

## 12" GSO RC TELESCOPE UPGRADE



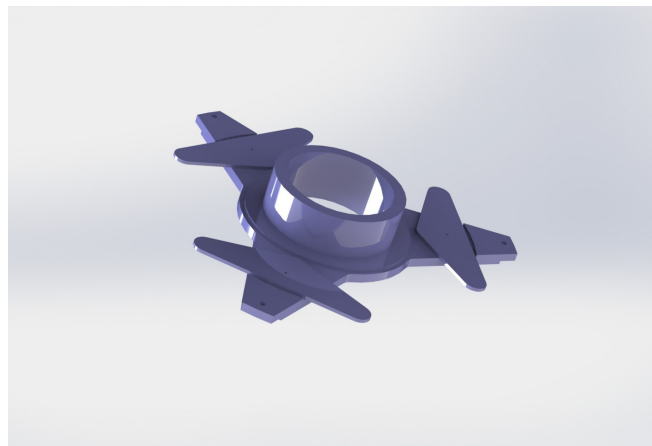
This is a description of the modifications done to your RC and also serves as a manual in case you need to remove the optics from the OTA for cleaning.



A 12" F8 OTA sold by TS

Upon receiving your OTA, it is completely disassembled. The optics are removed from their cells and cleaned if necessary.

The primary mirror is checked for central bore concentricity, a shim is applied in the bore if necessary. This will ensure that the primary sits concentric in the OTA. The mirror cell is turned until it is transformed into the central cylindrical part of the new cell.



The new mirror cell

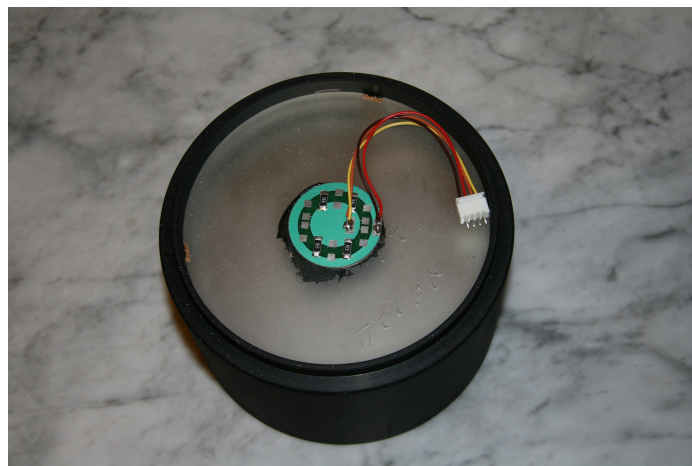
A new triangular part is cut and machined from aluminium sheet. This will be the main support of the primary. The cell is a 9 point flotation one, sufficient for a 37mm thick (1:10) primary. The mirror is held in place via the central bore and supported by the 9 point flotation cell.

Finally, a 94 cm resistance strip is glued to the perimeter of the primary that will serve as anti dew heating. Dew will extremely accelerate dirt deposition on your optics. It is very important to have the heating on from the morning hours on, until mid afternoon at least.

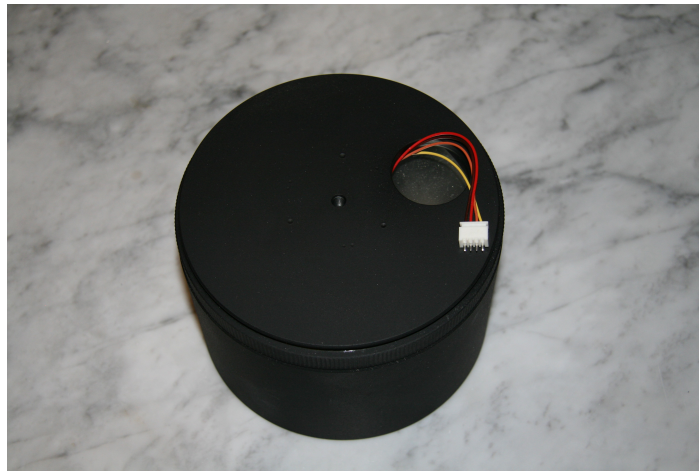


The primary mirror with the heating resistance installed

The secondary mirror receives a 3W (at 12V) heating resistance on its back, the cell bottom part is bored to leave access to the cable.

