TELESTO calibration manual

When to do a calibration of TELESTO?

- If you ever experience elongated stars during your exposure, it might be a sign that you need to do a calibration

Example of elongated stars during a 60s exposure. Screenshot credits for this manual: Kent Barbey’s report

How to do a calibration?

A calibration can be done with TPoint.

In order to perform a calibration, the startup procedure for TELESTO needs to be done first, as explained in the User Manual available on

https://plone.unige.ch/astrodome/telesto/usermanual.pdf/view

Once that TELESTO is setup, a calibration can be done with the following steps.

Additional information about TPoint can be found on

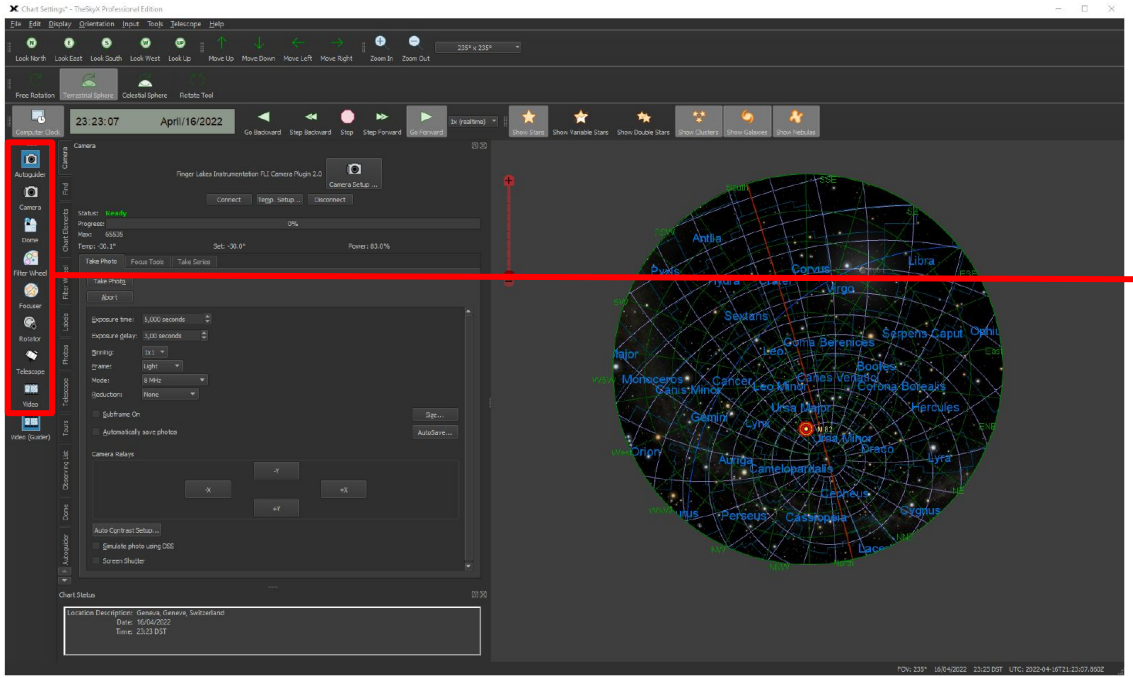
https://plone.unige.ch/astrodome/telesto/manuels/manuels/tpoint-add-on-user-guide.pdf/view

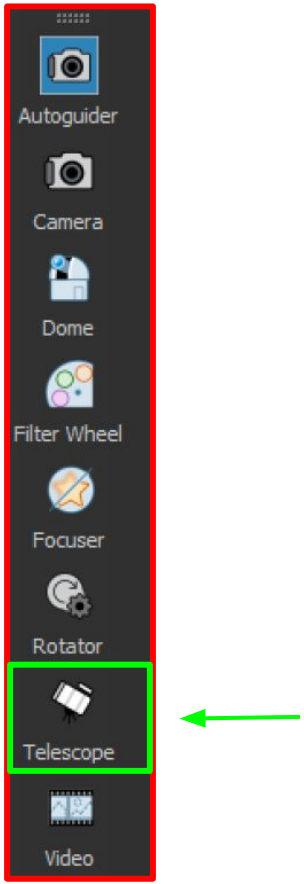
1. Open TheSkyX

Then, do the normal procedure to connect the telescope and dome in order to observe. If you do not know how to do it, explanations are provided in the User Manual.

