



How to observe with VEGA

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1 Starting VEGA

For all the computers, use the login “observe” (same as for the CHARA computers).

1.1 In the control room: control’s computers

1. Logon on PC-CTRLVEGA.
2. Start the applications controlling the electronic alimentionation *click on RUN when a window appears*
 - a. StartPwdServer
 - b. StartPwdGui
 - c. With the user interface PowerControl, first click on “status” and switch on successively ICS, PcIcs, PCs, Chiller, OptiLab, HV red and HV blue.
 - d. StartConfServer: this application has the responsibility of sharing the information to all the applications.
 - e. With the “RDP ICS” shortcut, log in on pc-icsvega. Then start the Instrument Control Software with the shortcuts on the desktop: ICSVEGA, TECHCAM. Wait for the end of the init sequence on ICSVEGA. Do not forget to check the date and time of the computer. When done, close the Remote Desktop Connection window.
 - f. Use the StartIcs shortcut to open the ICS GUI. Click on “Get Config” and then select the Laser Diode in the Type of Source widget and set Control Unit to “Up to Spectro”. Then click to “Send Config”. You are now ready to check the VEGA alignment.

1.2 In the corridor of the optical lab

- ✗ Check the chiller temperature (around 5°C)
- ✗ Check the detector’s temperatures (-27°C for the red 5°C for the blue)
- ✗ These temperatures are reached in about 15mn after step 1.1.2.c.

1.3 Inside the lab: Tables

- ✗ Follow the “How to Align VEGA” procedure.
- ✗ Before leaving the lab, do not forget to remove the Sky Pupil Mask and switch off the light.
- ✗ When back in the control room, go to the ICS GUI. Click on “Get Config” and then select “No Lamp” in the Type of Source widget. Then click to “Send Config”. Close the ICS GUI.

1.4 In case of remote operation

1. First, log on pc-ctrlvega2 in the VEGA control room (observe)
2. `ssh -Y observe@pc-ctrlvega`. When logged, open a first xterm and start “pwrServer” and a second xterm and start “ConfServer”.
3. Then come back on pc-ctrlvega2 and follow the standard procedure as described above and starting at 1.1, excepted 1.1-2-a and 1.1-2-e already done directly on pc-ctrlvega.
4. “`tiptiltgtk -d -D500 &`” + STATUS displays the informations of the tiptilt (tiptilt server should be ON).
5. “`weathertgk &`” gives access to the weather conditions.
6. “`oplegtk &`” + STATUS displays the informations concerning the delay lines (OPLE server should be ON).
7. “`grand_wazoo -V -o[1or2]`” to start GrandWazoo with ople server 1 (-o1) or 2 (-o2). -V is for VEGA.
8. CHARA Control Room: 00 1 626 796 8468. Chris: farringt0n, PJ: spaceblanket

2 Starting the VEGA CONTROL SOFTWARE

2.1 Starting the low-level servers

On the desktop of PC-CTRLVEGA, identify the various shortcuts called “RDP xxx”. Each shortcut allows to remotely access any of the VEGA computers located in the electronic cabinet. Use them successively to log on each of the following computers:

2.1.1 RDP Ics

1. Normally this step has already been done to prepare the alignment. If not, after login, start the applications ICSVEGA and TECHCAM.
2. Open the “data” directory, and check that it is empty, as for the the trash. The previous data should have been copied into the directory /dataSave.

2.1.2 RDP PC-VegaCam1 (RED) & RDP PC-VegaCam2 (BLUE)

1. On each computer, after login, start detector software VEGADET
2. Verify in the “Det State” field in “control vegaDet” window that the correct detector is detected on the corresponding computer.
3. If the “Light Alarm” is red, then click on the button “Restart Light Security”. If no effects, check that the light is OFF in the lab...
4. Open the “data” directory, and check that it is empty, as for the the trash. The previous data should have been copied into the directory /dataSave.
5. Close the “192.168.3.161 Remote Desktop Connection” (RED) and “192.168.3.162 Remote Desktop Connection” (BLUE) window.

