

Req 5.5.4

Title:

PSF anisotropy

Objective:

Determine the PSF anisotropy.

Detailed characterization of the Point Spread Function at various positions in the focal plane shall be provided. Monitor optical defects and possible variations in time. Do this for both optical configurations of the telescope, ADC in and out.

Fulfilling or fulfilled by:

Data reduction of observations of high density field, such as employed in req.551.

When performed/frequency:

Commissioning

Each optical change to the telescope,

Remount of the detector assembly. Once per three months.

Sources, observations, instrument configurations:

High density fields observed with **Mode– Stare N=1**.

Inputs:

raw science images

or

processed science images

Outputs:

CalFile– 554 *PSF anisotropy*

Required accuracy, constraints:

better than 1%

Estimated time needed:

Few minutes per pointing. Reduction: < 3 min.

Priority:

desirable

TSF:

Mode– Stare N=1

TSF– OCAM_img_obs_stare

Recipe:

```
PSF_Anistropy -i <filenames> [-s] [-d DETECT_THRESH] [-f FLAG_MAX]
                [-m FLUX_MAX] [-r MIN_FLUX_RADIUS] [-rm MAX_FLUX_RADIUS]
```

filenames : list of raw or processed science images

-s : switch to not run sextractor if catalogs already exist

DETECT_THRESH : sextractor detection threshold (float)
Range of allowed values: 0.0 - 100.0. Default 10.0.

FLAG_MAX : maximum flag value for sources (integer)
Range of allowed values: 0 - 255. Default 0.

FLUX_MAX : maximum maximum pixel value for sources (integer)
Range of allowed values: 0 - 70000. Default 60000.

MIN_FLUX_RADIUS : minimum half-light radius for sources (float)
Range of allowed values: 0.0 - 50.0. Default 0.0.

MAX_FLUX_RADIUS : maximum half-light radius for sources (float)
Range of allowed values: 0.0 - 50.0. Default 50.0.

Needed functionality:

catalog - source extraction
catalog - source selection

CA:

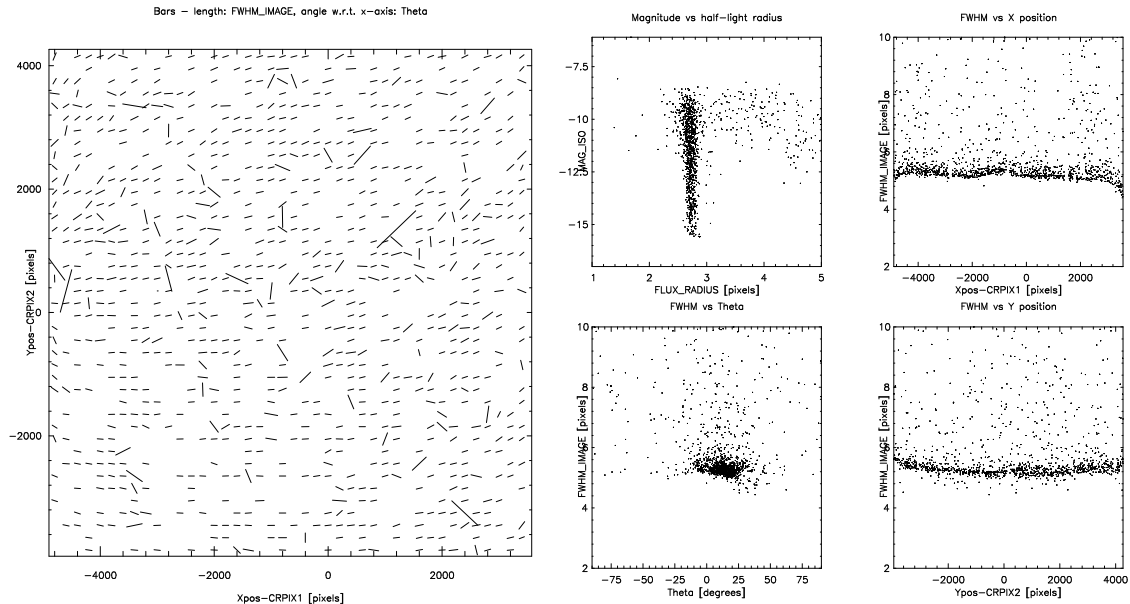


Fig 5.5.4 Example of default output plot of req554

Run standard pipeline reduction.

Do source extraction on output image, using SExtractor.

During the beginning of Commissioning source extraction can be done on raw data. Use the FWHM of stellar objects to search for systematic effects across the detector area. The distribution of the position angles and FWHM of the objects ellipse has to be evaluated. This is an interactive procedure, nearly identical to the one used for the determination of the tilt in **req. 571** *Camera Focus/tilt*

CAP:

```
# Create catalogs of images
```

```
catalogs = []
```

```
for filename in filenames:
```

```
    cat = Catalog()
```

```
    cat.frame = BaseFrame(pathname=filename)
```

```
    cat.threshold = DETECT_THRESH
```

```
    cat.sexparam = ['Xpos', 'Ypos', 'A', 'B', 'THETA', 'FWHM_IMAGE',  
                   'FLUX_RADIUS', 'FLUX_MAX', 'MAG_ISO', 'ERRTHETA_IMAG
```

```
# Run SExtractor
```

```
cat.make()
```

```
catalogs.append(cat)
```

```

# Filter and merge catalogs
for cat in catalogs:
    LDAC.filter(incat=cat.filename, outcat=cat.filename, table='OBJECTS',
                sel='(A > 1.0 AND B > 1.0 AND Flag < %d AND Max-
Val < %d AND
                    FLUX_RADIUS > %d AND FLUX_RADIUS < %d)') %
    (FLAG_MAX+1,
     FLUX_MAX, MIN_FLUX_RADIUS, MAX_FLUX_RADIUS))
LDAC.ldacpaste(' ',join([cat.filename for cat in catalogs]), 'cal554.cat

```

```

# Create plot of the source parameters
...

```

this produces a catalog, which can be visualised in several ways.
By default
a plot is produced.