

# PAUCam Observer's Manual



v0.1

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## Pointings list

If you have a large list of pointings, you probably want to create your own catalogue before your observing trip, so that you or the telescope operator (OSA) do not have to type the coordinates each time you want to move the telescope, which makes observing more efficient.

Each pointing entry should contain the following fields:

- `pointing_name`: Pointing title
- `ra`: J2000 Right Ascension (radians)
- `dec`: J2000 Declination (radians)
- `pa`: Position Angle from North to East (radians)
- `exp_time`: Exposure time (seconds)
- `filter_tray`: Filter Tray name (see Filter Trays section)

Write your pointings list in ascii as a list of dictionaries in yaml format with all the fields listed before. It should look like this:

```
- { pointing_name: "Your title 1", ra: 2.61300424, dec: 0.04117228, pa: 0.0,
  exp_time: 130.0, filter_tray: FT_NB775_NB845}
- { pointing_name: "Your title 2", ra: 2.61302565, dec: 0.04112474, pa: 0.0,
  exp_time: 130.0, filter_tray: FT_NB775_NB845}
- { pointing_name: "Your title 3", ra: 2.61307284, dec: 0.04120247, pa: 0.0,
  exp_time: 110.0, filter_tray: FT_r}
...
```

The system will process this list in the specified order. Minimize the number of filter tray changes to optimize your observing time (~3 minutes each filter tray interchange) and for a better care of the instrument.

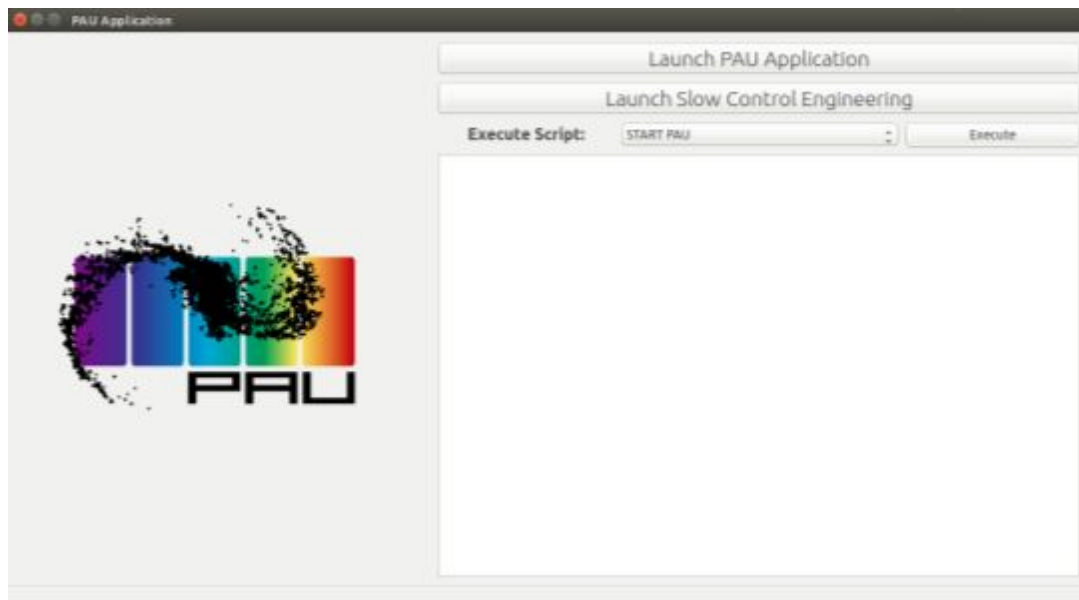
## Afternoon preliminaries

### Open PAUCam Master panel

Click on PAU icon in the sidebar to open PAUCam Master Panel



The **PAUCam Master** panel should appear:



### Start motors power

All shutter and filter tray motors are disabled from one night to the next. We need to enable them to operate the camera.

(in PAUCam Master Panel)

1. Click on **Launch Slow Control Engineering** button to open *PAUCam engineering panel*.
2. In the popup window Select New Session -> Press Ok button

(in PAUCam Engineering panel)

3. Press **Connect to control plc** red button. It will turn to green.
4. Go to **Management** section in the left side of the panel -> Select **Enables** sub section
5. Check that POWER is ON. If not press ON/OFF button to enable the motors.

### Open Filter Trays Panel (advanced operations)

Filter trays are changed automatically when requesting a flat field or a science exposure. This panel is used for engineers to monitor and control in a specific way the filter trays and jukebox system.

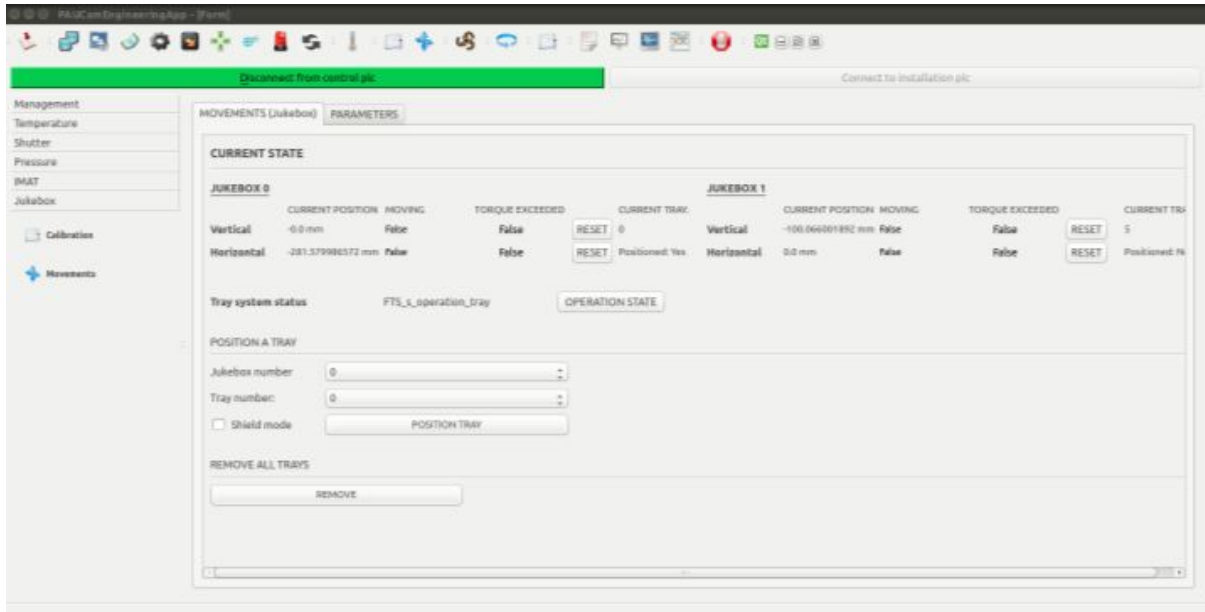
**Use this panel ONLY for monitoring purposes. Never enter into calibration mode.**

(in PAUCam engineering panel)

1. Open the Jukebox window for advanced control of the jukebox filter tray interchanger:

2. Go to Jukebox section-> Select Movements subsection -> Press the Movements (Jukebox) tab
3. Leave this window open to check the status of the jukebox and advanced control.

