# STARTING UP THE SPECTROGRAPH

Instructions for starting the control software and initializing motors and flexure compensation are given below and assume the user has already connected to the Goodman computer. Please see "ESTABLISHING THE INSTRUMENT LINK" for the connection procedure. The following procedure also assumes the telescope operators have prepared the spectrograph for observing using the instructions provided in "OPERATOR STARTUP GUIDE."

1. Confirm the spectrograph has power

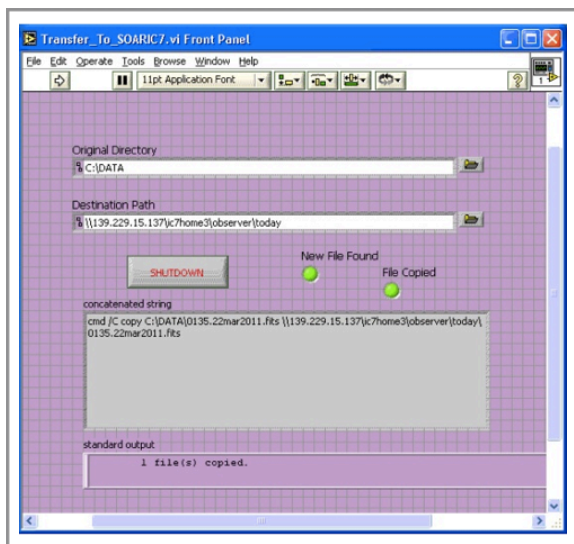Confirm with the SOAR operators that the "Goodman electronics box" and "Camera electronics box" have power.

2. Make sure the data transfer software has been activated

Check whether the *Labview* program "Transfer_To_SOARIC7" is loaded on the Goodman computer. Look for it on the toolbar and maximize it from there by clicking on it:
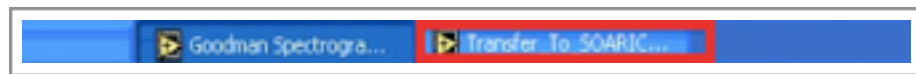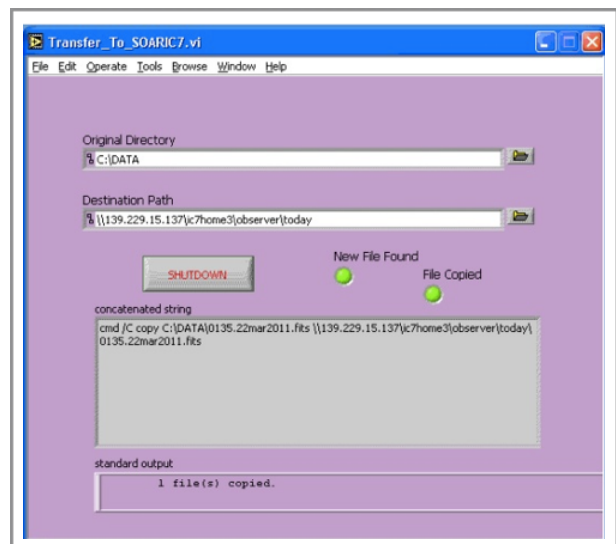

If the software is not running (left screenshot below), a white arrow will be present in the upper left-hand corner of the window. Click on the arrow to run the software, and minimize the window.
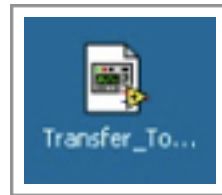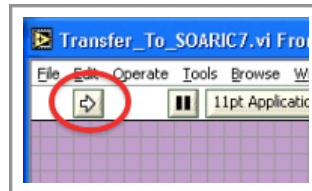
X *Transfer not running:*　　　　　　　✅ *Transfer running:*

If the program is not on the toolbar to begin which (in which case it definitely is *not* running), click the "Transfer to SOARIC7" *LabView* shortcut on the Desktop:


Start the application by clicking on the white arrow in the upper-left hand corner.

3. **Open Goodman control software**

From the Goodman computer (soaric4.ctio.noao.edu), open the *Goodman Spectrograph Control System.vi* program if it is not already loaded. It is accessible from a shortcut on the Desktop (*Shortcut to GSP_main.vi*) and from its home location (**Desktop/GSCS/GSP_Main.vi**).
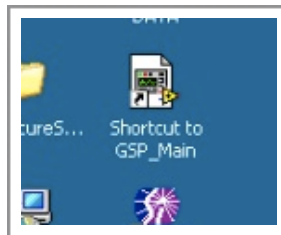
4. **Start control software**

Run the software by clicking the white arrow in the upper left-hand corner of the *Labview* window.
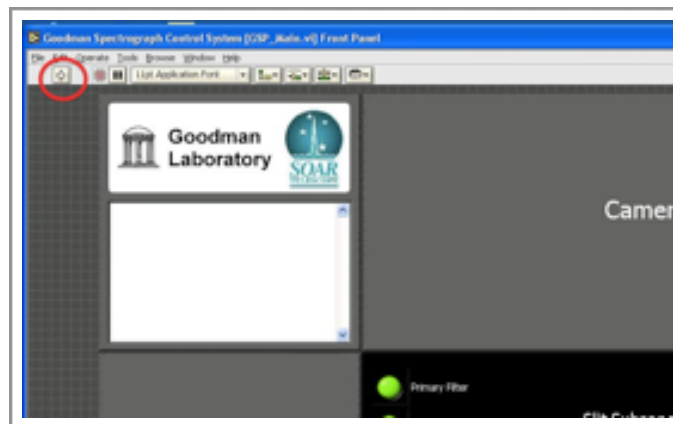
5. Log on

Log-on to the control system using the menu bar at the top of the GUI (**Main --> Logon**). Your home institute should provide you with a password. If your institute does not have an account, ask the operators for a temporary username and password and contact the support staff about adding a permanent account.

