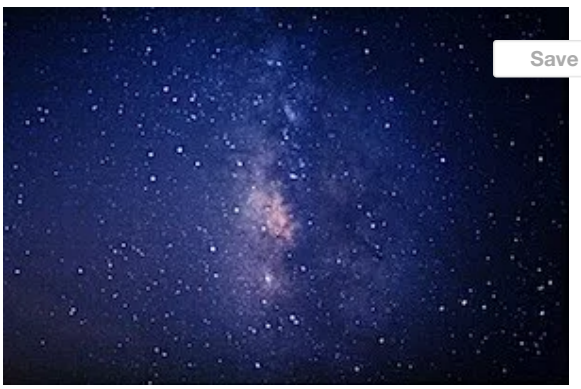
How to Shoot the Night Sky (Introduction to Astrophotography)

The following post on photographing the night sky is by jgomez65 – one of dPS's forum members.



Several people asked me to post a simple tutorial on how I took some night sky pictures. I am not an astrophotographer in any way, shape or form, nor do I have any expensive equipment. I simply read several tutorials, picked a dark spot on the beach and tried to do my best.

Anyway, here is how I did it.

1. What you need:

You need a camera that has manual exposure mode. Most SRL camera come with a feature called Bulb which does exactly that.

You will also need a remote control or a shutter release cable in order to minimize shaking the camera when taking the pictures.

You will definitely need a tripod

2. Selecting the spot to take your picture

The darker the place, the better it is. Taking stars pictures in your back yard is possible, however for better results select a place away from city lights. Those lights tend to pollute the image and make the stars less visible.

3. Camera settings

First, try to use a lens with a large aperture. In my case I used a Sigma 28 mm lens at f/3.5

Next, set your camera at a high ISO. I tried with both 1,600 and 800 ISO and I got good results.

Finally, in order to avoid the star trail (that is avoiding capturing the movement of the stars as the earth rotates) you have to use the RULE of 600 which is very easy:
Divide 600 by the focal length of the lens you are using. In my case I divided 600/28 = 21.42 (I can leave the shutter open for 21 seconds and avoid capturing the star trail)

Finally, put your lens in manual focusing and turn it to infinity focus (that would be the symbol at the end of the numbers on your lens)

4. Taking the pictures

Set the camera in your tripod and take at least 5 consecutive images at the stars using the correct exposure time (using the RULE of 600) Do not move the camera to a different spot or change the settings unless you are done with that series of pictures.

Tip: Every time I am done with a set of pictures, I place my hand in front of the lens and take another picture. That way I know that the picture where everything is black is where the series end.

5. Editing the images

Don't be disappointed if you don't see any color in your images. This is normal. You will need to bring the colors up in PS or any other editing software.

The first step is to stack the images. That is to superimpose one image on top of the others (not all the images, but pictures belonging to the same series). You can do this with a free software called Deep Sky Stacker. Just use the default settings on the software.
The final image will be a large TIF file that you will use to bring up the colors in Photoshop.

Next open your TIF file in Photoshop and edit the curves and levels. You can follow this easy tutorial on this video:

I also edited the blue, red and green colors in the level in order to make the nebula more visible.

That’s it.

Here is the original image and the final result:

Original Image:

Final Image:

4236	86	66	3883
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Sohan Dewan • 3 years ago

If I use f/3.5 with 800 iSO can I have any chance to get the good result? I'm just concern about the photo shoot because I don't have any problem after photo processing even I'm a professional photo editor.

86 • Reply • Share ›

JMH • 4 years ago

Last night I went to Rocky Mountain National Park. It was a fabulous night, lots of stars. A dark sky. I had all of the stuff. Tripod. Cable release. I put the controls on M and bulb, put the camera would not let me take the image. It kept saying image is too dark. Can you help me? (new camera)

10 • Reply • Share ›

Bruce Johnson ➚ JMH • 4 years ago

Try turning autofocus off.

4 • Reply • Share ›

Wombats ➚ JMH • 4 years ago

You could also try turning on "Release without Lens"

1 • Reply • Share ›

Darlene Hildebrandt Mod ➚ JMH • 4 years ago

what is the camera model? Did you have auto anything on?

What about autofocus?

Reply • Share ›

Pamela East ➚ Darlene Hildebrandt • 4 years ago

Turn off the autofocus on your lens.

2 Reply • Share ›

Gina • 4 years ago

I tried to do this last night, but failed to first multiply my focal length by the crop factor. Makes a big difference with a 1.6.
Also, with 30 sec exposure times five photos, how do you stack without getting a star trail? Your end photo will essentially be 2.5 minutes of the sky that has been broken down into 30 second segments and stacked.

9 Reply • Share ›

Darlene Hildebrandt Mod ➚ Gina • 4 years ago

Sorry I'm not familiar with this guest writer (before I came on as editor) and I'm not sure why he suggests shooting 5 images. Taking a look at the software site it seems that it what keeps the tails from showing up, it looks like it can mask them out. Seems like a lot of work - personally I'd take one shot and punch it up in LR.

6 Reply • Share ›

Fox ➚ Darlene Hildebrandt • 4 years ago

What the writer suggests is entirely correct - taking only one picture and pushing it in LR is possible, but will yield inferior results (loads of noise). Taking multiple pictures will allow for stacking (i.e. the software he mentions rotates every single frame so that the stars all line up as points instead of trailing) which greatly reduces noise, even at high ISO. The noise in the pictures differs, the stars don't, thus the software can discern the two (normal LR noise reduction can't!) delivering a final image that in spite of very high ISOs is almost noise free.

And the more images, the better the noise reduction. For best results I'd actually take one exposure for the foreground (it will be blurred when the software rotates the images to align the stars, thus you need another one and merge the layers in PS), around 30 so called 'light frames' (the actual images of the night sky), another 20 'dark frames' for better noise reduction and another 20 'bias frames' that allow for elimination of lens weaknesses. DeepSkyStacker can take all of these in and create a great final result that is muuuch superior to anything done with only one frame.

It is a lot of work, but then again none of the great night sky pictures we see on National Geographic or

in great portfolios were done in 5 min. with just one exposure ;)

4 ^ v • Reply • Share ›

Mark Howard ➚ Darlene Hildebrandt • 4 years ago

Most of the time you take multiple shots and stack them in order to eliminate the "noise" introduced by shooting at 800-1600.. The software will presume that if the spot (noise) did not move, then it is not a star, and thus eliminates it.. leaving a much truer and cleaner image.