The **PAUCam Engineering Panel** should finally look like this:



## Start Observation Control System (OCS)

The observation control system orchestrates all the modules and satellites running in multiple computers (CCS machines). This is the main process and will start all the subsystems.

(in PAUCam Master Panel)

1. Execute script: Select **START PAU**
2. Press **Execute** button. Wait until process ends.

## Initialize the PAUCam Observation Control Panel

The PAUCam Observation Control Panel is the main GUI to operate the camera.

\*After restart the paucontrolroom machine for the first time, you will need to start the server daemon in a terminal window:

```
> pftserverd
```



### Start the GUI

(in PAUCam Master Panel)

1. Press the **Launch PAU Application** button

### Load the configuration


(in the PAUCam Observation Control Panel)

2. Press Configuration icon 
3. Press **Select** -> Select `FullSystem_guider.yaml` file located in the `pauuser/Desktop/yaml_conf/` directory.
4. Press **Open** button
5. Press **Send**. Wait until Connection light  in the lower right corner turns green.

## Create a new observation set

PAUCam data sets are grouped into observation sets. By default, one observation set is created for each night. The content for each observation set (Bias, Flats, Exposures..) will be organized in a single folder. They are named following this format: YYYYMMDD-NN where NN is a counter starting from 01 for each night.

(in the PAUCam Observation Control Panel)

1. Press *New Observation Set* icon 
2. Set the observer's name, Set Camera Status to MOUNTED and specify the Observation details.
3. Press **New Observation set**
4. Close Window

## Configure Data Acquisition mode (DAQi)

The data acquisition readout system needs to be configured depending whether you want to observe with or without auto-guider.

If you want to use the auto-guider, two detectors (G12 and G17) will be dedicated to guiding so the science images will only contain the 16 remaining detectors. If auto-guiding is disabled, all 18 detectors will be dedicated to expose.

### Observe with auto-guider:

(in the PAUCam Observation Control Panel)

1. Go to MACRO tab -> Click on " DAQi" subtab -> select mode16CCDS
2. Press **Execute button**. Wait for the ✓ confirmation in the right side of the panel.

or

### Observe without auto-guider:

(in the PAUCam Observation Control Panel)

1. Go to MACRO tab -> Click on " DAQi" subtab -> select mode18CCDS
2. Press **Execute button**. Wait for the ✓ confirmation in the right side of the panel.

The DAQ can be switched later during the night.


## The PAUCam Monitor and basic checks

The PAUCam monitor is simpler display panel with the most relevant parameters for the observation.



UTC	05:59:22
Sidereal	17 55 30.5
Telescope	
RA	+14 59 58.9
DEC	+0 21 57.9
Angle PA	-0.000°
Angle Mount	-67.170°
Focus	82.297
Airmass	1.568
Slow Control	
Pressure	1.774E-07 mbar
FP Temp	173.050 K
Filter Tray	
Shutter	
Exposure	
Observ Set	20160407-07
Exp Num	5995
Exp time	900.0s
Status	--
DAQi Status	READY
TCS Status	READY
Guide Status	LOOPING

(in the PAUCam Observation Control Panel)

1. Press the **PAUCam Monitor** icon 
2. Check **pressure** is ok ( $<10e-6$  mbar). Call PAUCam engineering team if pressure is out of range.
3. Check focal plane **temperature** is ok ( $\sim 173K$ ). Call PAUCam engineering team if temperature is out of range.
4. Check Telescope **focus** is ok ( $\sim 82.3$ ). Go to Telescope Control System section of this manual and Set Focus if focus is far from default value.

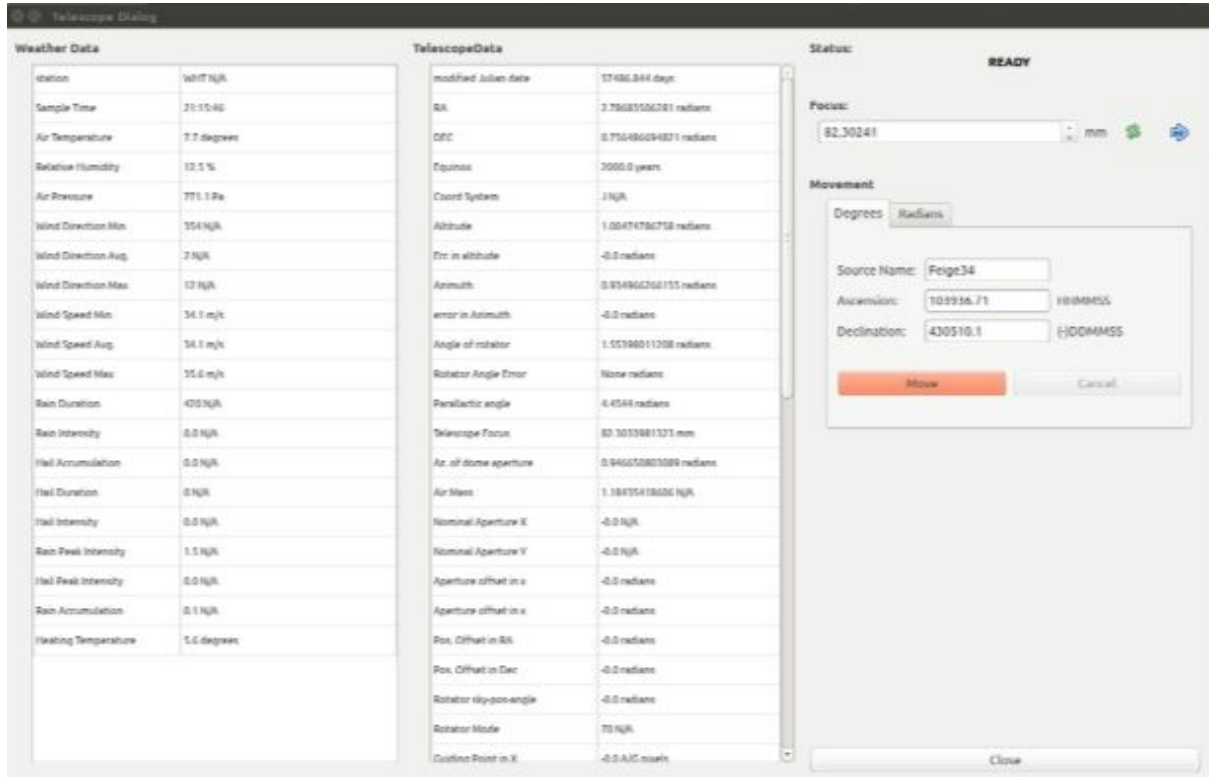
## Open Telescope Dialog Panel

The telescope dialog panel provides telescope and weather real-time data from the TCS. It also allows the observer to manually command position coordinates and focus. The telescope position can also be commanded automatically from PAUCam OCS through other routines that perform sequential actions (i.e. Science Exposure where the OCS moves the telescope, sets the filter tray and exposes the image). The sky and mount PA cannot be set directly through this window but from other routines explained later.