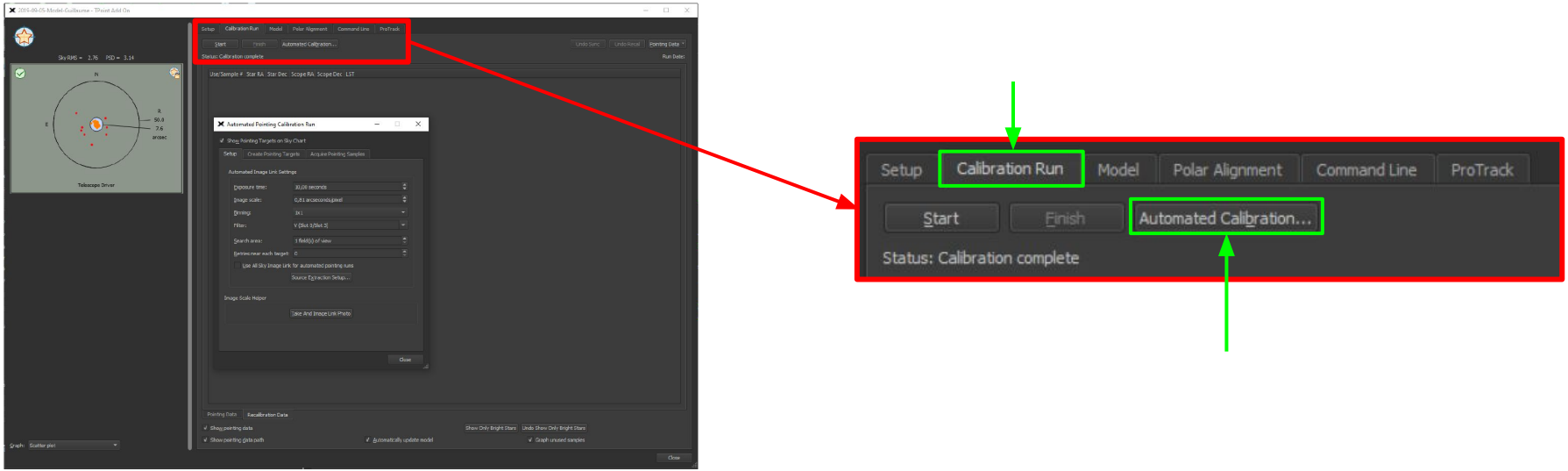
https://plone.unige.ch/astrodome/telesto/observations/usermanual.pdf/view