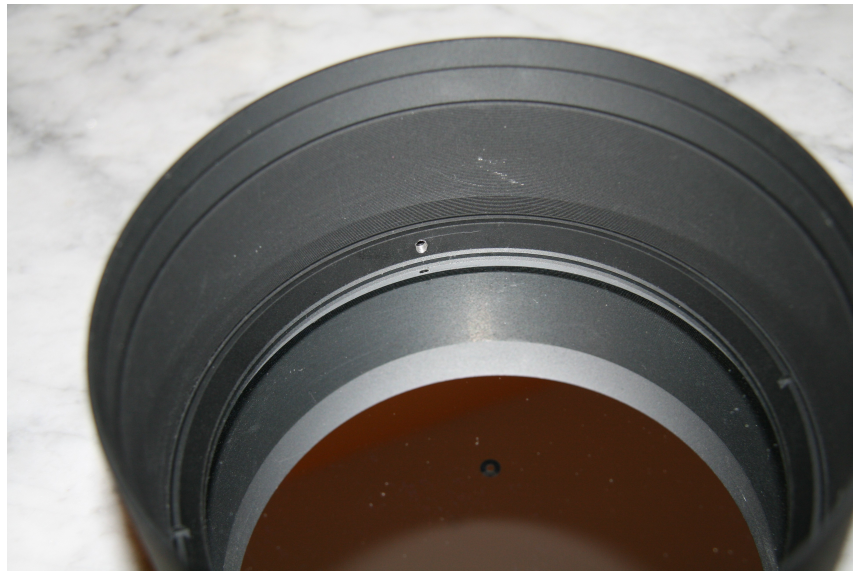


The heating resistance



The window for cable access

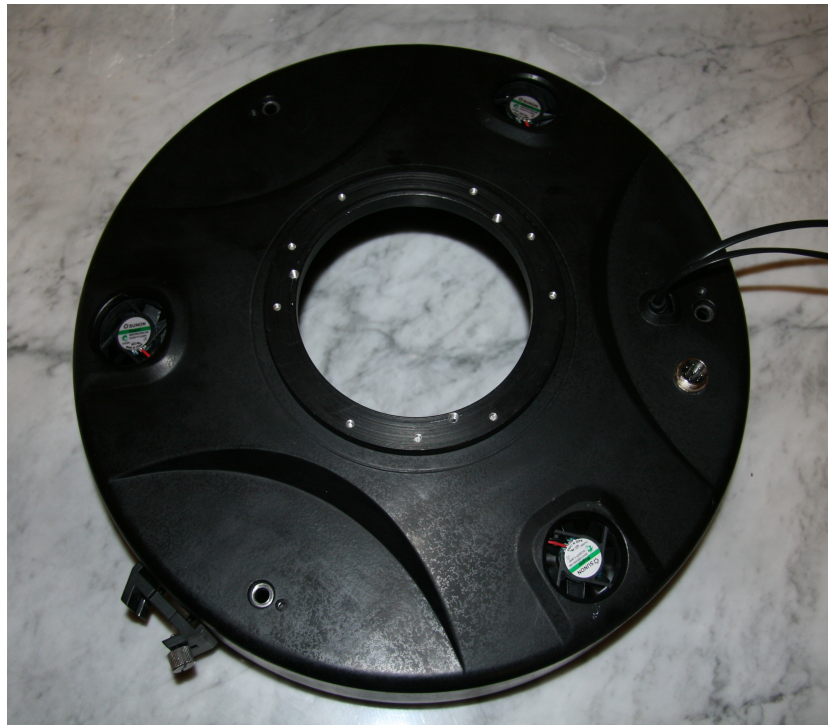
Side shims are added as the lateral play in the cell is close to 1mm. The adhesive strips are removed from behind the mirror and 3pc cork blocks are added. The mirror retaining ring is bored radially to insert 2pc M3 grub screws. These will allow blocking the ring without tightening it too much. This is important as it may come loose in transport otherwise.



