

## Photographing Lightning Summary Notes by Mary McIntyre

### What is lightning?

- A naturally occurring electrostatic discharge, where 2 electrically charged regions temporarily equalize
- Causes an instantaneous release of a huge amount of energy so your number one priority is to **stay safe!**
- The 3 distinct types categorised by where they occur:
  - inside a single thundercloud
  - between 2 different clouds
  - between a cloud and the ground
- Thunder is caused by rapid increase in pressure of gas in the air following the discharge

### Getting Started – you will need:

- Camera
- Tripod
- Remote shutter cable
- **Waterproof camera cover – very important!**
- Neutral Density Filters for shooting in the daytime
- Practice manual focusing! – Infinity will be too far, so you may need to focus on a distant object in daylight and put a bit of tape on the lens. Autofocus will not work on a dark, cloudy sky!

Keep an eye on the Real Time Lightning Map or use the Blitzortung App to track the movement of storms and choose your vantage point. It is safer, easier (and drier!) to photograph lightning from a distance (if you have a flat horizon you can image storms over 40 miles away)

Remember that having something nice in the foreground will make the shot even more appealing.

### Photographing Lightning in Daylight:

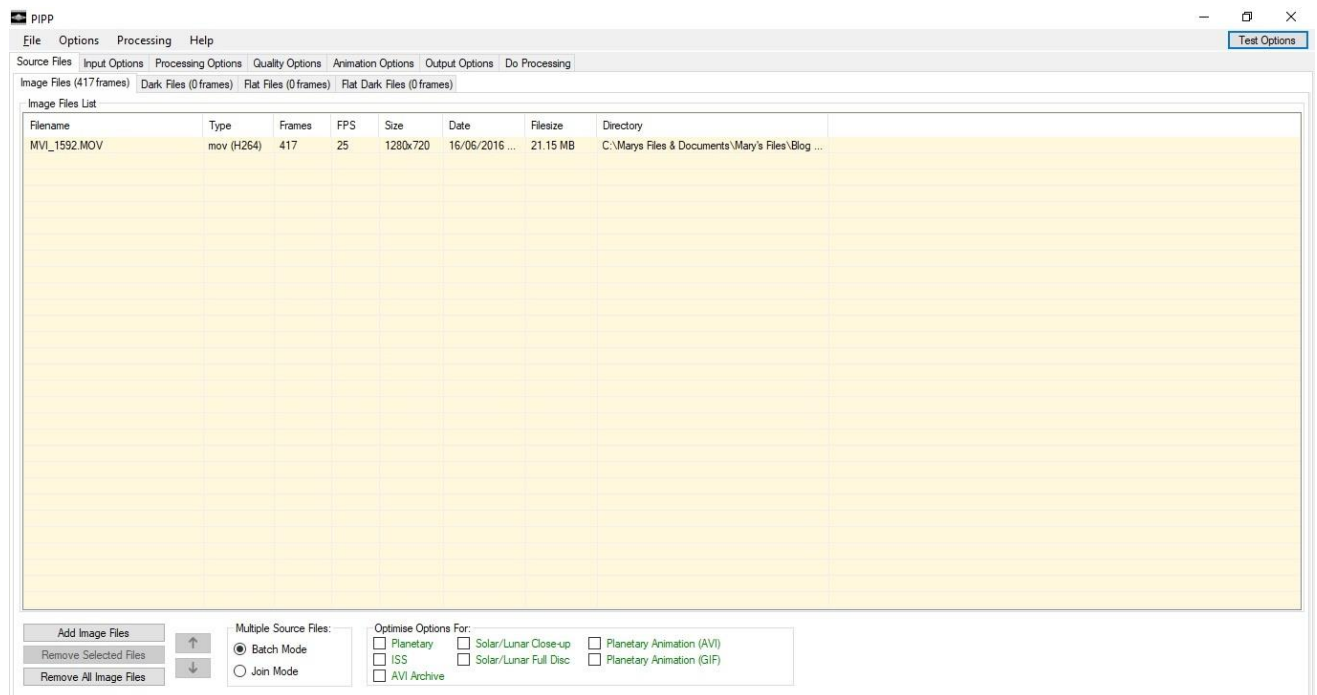
2 methods:

- 1. Shoot lots of short videos. If you capture a flash, extract the individual frames using PIPP and process the frames as if they are still images (see instructions below on how to do this)
- 2. Use neutral density filters to cut down the light. This allows you to shoot a continuous sequence of longer exposures, and removes the need for you to try and react to the lightning flash. The images can lack definition using this method but with some processing you can still get some nice images
  - I bought the set of ND 2, 4, 8 and 16 and use 8 and 16 stacked together
  - Set the f/stop to 22, ISO-100 and around 5 seconds
  - Keep shooting on continuous and hopefully you'll catch a lightning flash

