JetsonSky V12.02 - CUDA / OPENCV - Copyright Alain PAILLOU 2018-2022

LEFT SIDE controls :

Flip V : Flip the image vertically (Camera is performing the flip)
Flip H : Flip the image horizontally (Camera is performing the flip)

TIP : Text In Picture – Add the date and time in the upper left corner of the image
AZ/H : for further development
Cr : Draw a cross in the center of the image

Hst : Draw the histogram of the image (RGB or Mono histogram)
Trsf : Draw the transformation applied to the image (modifications applied to the pixels – RGB or Mono)
TrGS : Show the amplification applied to each pixel – Related to Ampli Soft with 3 kinds of amplification : Linear, Gaussian and Stars – see on the RIGHT SIDE controls)

USB : set the USB bandwidth for the camera

SAT and its **slider** : apply Colour saturation preserving image details and sharpness

FW and its **5 positions** : supposed to control ZWO mini filter wheel 5 positions. Do nothing for now until I solve issues.

Tracking (for now, only for colour camera) :
    Stars : Stars detection
    Satellite : Satellites detection with trajectories plot
    Meteor : not implemented yet.

RAZ Trk Button : Reset Stars and satellites trajectories lot

Demo : the left side of the image is the RAW image – the right side of the image is the image with the treatments.

RIGHT SIDE controls :

HQ Capture : Select (or not) high quality for captures
    High Quality : TIF for images and RAW videos
    Low Quality : JPG for images and MPEG videos

Filters ON : the filters can be used. OFF : no filter is active.

Full Res : display the center of the Full resolution image (depending of the resolution set). Useful for telescope fine tuning.

Set B&W : convert a colour image into a monochrome image
B&W Est : works only with colour camera. Calculate for each pixel the sum of Red,Green Blue channels, regarding the bayer matrix 4 pixels. It gives you the image you would have with a monochrome sensor.

MEAN, **SUM** and **#FS slider** : perform the mean or the SUM of 2 to 5 consecutive images.

BIN1 : set the camera sensor in BIN1 mode
BIN2 : set the camera sensor in BIN2 mode
HB : hardware BIN (for supported cameras). Only works in BIN2 mode. Hardware BIN gives you the mean of the 4 pixels instead of the SUM (noise will be lower).

RES & slider : select the resolution of the camera within 9 defined resolutions (7 for BIN2 mode).

GAIN : set the camera sensor gain.
Auto : the gain will be adjusted by the camera

Ampli Soft : software amplification of each pixel with 3 modes
    Lin : linear amplification for each pixel value (from 0 to 255)
    Gauss : the amplification is set with a Gaussian function you can adjust with 2 parameters (µX and Ro). This allow you to get selective amplification. Activate TrGS to see the Gaussian.
    Stars : the same as Gauss but it will only amplify Stars.

Hold : the video acquisition is stopped and you will work only on the last image acquisition.

Speed Mode : for selecting the exposure time
    Fast : from 100µS to 100mS
    Medium : from 1 ms to 500ms
    Slow : from 500ms to 20s

Exposition & slider : select the exposure time with the slider

Auto : the exposure time will be adjusted by the camera

CRed & slider : select the camera response for Red channel (camera internal setting)
CBlue & slider : select the camera response for Blue channel (camera internal setting)

R, G, B & the 3 sliders : software adjustment and fine tuning for the three channels red green blue

Sharpen : will sharpen the image
UnsharpMask : will perform a soft sharpening of the image

Bilateral & **2D convol** : blur the image

Dn Paillou : a home made noise removal filter

Dn Adaptative Absorber : a home made noise removal filter which perform great on static images. You can choose **High dynamic** or **Low dynamic** option.

Dn KNN and **slider** : KNN noise removal filter. The slider allow to choose noise removal level

Dn NLM2 & **slider** : Fast NLM2 noise removal filter. The slider allow to choose noise removal level

Grad/Vignet : remove image gradient or image vignetting (**select in the checkbox the filter you want to apply**)
- **1st slider** : choose the threshold for the gradient/vignetting
- **2nd slider** : choose the attenuation of the gradient/vignetting correction
Img Neg : turns the image into a negative image

Histo eq & slider : modify the histogram. Activate Trsf (LEFT CONTROL) to see how this filter works.

Histo Stretch & 2 sliders : modify the histogram. Activate Trsf (LEFT CONTROL) to see how this filter works.

Histo Sigmoide & 2 sliders : modify the histogram (sigmoide function). Activate Trsf (LEFT CONTROL) to see how this filter works.

Contrast CLAHE & slider : modify the contrast of the image

Cap Dark : capturing Master Dark
With the **slider**, you select the number of darks who want to make.
Clicking the **Cap Dark Button** will open a **dialog box** asking you to cover the telescope. Click **OK** and the program will capture the darks and create the master dark.
Dialog Information on le right will say "**Dark dispo**" or "**Dark NON dispo**" (means Dark available or Dark unavailable).
Check the checkbox "Sub dark" to subtract the Master Dark.

Start CAP / Stop CAP buttons & slider :
Select the number of images you want to capture
Press Start CAP to start the images capture
Press Stop CAP to stop images capture
Note : don't forget to choose the capture quality you want by checking unchecking HQ Capture

Start REC / Pause REC / Stop REC buttons & sliders :
Select the number of frames you want to capture with the **slider**.
If you select **0** with the slider, the number of frames will be set to **10000**.
Press Start REC to start the video capture
Press Stop REC to stop video capture
Press Pause REC to pause video capture
Delta T slider : set the number of seconds between 2 frames
Note : don't forget to choose the video quality you want by checking unchecking HQ Capture

Quitter BUTTON (Quit) : exit the program