1 ^ v • Reply • Share ›

Marc Hill ➚ Darlene Hildebrandt • 3 years ago

You might want to do a bit more research on astrophotography. Multiple shots are taken and the software automatically moves and rotates each subsequent image to match the star positions. You would reduce the need for each image to be substantially rotated or moved by simply rotating your tripod head in the direction of travel of the area being photographed. Also dark frames of the same length of the star exposure are taken and combined to help map out noise.

You can just put into lightroom and play around with the sliders as I have done for meteor shots. But with just one image it is impossible to determine the difference between a pixel of noise and a distant star. Multiple exposures allows you to collect more light from the distant star and average out the noise.

^ v • Reply • Share ›

David Majors ➚ Gina • 2 years ago

Gina: I know this is a couple of years old and you have probably figured it out by now- but you take several images. When the images are stacked they undergo a process called registration. This process identifies how the sky moved between the various exposures and compensates for the movement. Thus one frame will be slightly rotated to the previous etc. Obviously there are limits to this and Deep Sky Stacker only stacks the images where there is a sufficient amount of overlap. I have many times started with a stack of 10 images only to discover that only three could actually be stacked. It's all part of the learning process. You will learn how to take your images so they can be stacked.

^ v • Reply • Share ›

Pratik Kubal ➚ Gina • 4 years ago

Decrease you exposure time
exposure time<=600/(max focal length or focal length on which u are operating it on)

Reply • Share ›

marg93 ➚ Pratik Kubal • 3 years ago

I find it funny that everbody is sharing these "rules" around. Well if you just experiment for 5 minutes, you'll figure out the correct exposure time.

E.g. you set 3 minutes, and it's way too much. Then you set it at 1 minute and it's somewhat (proportionaly) better. By then you already have an intuiton on how it works, and you set it to say 30 seconds and it's fine. See, no big deal. You just observe the star trails on your screen zoomed in and see if they are too long. No need to invent a rule for every little thing.

Reply • Share ›

Marc Hill ➚ marg93 • 3 years ago

They are helpful as a starting point though.

1 Reply • Share ›

jeepcountry • 4 years ago

does anyone have any suggestions on how to manual focus a sony a330 At night for stars? I've gotten close to getting it clear but it never seems to come out right.

2 Reply • Share ›

Fox ➚ jeepcountry • 4 years ago

It can be a bit tricky - use live view and magnify, then (ignoring all the noise) look at a star and focus in a way that it reaches its smallest diameter. When you go too far you will notice it becoming bigger (blurrier) again.

1 Reply • Share ›

Larry Waite ➚ jeepcountry • 2 years ago

I take lots of pics of stars and I place a flash light about 25 meters away(slightly facing away from the camera) and manual focus on it. That sets me up for shooting stars (pardon the pun).

Reply • Share ›

Catarina Oberlander • 5 years ago

I'm using a Macbook and the DeepSky stacking program suggested does not run on it. Are there any programs with similar functions you recommend for a Mac?
Thanks in advance!

2 Reply • Share ›

Mike ➚ Catarina Oberlander • 5 years ago

Catarina,

You can either use this guide to run DeepSky Stacker on a Mac - http://blog.tom-goetz.org/2...

or

You could use this native Mac application that is bascially the same thing...

http://www.stark-labs.com/n...

Hope that helps.

Mike

2 Reply • Share ›

Catarina Oberlander ➚ Mike • 5 years ago

Thanks very much! I'll try this out as soon as I get a chance :-)

1 Reply • Share ›

Jes Lorraine • 3 years ago

Tried this and failed. Was on manual mode f/4 ISO1600 70mm with manual focus and on BULB. (Unsure on how to see how many seconds my exposure was).
Nikon D7000 (Originially tried using my Nikon 18-55mm but then changed to the AF Nikkor 70-210mm) Used a tripod but there was still "movement" causing the image to not look good. I'm really interested int his stuff so any advice would be great.
Thank you

1 Reply • Share ›

Marc Hill ➚ Jes Lorraine • 3 years ago

Change from Bulb to Manual and set the shutter to 5secs

Change from Bulb to Manual and set the shutter to 5secs (600/(70*1.6) rounded down). This way you only press the shutter button once. Pressing shutter button causes vibration.

It looks like the tripod wobbled as well. Use the minimum number of leg extensions and do your best not to raise the central column at all. If you use a battery extender take it off to remove weight. Try weighting the tripod down with a rucksack full of rocks hooked onto the central column. Also make sure if you use a remote cable instead of an IR remote that the cable is securely fixed to the tripod and isn't pulling on the camera body. If it is windy - don't bother, trust me on that.

Use live view and zoom in to focus on one bright star. Take time on this stage, it is so worth it.

Are you shooting multiple images? If so remember at 70mm the sky will move a lot over the course of five images making it difficult for the images to be stacked

edit: are you using a remote shutter release? that is essential at this focal length as the camera will wobble from you pressing the shutter. You could try using the shutter timer, so it waits ten seconds or so after pressing the shutter button before it takes the image, hopefully leaving enough time for the vibration to have gone.

My best advice though would be to apply all this advice to the 18-55mm at 20mm your exposure time per shot would be 18secs - 600/(20*1.6)

Reply • Share ›

Bill Williamson • 4 years ago

I can't access the start stacker website any ideas how to access the software?

1 Reply • Share ›

Rebecca Maher • 4 years ago

Do you need to do anything different if you want something in the foreground of the image?

1 Reply • Share ›

anand ➚ Rebecca Maher • 4 years ago

The way I understand it is that the NR works by assuming the points that do not move are noise, so if you have a tree/building in the foreground, the stacking software will probably interfere with that.

Reply • Share ›

Fox ➚ anand • 4 years ago

That is correct - the software rotates all the images so that the stars (which have moved over the frame

slightly) will align again. Naturally the foreground didn't move and will be blurred. What you need to do is take another exposure just focussing (and correctly exposing for) the foreground. You will later take the final, stacked TIFF image from DeepSkyStacker and your foreground image and combine them in Photoshop using layer masks.

1 · Reply · Share ›

zelias • 5 years ago

Thank You! ^_^

1 · Reply · Share ›

Brian • 9 months ago

I have had that problem. What i do is take a small piece of tape and put on the small silver pegs on inside of camera or on the lense, so it stops making contact. Works every time.