2. In the *Telescope* tab, open *TPoint addon*

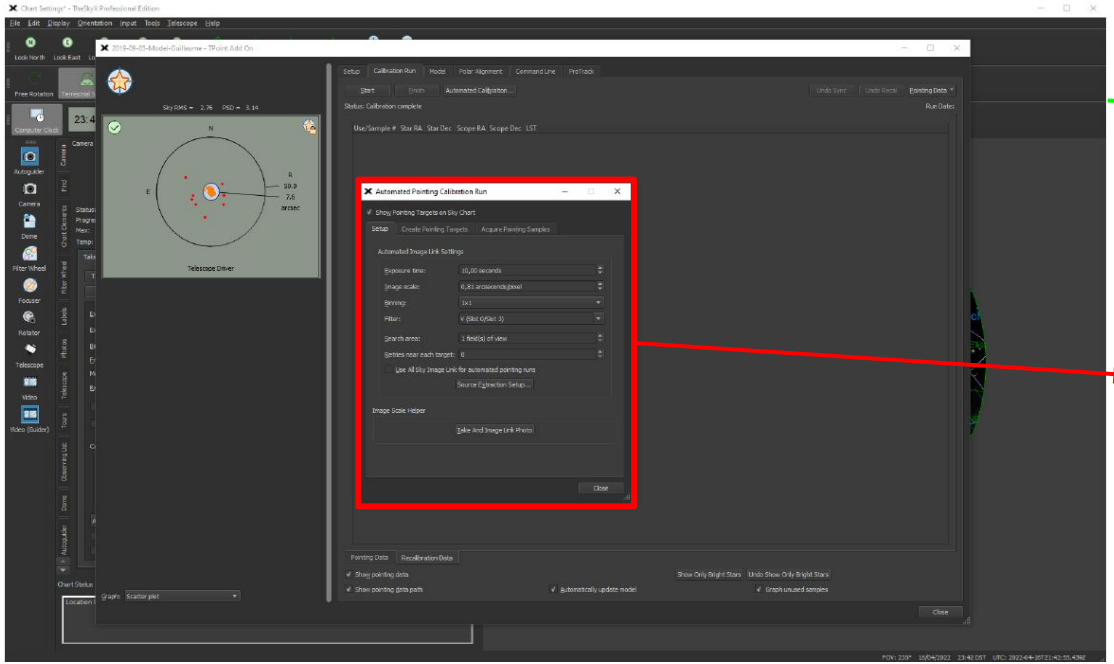


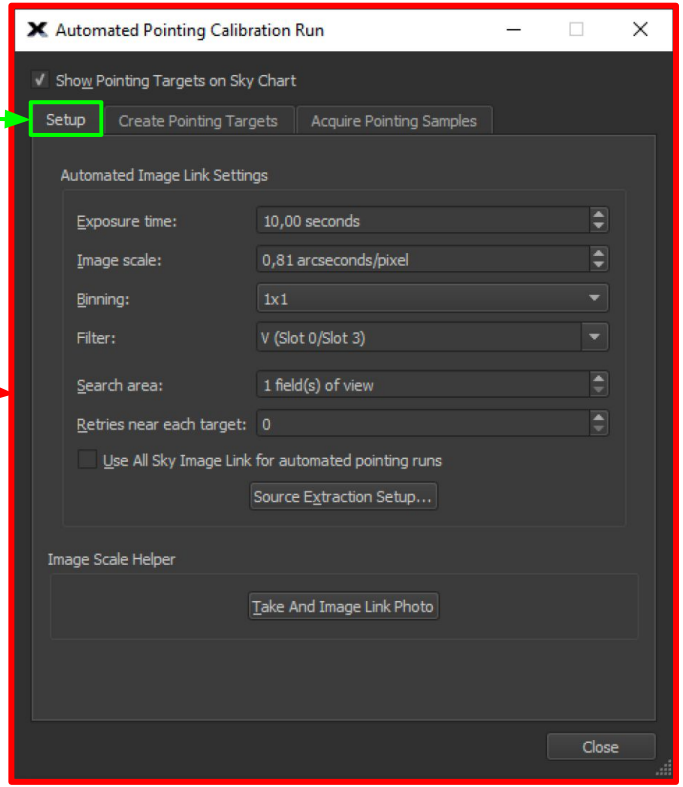


3. Click on *Automated calibration* in the *Calibration Run* tab



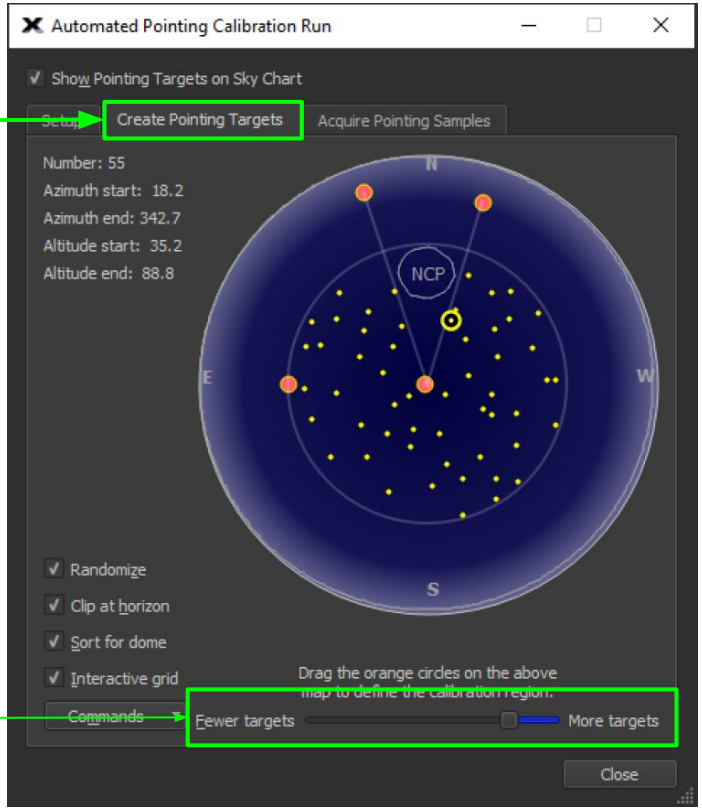
4. Choose the settings in *Setup* or leave as default





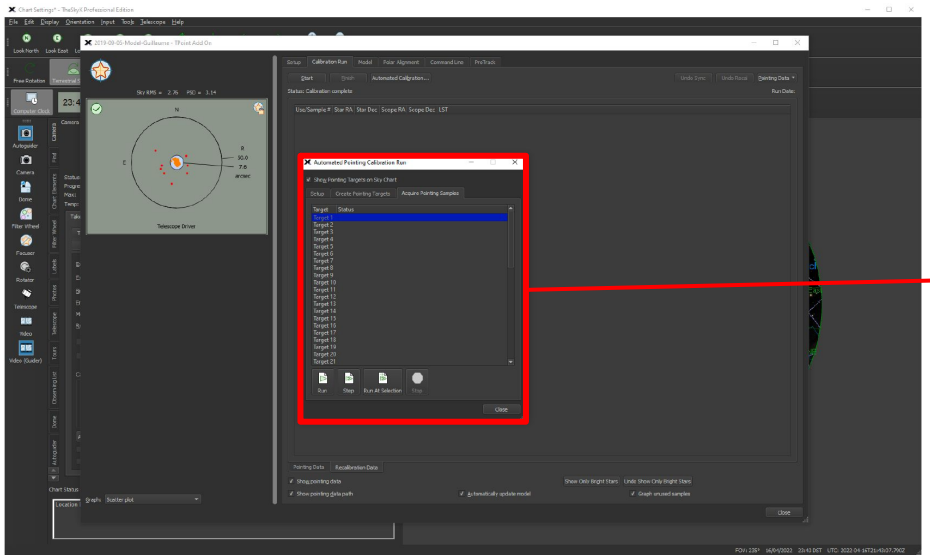