6. Verify connection to *SI Image SGL* (camera control software)

Under the "Camera TCP/IP" tab in the *Camera Control Panel*, check the status of the camera connection. A green status light with label "Connection Open: Getting Data" indicates the GUI is communicating properly with *SI Image SGL*, the software that controls the camera. If the status light is yellow, no connection has been established, and you will not be able to take images. In this case, refer to the troubleshooting document for assistance.

7. Check CCD temperature and pressure

Click the *Obtain Camera Status* button to get the updated temperature and pressure inside the CCD dewar. The "CCD Temp" and "Vacuum Pressure" values should be near -106 and 0, respectively. If the temperature is more than 2 degrees off of this value, inform the operators *immediately*. It is a good idea to check the camera status every few hours while observing.
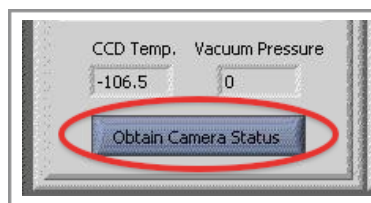
8. Initialize and home motors

From the menu bar, select *User --> Home Systems*. Motors to be homed should be selected from the pop-window that appears, (see figure below). To home all of the subsystems, press *Select All*. One may also double click on an individual subsystem name to check or uncheck it for homing. As Nasmyth rotator angles near 90 or 270 degrees may place excessive strain the Wavelength and Slit Assembly stages during the homing sequence, it is recommended that these two systems not be initialized unless the rotator is near 0 or 180 degrees. A warning message will appear if the Nasmyth cage should be rotated first, a task only the SOAR operators can do. **All motors must be homed for full functionality.**
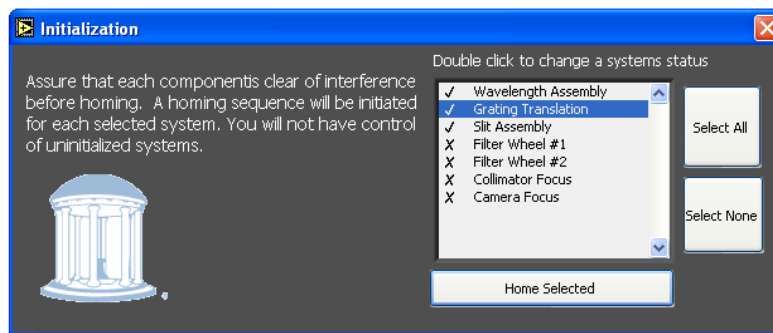
Once selections have been made, press the *Home Selected* button to initialize the motors. Immediately following this action, the indicator lights on the main GUI will turn from dark green (un-initialized state) to yellow (moving state). As each motor reaches its home position, the color of its indicator light will turn to light green (ready state).

9. Wait for all indicator lights to turn bright green

A green light on a motor indicates it has successfully arrived at its home location. Once each subsystem goes green, the spectrograph is ready for observing. If any motors turn red in the homing process, please consult the red light debugging document.
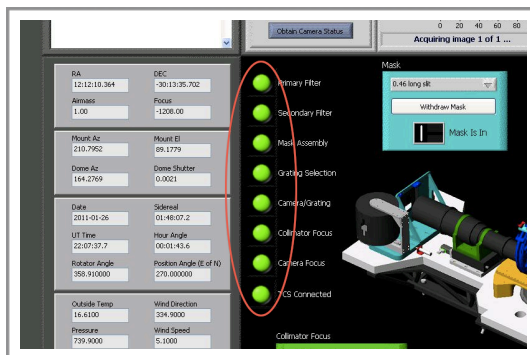
10. Turn on flexure compensation

As the Nasmyth cage rotates, gravity's effect on the components and motors in the spectrograph will vary. This changing force vector can cause the camera to adjust its configuration slightly; the consequence of such a movement is that an object's pixel location on the CCD changes as the rotator moves. To counteract this effect, the Goodman Spectrograph incorporates a set of Piezo motors that must be activated upon start-up of the GSCS. To activate this flexure-compensation system, simply press the green LED labeled '*Active?*' on the *Flexure Compensation* subpanel.
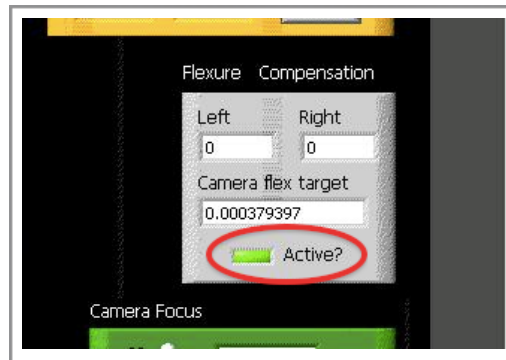
10. Start observing!

If all motor status lights appear light-green, and the flexure compensation has been activated, the spectrograph is now ready for imaging and spectroscopy.

Tips & Suggestions

- it is possible to observe if the flexure compensation is not activated, but note that a target's position will shift during the observation.

- if you are initializing the system after cycling the power and re-starting the GUI because of a red light, start by homing only those systems that red-lit; there is no need to home everything in this case.

Next recommended document:
"**TAKING AN IMAGE**"