Reply · Share ›

Jamie C • 3 years ago

Thanks! Second time around I got the shot (Really noisy as I didn't bother stacking with DSS). Shot using kit lens at 18mm, f/3.5, ISO 1600 at 25sec exposure time.

Reply · Share ›

Khushal Khan ➔ Jamie C • 2 years ago

i dont understand the exposure time sEtting :/ how can i do it /.?? in canon 750D

Reply · Share ›

Darlene Hildebrandt Mod ➔ Khushal Khan • 2 years ago

Use manual exposure mode. Set the shutter speed manually

Reply · Share ›

Khushal Khan ➔ Darlene Hildebrandt • 2 years ago

can i gen any snap or video tutorial for it? plEase

Reply · Share ›

Darlene Hildebrandt Mod ➔ Khushal Khan • 2 years ago

or try this https://digital-photography...

If that is too advanced you will need to learn the basics of exposure triangle first

https://digital-photography...

Reply • Share ›

Darlene Hildebrandt Mod ➚ Khushal Khan
• 2 years ago

https://resources.digital-p... - our complete night photography course will help you

Reply • Share ›

Jessie • 3 years ago

I just bought my daughter a Canon EOS 70D with 20.2 megapixels, EF-S 18-55 lens and EF 700-300mm telephoto lens. I wanted to surprise her by having it set up and ready to do a photo like this but I have no idea about cameras. I was wondering if you could tell me what I should set it to? Thank you

Reply • Share ›

Daniel Benjamin • 3 years ago

Hello! I have recently got the opportunity to use my dads old DSLR camera (Canon EOS 10D) as he stopped using it. After getting it cleaned and repairs on the lenses and the actual camera I tried using it. In daylight, the results were good (I was happy with them).
I have always been interested in stars and really saw the opportunity to try and take pictures of them. After checking multiple sites on how to take pictures at night and of the night sky, I decided it was time to try it myself. I travelled out of the city and tried taking the pictures with the recommended settings. The results disappointed me. The results were completely black images. I really don't know why I couldn't get at least one star on it..
As I may have written before, my camera is a Canon EOS 10D. My lens is a 28mm f/2.8 lens (Canon lens EF). The settings I was on: I set the camera to Manual mode (M); I put the lens on manual focus and turned the wheel to infinite; I have tried with ISO 400, 800 and 1600; I put the camera on a timer setting (the symbol that looks like a timer); I set the seconds on 20 and then 30 and 40'' seconds; the settings of AF-WB I set on daylight and then on custom; further more, I set the exposure compensation on 0. If these settings are wrong, please correct me.
I am completely new at this and really hoped for some results. I understand that I may be being hasty. If it helps, I could attach a picture I took.
I really hope someone here could help me figure out the problem I have.
PS: in addition to the results of the sky, I tried taking pictures of my surroundings at night as well. The results were disappointing as well. I hardly saw anything in the picture other than maybe a few lights. I compared my pictures to those my friend made with his camera and he got much better results than I did.
Thanks for your time. Sorry for the long post. And I hope someone replies.

Reply • Share ›

marg93 ➚ Daniel Benjamin • 3 years ago

Hi.

I don't know what's going on in your case but something is not working as it should be.
Just to mention while it's on my mind; when you're in manual mode, exposure compensation doesn't matter. It's only for when the camera decides the "correct" exposure by itself (in automatic and semi-automatic (Av, Tv, P) modes).

The settings you're using are good. I know that this should not affect it, but are you happen to be using some kind of noise reduction for long exposures? Or some other kind of in-camera noise reduction? Perhaps it could "erase" the stars.

When I shoot at f/3.4, 30", ISO 3200 I see lots of stars and it seems pretty vivid. ISO 1600 is a bit too low for me, but I still see lots of stars even then, just with less intensity.

Hmm.. second reading your post, I realize you've said that you set the camera to something that looks like a timer? Are you actually setting the camera up to WAIT say 30 seconds and then shoot (rather than setting your exposure to last that long)? I don't know specifics of your camera because I don't own a DSLR so what I'm saying may be kind of nonsensical but still check it out.

Also if you're in manual mode, how is it possible that there is exposure compensation setting? As I've said, it's only present in automatic/semi-automatic modes because there it makes sense.

  • Reply • Share ›

marg93 • 3 years ago

Recently I've read a smart trick on how to focus a camera in dark: Buy a laser pointer, point it somewhere farthest you can see and use that "point" to focus your camera.

Supposedly green one works the best because of camera sensor having twice as much green "pixels" in comparison to red and blue. I haven't tried it so I don't know how strong it is and whether there really is going to be enough light for your camera to focus, but it seems to me that these lasers can be really powerful so why not. Just don't make youself blind by "testing" it's strength ;)

  • Reply • Share ›

David Mott • 3 years ago

Hello. My second attempt after reading your article. My first was out of focus turning the focus ring to infinity at f2.8 so I used an app to calculate the hyperfocal distance and it was a bit better. I have lots to learn about this but I'm happy I can see the milky way on my second attempt. Thanks for the article :-) This was shot in my backyard in Suburban Sydney so I reckon I need to get out into the

countryside. Canon 70d, EFS17-55mm f2.8 lens shot at 17mm. Exposure 30sec, f2.8, ISO800.

Reply • Share ›

Patrick Rushe • 3 years ago

Took this with D5000 with 10-24mm lens. f/3.5 iso3200 for 30 seconds. From reading today, discovered my focal point setting was off. Will try again tonight.

Reply • Share ›

Jared • 3 years ago

Hi. I have a Nikon D5500 and two lenses. One is a 28mm lens (but it doesn't have the infinity symbol so I'm not sure how to use it for this purpose... do I want it all the way zoomed out or all the way zoomed in?). The second is a 50mm lens (which does have the infinity symbol).

Following the instructions above, I used a 50mm lens with an exposure time of 12s. Though I think I got some star trail despite following the rule of 600. Did I set that incorrectly?

Finally, when Deep Sky Stacker produces the TIFF (which has some star trail, I think), Photoshop can't open it! I get the error message, "the TIFF uses an unsupported bit depth". I have a very old version of Photoshop - Photoshop 7.

