

JETSONSKY V12.02 – Brief informations – Copyright Alain PAILLOU – August 2022

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

The interface consists of a main dark area for the camera feed and a right-hand settings panel. On the left side of the feed, there are checkboxes for image flipping (Flip V, Flip H), rotation (TIP, AZ/H, Cr), and various filters (Hst, Trsf, TrGS). Below these are sliders for USB and SAT. At the bottom left, there are radio buttons for frame rates (#1 to #5) and checkboxes for tracking (Stars, Satellit, Meteor) and a RAZ Trk button. The settings panel on the right is organized into sections:
 - **HQ Capture**: Includes checkboxes for Filters ON, Full Res, Set B&W, and B&W Est. It also has a #FS slider and a RES dropdown.
 - **BIN**: Radio buttons for BIN1, BIN2, and HB.
 - **Gain**: A slider from 0 to 600.
 - **Amplif Soft**: A slider from 0 to 10.
 - **Lin/Gauss/Stars**: Radio buttons for Lin, Gauss, and Stars, with associated sliders for μX and Ro.
 - **Speed Mode**: Radio buttons for Fast, Medium (selected), and Slow, plus a Hold Picture checkbox.
 - **Auto Exposure**: A slider for Exposure ms from 1 to 451.
 - **Color Balance**: Sliders for CRed, CBlue, R, G, and B.
 - **Sharpening**: Checkboxes for Sharpen, Unsharp Mask, Bilateral, and 2D convol.
 - **Dn Pailou/Dn KNN/Dn NLM2**: Radio buttons and sliders for denoising.
 - **Grad/Vignet**: Checkboxes for Gradient and Vignetting with sliders.
 - **img Neg/Histo Eq/Histo Stretch/Histo Sigmoid/Contrast CLAHE**: Various image processing sliders.
 - **Recording Controls**: Buttons for Cap Dark, Start CAP, Stop CAP, Start REC, Stop REC, and Pause REC, along with a Delta T slider.
 - **Test Information**: A Quitter button.

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 (μ X 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 100 μ S 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 the 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