

Welcome to the Elemental Project - Northern Lights adventure.

"The Northern lights is a natural phenomenon I have always desired to experience. It has a magical almost mythical surrounding that has been witnessed by few people in all her glory. The Vikings thought they were contrails from Thor's chariot pulled by three goats. As an elemental photographer I wanted to be included on this elite list and seek out Thor's chariot" - Mark Humpage 2008



This handout will help you plan, see and capture the magnificent Northern Lights on camera, aimed at travellers and photographers from novice to experienced.

Without adequate planning the odds of seeing the Northern Lights are very low. Logistically, one has to travel to a cold northerly location where firstly the Northern Lights can be seen AND when the sun is particularly active (solar flares interacting with the earth's atmosphere) AND also hope the skies are clear. In addition, it is a winter event (summer in some northern latitudes enjoys 24 hrs of daylight). Throw in the phases of the moon, which can diffuse any showing and you realise JUST how the odds are really stacked against witnessing the phenomenon.

There may be a number of obstacles but don't let these put you off because, with good planning, they can be overcome and increase the odds of successful viewing. At the end of this handout you will be well prepared for planning your very own aurora trip and significantly increase your odds of witnessing this amazing natural phenomenon.

Let us take an overview. We will be looking in more detail, at:

What causes the aurora or Northern Lights?

How to forecast aurora and improve your chances of seeing it?

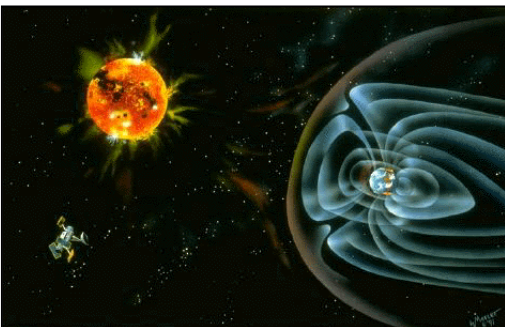
Where to go and view the aurora?

What camera equipment is required to capture stunning photographs?

What camera settings should I use for aurora photography?

It's important to have, at least, a basic knowledge of any challenging subject before attempting to capture it on camera so let us start by looking at:-

What causes the aurora or Northern Lights?

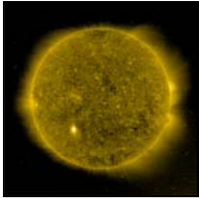


The aurora borealis, commonly known as the Northern lights is a pattern of differently coloured lights that are sometimes seen in the night sky in the most northern parts of the world. In the southern hemisphere they are known as the aurora australis.

The Northern lights originate from our sun. Explosions from the sun's surface eject huge quantities of solar particles into deep space. These particles travel through space and which take two to three days to reach our planet. As they close in on Earth, they are captured by Earth's magnetic field and then guided towards Earth's two

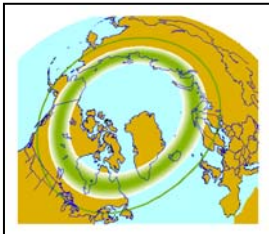
magnetic poles. On their way down towards the poles, the solar particles are stopped by Earth's atmosphere, which acts as an effective shield and collide with the atmospheric gases. The collision energy between the solar particles and the gas molecule is emitted as a photon - a light particle. And when you have many such collisions, you have an aurora - lights that may seem to move across the sky.

How to forecast aurora and improve your chances of seeing it?



Since the aurora originates from activity on our sun, we can find out when such activity will occur and more importantly when it will interact with earth (resulting in aurora). All of this information can be found easily on the internet. There are many sites available and I have chosen two very simple and yet informative ones which can help us.

The first is - <http://www.spaceweather.com> - This site includes some very useful images and information on the sun's activity, such as sunspots and coronal holes which eject solar particles into space and create aurora. The site also shows the current auroral oval which is simply a map of the world that identifies the location and strength of the aurora activity. Spaceweather also has an excellent gallery of current and historic aurora images from across the world and allows anyone to submit photos.

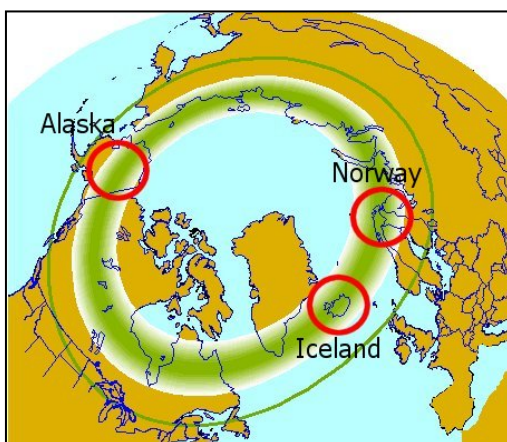


The second website is <http://www.gedds.alaska.edu/auroraforecast> the Geophysical Institute in Alaska. This site includes very useful images global and local showing the strength and coverage of aurora activity. More importantly it has an excellent forecast feature in a simple calendar format allowing predictions to be made up to a month in advance.