Questions:
1) Does anyone have the specific settings for a Nikon D5500 (ISO, image type, basically every setting to do well with stars)?
2) Can I use my 28mm lens next time and if so, what is the right zoom level?
3) Was 12s too long with my 50mm lens?
4) Any advice on how to get Photoshop to open my file?

Thanks!

Some Older Comments

Spaceman

June 12, 2013 12:03 am

Joe - Images are stacked in order to increase the signal to noise ratio

Chris
April 25, 2013 05:46 pm

Great article! Recently in Kona (where lights are dimmed because of the observatory on the island) I followed the 600 rule, 18mm, ISO 1200, and stacked myy shots. (Canon 50D, tripod, mirror lockup,etc) DSS worked well and I saved three of my stacked shots. My question is about PSE11. I don't seem to be able to adjust my levels. The video instruction above cites the Tab and select 'level'... there isn't one. Also cNTRL L for level adjustment... no go. HELP! Does PSE11 have this ability? My shots are nice and full of stars but flat and no depth or color.
Also, an app for IOS called "Starfinder" (free download last time I looked) can help with finding nebulas and the Milky Way so you shoot more than just a bunch of stars without depth.
Thanks for any help with the PSE 11 issue. I really appreciate it!
Chris

mark
April 4, 2013 09:10 am

Michael,
Thanks for that.
I've had a look at settings, but can't see any mention of a noise reduction filter.
A mate of mine has a more modern entry level camera like mine, so I will get a loan of that and try
If it makes a difference, then it may be time to get a new one.
Cheers.

michael
April 3, 2013 12:31 pm

I am guessing MarK, but it might be the 400d. This is a circa 2006 camera, and at 7 years old, I am going to suggest the noise is due to a sensor of meagre capability (signal to noise ratio at 800 ISO on almost any camera has improved by leaps and bounds since then). I wonder if you tried the same thing with a more modern

camera with better noise control, if you'd have better results. ALSO, check to see if you have a noise reduction filter (a setting in your menu that may or may not be there) to ensure you do NOT have the filter on...it could be negating what you're doing). My final thought is DSS...with which I'm not familiar. I'm a PhotoShop guy and I got good results. What DID frustrate me about the demo above, is the image was in colour, but the tab in the curves menu in PhotoShop said "grey". I LIVE in PhotoShop and I have no idea how that is possible.

Mark
April 3, 2013 09:27 am

Hi, thanks for this post.
I have tried it though and failed miserably. Can you shed some light on what I may be doing wrong?
I have a Canon 400d with a 50mm lens. I kept the shutter open for 13 secs with f1.8 ISO 800.
When I loaded the 5 images into DSS, it said it could only use 1 of my images.
Have you any idea why? Were the other 4 too dark? If so, surely they'd all be dark?
I tried loading 1 image into photoshop and brightening it, but the amount of noise on the image was ridiculous.
Thanks for any advice/

Alex
October 12, 2012 10:58 pm

Thanks for the information, I followed your instructions last night and got awesome results. I was able to get a series of photos from a clear, beatiful Maine autum night sky, that I'm very pleased with. Thanks!!

Michael
August 29, 2012 12:54 pm

@tassos,
If you are referring to the examples in the above article, I think you need to realize these are small, web-friendly images, not the original, high resolution versions.
Further.....

I think you'll find (if you read the initial article) there is a formula relating to your focal length/600 that tells you how many seconds your shutter can be opened to avoid blur/motion due to the rotation of the earth. If the camera you are using is of low quality, yes, you're going to see noise, but that is where the process of shooting a number of shots and stacking them helps. I shot my first astro shot recently when I was in Bermuda. The shot I have uploaded is only 4 megs (I shoot with a 25 MP camera and the original is huge). You can see it here:
http://hopecreative.com/ASTRO_Bermuda_small.jpg
I think it turned out pretty well for a first attempt. Not blurry, not noisy and not "moved" (not sure what that means).

Tassos K.
August 28, 2012 05:23 pm

Hi, i am sorry for saying this, but the result picture is blury, moved and full of grain. Digital photography is a good place for experimenting but you need the knowledge to do some things. Off course you need a serious lens and for beginning you need an astronomy tripod. Earth moves! You can not shoot steady. Ph is not Harry Potter! This is a photographers opinion.
Thank you

Hemi
August 9, 2012 05:39 pm

Hi,
I have a Olympus VR320 compact digital camera with 21 x optical zoom.
I would like to know the settings to capture the night sky....with stars n moon.
Any idea?
Thank u

Shane
May 22, 2012 09:46 pm

I'm late to the game on this one, but I was camping this weekend and got some great opportunity to take some shots for this technique. I came home, loaded up my RAW files (they were a bit noisy due to the 1600 ISO I used) but I pressed on. I

used the Deep Sky Stacker software and when it "stacked" them, they were offset by a little bit (due to the shift from taking a series of shots over 3 minutes). I thought it would correct for that but it didn't.
Any suggestions on that one?

Steve P
March 15, 2012 01:51 am

Thanks Pete & Mark.
Mark, I thought that was the case. I kept thinking there is no way I'm going to take 5 shots in 21 seconds in the dark haha!
Can' t wait to give to ago and as I'm going to the Isle of Mull later in the year where the light pollution is virtually 0 I want to get some practice in!
Cheers guys.

Mark
March 15, 2012 12:28 am

Steve P
I don't know where the rule of 600 came from, but it does work. As you have worked it out, 21 seconds is the amount of each exposure.
You will need to take 5 (or more) photos each using this exposure. Any more than 21 seconds on each exposure and you will get star trail. You do not need to cram 5 shots into the 21 seconds, each shot needs to be 21 seconds.
Don't do what I did the other night though... worked out the exposure length of 15 seconds per shot, but then for some reason I zoomed in a bit more but didn't adjust the exposure time. Spent nearly 2 hours taking various sequences of shots only to find that I had star trail on each shot :(

Pete Wendt
March 14, 2012 12:24 pm

well since the stars all shift rotationally. you could always shift the images to overlap perfectly. then the noise issue is solved and the least amount to trail would show. I would just experiment. shoot one at 21 seconds.
shoot one at 5 x that or 105 seconds. this would show the most and least amount

of trail. I tend to like 1000 images showing the movement. a lot depends on how you are going to post process these as well. i hope i answered your question. experiment! Pete

Steve P
March 14, 2012 10:37 am

Great tips on here!!
My question is on the 600 rule?
So it states "Divide 600 by the focal length of the lens you are using. In my case I divided 600/28 = 21.42 (I can leave the shutter open for 21 seconds and avoid capturing the star trail)"
We then take 5 photo's. So, do I need to take 5 shots within 21 seconds to not get a trail?
Hoping for a simple answer on this please guys lol!