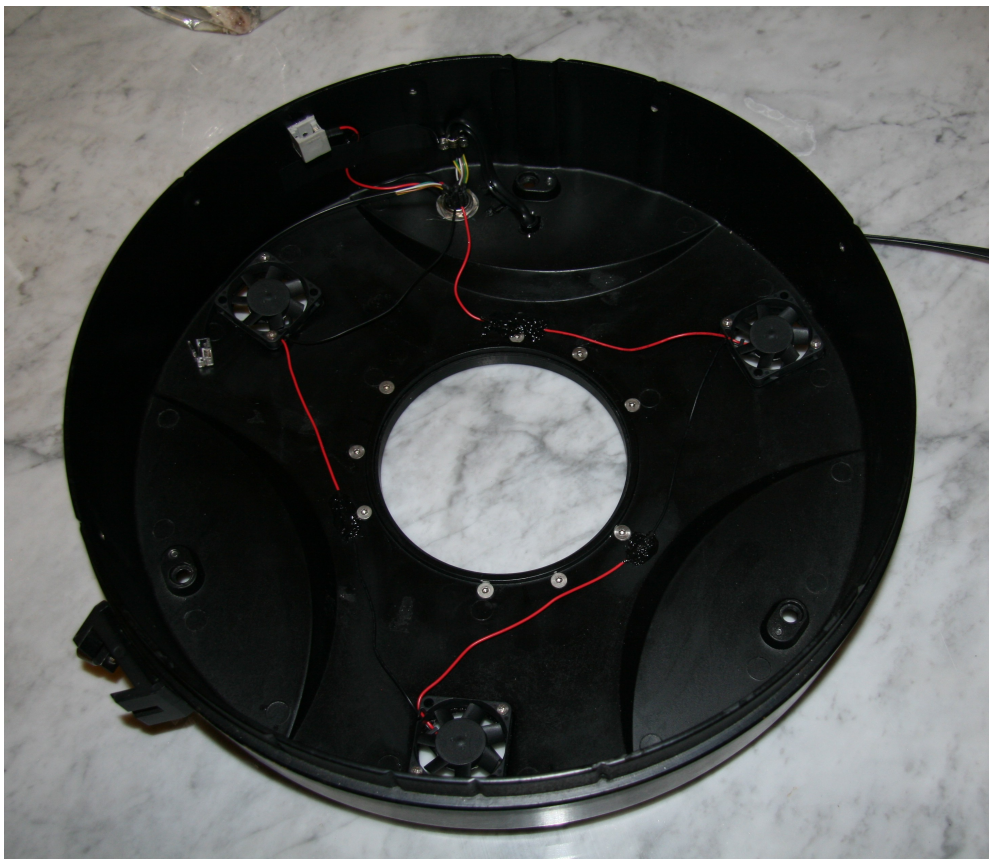
The retaining ring grub screw

The bottom endpiece of the OTA is also modified. It receives a support ring for mounting the Integra85, a new 8 pole DIN connector is added that will give access to mirror heating, vents and Snapcap. The vents are also replaced with 5V ones, connected in series. When you run them on 12VDC, they will run smoothly, creating a stable laminar flow and work noiseless and will last longer.





The adapter ring for the Integra85



Looking inside the bottom endpiece

An RJ type connector is added internally that hosts the secondary mirror heating power cable. It can be easily unplugged when you remove the endpiece from the OTA. The primary mirror heating power cable is connected similarly.



In the next step the primary is installed in the bottom endpiece. The original M4 counter-lock collimation screws are modified to M6. These give a more secure support to the mirror cell.



The primary installed, heating cable connected

Now the optics can be installed in the OTA. Inox M4 screws are used instead of the original ones to avoid rusting, large washers to distribute stress better.



A2 inox screws

It is time to mount and collimate the Integra85 and in the next step the secondary and primary mirrors are collimated with a Sight Tube and a Laser.