2.1.3 RDP PC-VegaTrack

1. After login, start tracking software TRACKER
2. Close the “192.168.3.163 Remote Desktop Connection” window.

2.2 End of preparation

2.2.1 On PC-CTRLVEGA:

1. Open the “data” directory, and check that it is empty, as for the the trash. The previous data should have been copied into the directory /dataSave.
2. Install the new observing file “StarList.txt” in the directory /home/observe/StarList. You can either use a USB key or transfer it by ftp. For this, use 192.168.3.169 as the IP number for the connection and log with the observe account.

2.2.2 On PC-DATARVEGA:

1. Log on PC-DATARVEGA and install the new observing file “StarList.txt” in the directory /home/observe/StarList. You can either use a USB key or transfer it by ftp. For this, use 192.168.3.168 as the IP number for the connection and log with the observe account.
2. Open a terminal and start idl. Then “.run vega_plan” and “vega_plan”. Use “Load an observation” to load the StarList and to follow the observation’s informations.

3 Starting the Graphical User Interfaces

The following actions are done on PC-CTRLVEGA by double-clicking on the icons:

1. On desktop number 1:

- a. Open a terminal. “cd VEGA-OS/CentralControl/Config” then “./centralcontrol control local”. Put the terminal and the window on the right screen.
 - b. Start application “StartDetR”
 - c. Start application “StartDetB”
 - d. Start application “StartTrack”
- Place the 3GUIs on the left screen. ALGOLR (corner top-left), ALGOLB (corner down-left), TRACKER (center-right)
- e. The three terminals (xt_PrimTrack, xt_ALGOLR, xt_ALGOLB) could be reduced and put on the right part of the CONTROL GUI (with right-click and Always on Top).
 - f. If needed, open also the secondary tracker application. This application is necessary when an observation is programmed with the secondary OPLE Server. Check this information with the CHARA’s operators.

2. On desktop number 2:

- a. Start application “StartICS”
 - i. In the View menu of the” ICS Window”, select “Open TECHCAM”
 - ii. On the “ TECHCAM” window, click on the following buttons and arrange the windows:
 1. “Display Images and Pupils”
 2. “Display Periscope Panel”: VEGAPERI window appears and do a right click and “Always on visible Desktop”
 3. “Display Shutter Panel”: SHUTTERS window appears and do a right click and “Always on visible Desktop”
 4. “M10s for Pupil” (PICO2) and “TTs for images” (PICO3) and do a right click and “Always on visible Desktop”
 5. Organize the GUI so that they are correctly located also on desktop #1.

3. Finally on PC-DATARVEGA, desktop #2, open a terminal window

- a. ssh -Y observe@192.168.3.169
- b. cd VEGA-OS/GuiObsLog
- c. ./GuiObsLog
- d. This tool aims at an electronic version of the observing report and the informations that are entered in this panel are used as inputs for the VEGA data base.

4 Observing

The messages provided by the CONTROL GUI indicate why it is waiting. The observer should confirm that the observation could continue by clicking on the **Next Step** button.

4.1 Choose star

On the “CONTROL” GUI on desktop#1, begin by **Select Starlist File** and then **Choose a star** in the combo box. The information on the GUI are updated and the scheduler automatically executes the “Test and Init” and “GenerateScript” phases. If everything is ok, the scheduler is positioned on setup VEGA. Otherwise look at the errors on Control terminal.

4.2 “SETUP VEGA”

When ready to start, **click the “Run” button**. This will start the observing sequence. During this step all the devices of the instrument are set.

The end of this step is indicated by a message displayed each second in the LOG Box:

MESSAGE: “WAIT_CHARA_TELESCOPs_LARs_READY”

4.3 “WAITING CHARA READY”

VEGA is waiting that CHARA sends the star light on the selected beams and that delays are available.