Nick Woodruffe
March 4, 2012 08:18 am

@Mark with long in camera processing.
Try turning off the cameras internal noise reduction system. That should help with processing time.

Paul
March 3, 2012 03:15 am

Thanks for this, something I've never tried, only done some low light photog up till now

Pete Wendt
February 2, 2012 03:57 pm

I know the feeliing Mark. I dont have an answer, my GH1 and GH2 process for about the same length of time that the exposure is. Maybe someone out there knows a faster camera. ?

Mark Shepherd
February 1, 2012 10:31 am

I have been an amateur astrophotographer for many years initially using hypersensitised colour film and exposures through a guided telescope of up to 3 hours. Now I am switching to digital (canon 500D). My current problem is the in-camera processing time for a long exposure, say 30 minutes. Does anyone know how to get around this.
thanks

Em
January 25, 2012 01:18 am

Hey, this maybe a stupid question but when I watched your video I noticed that the image you were using was in grey scale rather than RGB. My Images is in RGB not grey scale and when I used the technique you suggested with curves and levels it just comes out extremely red and orange. Do you change your grey scale image to colour after you have applied curves and levels? Or am i doing something completely wrong.
Cheers

kirpi
January 13, 2012 06:03 pm

@EmyB
You are right: *any* exposure of stars will show movement. The point is that the shorter the shooting time, the less movement is shown. This means that often star trails will look so short that you will not notice them (particularly with short focal lenses and no blow up of images). Also, shorter trails are easier to correct by specific software. You will find an older comment of mines here on November 11th where a page is linked with some hints on the subject.

EmyB
January 13, 2012 04:59 pm

Thanks for your reply - but the article is talking about exposure times of 21 seconds!?!? I thought that meant for each image? Or does it mean of total time from

when you start taking photos to when you finish?

Pete Wendt
January 13, 2012 03:05 pm

I understood the question. You would shoot them as quick as possible for the least movement. perhaps 10 images in a minutes time, if possible.

EmyB
January 13, 2012 02:56 pm

Pete - was that in answer to my question? If so, I think you've misunderstood me. I realise the stars move, I just don't understand how you can stack successive images WITHOUT getting movement.

Pete Wendt
January 13, 2012 02:45 pm

If you shoot a lot of images, over a long period of time, you are making a motion "Time lapse" sequence, that can be sequenced easily in quicktime pro, for example. If you are wanting to just try to limit the amount of noise from low level light, then just a few pictures stacked will work. The stars are all moving, those further from the north star in our hemisphere move further. Consequently, lets say a 10 minute exposure would give a trail, 10 minutes in lenth, whereas a photo every minute for lets say 10 seconds in length, would give 10 stars with the same distance of the first example. My self, i like doing time lapse series, but you just need to go play!

EmyB
January 13, 2012 01:47 pm

I am a bit confused - can someone please help me?
To sum up my understanding: To avoid creating star trails you take successive exposures of a shorter duration and stack them. So my question is - wouldn't the successive exposures show the same movement of stars? And be misaligned if they were stacked? Or does the stacking program align them all perfectly again??

Pete Wendt
December 12, 2011 01:54 am

Just keep trying mark, I would bracket a couple of pictures first, and find which ones give you the best result, I am usually shooting about 30 second long exposures. My Lumix gh1 and gh2 take about the same length of time to write the image to memory before i can shoot again. The sharpest image usually results about mid-way of your aperture range, pehaps f8'ish. depending on whether you want star trails would determine whether you want the appearance of the continuing trails, or movement of stars which would lead you to longer exposures with a low ISO of 100 and possibly neutral density filters as well. Until you narrow in ONE image that gives you what you like you can waste a lot of time. (Typically i shoot about 3000 images in a time lapse). The Photoshop problem is frustrating as well, as i have about the same setup that you do with the i7 core and memory. I get memory errors and if i watch my Task Manager and memory usage, it i hardly being taxed, and i have played with many of the memory allocation settings without much help. Don't give up!

Mark
December 12, 2011 12:05 am

Thanks Zan, I did try the settings, but same thing. Weird as it loaded fine on a different machine with only 8 gigs of ram and much slower c2d chip. When I get a spare hour or two, I'll wipe it and re-install.
It's a shame the video didn't fully explain what the photo was of, and what settings were used, or even how many shots were taken. I can't see that there would be that much 'hidden' cloud and nebula on a 28mm shot of the night sky, it looks like it was more like 300mm, but then with the rule of 600, could you get that much info in 2 seconds???
Still, practice (patience and persistence) makes perfect as they say :)

Zan
December 11, 2011 06:37 am

@Mark - Seem here didn't work for on several tries. As for Photoshop (if you haven't tried it as yet) you can try manually adjusting your memory usage in the preference

menu under the edit tab (it's located in performance).

Mark
December 11, 2011 06:23 am

I completely agree Pete.
I bought my Nikon D5000 as a kit, body and lens, the lense is a Nikon, so it should have been adjusted to suit the body. Without the moon present (or some other far off object), it's next to impossible to set the lens ready for infinity when it overshoots it.
I did try last night, got 5 or 6 good shots, but after stacking them and trying to load the 'large' tif file into Photoshop, I get a 'not enough ram' error and it won't load :(Strange considering this machine is a quad core i7 with 16 gigs of ram and TB's of HDD space available...
I managed to save a compressed image from the stacker which did load, but I could not get anywhere near the results of that video. Perhaps it didn't help that I had just a smidge of star trail (miss calculation on my part), but no nebula or anything, completely black. I'll have to give it another go next time it's clear...

Pete Wendt
December 9, 2011 04:49 am

i totally agree! So we need a mechanical stop, either home-made of manufactured into the lens
Once we know that spot, it wont change unless we put the lens on another body. I think if a camera is provided with a lens in a kit, it should be factory adjusted. The lens is always my most costly item, and i always hate changing to new name brand cameras!

Michael
December 9, 2011 12:39 am

Points taken.