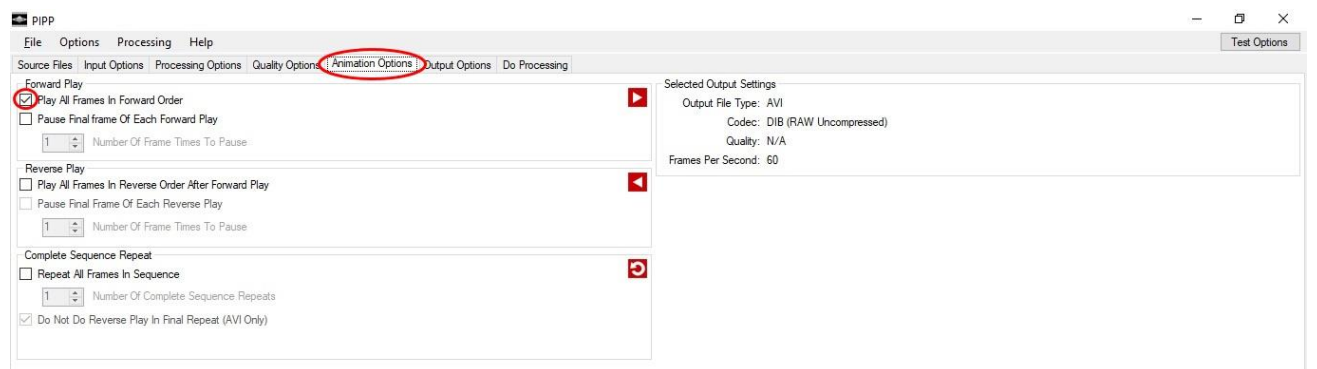
## Method 1 - How to Extract Frames from a Video using PIPP

For this demo I used a 16 second long video taken with my Canon 1100D on 16<sup>th</sup> June 2016

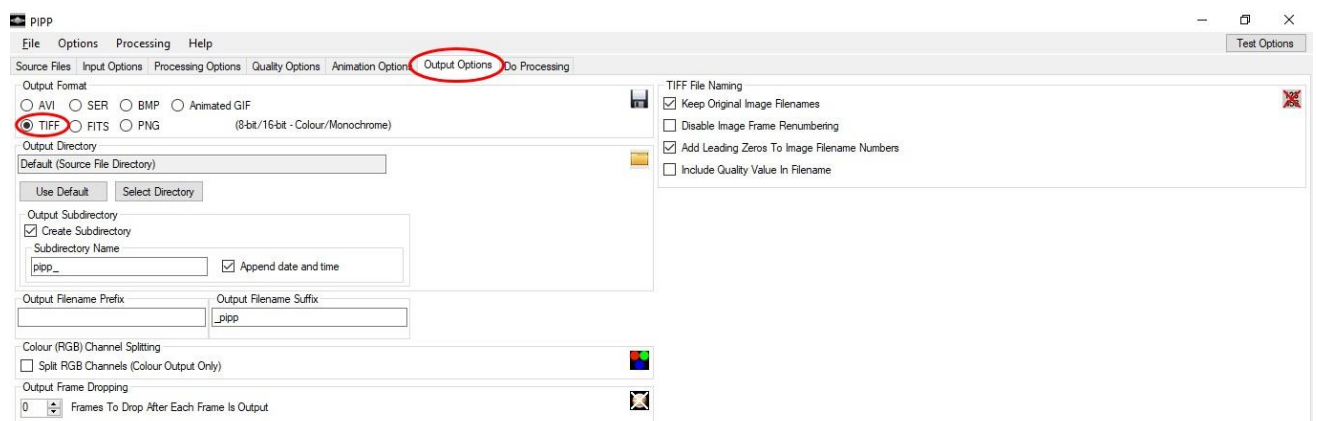
Step 1: Open PIPP then drag and drop your video file into it



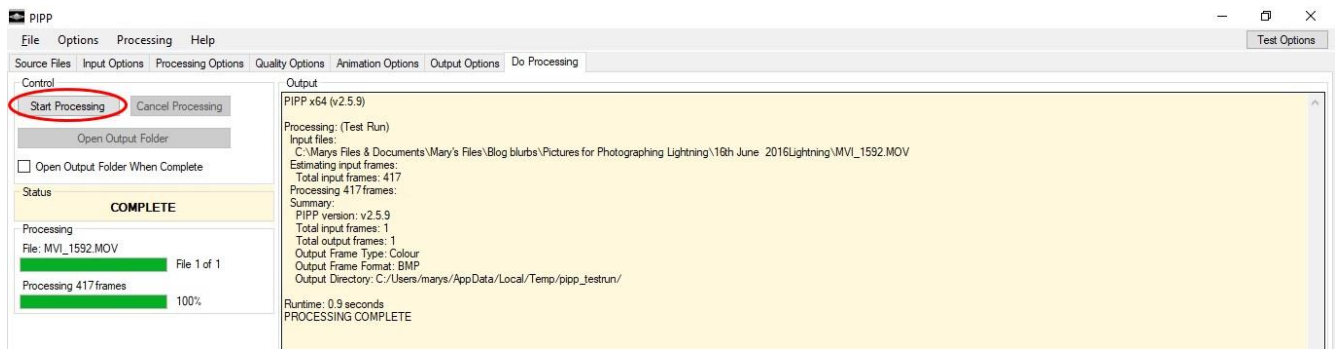
Step 2: In the **Animation Options** tab, check the **play all frames in forward order** box