5. Choose the number of recalibration targets

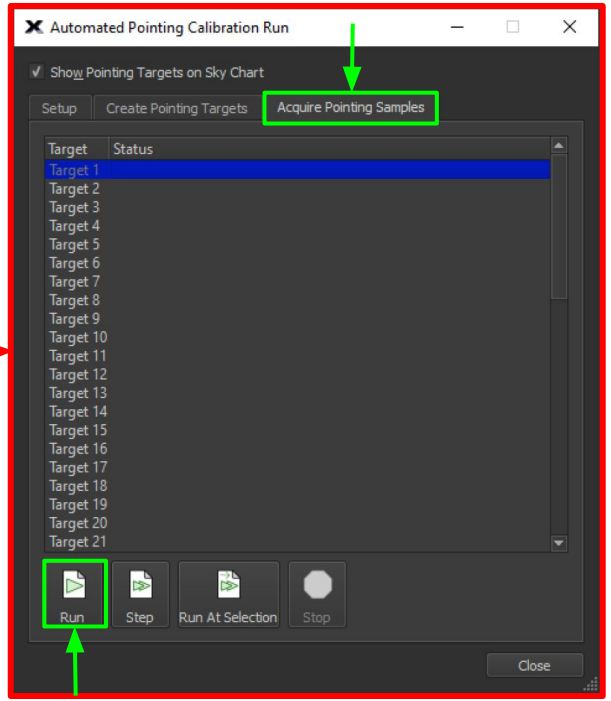
In *Create Pointing Targets*, choose the number of targets that you want to use for the recalibration (minimum is 16). Choose targets that are high enough in the sky, as the top of the trees can sometimes get in the way