Mark
December 8, 2011 10:10 pm

Thanks Pete and Michael.
@Pete, I think I'll leave the lens as is, with my clumsy fingers, I'd ruin it for sure lol
@Michael, thanks for that suggestion. Unfortunately, when taking a picture of the night sky at 28mm, a 3 inch screen on the back of the camera does not give enough clarity to see if a pinprick of starlight is in focus or not - most stars are less than a pixel in size!

Pete Wendt
December 8, 2011 04:02 pm

Well i do an awful lot of night photography and time-lapse videos, and i can tell you that when you go out on a foggy or overcast night with no light to focus on, you are pretty well up a creek without a paddle!

michael
December 8, 2011 12:51 pm

@ Pete and Mark.
Hate to oversimplify (but I'd do darn near anything before gluing something to one of my $1,200 lenses or worse.... taking it apart!!!)
Thank god we're not still shooting film. This is digital my friends. Fire a frame and look at the back of the camera! (Just sayin').

Pete Wendt
December 8, 2011 10:43 am

Yes and no Mark. This is really an issue with the manufacturers, and they should at least give a mechanical adjustment for infinity for users to allow for this. You could tape and glue something to the ring to stop it before it goes past focus. the other thought is to disassemble the lens and collimate it. there are a couple articles on youtube like this one: Agfa Isolette and Ansco Speedex Lens Collimating.wmv .
http:// www youtube com/watch?v=XGu4HFm-JeI
i elect the first option and pressure on the camera makers!
Good luck,
pete

Mark
December 8, 2011 05:02 am

Excellent tutorial, really looking forward to getting some great results.
I did try the other night (as it was nice and clear), and set the focus to infinity as suggested, but after taking 5 or 6 shots for each series (5), I excitedly loaded up the pictures to find that all the stars were out of focus!
At first I thought that maybe I had wound the focus to the wrong end as my lens does not have markings, but checking, it was definitely set to infinity. It was getting late after that, so I left it for another time.
I have found that winding the focus just back slightly is better on stars that can be seen with the naked eye as is the moon, but I have yet to check this due to light cloud coverage.
Any ideas?
Thanks,
Mark.

michael
November 27, 2011 10:52 am

@cvmf,
It sounds like there is some intense confusion in your note. Your lens might be 100mm in focal length, but your aperture definitely is not. 100 is not a very likely aperture setting. Perhaps f/2.8, or f/5.6, or f/11, but not f/100. So, you must be referring to your shutter speed or your focal length. The 600 rule asks you to divide your focal length INTO 600, so if your lens IS 100 mm, you can leave the shutter open for 6 seconds maximum, with an aperture that offers a correct exposure.
You do not mention your exposure, so it is tough to tell what is happening with the "movement" of the stars.
I hope this is helpful.

Tami
November 26, 2011 01:06 pm

The sky is nice and clear tonight and I think I got some cool shots, but I can't figure out the post processing. I have Photoshop CS2 and I'm trying to do the curves, but

mine doesn't have grey as a choice. Only RBG and individually Red, Blue and Green. Also, when I do the levels, my levels show up already "toothsome". There are just 3 or 4 lines and no space before them on the black side. Anyway, I'm playing with it. Thanks for the tutorial. I am closer to it than I was!

CVMF
November 26, 2011 10:17 am

Hi,
So I just tried steps 1-4 and tried to stack my pictures in the suggested software, DeepSkyStacker. But what is this about "Dark Files", "Light Files", "Flat Files", etc? In Step 5 it sounds so easy but under the Help file in the software, it gets into some pretty deep descriptions. Is there a more "dumbed-down" way to process the pictures?
Also, I am using a lens with an aperture of 100. Based on the 600 rule, I kept my aperture opened accordingly and did this with 5 shots. However, I am using a Rebel T1i (not the best but not bad, either...I think). When I flip though my pictures one after the other in the picture browser, the stars move a little to the right from each picture. Even though I took them immediately in succession, it took my camera a few seconds to process until I could take the next picture. I assume if I can get the staking down pat :-), my pictures will still suck. Would it be better to take 10 pictures with 3 seconds each instead?
Thanks in advance for any help and suggestions!!!

ellen
November 23, 2011 06:05 am

I am just learning Lightroom 3. Can it be used instead of PS to adjust the curves and levels? Thanks for the article, by the way!

ramon
November 22, 2011 10:18 am

Hi all.
To eliminate camera shake without a shutter-release cable... just set the camera's auto-timer for a couple of seconds.

:-)

Phyllis Picardi
November 21, 2011 03:52 am

What time of year is best to get the Milky Way? I thought only summer. Can you please reply to Michael's question about not being able to find the grey channel in RGB, CMYK etc.

Pete Wendt
November 18, 2011 11:19 am

It is SELDOM that turning the lens all the way to infinity is actually in focus. This is due to compensation of manufacturing of lens / body / focal plane. Adjust for best focus on a distant object. This happens to be a pet peeve of mine, and i think lens's should be able to be consumer adjusted for this. Even Camcorders dont focus when zoomed to infinity.

Vineeth
November 18, 2011 07:05 am

Great article. Nice snap!

Sam Bordovsky
November 15, 2011 05:37 am

Great article! Thanks
Question, How long should you wait between shots?

MdGo
November 15, 2011 05:22 am

Learned something new again today. Can't wait to try this technique. Hope the sky is clear tonight.

Zan
November 14, 2011 03:30 pm

Great article, short and to the point. Will definitely be giving this a try.

Michael
November 14, 2011 03:43 am

@moshe. Thanks for this brother. I was trying to figure out why a sophisticated piece of software like PS could not do this. I appreciate you passing this along. Would love to know why the video demonstration of the "processing" was using a grey channel. My RGB shots have no grey channel and I was wondering about the comment beneath the video, "I also edited the blue, red and green colors in the level in order to make the nebula more visible." meant. If you have an RGB file, there is no grey. if you have a CMYK file, you have a black (not a grey) channel and then CMY (not RGB). As someone who LIVES in PhotoShop I am wondering a) what mode this demonstrator is in, and b) how NOONE with (potentially) lesser PS experience made mention of this in any comments above.
sigh.