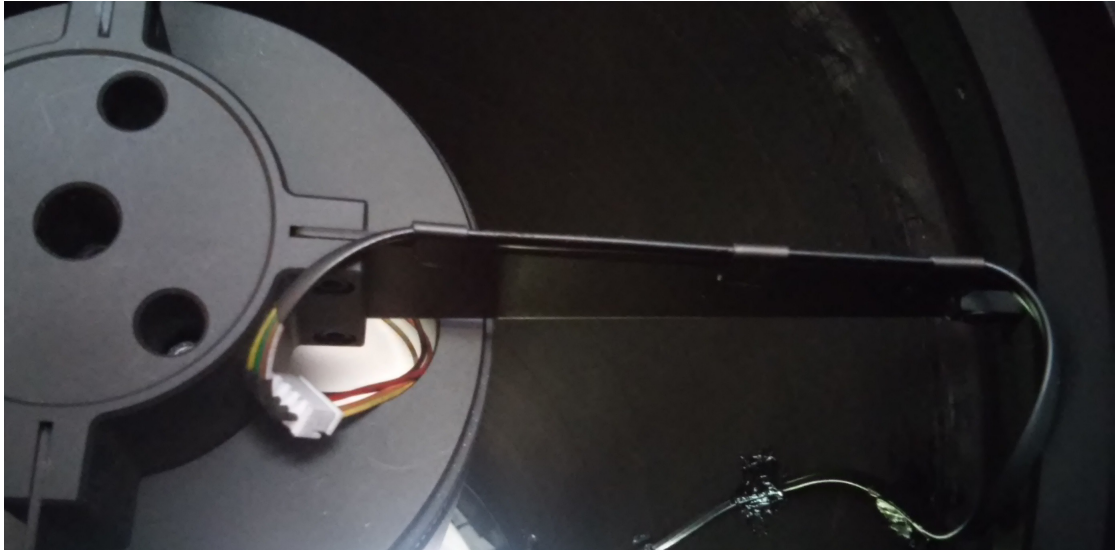
Integra 85 installed and collimated



Edges and reflections appear concentric

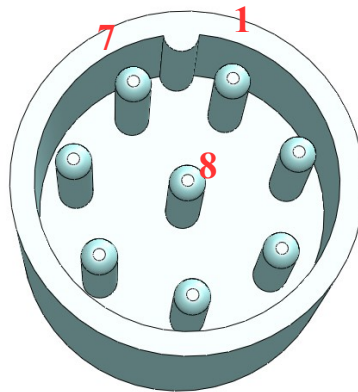
The next move is to solder and fix the secondary mirror heater cable. Black silicone is used to glue the cable to the OTA inner surface. Small clips are used to route the cable to the secondary mirror, following one of the spider vanes.





Secondary heating supply

Below you find the pinout of the 8 pin DIN connector



- 1 heater negative
- 2 vent negative (12VDC)
- 3 vent positive
- 4 SnapCap control negative
- 5 SnapCap power negative (12VDC)
- 6 SnapCap power positive
- 7 heater positive
- 8 SnapCap control positive (12VDC)

The primary mirror heating has 6,2 Ohm, the secondary 47 Ohm resistance.

The distance between the primary and secondary mirrors is adjusted to reach the factory back focus of 233 mm. Naturally, collimation is controlled afterwards.

The next step is to load the OTA on a Gemini G53F and fine tune collimation.



OTA on the mount, custom adapter attached to the Integra85

To maximize the precision it is necessary to collimate the rotator too. In this particular case pictured below, the residual eccentricity was cca 70 arcseconds, in part due to chip position in the camera.