(in the PAUCam Observation Control Panel)

1. Go to the left sidebar at the bottom, in **TCSi section** and press the window icon 

2. Leave this window open to communicate with the Telescope TCS.



More details about communication and commands with the Telescope in the TCSi section.

## Filter tray selection

The selection and interchanging of filter trays is done automatically when requesting a flat field or a science exposure. Simply set the filter tray name or filter tray id when requested and the system will perform the movement.

## Filter tray set

The following table contains the relation between Filter Tray names, the associated IDs and additional complementary information.

Filter Tray ID	Filter Tray Name	Jukebox	Jukebox Position	Comment
0	FT_y	0	0	Single filter with Y band.
1	FT_z	0	1	Single filter with z band.
2	FT_i	0	2	Single filter with i band.
3	FT_r	0	3	Single filter with r band.
4	FT_g	0	4	Single filter with g band.
5	FT_u	0	5	Single filter with u band.



6	shield	0	6	Thermal shield
7	empty	1	0	No tray
8	FT_NB775_NB845	1	1	Individual filters per detector. Broad band filters on 10 external detectors. Narrow band filters on 8 central detectors from NB775 to NB845.
9	FT_NB695_NB765	1	2	Individual filters per detector. Broad band filters on 10 external detectors. Narrow band filters on 8 central detectors from NB695 to NB765.
10	FT_NB615_NB685	1	3	Individual filters per detector. Broad band filters on 10 external detectors. Narrow band filters on 8 central detectors from NB615 to NB685.
11	FT_NB535_NB605	1	4	Individual filters per detector. Broad band filters on 10 external detectors. Narrow band filters on 8 central detectors from NB535 to NB605.
12	FT_NB455_NB525	1	5	Individual filters per detector. Broad band filters on 10 external detectors. Narrow band filters on 8 central detectors from NB455 to NB525.
13	sensors	1	6	Filter tray with temperature sensors, a.k.a. Octopus. (do not use).

For more details of the filter trays, the corresponding match between Filters and CCDs and the system throughput for each band, visit the PAU Survey website: [www.pausurvey.com](http://www.pausurvey.com)

## Basic image acquisition

In this section, basic image acquisition commands are explained.

### Acquire single Bias image

(in the PAUCam Observation Control Panel)

1. Go to MACRO tab -> Click on "OB" subtab -> select **Bias**
2. Press **Execute**. Wait for the ✓ confirmation.

### Acquire single Flat image

(in the PAUCam Observation Control Panel)

1. Go to MACRO tab -> Click on "OB" subtab -> select **Flat**

2. Set exposure time (in ms)
3. Set the filter tray ID (see Filter Tray section for details)
4. Press **Execute**. Wait for the ✓ confirmation.

## Acquire single Exposure image

(in the PAUCam Observation Control Panel)

1. Go to MACRO tab -> Click on “OB” subtab -> select **Science**
2. Set exposure time (in ms)
3. Set the filter tray ID (see Filter Tray section for details)
4. Press **Execute**. Wait for the ✓ confirmation.

## DRACO and Fits Viewer

DRACO (Draw, Reduce and Analyze Camera Observations) is the subsystem responsible of the calculation of the basic quality parameters of PAUCam images. The quality values are calculated after taking the image and are stored in a database, allowing the observer to retrieve them offline. The image itself can be displayed from the Fits Viewer window, while the results of the basic reduction (based on astromatic software SExtractor and PSFex) are displayed by the Quality Image Tests window.

## Open the Quality Image Tests window

(in the PAUCam Observation Control Panel)