These two websites are very good at identifying and forecasting the best days for solar activity and once you have identified these we can look at the logistics of travel and where to go.

Where to go and view the aurora?

The aurora, when particularly active, can be seen from anywhere within the northern hemisphere that falls within the auroral oval. However, there are a few common locations which have proven to be very popular and ideal for seeing excellent aurora activity.

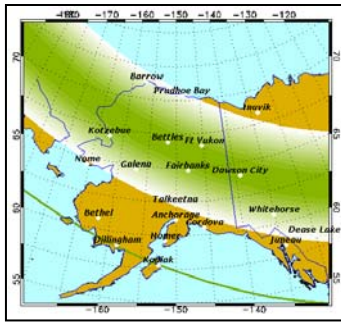


Let us look at some of these in more detail. I have chosen three common and excellent viewing locations, two of which are relatively easy to travel within Europe and the other slightly further afield across the Atlantic, Alaska.

Norway or other Scandinavian countries such as Sweden and Finland are great locations for viewing the aurora. In Norway, the northern city of Tromso is well within the Arctic Circle, which offers an excellent base to travel via air. It also has a good road network should you need to move away from the city.

Iceland is another excellent country for viewing the Northern Lights. In fact, it is renowned as one of the best in the world for viewing aurora since it has the least cloud cover. Travelling to the capital Reykjavik is easily done by air, and once again the road network is very good

should you need to move away from the city. The Arctic Circle runs past the very northern part of the island and this is a good place to head off to. Iceland also offers stunning scenery such as geysers, waterfalls and volcanoes. These are stunning features to include in those aurora photos.



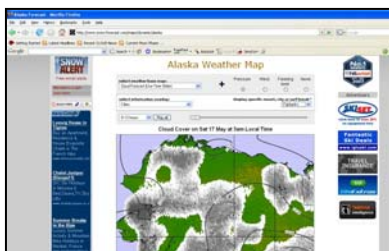
Finally, a bit further afield from Europe is Alaska. Fairbanks is right near the Arctic Circle and a great destination which accommodates an International airport too. Yukon Territory is not that far from here and once again the surrounding scenery is simply stunning which offers great foreground or background for aurora photography.

Once you have done all the hard work and selected the best dates and places to travel for an aurora sighting there is still one final obstacle that can ruin everything when you arrive. This is cloud cover. I have included some very useful, and simple to understand, weather forecast links which will help you determine how to avoid cloud cover, if possible at these locations. By simply checking these sites, on location, you will know instantly whether to stay put or the need to get on the road and find clear skies.



Norway - <http://www.yr.no/place/norway> This site is the Norwegian equivalent of the Met Office and has some excellent easy to read maps for Norway and many northern hemisphere countries.

Iceland - <http://en.vedur.is> This site, the Icelandic equivalent of the Met Office, again has some excellent easy to read maps.



Alaska - A couple of sites here. The first - <http://www.snow-forecast.com/maps/dynamic/alaska> is a snow forecast site which has great maps showing existing and predicted cloud cover. The other site - <http://climate.gi.alaska.edu/AKweather> is the Alaska Climate Research Centre and which offers a more comprehensive forecast.

What camera equipment is required to capture stunning photographs?

Let us move onto the camera side of things and concentrate on which equipment is best to use in order to get those amazing aurora photographs. These are THE most important and sizeable items of camera equipment you should be taking, and obviously excludes the smaller and common accessories.



Firstly a digital single lens reflex or DSLR camera is an absolute must. You will be taking photos of a very challenging subject and in dark conditions. For this you will need a quality camera system that allows full manual control of the many settings such as exposure and shutter speed. In addition, a camera that allows interchange of different kinds of lenses (for close up and wide exposures), that can deal with Noise Reduction and has a high quality output. Only SLR cameras can do all of these. Personally I use the Olympus E3 DSLR, an ideal camera for this subject.

You will also need a tripod. This will keep the camera still and avoid shaking when taking long exposures. It is important to avoid blurring as much as possible, even with long exposures, and a tripod will be necessary for this.

I have found that the best lens for capturing the aurora is a wide angle lens. At times, the aurora can and does, fill the sky from one end of the horizon to the other. A wide angle lens such as the Olympus 7-14mm (14-28mm in 35mm terms) will be ideal for capturing an almost 180 degree field of view, from ground to sky. Personally, I love using a fisheye lens, such as the Olympus 8mm fisheye. This really does complement the magical subject and produces wonderful photos. It's best to also include a mid level zoom lens, something like the Olympus 12-60mm (or 24-120mm in 35mm terms) in order to vary the compositions.

Finally, a note on batteries. I know it sounds like common sense, but working in cold climates tends to drain battery power quicker than normal. Ensure you have plenty of spare batteries on the trip. The last thing you want, in the middle of a once in a lifetime aurora display, is not being able to capture the spectacle because the batteries have died.