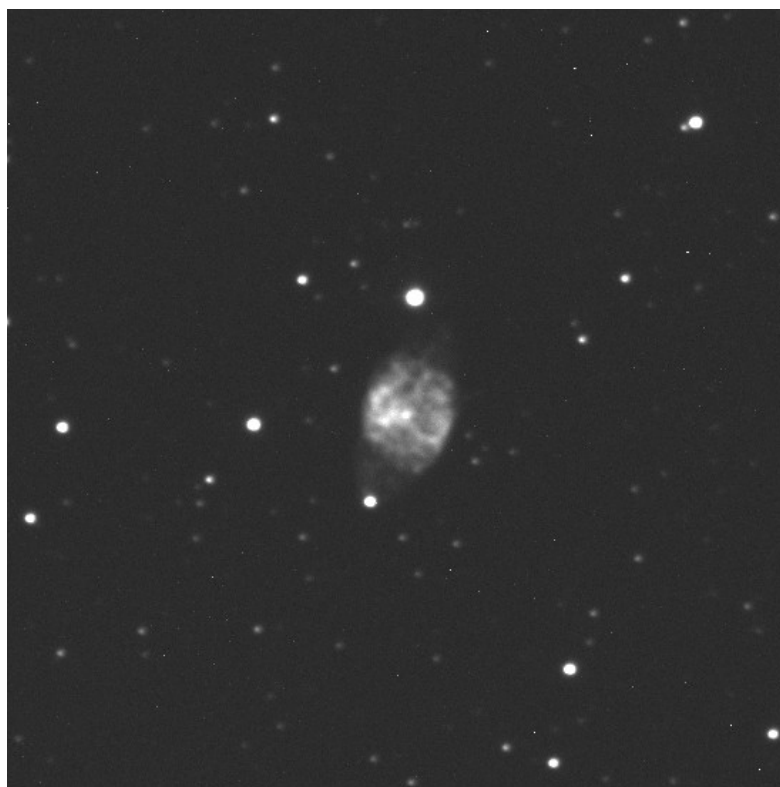
Rotator being collimated with a digital dial gauge

Now we can start the final phase of the collimation, using a CCD camera and inspecting the star profiles in various parts of the image. The final result should look something like this.





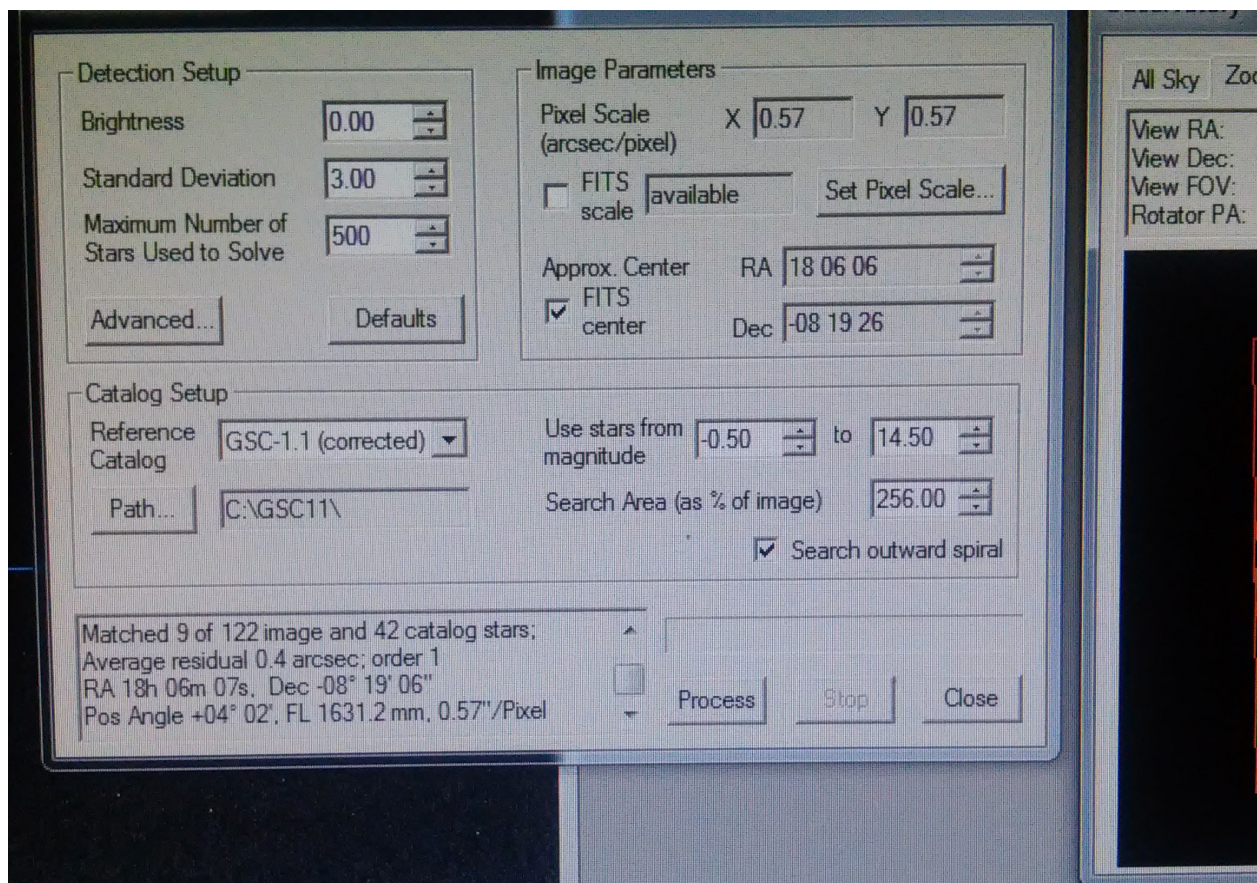
10 min guided image (single, no dark, no processing) of NGC6905 with OIII filter, Ap CCD67 reducer