Go to the left sidebar, in **DRACO section**, press the window icon on the left

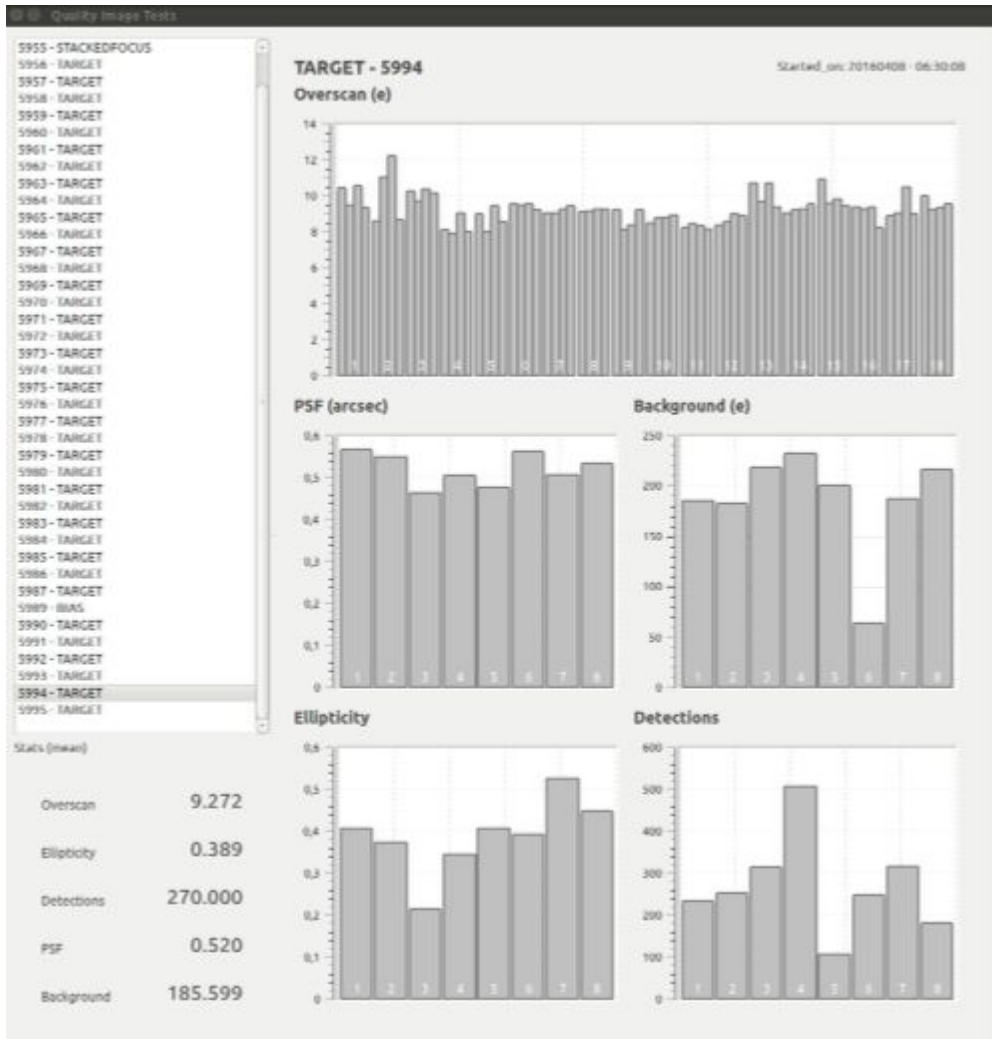


On the left side of the Quality Image Tests window select one image from the list to see the results of the quality tests - > Click on *EXPOSURE NUMBER - KIND* (ex. “5994 - TARGET” )

On the right side of the window the following plots will be displayed, corresponding to the selected image:

- Error in the Overscan (readout noise) vs amplifier number (from 1 to 72)
- Mean PSF FWHM (in arcsec) vs CCD number (only central area, from CCD 1 to CCD 8)
- Mean Background level vs CCD number (only central area)
- Mean PSF Ellipticity vs CCD number (only central area)
- Number of Detections extracted per CCD number (only central area)

On the left side, below the list of images to select, the mean values relative to the central focal plane area are displayed.



## Open the fits viewer

PAUCam images are stored in fits files, they can be displayed using the Fits Viewer window.

(in the PAUCam Observation Control Panel)



On the upper-left -> Click on the image icon

On the right side -> Click on the exposure number corresponding to the image to display

Gray scale range can be modified with the Contrast Adjustment Tool, below the image display panel.

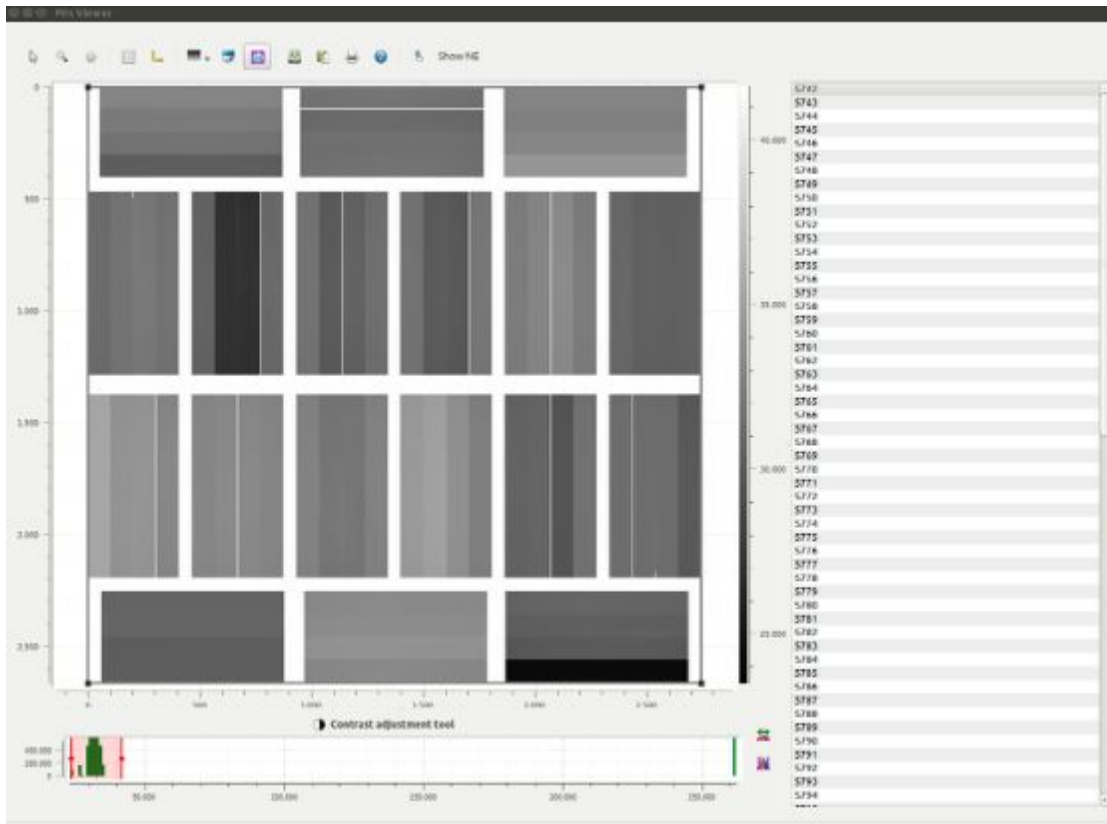
Select an option on the right side of the light curve plot and adjust the dynamic range moving right or left the red vertical lines with the mouse:

- Adjust the image color range according to data range
- Eliminate outliers by setting lower and upper limits

On the upper part of the window, press the selected icon to perform the corresponding action:

- Arrow -> Click on the exposure number to display. Move the image inside the window
- Zoom -> Click on the image to zoom in and out
- Grid -> Activate grid on the image display
- Print -> Print the image displayed

- Copy to clipboard
- Save as -> Select how to save the image display
- Image statistics -> Select a region of the image and retrieve corresponding statistics
- Rectangle snapshot -> Select a rectangle with the mouse to have the corresponding snapshot
- Select colormap -> Select the image color palette
- Axes style -> Configure image axes style
- Parameters -> Configure image parameters
- Select -> Click on a position in the image image to get coordinates and intensity
- Help



## Image Calibration Routines

This section explains how to produce the following calibration exposure sets:

- Bias image set
- Flat Field image set
- Focus image set
- Stacked focus image
- Photon Transfer Curve image set (advanced)

### Set of Bias images

Request to Telescope Operator

- Switch off dome illumination
- Close the petals (it isn't necessary, but recommended)

(in the PAUCam Observation Control Panel)

1. Go to MACRO tab -> Click on " routines" subtab -> select MultiBias

2. Set exposures number
3. Press **Execute**. Wait for the ✓ confirmation.

## Set of Flat Field images

There are four modes to obtain flats images:

- Take automatically ALL filters flats
- Take automatically all broad band filters flats
- Take automatically all narrow band filters flats
- Take manually the flats for each used filter

In any case, request to Telescope Operator

- Park the telescope in the Flats position
- Switch off dome illumination
- Open the petals

In the automatic modes lamps and exposure times are controlled by the computer.

