on the edge of frame, while also giving you a handy crop.



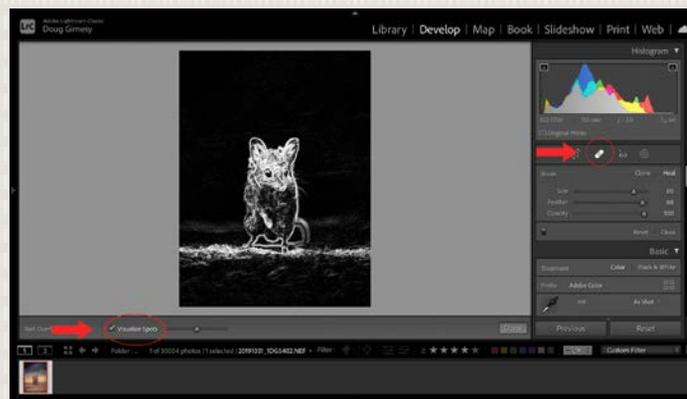
THE POST-PRODUCTION FIX

If you do find a spot on your image, you can of course clone them out using something like Photoshop, but if you use mainly Lightroom (and I do), I find it super easy to use the 'visualise spots' feature. You use this by simply going to the spot removal tool (it looks like a band aid, and the shortcut is Q) in the Develop panel, click on that, and then the bottom of your screen you'll see under your image a check box titled 'Visualise Spots'. If you check that, and then as you move your slider to the right, if you have spots

on a clean background (remember visually complex backgrounds hide spots), you should see the appear. From here you can then zoom in (by holding the space bar down and clicking on them), and then use clone out as you normally would.

One other tip: If you have spots on one image, you're most likely to have them on other shots, so rather than repeating the process for every image, just copy what you have done and paste the action by clicking 'Cmd C', checking the

'Spot removal' box, going to grid view, selecting all the other images which may have spots, and hitting 'Sync settings' (bottom right) ensuring the 'Spot removal' box is ticked.





ACTIVATE YOUR CAMERA'S SELF-CLEANING SENSOR MODE

Many digital SLR and mirrorless cameras now have a function to clean the camera's sensor using vibrations to shake particles off. If your camera has this function, make sure it is activated, so every time you turn the camera off (or on), the sensor gets cleaned. This doesn't always work, and whilst this may get rid of dust 'on' the sensor (which is great), it doesn't mean the dust is out of the camera body. Over time it can accumulate, increasing the risk of it falling back on the sensor in the future.

4 INCREASE YOUR ISO

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I know many people recoil at a suggestion to deliberately increase ISO, but surprisingly, as sensor noise increases, the visual impact of sensor dust diminishes. I'm honestly not sure about the physics of why this happens, but I guess it's because as the image gets grainier, the spot effectively gets broken up by the grain - a bit like looking at a mark on a window through fly wire screen. Full disclosure: I've never used this technique professionally!

5 SHOOT IN CROP MODE

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Finally, depending on where your sensor spots are, whether you can sacrifice file size, and if the spots (or the majority of them) are near the edge of the frame, you can also consider shooting in crop mode. I had an issue recently where I had just one annoying spot near the bottom edge of my image. As the images didn't need to be huge files, by simply moving to crop mode I had a quick and easy work around that literally cut out the problem.

FINAL THOUGHTS

Sensor spots are annoying at the best of times, and of course it's always worth doing what you can to prevent them from happening, and also checking your sensor regularly before you take your camera out; Shoot the sky or a flat wall at say f20 will help you see if you have any. But spots do happen, and you sometimes you only discover them in the field, when there isn't a lot you can do about them. I hope at least some of these strategies help ease the pain! 🌟