Center, bottom left and top right corners, respectively

A plate solve with MaximDL reveals the exact FL of the setup.

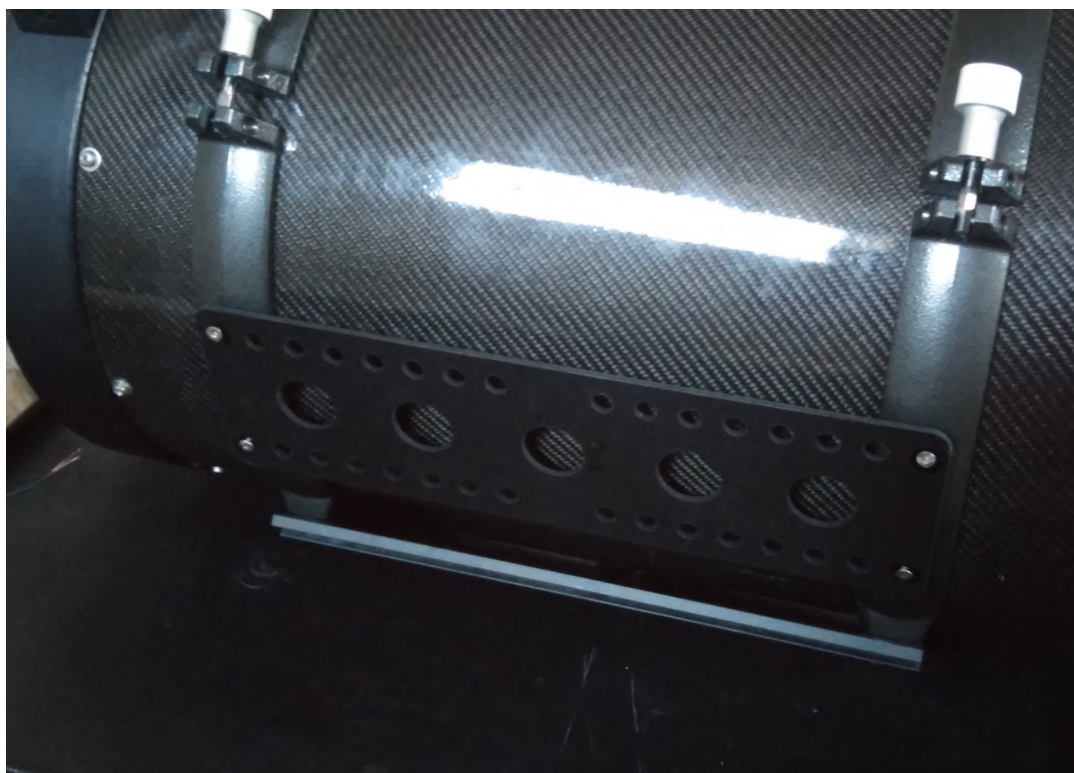


As a final step, your SnapCap (optionally with a flat generator, as in this case) is being installed on the OTA. The two platforms fixed to the tube rings provide space for mounting some of the electronics that control the OTA based equipment.





The SnapCap and its mechanism



One of the two accessory platforms

***ENJOY YOUR TELESCOPE!***