

# Goodman acquisition camera: Instructions

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File: prj/soar/soar/goodman/acam/Instruction.doc

## 1. Description

The acquisition (or slit-viewing) camera, hereafter ACAM, is located inside the Goodman spectrograph, near the slit assembly. Its deployable arm puts a diagonal mirror in front of the collimator to intercept the beam. The image is captured by the Prosilica GigE camera of 659x493 (HxV) pixel format, pixel scale 0.17". It can be viewed in real time using the ACAM software.

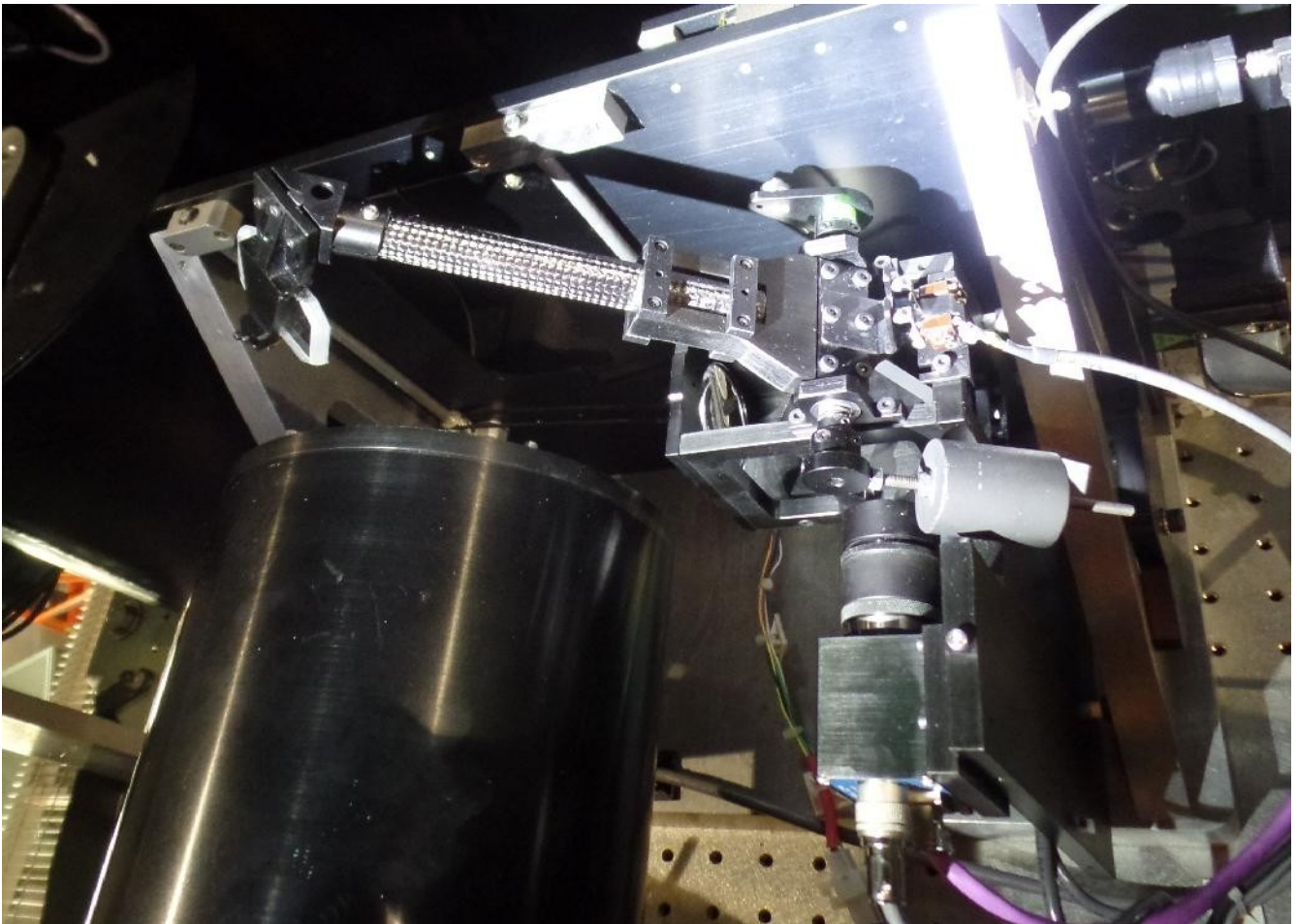


Fig. 1. ACAM with arm in the OUT position.