Step 3: In the **Output Options** tab, select **TIFF**



#### Step 4: In the **Do Processing** tab, click **Start Processing**



PIPP will now extract all of the frames from the video and save them in a separate folder. This video contained 417 frames and the lightning crossed over 5 of them. You can stack those images together or just select the best image from them. The image will probably be over-exposed but you can correct that with some post-processing. The images before and after processing are shown below. You can use this same method to extract frames from a video shot at night.



## Method 2 – Using Neutral Density Filters

For comparison, below is a picture of lightning taken in daylight with ND filters. The lightning doesn't look as dramatic as photos taken at night. This is because the background sky is much lighter so the relative brightness of the lightning flash compared to the back is much less.



The photo below was taken closer to sunset, so the lightning stands out a little more



## Photographing Lightning at Night:

This is much easier because you can shoot at a low ISO and do longer exposures. A lightning flash is so bright that it will have no problem being detected by your camera

- Set the f/stop to between 3.5 – 8, ISO-100 for 5 – 10 seconds (depending how often flashes are occurring). If the shots are looking over-exposed stop the lens down a couple more steps.
- Shoot on continuous to make sure you don't miss any flashes

- If you keep the camera still you can stack all of the images which contain lightning bolts to produce a really striking image (no pun intended!) I use StarStaX for this, which is free to download, link below
- You can also create a timelapse video with your images shot on continuous
- If you are shooting with a mobile phone or any other camera with a video function, you can shoot short video clips and use PIPP to extract all of the still frames from the video. Depending on the frame rate, you may get lightning in several frames so you can stack them together using StarStaX or Photoshop

### **Image Processing:**

Usually only minimal processing is required if the exposure was right. But the following will help to improve things:

- If the lightning bolt is over-exposed, turn down the highlights
- Increase the clarity / sharpen a bit if necessary
- Correct white balance if necessary
- You can also create a timelapse video with your images shot on continuous

Keep an eye on the movement of the storm and if it is getting too close, get yourself somewhere safe. It's really not worth the risk for a nice photo.

### *Single lightning shot*





*Stack of 7 lightning shots, stacked using StarStaX*



### **Sprites:**

What are sprites?

- Clusters of large scale electrical discharges that occur 50 – 90 km above storm clouds
- It causes red/orange flashes which last only a few milliseconds so they are not visible during the day
- Usually triggered by discharge of lightning between cloud and ground
- First visual report was in 1730, but they were not photographed until 1989



*"Dancing Sprites" photographed by Paul M. Smith*

### Photographing sprites:

- You will need a clear view of the sky above the storm clouds. They are usually photographed 100+ miles away from the actual storm but if you have a clear view above a storm cloud you may catch them closer. Our UK Meteor Network Cameras in the southern UK often capture sprites above storms happening over France
- Sprites are faint and fast. A common method of capturing them is to use a very high frame rate video camera and then extract the individual frames as described earlier
- To capture them with a DSLR, you will need to set the camera to a much higher ISO and lower f/stop and a shutter speed of 5 seconds. Then shoot on continuous and hope for the best! The people who regularly photograph sprites are using cameras capable of extremely high ISO settings without any noise issues, such as the Sony A7S
- An astronomy-modded camera will help because it has had the IR-block filter removed which makes it more sensitive to red light

One last thing to consider is that if you shoot in RAW, make sure you have a high speed memory card. A slow write to card speed means less time taking images so you could miss out on a really good lightning shot.

Don't forget to keep an eye out for interesting cloud formations such as shelf clouds which often accompany thunder storms. Also be mindful of the possibility of tornadoes – there are approximately 30-50 tornadoes each year in the UK!

Make sure you report your severe weather observations to TORRO – the Tornado and Storm Research Organisation

**Once again, please stay safe!**

Mary McIntyre

My lightning album on Flickr: <http://bit.ly/2nfFeCm>

### Some useful links:

StarStaX - <http://www.markus-enzweiler.de/software/software.html>

PIPP - <https://sites.google.com/site/astropipp/downloads>

Real-Time Lightning Map - <https://www.lightningmaps.org>

The real-time lightning app is called Blitzortung

TORRO – <http://www.torro.org.uk/>

Email: [spiceyspiny@gmail.com](mailto:spiceyspiny@gmail.com)

Visit my website: [www.marymcintyreastronomy.co.uk](http://www.marymcintyreastronomy.co.uk)

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Blogs/Articles: <http://marysastronomyblogs.blogspot.com>