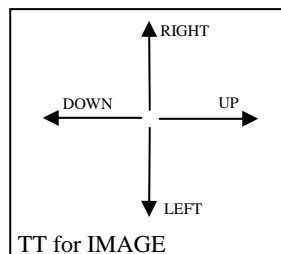
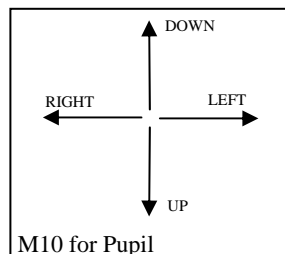
When CHARA is ready **click the “Next Step” button**.

MESSAGE: “WAIT_USER_VALIDATION_GAIN_AND_POSITION_ADJUSTMENT”

4.4 “VERIFY PUPIL&IMAGE”

VEGA is set to control and adjust the correct positioning of the pupils & images. Switch to the ICS control panels on desktop #2. The following steps have to be done:

- ✘ Check that the CHARA shutters are correctly configured according to the VEGA configuration.
- ✘ Click on “Get Images” on the TECHCAM panel. You should now have the display of the pupils and the images (check that the displays are selected on the IMAGES & PUPILS DISPLAY panel). If not check the configuration of the shutters. Adjust the gains (G_Pup+, G_Ima+) without saturating the images (check that max <255). The errors are displayed on each field. You can now finely adjust the pupils and images positions.
- ✘ Adjust the pupils with the CHARA M10 mirrors and the images with the CHARA tip/tilt mirrors. You should bring the green cross on the red one. For the pupils prefer to centre the central obscuration on the red cross. Use the controls on the TechCam Gui.



When you are done, click on “Stop Get Images”. Go back to desktop #1, on “CONTROL”

When ready **click the “Next Step” button**.

MESSAGE: “WAIT_USER_INCREASE_HT_GAIN”

4.5 “VEGACAMERA HV”

VEGA is now ready to switch on the HV gain of the science detector. Perform the following actions:

- ✦ Go to the ALGOLR and ALGOLB GUI
- ✦ Click on “StartGetImg”. Some informations are updated and the frame number count should change regularly. Click on “Display”.
- ✦ Click on HT1max and check the number of photons. If you reach a flux higher than 3500 photons, use the neutral density with actions on the ICS Console (GET_CONFIG, configure Density Filter, SEND_CONFIG).
- ✦ When happy, click on “No display” on the ALGOLR and ALGOLB GUI.

When ready **click the “Next Step” button.**

MESSAGE: “WAIT_USER_VALIDATION_FLUX_OPTIMIZATION”

4.6 “FLUX OPTIMIZATION”

This operation has to be done after each change of configuration (beams, telescopes) or after a long slew on the telescopes. Follow the procedure:

1. Select one beam (action on the SHUTTERS panel)
2. On the ALGOLR GUI set the Upper Limit to 200 and the Lower Limit to 400. Activate the Display.
3. Click on “Integrate Frame On” and check the vertical centering of the image. Adjust with UP or DOWN on the corresponding TTBx panel (step 57 is fine).
4. Adjust Photscale to correctly see the photometry. Adjust RIGHT and LEFT of the TTBx panel to maximize the flux.
5. Select an other beam and perform again steps 2, 3 and 4.
6. Open the shutters on all the active beams. Adjust the Photscale. Adjust Upper Limit to 130 and Lower Limit to 510 and adjust NbPhotTk to a value less than 1000 photons by adjusting the Left and Right Limits.