### To take automatically ALL filter trays flats

(in the PAUCam Observation Control Panel)

1. Go to MACRO tab -> Click on “ routines” subtab -> select AllFlats
2. Set number of flatfield exposures for each filter tray
3. Set broadbandalso value (0 no, 1 yes)<sup>1</sup>
4. Press **Execute**. Wait for the ✓ confirmation.

### To take automatically all broad band filter trays flats

(in the PAUCam Observation Control Panel)

1. Go to MACRO tab -> Click on “ routines” subtab -> select BroadFlats
2. Set number of flatfield exposures for each filter tray
3. Press **Execute**. Wait for the ✓ confirmation.

### To take automatically all narrow band filter trays flats

(in the PAUCam Observation Control Panel)

1. Go to MACRO tab -> Click on “ routines” subtab -> select NarrowFlats
2. Set number of flatfield exposures for each filter tray
3. Set broadbandalso value (0 no, 1 yes)<sup>1</sup>
4. Press **Execute**. Wait for the ✓ confirmation.

### To take manually the flats for each individual filter tray

Switch on required lamps, adjust the percentage<sup>2</sup> and use the referenced exposure time.

Lams can be operated from a console or from the telescope control panel

(Console: <http://161.72.6.103/PetaLamps/>)

(in the PAUCam Observation Control Panel)

1. Go to MACRO tab -> Click on “ routines” subtab -> select MultiFlats

---

<sup>1</sup> For narrow band filters two exposure times are set. One for the 8 central narrow band filters and another one for the 10 external broad band filters. Selecting 0, only the exposures times for narrow band filters are set.

<sup>2</sup> For short exposure times, we recommend to use a percentage of 100% because the lamps blink.

2. Set number of flatfield exposures for the selected filter tray
3. Set exposure\_time (in milliseconds!)
4. Set filter tray id
5. Press **Execute**. Wait for the ✓ confirmation.

The following table give a reference of the lighted lamps, exposure times and signal.

Filter	Tray	Lamps	Percent age (%)	Exposure time (s)	Counts (ADU)	Exp. time for BBF (s)	Comments
u	5	1-2-3-4	100	2	50k		Edges with "contamination"
g	4	1-2-3	100	1	140k		
r	3	1-2	100	1.5	160k		
i	2	1	100	7	140k		
z	1	1	100	3	110k		
Y	0	1	100	3	70k		
455 - 525	12	1-2	100	8	60/110k	(4)	BBF not saturated with 8 sec.
535 - 605	11	1-2	100	5	50k	2	160k BBF with 2 sec
615 - 685	10	1-2	100	5	75k	2	160k BBF with 2 sec
695 - 765	9	1-2	100	3	75k	1	100/200k BBF 1 sec
775 - 845	8	1-2	100	4	110k	1	

Last update: March 31, 2016

## Photon Transfer Curve (PTC)

To create a calibration set of Photon Transfer Curve, a sequence of flats will be created with increasing exposure time. PTC test is used to measure the linearity and gain of the CCD detectors.

OSA preparation:

- Set the telescope to dome flat position
- Open the petals
- Set the flat lamps (default is Lamp 2 @ 100%)

(in the PAUCam Observation Control Panel)

1. Go to MACRO tab -> Click on "routines" subtab -> select **ptc**
2. Set the **maximum exposure time** (max\_time\_sec) for the PTC sequence in seconds (default is 30s)
3. Set the **number of samples** (num\_samples) for the PTC sequence from 0s to max\_time\_sec (default is 15)
4. Set the **filter tray** ID (see Filter Tray section for details - default is FT\_g - id: 4)
5. Press **Execute**. Wait for the ✓ confirmation.

## Focusing

The system allows two modes to focus the camera:

**Focus Sequence:** a set of images are produced automatically, each image in a focus position.

**Stacked Focus Image:** a single image is produced and detector charges are shifted for each focus position (recommended and much faster).

The operation of these two modes is explained below.

### Focus sequence

For this mode the system will produce a set exposures, one for each focus position specified in the macro:

(in the PAUCam Observation Control Panel)

6. Go to MACRO tab -> Click on "routines" subtab -> select **FocusScanThreaded**
7. Set the **exposure time** for each focus step(in ms)
8. Set the **filter tray** ID (see Filter Tray section for details)
9. Set the start focus position (**finit**) and final focus position (**fend**)
10. Set the number of focus **steps** between finit and fend
11. Press **Execute**. Wait for the ✓ confirmation.

### Stacked Focus sequence

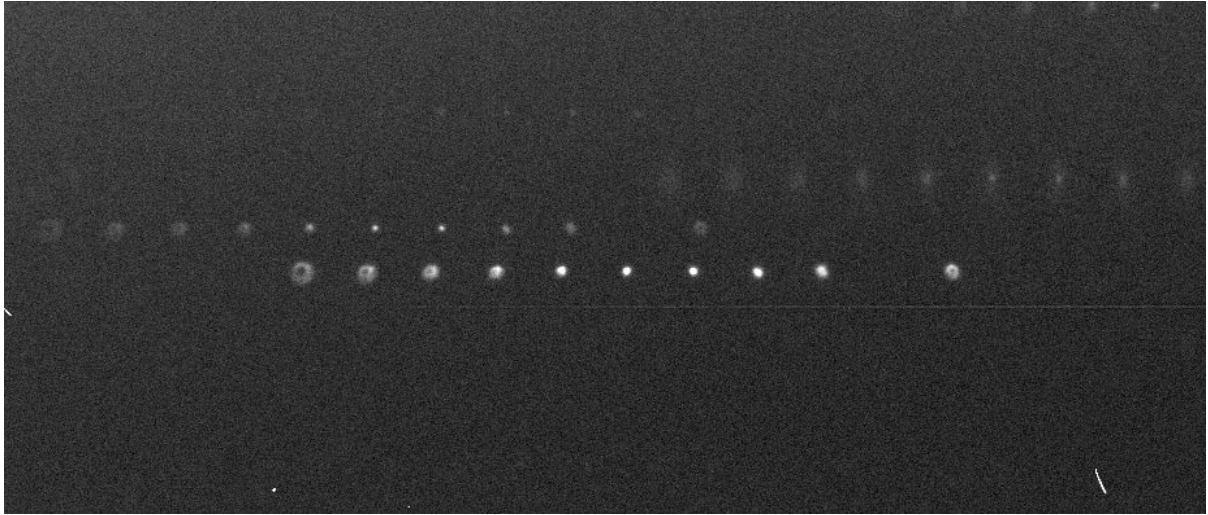
For this mode the system will produce a single exposure image, shifting the detector charges between focus steps as specified in the macro:

(in the PAUCam Observation Control Panel)

1. Go to MACRO tab -> Click on "routines" subtab -> select **stackedFocusScan**
2. Set the **exposure time** for each focus step(in ms)
3. Set the **filter tray** ID (see Filter Tray section for details)
4. Set the start focus position (**finit**) and final focus position (**fend**)

5. Set the number of focus **steps** between finit and fend
6. Set the number of pixels shifted between focus exposures (**numrows**)
7. Press **Execute**. Wait for the ✓ confirmation.