The device is connected via its connector panel. It needs the +12V/1A power (lemo connector) and the dedicated Ethernet line for the camera. The Ethernet cable is connected to the ethernet adaptor in the SOARAOM computer (139.229.15.32). The arm position is controlled remotely through the camera

and its GUI when the switch on the connector panel is in REMOTE CONTROL position.

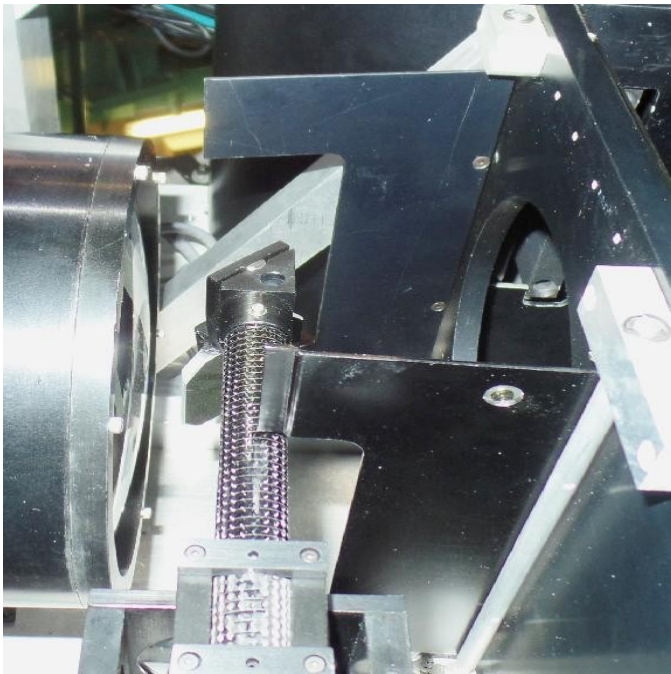


When the camera is installed and/or not in use, the switch must be in the FOURCE OUT position. Then, independently of the remote control, the arm moves out of the beam, and the green light is active. When the arm is in the beam, the red LED is active. Once the arm is OUT, the camera can be switched off by disconnecting the 12V power. LEDs are not active in the remote-control mode.

Fig. 2. Connector panel of ACAM located on the side of the Goodman enclosure.

## 2. Operation

ACAM should be used only in the spectroscopic mode, to acquire stars and center them in the slit. In the imaging mode, when the “doors” of the Goodman field mask are open, the arm would collide with the mask during deployment or retraction and hence should not be moved (Fig. 3). If the “open” position is default when Goodman motors are energized, the ACAM must not be started until **after** switching into spectroscopic mode. The ACAM arm must be moved OUT before switching into imaging mode. When the ACAM is powered and the connection to the camera is established, the arm moves IN, then OUT. Note however that the field mask can open or close with the ACAM arm either IN or OUT.



The space between collimator lens and diagonal mirror is about 10mm (see Fig.3).

To access the ACAM GUI, vnc to:

**139.229.15.32:5 (vnc4gacam)**

Enter the software by double-click on the launch icon on the left side of the screen (Fig. 4). The white window will show the camera ID 02-2110A-07072 if ACAM is powered and the connection to the Prosilica camera is established. Then click on the “eye” icon to open the live display. The slit is oriented horizontally (along lines) in the display.

Two controls on top of the live display define the arm position (the switch must be in REMOTE) and the camera exposure (Auto to fit the intensity range, or maximum 0.5s). The arm status is shown below the display.

Control-click opens the cursor menu which allows to save image as fits file (a name will be asked), to toggle between “auto” mode (intensity scale adjusted automatically to show faint stars) or “fit-range” mode (display full intensity range). The exposure time is adjusted automatically, up to maximum of 0.5s, or forced to this value.