Adjust number of targets with this slider

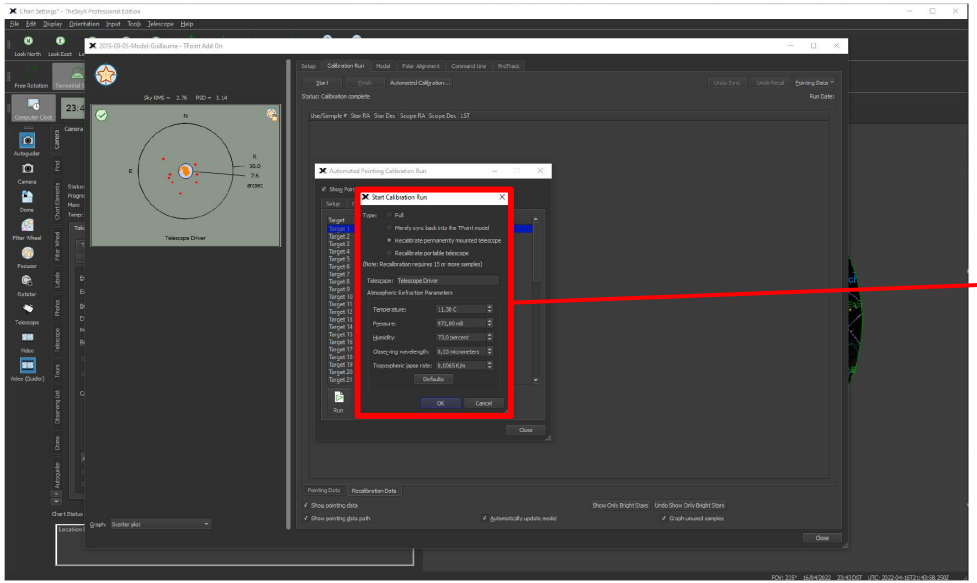
6. In *Acquire Pointing Samples*, click on *Run*

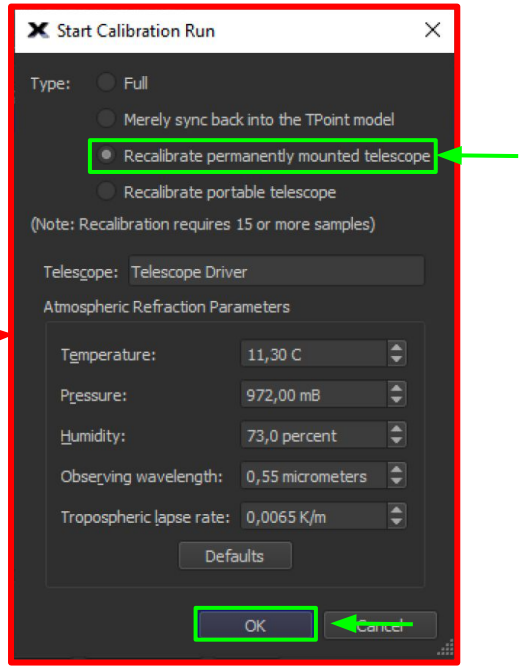




7. Recalibrate permanently mounted telescope

On the new window, in *Type*, click on *Recalibrate permanently telescope* and then *OK*