Moshe
November 13, 2011 06:30 pm

If you use Photoshop Extended, you don't need any additional software to perform the noise averaging. From Bridge, load all frames into layers: Tools->Photoshop->Load Files into Photoshop Layers... select all layers and align them: Edit->Auto-Align Layers... with all layers still selected, convert the whole stack into one Smart Object: right-click on any of the layers and select 'Convert to Smart Object'. Now select Stack Mode from the Layer menu: Layers->Smart Objects->Stack Mode. From the Stack Mode options, select Mean. That's all.
If you don't have the Extended version of Photoshop, you can still perform averaging by manually changing the opacity of the layers: bottom layer (layer No. 1) opacity = 100/1 = 100%. Above that (layer No. 2) opacity = 100/2 = 50%, and the third layer 100/3 = 33%, or generally, opacity = 100/Layer No. The blending mode should be 'Normal'. As you go up the stack, layers contribution drops. It is seldom worth it to use more than 10 layers, probably 5 will be sufficient.

Juan
November 13, 2011 11:32 am

Great results!!! What's the logic behind the 600 Rule? Thanks. Fine post.

Juan
November 13, 2011 11:31 am

Great results!!! What's the logic behind the 600 Rule? Thanks. Fine post.

Michael Tuuk
November 13, 2011 04:13 am

Great article and starting point for astrophotography! I've since followed a web trail of dozens of helpful articles on this. On a recent trip to Big Bend National Park (very dark skies) I took a bunch of night time star shots that turned out "nice" but if I knew this information I could have done so much better. Thanks for writing this.

Thomas Baker
November 12, 2011 06:48 am

The video tutorial is a very impressive demonstration of multiple curve action in post production. Quite amazing.

nitin satgharen
November 12, 2011 06:26 am

RULE of 600 when traveling by airplane 680K,M.Per Hr. we see all movement in zero motion. isn't it ?

Andy
November 12, 2011 02:18 am

Great info..... One setting I havn't herd mention is mirror lock up! I mostly take night shots and use mirror lock up all the time! the rule of 600 is great! never used it but will in the future!
Happy shooting!!!!

Nigel
November 12, 2011 12:35 am

That is inspiring! Makes me want to blow the dust off my 35mm camera and give it a try. As life is on a tight budget at the moment, does anyone know of free editing software that'd do the trick?
By the way, I'm sure that in the final image there is the face of a litle lamb just left of centre!

tiotio
November 11, 2011 11:39 pm

i have some questions which is maybe the same question to some readers' questions up there.
wouldn't we have a sharper image with a bigger amount of f/ stop (smaller diaphragm)? maybe f/11 or f/22?
i have a canon eos 400d which has a crop factor sensor. is the 600 rule available for my camera?
but they don't really matter. because photography is about exploring. so i just wanna try some shots with different settings and make my own rule.. lol

kirpi
November 11, 2011 10:18 pm

While reflex cameras are definitely the best tools for the job, still decent and rewarding results can be obtained with compact cameras. This is particularly true with many Canon models, thanks to the free Canon Hacker Development Kit software. Some time ago I published a couple of short primers with useful links on the field at http://www.millenuvole.org/i/s/fotografare_cielo_stellato_fotografia_notturna (it's a newsletter in Italian, actually) and http://www.kirpi.it/Photo/Star-sky-night-photography-tips (in English).

Pankaj J
November 11, 2011 08:50 pm

Awesum post....last night i shot the picture of MOon N star.....today i go with this stuff n shot again...thnx for this post

Brian
November 11, 2011 06:55 pm

Hi all, nice result OP.
There are several placed to find light poluition charts. I found a detailed google earth chart for the UK. (Cant find it at the moment)
but try this site to see if your planned photo site is a good area!
http://www.inquinamentoluminoso.it/worldatlas/pages/fig1.htm

chong yuh yih
November 11, 2011 06:52 pm

Great short article..definitely going to try it out..thank you...

Moshe
November 11, 2011 06:40 pm

The difficult part is setting the lens focus to infinity. What used to be a trivial thing in film days is not so trivial with digital cameras, especially at night. Most lenses focus setting ring (or other focus means) will travel beyond infinity, and the infinity mark on the lens (if there is one), can't be relied upon.

Vikas Kumar
November 11, 2011 04:03 pm

Your tips are very nice i will try its

Kris
November 11, 2011 01:54 pm

Man, reading the DeepSkyStacker Quick Start Guide is kind of depressing. The author recommends taking *hundreds* of shots per set.

Vijay Anand Ismavel
November 11, 2011 11:55 am

Excellent article. I did some internet search and found that there is an excellent software called Nebulosity - http://www.stark-labs.com/nebulosity.html - which does the same work as Deep Sky Stacker but works on a Mac and costs $60. However, it appears to support all the Canon cameras and some specialist cameras but not the Nikons (I own a Nikon D300s). I have not tried this out - just sharing what I found. I have asked them whether Nikons will be supported.

Steve
November 11, 2011 11:41 am

I found this program recently for stacking star photos on a mac. Its called StarStaX. There is a Flickr group dedicated to its use. I'm sure if you google it you can find the download. Its free.

Hassan Alsaffar
November 11, 2011 11:21 am

Hello, that is a very nice work. Thanks for sharing the information.
All the best from Kuwait

Margie Murr
November 11, 2011 10:13 am

This seems like an amazing software, along with the needed tutorial. I noticed all the listed applications for Windows, and nothing specific for Mac. Will this work on a Mac, or will it require a separate application? If so, I hope it comes out soon. How can we be notified when it does?

Shane
November 11, 2011 09:03 am

Fantastic details - I am going to try this and let you know how I get on.
I was wondering what "Most SRL camera come ..." was until I figured out SRL was supposed to be "SLR cameras".
I didn't know the 600 rule - I have had that problem in the past !

Jason Racey
November 11, 2011 08:23 am

Thanks for this article. I've seen many great night skies from deep wilderness without realizing how easy it is to get shot like this. I'll be giving it a try soon.

Chris
November 11, 2011 07:29 am

Very interesting article, my first night shots were so bad, now I really want to practise !

Jason St. Petersburg Photographer
November 11, 2011 07:20 am

Thank you for this how-to for astrophotography. I was hoping to be able to try this with a shot I took last night (http://jasoncollinphotography.com/blog/2011/11/10/the-moon-besides-venus-astrophotography.html) but I did not make multiple shots of it with the same framing.
The 600 rule is good to know.
I look forward to trying this once a Mac app is found that can do the stacking.