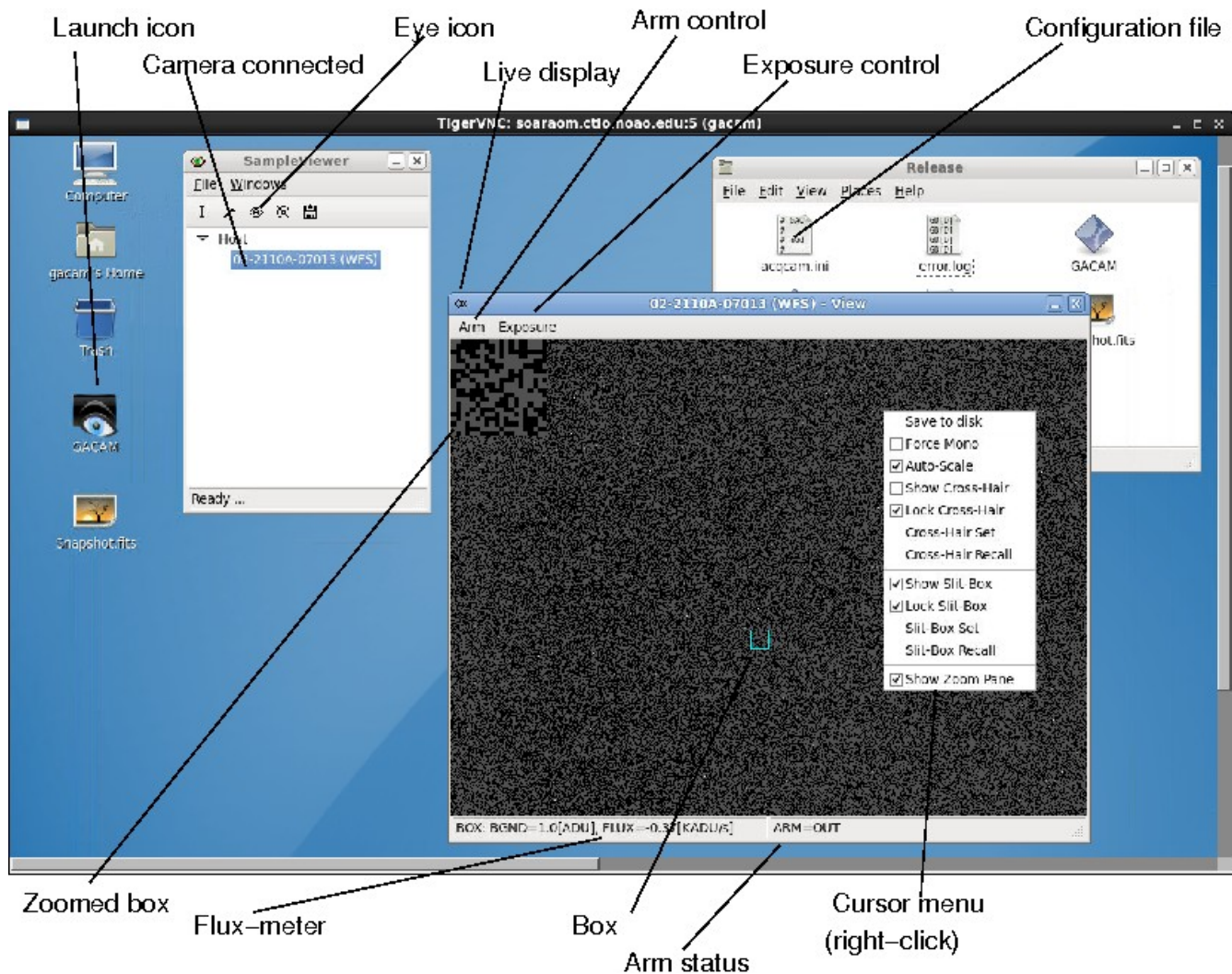


Fig. 4. Screenshot of GACAM computer with explanation of various function.

The slit position is marked by a blue box. Its size and initial position are defined in the acqcam.ini file located at `~/GACAM/bin/Release/` directory.. When you click on it in the Release file-view window, it is opened for editing in gedit. The configuration changes become effective when you close and re-open the live display (eye icon). The box position can be adjusted using the cursor menu (unlock, click on the new center, lock). The zoomed box is displayed in the upper left corner. The flux in the box is shown below the display. Using the zoomed image and flux, the star can be accurately centered in the slit.

Figure 5 shows images of the sky taken with ACAM and Goodman, in approximately matched scale and orientation. Note that +Y axis in the ACAM display is directed down, +X to the right. The image of long slit in ACAM is tilted by 0.7deg relative to its lines. The center is at about (330,300) pixels. The slit image moves slightly due to flexure, depending on the rotator angle. The total range of flexure in Y

(across the slit) is  $\pm 5$  pixels.