These are the main essential camera items, so now let us look in a bit more detail at how to set up the camera before we start hitting the shutter release button.

What camera settings should I use for aurora photography?

Let us now prepare the camera in readiness to capture the aurora. It is best, if you get the opportunity, to prepare the camera as much as you can beforehand, and then make any final tuning when the aurora show starts.



The built in-camera Noise Reduction (NR) can be switched on/off easily within the camera menu system. When shooting long exposures, such as at night, noise can appear in images and be quite a problem. Noise tends to add a grainy like appearance and reduces the sharpness. By switching on the NR the camera will automatically reduce the noise and produce a clearer image. This could of course be left until post processing and removed with software. However, I have found the in-camera NR process to be the best method of producing a clearer image. The only downside is that

in-camera processing will double exposure times. So if you take a 1 minute exposure with NR on you will have to wait 2 minutes before taking the next shot. Frustrating but required I'm afraid! I actually shoot with 2 cameras to overcome this and eliminate the down time but I accept this is not always possible.

Set the image quality to the highest setting. I always shoot RAW (together with JPEG) as RAW format images, equivalent of the 35mm negative, are much easier to work with and get better results when post processing with software.

Start by using the lowest ISO setting available, which may go against the concept of - *the higher the ISO value the greater the camera's light sensitivity and better ability to shoot in low light conditions*, but there is a reason for this. Increased ISO settings will increase noise and give a grainier appearance. The amount of noise will vary from camera to camera. So by starting on a low ISO you are always working with the best in terms of image quality. Increasing the ISO may reduce exposure time but will also increase noise. A fine balance will inevitably need to be achieved with the



camera that you use. It's important to remember that in remote northern latitudes the skies are generally less polluted with light. The skies really are an intense and clean looking black (and stars really do sparkle like diamonds!). Paradoxically this will show noise more.

Auto focus will not work in low light with aurora. Set the camera to manual focus and infinity in the first instance. This will yield best results. However, if you have a defined foreground object in the composition then adjusting the focus to sharpen these up will give a nice added feature to the image composition and the aurora still looks great.



Put the camera in full manual or M mode. Don't be put off with M mode, especially if you don't use this too often. It really is the only way we can fully control the camera and get good aurora images. We now need to set the aperture size and shutter speed manually. Choose the lowest aperture value for the lens that you use. This will allow the maximum available light into the camera (even in darkness). For my 8mm fisheye lens this is F3.5. Now set the shutter speed. This is where cameras will vary quite a bit as they all deal with sensitivity and low light in different ways. However it is good to start with a reasonably long

exposure. Something like 30 seconds. If, after taking a photo the image still appears too dark try increasing the setting to 60 seconds and try again. There is quite a bit of experimenting at this stage in order to get the correct or best workable exposure time so do play with this and see which works best for your camera. Personally I found with the Olympus E3 that exposure times between 60 and 120 seconds worked best.

One thing you may notice with long exposures is that foreground objects can sometimes appear slightly blurred or out of focus, especially if there is some wind around. This is quite natural and unavoidable at times. Image Stabilisation (IS) may help if ambient movement is physically noticeable. Simply shielding the camera from the wind with your body is useful advice. Remember, aurora is one mighty challenging subject to capture well and the ultimate objective is to capture those beautiful ribbons of colour in the sky.

Your camera is now primed to capture the stunning Northern Lights. The aurora show can last for anything up to 6 hours or longer in any one location, depending on its strength, so be prepared for a potentially long night. On occasions, I have found the lights activity to sometimes stop, only to intensify shortly after, so please be patient.



Also think about the composition and where you point the camera. It's always nice to get a foreground subject in the frame whether it's a building, tree, mountain, water or some other feature. If you have the luxury of one or more of these then do move around and vary the composition, remembering to adjust the manual focus on each subject.

Be prepared and have spare batteries in your pockets ready to change, if required. Your camera batteries will drain quicker when left out in the cold. Also, if you have the luxury of a building, cabin/hut etc in close proximity during a shoot, keeping the coffee on drip, remember never to take the camera inside with you until the shoot is over. A sudden increase in temperature and humidity will create moisture and fog up the camera (inside and out). Not good. If you are not

using the camera and need to go indoors keep the camera outside and just throw a towel or blanket over it.

After a while and experimenting with exposure times you should be achieving good results and hopefully producing aurora images that will be the envy of all who see them.

I will leave you with a few images of the aurora from my recent trip to Norway. The results were achieved by simply following the afore mentioned pointers, allowing me to share the beauty of Thor's contrails.

Thanks for reading and good luck with your own aurora adventures in the future.

Please also keep checking <http://www.elementalproject.com> for more extreme project updates, useful handouts and downloads.

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This handout is also available in slide show format for reading/watching on your ipod at your convenience. Other output formats can be produced upon request. Please check the website for information.

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