Stars will look like this:



*First approach focus - default parameter values:*

- exptime: 10s
- finit: 81.3
- fend: 83.3
- steps: 10
- numrows: 50

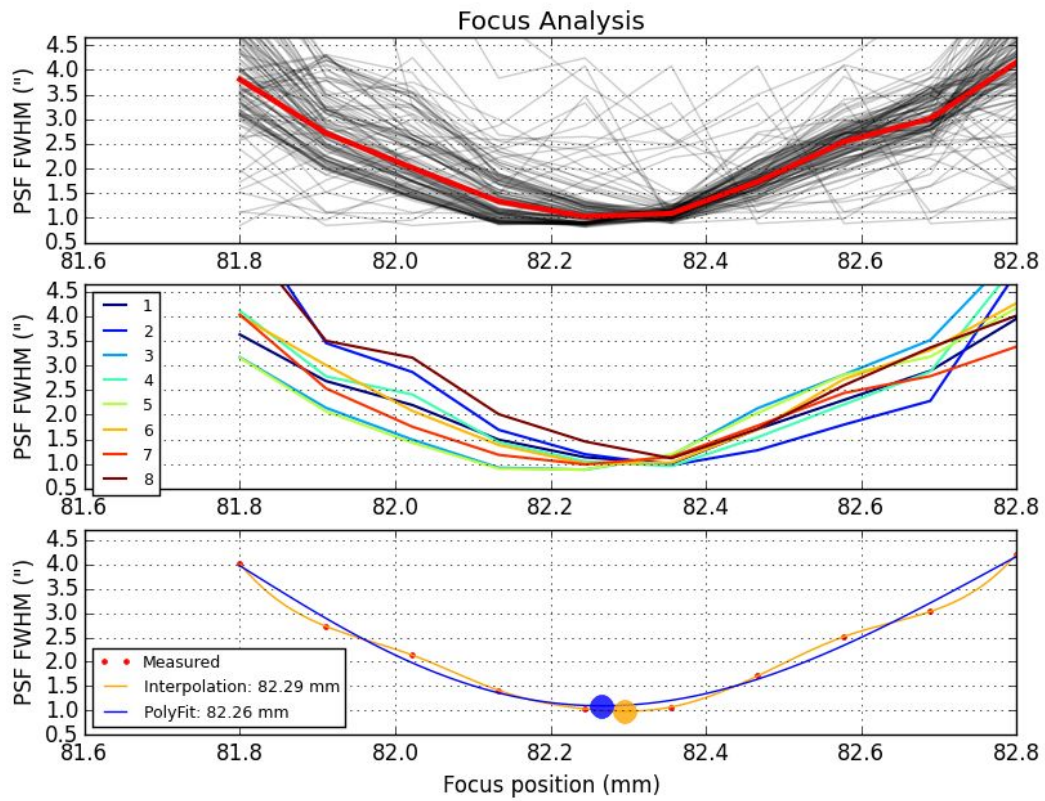
*Fine focusing - default parameter values:*

- exptime: 10s
- finit: 81.8
- fend: 82.8
- steps: 10
- numrows: 50

Nominal focus is 82.3

DRACO will analyze the stacked focus image and provide the focus minimization for the camera and for the individual detectors:

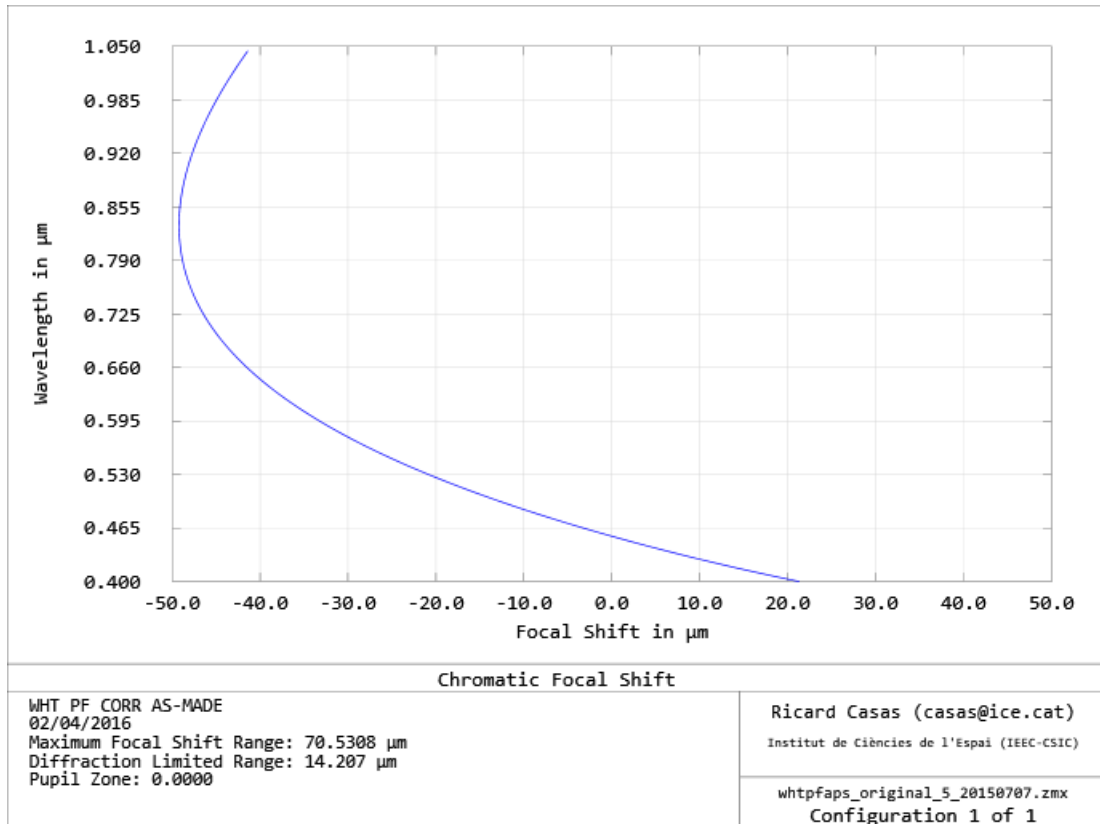




After the analysis the observer will have to decide the best focus position and set it through the TCSi interface (see TCSi section for instructions) or ask the OSA to set it.

**Additional Focus information:**

- Nominal focus: 82.3 mm (Last update: March 31, 2016)
- The focus shifts with the wavelength. The theoretical focal shift is:



In the Narrow Band Filters wavelength range of (455 - 845 nm) the focus shift is around 50 μm.