Vamsi
November 11, 2011 06:57 am

Thanks for the lovely article! It's really inspiring, I might wanna try this out in the cold nights :D

Ivan Cabrera
November 11, 2011 06:37 am

Nice, thanks, I was trying to remember the rule of 600 :)
But wouldn't you not have a sharper image stopping down the lens? like going from f/3.5 to f/8 ?

Hector Caroselli

November 11, 2011 06:08 am

This is a great article and I too am interested in a product like Deep Sky Stacker for a Mac.
Thanks for the great tips.
Hector

John Heilman
November 11, 2011 05:22 am

Hi jgomez,
Thanks for the tips. Now that it is winter here in Montana, the nigh sky is filled with stars.
I downloaded startracker, and it calls for four types of shots to be stacked, light, dark, bias and something else. Do I need to use all four, or can I just use the five shots of the stars that you suggest?
John

javier
November 11, 2011 04:00 am

@laelomo: The moon (specially a full moon) is actually much brighter than it seems. To get a decent moon-shot you need to go at it with speeds of about 1/1000s or even 1/1500s, almost as if you were shooting something with the sun on it (see the pic I posted above). Bottom line is, if you want to get a nicely exposed moon, the rest of the sky will be black. I have found no way around this but taking several exposures: one for the moon and one for everything else. In this case getting rid of moon-flare is hard; a ND filter can help but it is still not a perfect solution.

Kayla Flores
November 11, 2011 03:59 am

Wow, STRIKING!
Great article, very understandable and easy to read. Thank you so much!

javier
November 11, 2011 03:52 am

Nice article! I will definitely try these advices, as so far I have been quite unsuccessful whenever taking pics of stars. I've had better luck with the moon, though:
http://jlopez.ende.cc/?p=599
@Jenn: The crop sensor doesn't change the rule, as the actual focal length is the same. 50mm is 50mm no matter what the size of your sensor is. The final result may "look" like it is been zoomed to 80mm, but it isn't. For instance there is no background compression.

Yngve
November 11, 2011 12:55 am

Here is another bunch of software for Mac that can stack and process your images.
Keith's Image Stacker $15 - For stacking planetary images.
http://keithwiley.com/software/keithsImageStacker.shtml
Lykenos $Free - Planetary image stacking and processing.
http://lynkeos.sourceforge.net/
Astrostack $39 - Image stacking and processing.
http://www.astrostack.com/indexAS3LE.html
PixInsight 171 Euros
http://pixinsight.com/index.html

Yngve
November 11, 2011 12:49 am

Nebulosity works on Mac and can stack images similar to what Deep Sky Stacker does.
http://www.stark-labs.com/nebulosity.html

Miklos Harmatos
November 10, 2011 09:45 pm

Before take a picture switch off the image stabilization. But if you use remote control the camera switch off this automatically.

David Yoo
November 10, 2011 01:43 pm

Great tip to know!
This might be a silly question, but where does this RULE of 600 come from?
I don't quite understand why 600 is divided by the focal length.
would appreciate for some feedback!

Johnny
November 10, 2011 06:34 am

Thank you very much! Great and simple article!

Laelomo
November 10, 2011 05:56 am

Thanks! I never knew there was a rule of 600. I used to do trial and error every time I shot the sky.
Any advice for shooting the moon? I get a lot of lens flare if the moon is in my shot

mjstrong
November 10, 2011 04:27 am

Thank you! Great timing on the article for me as I am headed to Yosemite over Thanksgiving and plan on trying some night photography.

Mike Pepe
November 9, 2011 09:57 pm

Great article! I've never tried this before, and I can't wait to start. Is there anything for Mac? I've had no luck so far finding a program...THANKS!!!

Fuzzypiggy
November 9, 2011 07:50 pm

Perfect time of year to start getting out and about! Living in the UK we've had a week of horrible cloud but this article is definately going on my stack of things to try before March next year before the early mornings start to return.

Glyn
November 9, 2011 04:55 pm

This is also called the Teapot with the steam rising at the end which is the Milkyway.

Glyn
November 9, 2011 04:41 pm

This looks to be the constellation `Sagitarius`

Mike
November 9, 2011 01:36 pm

Jenn, you use the actual focal length of the lens.

Robert
November 9, 2011 11:31 am

Wow, very cool. Thanks for the info!

Paul Burwell
November 9, 2011 10:23 am

I love the simple way that night sky photography was explained. We get plenty of clear, cold, dark nights up where I live and I'm definitely going to give this a shot when I get an opportunity.
The included video on curves and levels in Photoshop was a great addition.
Thanks for the tutorial.

Kris
November 9, 2011 06:53 am

I see. Thanks!

PML Photo
November 9, 2011 06:40 am

@kris - using multiple shots lets you average out the noise thereby reducing it. DSS also allows you to include dark frames as well to remove the noise the semsor generates when it is not lit.

Joe
November 9, 2011 06:02 am

Why do you need to stack multiple images?

Kris
November 9, 2011 05:32 am

I don't understand what taking five different shots does for you that using multiple copies of the same shot wouldn't do with more accuracy. Please explain.

Francis
November 9, 2011 04:06 am

That's interesting, it made me take a picture of night sky after reading it...
I don't have the Deep Sky Stacker, i'll try to find a something like it that works on the mac :(
Here's what I got 50mm F1.8 800iso
http://www.flickr.com/photos/francisverana/6326452930/in/photostream

logicalnot
November 9, 2011 04:00 am

Thanks. I'll try that 600 rule next time I am in Oregon.

Erik Kerstenbeck
November 9, 2011 02:41 am

Hi
Very awesome - I like to hang out with Astronomy Folks from time to time. They have all sorts of adaptors for their telescopes. Here in California, they have Sky Parties, Wine, Food, Scopes, Dark Skies.

Erik Kerstenbeck
Kerstenbeck Photographic Art
http://kerstenbeckphotoart.wordpress.com/

Cheryl
November 9, 2011 01:19 am

Really helpful article. Makes me want to shoot some night pictures.

Mandy
November 9, 2011 01:02 am

Wow that image looks great, I thought I'd need expensive equipment to come up with an image like that!
Thanks for the step by step I've got no excuse to not give it a go...

Ray
November 9, 2011 12:50 am

Anything similar to Deep Sky Stacker for the MAC?

Jenn
November 9, 2011 12:26 am

Wonderfully informative article, thanks! Just one question, about the rule of 600 - when using a body with a crop sensor, do you use the actual focal length of the lens, or the effective focal length?

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