When ready **click the “Next Step” button.**

MESSAGE: “WAIT_USER_VALIDATION_FRINGES_TRACKING”

4.7 “FRINGE TRACKING”

VEGA is now ready for fringe tracking. Perform the following actions on the TRACKER GUI (be sure to use PRIMARY or SECONDARY TRACKER, according to the Grand Wazoo used for VEGA):

- ✦ **Click on “Get Tk Conf”** and verify in the upper right part of the panel that the setting is correct (Telescopes, Spectral band, beams, and delay lines).
- ✦ **Click on “EraseFT1”** and then **“Set+StartTrack”**.
- ✦ The active delay line should be configured to accept offsets. **Click on ON for “OPLE Man”** for this line or ask the CHARA operator for ‘MAN’ on the corresponding OPLE. A good way to test the correct communication is to send an offset of 50mm and to check that the error on the corresponding delay line jumps and come back to 0.
- ✦ In the **SnrThresh box**, enter the value of the SNR threshold at which a correction is send to the OPLE. 8 is a good value but to avoid too much frequent correction, you can use 15. In case of faint fringes, you could decrease to 6 but not lower to avoid bad detections.
- ✦ In the **ConsOPD box**, enter the OPD target you want so that the fringes have the correct tilt: -30 μ m in LR, -80 μ m in MR, -350 μ m in HR.
- ✦ Then iterate on the following actions to find the fringes:

- Set the **offset** (in mm) and click to **SEND**. Scan by step of 200µm in LR, 500µm in LR and 2mm in HR.
- Click on **Erase** and check for fringes on the TF display and on the HF profile plots. If necessary adjust the line position (**PosProfil box**).
- ✗ When fringes are detected, click on **“Tracking ON”**. If the fringes go in the wrong direction, change the sign of the correction in the **“Coeff”** box.
- ✗ When fringes are correctly centered (errors less than 5µm in LR, 10µm in MR and 50µm in HR) you can continue.
- ✗ Note that if fringes are not found, you have to check various things:
 - errors of the delay lines should not be larger than 0.01µm
 - check the CHARA clocks (Lost T/S on the OPLE SERVER Window)
 - check seeing

click the **“Next Step”** button.

MESSAGE: “WAIT_RECORD_COMPLETE”

4.8 “RECORD DATA ON VEGA”

During the recording, fill the observing sheet and check tip/tilt (r0 indications) and fringes. Check the flux, the frame number and the block number.

At the end, the system is configured to record Images and Pupils:

MESSAGE: “WAIT_USER_VALIDATION_GAIN_TECH_CCD”

On the ICS Control panels, perform the following actions:

- ✗ Click on “Get Images” on the TECHCAM Gui. You should now have the display of the pupils and the images. Adjust the gains (G_Pup+, G_Ima+) without saturating the images (check that max <255).
- ✗ When done with this adjustment, click on “Stop Get Images “ and go back onto the CONTROL panel. click on **“Next”** button and wait for the **“END OF OBSERVATION”** message. As soon as you get the message, **“WAIT_RECORD_DARK_FINISHED_NEW”** you can change the star on the Grand Wazoo panel.

If the selected observation is a calibration, the steps 3,4, 6 and 7 are skipped as well as the “Next” step in the “Record Data On Vega” situation. DO NOT FORGET to close the shutters B1, B2, B3 and B4 before starting the calibration to avoid pollution of the calibration by stellar light.

5 EndNight sequence

5.1 *Electronic & informatics side*

1. On the GUI (ALGOLR, ALGOLB, TRACKER, ICS and TECHCAM), use the button “Close Server” to shutdown all the server programs.
2. Close the “ConfigServer”.
3. Close the CONTROL GUI
4. On the Power Control GUI, switch off “HV Red”, “HV Blue”, “Optilab”. Do not switch off the PCs otherwise you will not be able to archive the data!
5. It’s not necessary to switch off the chiller during a run.

5.2 *Preliminary check from PC-CTRLVEGA*

- ✗ Use the RDP connections to log on ICS, VegaCam1 and VegaCam2. Open the ‘data’ directory and remove all the bad directories. Empty the trash. Close the RDP connection window.
- ✗ Do the same on PC-CTRLVEGA in the /data directory.

5.3 *Starting the backup on PC-DATARVEGA*

- ✗ On PC-DATARVEGA (observe account), open a terminal windows and start “/ScriptRetrieveData_v2.sh”.
- ✗ All the data are transferred on /datadisk1 with a copy on /datadisk2.

