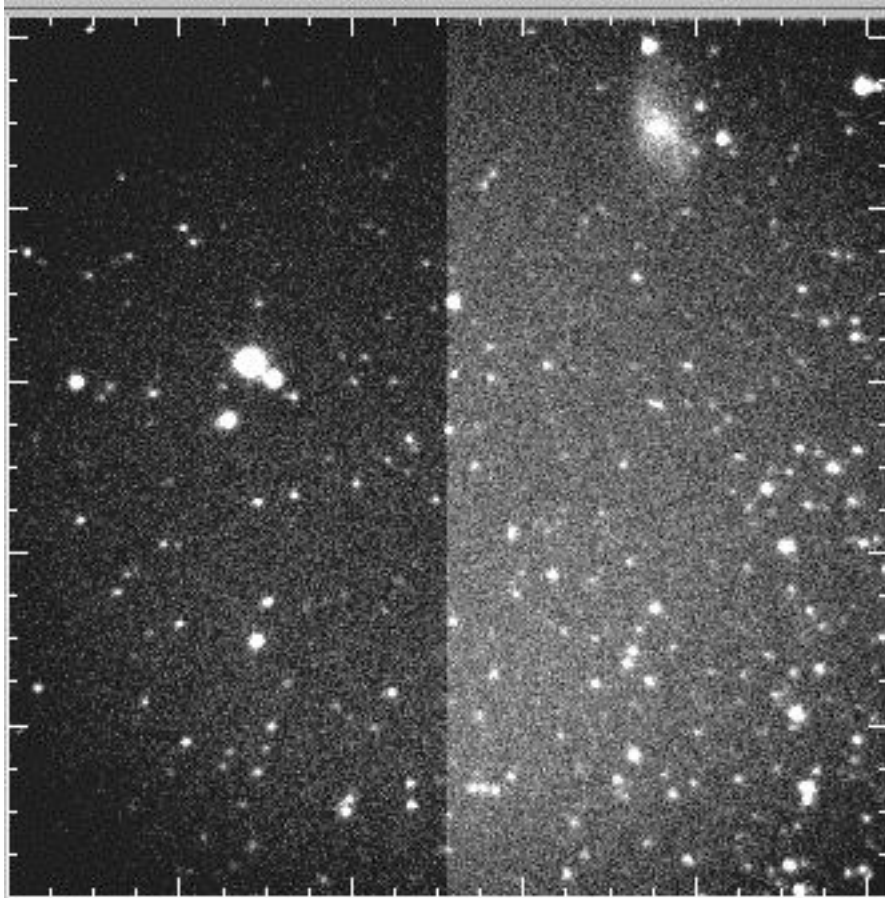


How to update the position of the slitmask alignment software's guider field of view.

During nighttime engineering or using an observer mask complete the following steps:

- 1) align a slitmask where the mask central coordinates are accurate.
- 2) Adjust exposure params and ND on offset guider until several field stars are clearly detected. An example image of NGC288 is given below.



- 3) Save an offset guider image with mask aligned, 1x1 binning.
- 4) Copy the image to a scratch sub directory for your use

Off line complete the following steps

- 5) Measure the delta offsets in the SAT predicted positions-actual (saved image) positions of a star in the field
  - a. Use the SAT to mark a guide star
  - b. Record Deltas for X and Y on (next to the Move Telescope btn)
  - c. Take the negative of the deltas
- 6) Invert the y axis of the guider image
  - a. In IDL do the following:
    - i. `Data = readfits('IrisOffsetFF025_0000.fits')`