## Telescope Control System interface (TCSi)

### Initialization

**NOTE:** These commands should be set by the Telescope Operator (OSA) only directly in the WHT TCS terminal.

Instrument and Guiding should be set to PAUCAM

```
STATION PRIME
INSTRUMENT PAUCAM
AGSELECT PAUCAM
```

The internal parameters are set to:

```
ins_ad_xy2mount(7) = 0.26843163 (15.38°)
ins_ad_off(7) = 0.26843163 (15.38°)
gui_gd_rotation(13) = 0.26843163 (15.38°)
gui_gr_pixel_size(13).X = 0.126051 E -05
gui_gr_pixel_size(13).Y = 0.126051 E -05
gui_gl_flip(13) = 1
```

Make sure TCS is in **COMP mode** to allow PAUCam to communicate and command orders to the TCS.

## Move telescope


Some routines command automatically the TCS (i.e. Survey Mode, Eight Central Pointing...) However you can manually set the sky coordinates through the Telescope Dialog Panel:

(On the Telescope Dialog Panel)

1. In the **Movement** section select *radians* or *degrees* tab depending on the format you want to introduce the sky coordinates.
2. Introduce the **Source Name** (string without spaces)
3. Enter **RA** and **Dec** in the format selected
4. Press **Move**. Wait until TCS status is back to READY.


## Move rotator

(in the PAUCam Observation Control Panel)

1. Go to MACRO tab -> Click on "TCSi" subtab -> select **TCSiMoveRotator**
2. Set the rotator **mode** (0 is SKY, 1 is MOUNT)
3. Set the **angle** from North to East (in degrees)
4. Press **Execute**. Wait for the  confirmation

## Set focus

(On the Telescope Dialog Panel)

1. In the **Focus** section set the Focus value in mm
2. Press the **right arrow** to confirm  Wait until TCS status is back to READY.

## Auto-Guider

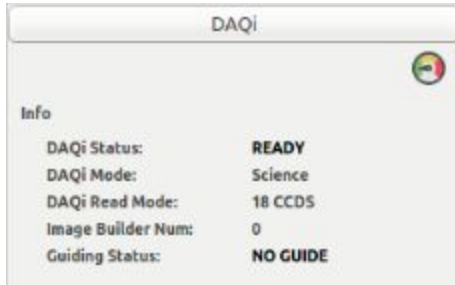
PAUCam has a built-in auto-guiding system to allow precise tracking of long exposures. When guiding is enabled, 16 detectors integrate light for the scientific exposure while the two outermost detectors are dedicated for guiding. The guiding detectors (G12 and G17) integrate ~1 second and make a fast readout over the Region Of Interest (ROI). Depending on the stellar density of the field 3 to 15 guide stars are analyzed to measure the centroid correction. The error signal is sent to the TCS every 6 to 8 seconds.

## Configure guiding mode

To enable the auto guider, the DAQi must be set to *mode16CCDs*.

(in the PAUCam Observation Control Panel)

1. In the left side of the panel, **check** if DAQi Read Mode is *16 CCDS*.



2. If mode is different than 16CCDs, go to MACRO tab -> Click on “**DAQi**” subtab -> select *mode16CCDS*
3. Press **Execute button**. Wait for the ✓ confirmation in the right side of the panel.

## Guided Science Image

To enable the auto guiding system on a science exposure, follow these instructions:

(in the PAUCam Observation Control Panel)

1. Go to MACRO tab -> Click on “OB” subtab -> select **ScienceGuided**
2. Set `exptime_ms` to define the **exposure time** of the science image (in ms)
3. Set `filter_tray` to define the ID of the **filter tray** to observe(see Filter Tray section for details)
4. Set **guider exposure time** (`guider_exp_time_ms`) to define the integration time of the guiding images (1000 ms by default)
5. Set the **number of rows to skip** (`skip_rows`) to define the guider ROI area (3196 by default)
6. Set the number of rows to read (`heigh_rows`) to define the guider ROI size (900 by default)
7. Press **Execute**. Wait for the ✓ confirmation.


## Survey and Sequence mode

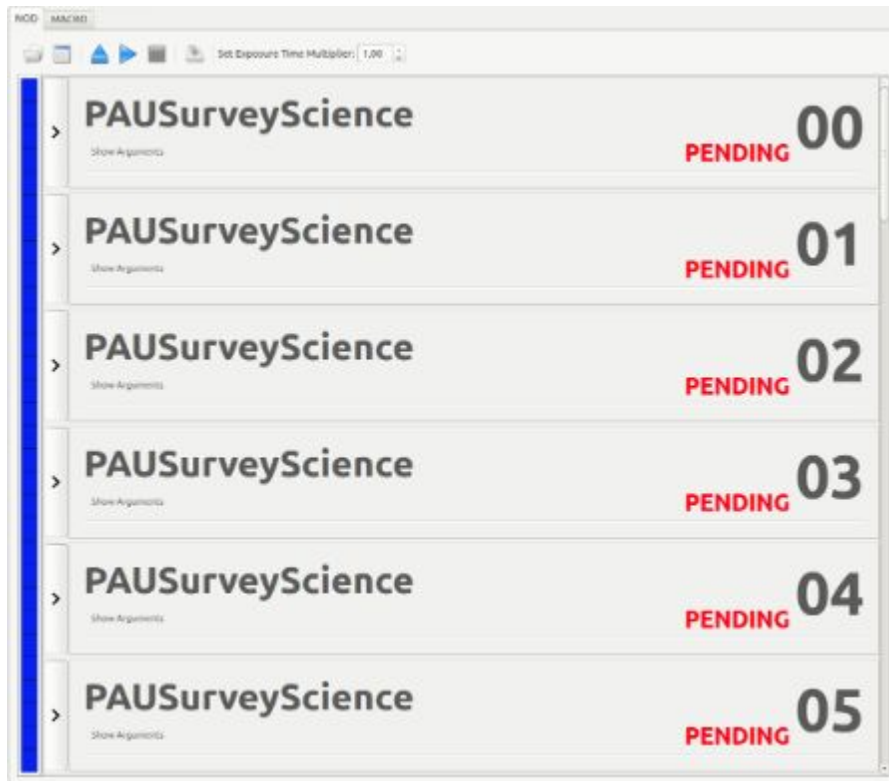
For long automated sequences of exposures it is recommended to create a list in the format specified in the section “Pointings List”.