5.4 *Switching OFF*

- ✗ On PC-CTRLVEGA, use the Power Control Gui to switch off “ICS”

6 Preparing the data for the reduction pipeline

- ✗ When the transfer is completed, you could prepare the data for the reduction pipeline.
- ✗ Perform the following tasks:
 - \$ cd /datadisk1/yyyy-mm-dd and identify the directories you want to process, including the associated spectral calibration.
 - \$ cp -R directory1 directory2 /data/STAR/temp
 - \$ cd /data/STAR/temp
 - \$ prepare
 - \$ mkdir ../yyyy.mm.dd
 - \$ mv * ../yyyy.mm.dd
 - The data are ready.
- ✗ Follow the data reduction procedure.

Caution...

from here to the end of the document, the description is not up to date.

7 Detailed description of the GUIs

7.1 The ICS GUI

Respect the following order for a correct use of the application:

1. Test button: to test the connexion with the server
2. “Get Status”: this button retrieves the high level status and displayed it in the status area.
If the status is OK_READY you can send command to the server.
3. “Get Config” button: to obtain the current ICS configuration
4. Configure the devices as you need
5. “Send Config and wait the message OK_READY instead of KO_BUSY

7.2 The TECHCAM GUI

7.2.1 User manual

This GUI is first started in the ICS GUI by selecting in the View Menu “Open TECHCAM”. Respect the following order for a correct use of the application:

1. Test button
2. Get_Status
3. “Display Images”: a new window appears to display the image of the four beams. On each image the red cross is the reference and the green one the photometric centre.
4. “Display Pupil” a new window appears to display the pupil of the four beams. On each image the red cross is the reference and the green one the geometrical centre.
5. “Power On Img”: this button switch on the image ICCD detector
6. “Power On Pup”: this button switch on the pupil ICCD detector
7. “Live”: this button launch the frame grabber
8. “Get Images” button: Images, Pupils and informations are obtained from the server and displayed in the corresponding windows.
9. “Gain+” “Gain-“ buttons: adjust the intensifier gain off the corresponding detector.
10. Click on the “Stop Get I.” button when you are done.
11. Exit each window with the “Close window” button.

7.2.2 Use of this GUI for recording image & pupil in files:

1. Set “dirname” & “filename” with a carriage return after each entry. Click the “Set DirFile Name” button to send information to the server for the following record.
2. “Save Raw Frame”: save a movie of 100 frames
3. “Save Int 100 Frames” save the integration of 100 frames
4. “Save Int 1000 Frames” save the integration of 1000 frames

7.2.3 How to visualize the image and pupil files

Retrieve the file:

1. Access PC-ICSVEGA through the “RDP shortcut” on the PC-CTRLVEGA desktop.
2. Launch the WS-FTP application and open the PC-DATARVEGA (192.168.3.168) connexion scheme (account observe). On the left window, you have the directory you just created on PC-ICSVEGA (see IV.2.4) and on the right window you should have the /home/observe/PUPIM/data directory on the PC-VEGADATAR computer.
3. Transfer the directories you need by clicking on the left-right arrow.

Visualize the files:

1. log on PC-VEGADATAR with devpt,Regain
2. open a terminal
3. cd PUPIM
4. start idl (just type idl)
5. in the idl environment you can use any of the following applications. Each application shows you the corresponding files for selection

- a. pup
- b. lp
- c. filmIm
- d. filmPup

7.3 Various control GUI (M2, M6, Periscope)

7.3.1 M2

M2 picomotor are located on the periscope

The xpico6 or PICO:PERIB1 or M2 GUI permit to move picomotor of the previous generation than the M6 one.

The step size is positioned in the text box.

Smaller & Bigger change the step value

Left, R, U, D button apply a move in the right direction.

Go Back made a return to the original value of all axis.

7.3.2 M6

M6 picomotor are located on the Vega IOP table

Same strategy than M2 motor

All movement is recorded in a file in the M6Server directory.