- ii. Writefits, 'guider.fits', reverse(data,2)
- 7) Using IRAF do the following
    - a. Start iraf
    - b. Go to noao, digi, daophot
    - c. Epar daofind and set parameters appropriately (examples below)
      - i. Findpars- threshold=10
      - ii. Datapars- fwhmpsf = 7
      - iii. Datapars-datamax=16000
      - iv. Datapars-sigma = 17
    - d. Daofind guider.fits
    - e. Should create a file called guider.fits.coo.1
  - 8) Look up the two commands in the log file that retrieve the predicted guide star image. View the log file by clicking on the log tab on the SAT. The two commands should look like the following:
    - a. Dss = get\_dss(184.73235, 49.796331, DETSIZE=1024, IMSIZE=2.08907, ROTATE=271.445, /popup, HEADER=header)
    - b. Guide\_star\_list = get\_gsc\_targets(184.73235, 49.796331, 4.36860,dss, header)
  - 9) Run the above two commands in the SAT idl session. You may have to ctr-C and retall to get command line control
  - 10) Run update\_guide\_position in IDL to create a file for input to CCMAP. Update\_guide\_position is available in the SAT source code and should compile.
    - a. Update\_guide\_position, 'guider.fits.coo.1', guide\_star\_list, '1x1', deltaX, deltay,'LRIS
    - b. Deltax and y are measured in step 3
    - c. Guide\_star\_list is a structure
    - d. Output = guider.fits.coo.1.out
  - 11) Run ccmmap on the output
    - a. Unlearn ccmmap
    - b. Epar ccmmap and set fitgeom to "rxyscale"
    - c. IRAF Cmd => ccmmap guider.fits.coo.1.out guider.wcs
    - d. Check that the pixscale = 0.181 or close enough
    - e. Output guider.wcs
    - f. Record PA for the field (x and y values will be the same mod 180)
  - 12) Create a file with the center of the guider coordinates in it (512,512)
    - a. echo 512 512 > pix\_cent.list
  - 13) Cctran in iraf
 

```
Cctran pix_cent.list STDOUT guider.wcs guider.fits.coo.1.out
```

Output: 12:18:55.82 49:47:45.8
  - 14) In idl run coord\_diff for target center coordinates and the center of the guider field.
    - a. coord\_diff, '00:53:02.500', '-26:34:59.88','0:52:24.46','-26:33:04.4'

- b. First set of coordinates is the mask center
- c. Second set of coordinates is the output from CCTRAN (guider center coordinates)
- d. Output DISTANCE = distance between science and guider center fields
- e. Output PA = pa between the science and guider fields

15) Adjust values

- a. guider PA -> adjust to PA 180 (this is because image is flipped in y), Did this for the PA output for the xaxis. Y axis rotation will have different values but should be the same.
  - i. 0 -> value+180
  - ii. 90 -> value+90
  - iii. 180 -> value 0
  - iv. 270 -> value -90
  - v. e.g. for a position angle of 20 degrees
    - 1.  $gpa = iraf\_pa + 180 - (rotposn - 270)$
    - 2.  $rotposn = 289.9999931$
    - 3.  $iraf\_pa = 74.978$
    - 4.  $gpa = 234.978$
- b. guider to Science field adjust to PA=0.0
  - i. e.g. for a position angle of 20 degrees
    - 1.  $gpa = pa\_from\_coord\_diff - (rotposn - 270)$
    - 2.  $rotposn = 289.9999931$
    - 3.  $pa\_from\_coord\_diff = -58.011622$
    - 4.  $gangle = -78.0116$

16) Update the slit\_align.pro structure for the following keywords

- a. Log in as iris on an hq machine
- b. Cd ~iris/widgets/src/slit\_align
  - i. Cd to correct version
- c. Emacs slit\_align.pro and edit the following values for the appropriate instrument
  - i. Gpa – Guider PA for a PA of 0.0 (e.g. LRIS -> +235.684)
  - ii. Gangle – PA between the science field and guider camera for an instrument PA= 0.0 (e.g. LRIS -> -77.181)
  - iii. Gdist – the distance between the guider and science mask centers. (e.g. LRIS -> +523.754)
- d. Please try to preserve the history of the changes.

17) Fine tune the positions if needed. If the field prediction does not match the saved guider image you can fine tune the guider parameters

- a. + gpa\_off will result in the prediction moving right in the image
- b. - gpa\_off will result in the prediction moving left in the image
- c. + gdist will move the prediction down in the image
- d. - gdist will move the prediction up in the image.