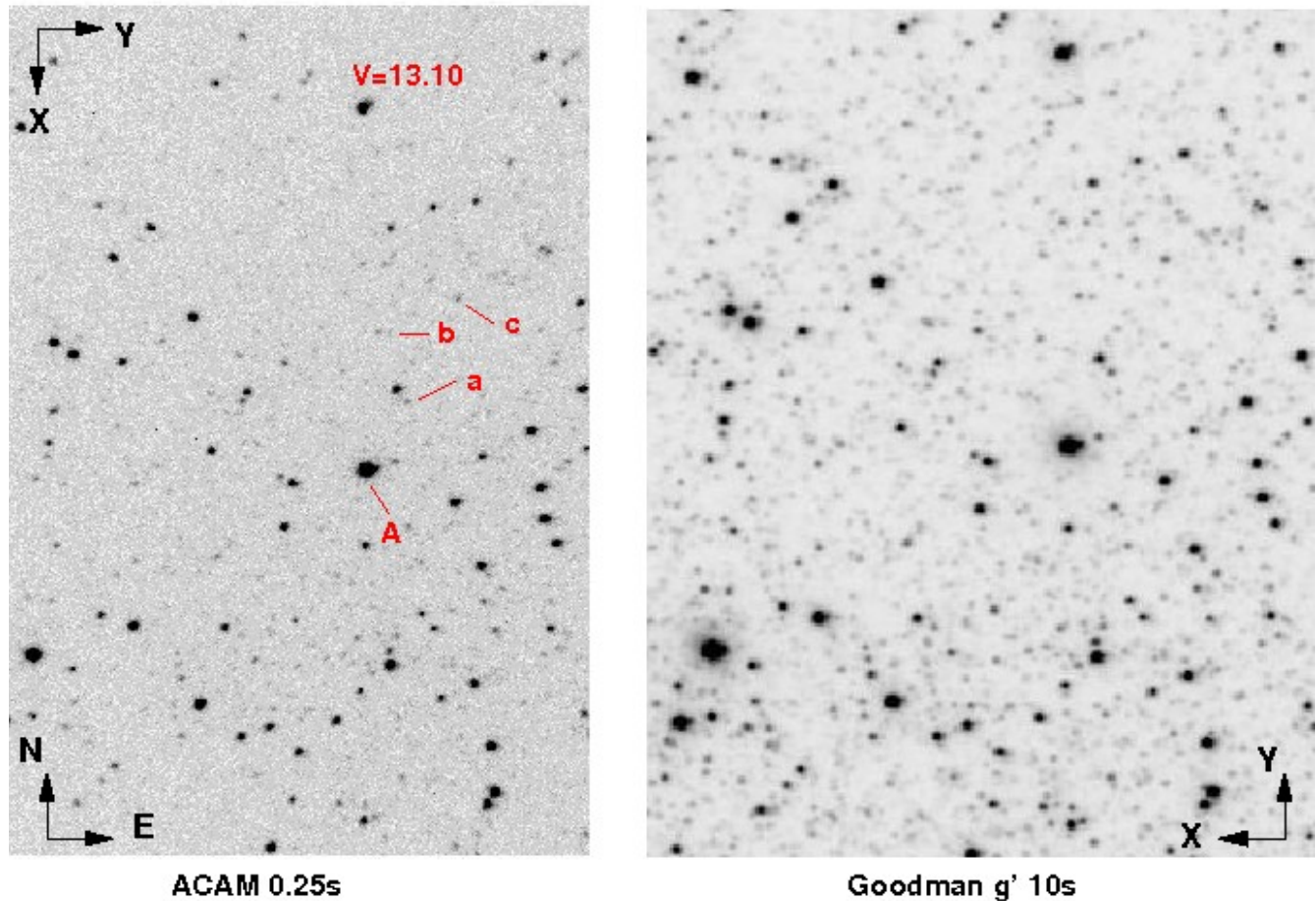


Figure 5. The dense star field is imaged with ACAM (left) and Goodman (right). Orientation of pixel coordinates is shown by the X,Y arrows, North is up and East to the left (position angle zero).

### 3. Related documents

See DocDB document 802-v2 at

<https://www.ctio.noao.edu/cgi-bin/DocDB/ShowDocument?docid=802&version=2>

- Concept of an acquisition camera for the Goodman spectrograph (optical design)
- Design of the acquisition camera for the Goodman spectrograph (mechanics)
- Integration and test of the acquisition camera for the Goodman spectrograph (performance, pictures)
- On-sky test of the acquisition camera for the Goodman spectrograph

Also DocDB document 835-v1 at

<https://www.ctio.noao.edu/cgi-bin/DocDB/ShowDocument?docid=835&version=1>