7.3.3 Periscope

A very simple GUI with mainly a Up & Down button.

7.3.4 Shutters

Use only the B1 to B4 button to close or open the shutter of the according choice.

7.4 How to use the detector GUI

First click on Test button to see if the server is started.

7.4.1 In automatic mode

Let the scheduler manage the detector except the following command:

- When the detector is in live mode you can click on “Start GetImg”. This action launch a parallel process which got, according to the “Refresh speed”, the current frame and some other contextual information (noFrame, HV vals,).
- Increase HV with the double or simple arrow and take care that the photon number in the curve area don't exceed 3500.
- It's possible to change the scale of the curve by modification of the text area near the SetPhotScale button. Click on this button to send the value to the server.
- In case off emergency click on the HV Off button.
- You can adapt the frame display by setting the “SetDispCoef” area between 1 to 10 and send the value to the server.
- In case of to much photon for tracking you can use the Hline and Vline set of buttons to reduce the area used for tracking. Each action on a button move a line on the frame display.

In case of distant observing you can select the choice “No Display” than the frame is not downloaded but you need to have a look frequently to the photon curve.

7.4.2 Other actions

Click on buttons located at the top of the GUI could perturb the observation scheduling.

A regular set of actions after a startup is for example:

- | | | |
|-----------------|----------------------|---------------------|
| - Test | - Detect Photon Only | - Det Phot & record |
| - LoadDetConfig | - HV On | - Stop |
| - Start GetImg | - HV2 Max | |
| - Generate Dark | - HV1 increase | |

7.4.3 Warning message or red light on low level server GUI

If the following message “Warning hand pad or Light“:

- High Voltage was automatically shut off cause of to much light in the optical lab for the intensified detector.
- First verify why to much light and if it's dark
- Go on the server GUI to click on the button “Enable light detection” and then HV On

It's possible in the optical lab to do the same action by push button on the detector and on the HV rack in the cabinet.

7.5 How to use the tracking GUI

First click on:

- Test P1 button to see if the server command port is started.
- Test P2 button to see if the server is data port started
- Test Conf to see if the configuration server is started

7.5.1 General usage

- Set flux scale area permit to adapt the display according the photon number
- Set Low Lim Det permit to fix a photon level under which the tracker does not take into account the images.
- GetTkConf allows to contact the central control to get the current tracking configuration to fix parameters to tune to search fringes, etc.
- All display could be selected or unselect to improve performances.

7.5.2 2 telescopes mode

With this mode:

- Only one line is valid in the tracking possibility. On this line it's possible to set the position of the TF line.
- One delay line is fixed and one is moving and it's possible to fixe some parameters.
- Before to send a correction to OPLE if the device is not set in manual on the Chara side you have to click on the OPLE Man On button.
- To send a correction to the OPLE fill the text area and click "Send". To see if the system is working send a big correction than the error position of the delay line become important than visible on the Chara control system.
- To move the fix delay line use the same method.

7.5.3 3 telescopes mode

The same than 2T but:

- more possible lines are validate
- more delay line could be moved
- more curve are displayed.

7.5.4 4 telescopes mode

The same than 3T but all capability are used

8 VEGA Special cases

8.1 Telescopes pupil & image recording only

- Start ICS panel & check if server is ready by “test server” & “get status”.
- Open TECHCAM panel, display image & pupil panel
- GetConf on the ICS panel
- Verify if there is no lamp on (no green light only yellow)
- Set IPS down “image&pupil sensor”
- Check if CAU is UP
- Set Image & pupil neutral density in “open” position
- Send config & wait that the status become OK_READY.
- Set gains On, live and look if there are pupil & image on according panel
- Use panels as describe in II.1.b including M2, M6, periscope panels.

8.2 Internal alignment

Use the same method than before but put the CAU down and put the white lamp at the place of the laser and switch on the punctual source.

8.3 VII.3 Internal fringes