## Load Pointings Sequence

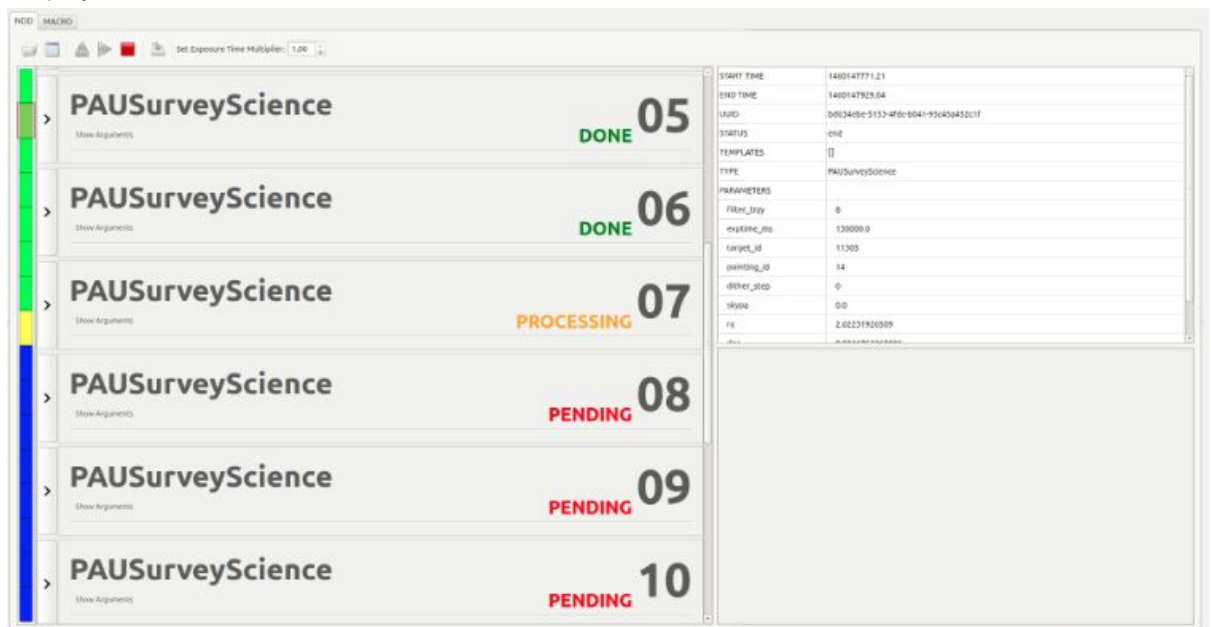
(in the PAUCam Observation Control Panel)


1. Go to NOD tab

2. Load your pointings list file (file extension must be .sdb) with the load icon . Your pointings list must appear in the main window:



3. Check that the coordinates, filters, exposure times... are correct.
4. Click Play icon  to begin the automated exposure sequence. **PENDING** science exposures will begin to **PROCESSING** state until are complete, that will change to **DONE**. If an error occurs the status will change to **ERROR**. You can pause the sequence by clicking on the stop icon . The sequence will stop after the completion of the processing exposure. It can be resumed with the play icon.



5. To unload the list click on the eject icon . This can only be done when the sequence is complete or paused.

## Data Storage and Transfer

PAUCam images are fits files organized in directories, whose name is the observation set name (format YYYYMMDD-##). When closing an observation set, a metadata file called YYYYMMDD-##.yaml is written in the same directory with a description of the observation set.


The internal disk storage has a capacity of 7 TB.

Contact the PAUCam Team for further details and for support in access and transfer your data.

## End of night

### Close the Observation Set

(in the Observation Control Panel)

1. Click on Observation Set icon 
2. Click on "Close Actual Observation Set"
3. Close window

### Move staging directory to archive

(temporary - only for PAUCam users)

1. Log into pausrm2 server.  
> ssh [paucacs@pausrm2.ing.iac.es](mailto:paucacs@pausrm2.ing.iac.es)
2. Go to staging archive  
> cd /paucacsarchive
3. Check all observation set directories and remove those with no images in it (only with the observation set yaml file)
4. Check that all the directories have one <observation\_set>.yaml file. If it is missing, the directory cannot be moved (see next step).
5. Atomic move of observation set directories to main archive  
> mv -n <observation\_set\_directory> /archive/

Images will begin to transfer automatically to PIC.

### Shutdown Camera Control System

1. Close PAUCam Observation window  
(in PAUCam Master Panel)
2. Execute script: Select **STOP PAU**
3. Press Execute button. Wait until process ends.

### Remove trays from jukebox

(In PAUCamEngineering window)

1. Go to **Jukebox** -> Movements -> MOVEMENTS (Jukebox)
2. In REMOVE ALL TRAYS -> Press **REMOVE** button.

### Turn motor powers off

1. Go to PAUCamEngineeringApp window

2. Enter into the **Management** section (left lateral bar)
3. Enter into “**Enables**”
4. Click on **POWER ON/OFF**. X indicator should move to **OFF**.

Close engineering application.

Go to sleep.

## Advanced

Open Readout PanVIEW Desktop (Advanced)

(in a paucontrolroom terminal)

> vncviewer pauccs1.ing.iac.es:9

> Enter password for pauccs user ;)

Four PanVIEW terminal windows should be open if readout system On.

## DAQi machines

pauCamRight -> CCS1

pauCamLeft -> CCS4

pauCamGuidingRight -> CCS3

pauCamGuidingLeft -> CCS5

## Troubleshooting

### Control System does not respond

1. Close PAUCam Observation window  
(in PAUCam Master Panel)
2. Stop the CCS with Execute script: Select **STOP PAU**
3. Press Execute button. Wait until process ends.
4. Restart the system with Execute script: Select **START PAU**
5. Press Execute button. Wait until process ends.
6. Press the **Launch PAU Application** button to open the PAUCam Observation Control Panel.

### DAQi error

If an error in the DAQi system appears, it is very likely that one or more PanView controllers are crashed or under error status. Follow this procedure to restart them without booting the entire CCS:

(in PAUCam Master Panel)

1. Stop the CCS with Execute script: Select **RESTART PANS**
2. Press Execute button. Wait until process ends.

If problem persists try:

(in PAUCam Master Panel)

3. Stop the CCS with Execute script: Select **RESTART PANS AND “FUENTES DE PODER”**
4. Press Execute button. Wait until process ends.

If this process does not solve the issue, you can try a second time. If the problem persists, restart the entire CCS. (follow the instructions in **Control System does not respond**)

### **Filter Trays Torque Exceeded**

In some circumstances, the Filter trays will stop moving with this error. We are working on a recovery mechanism but for the moment contact the PAUCam Engineering Team.

### **Automatic transfer has not worked**

Images have been moved to /archive/, but have not been transferred. Transfer daemons status could be “not running”. Send a mail to PIC people, they will take care of it.

### **Contact PAUCam Team**

If any issue occurs and the proposed solutions do not work, please contact the PAUCam team at the following address: [paucam-support@ifae.es](mailto:paucam-support@ifae.es)