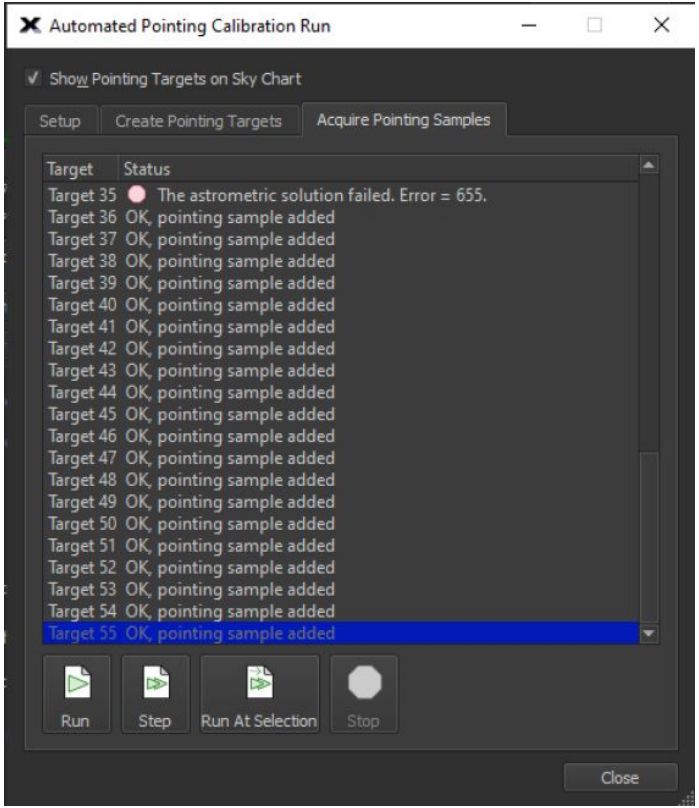
8. Exporting the pointing model

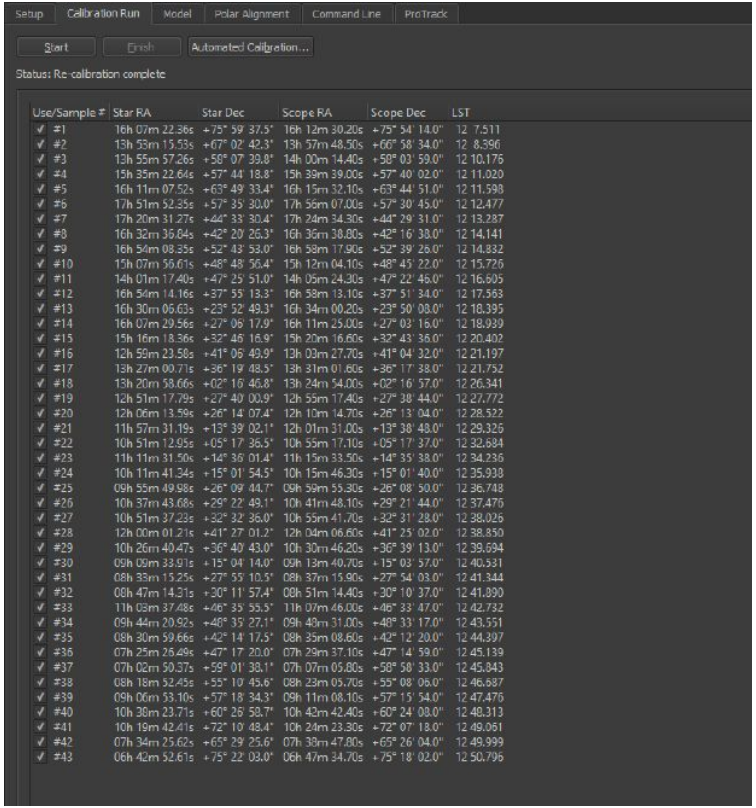
Calibration on TheSkyX is not the final step. SkyX will create a pointing model, which needs to be imported to Maestro. This can be done using an Excel spreadsheet available on the plone at the following url : https://plone.unige.ch/astrodome/telesto/manuels/manuels/tpointtodynacorr.xls/view

This spreadsheet also contains information on how to proceed with the importation of the pointing model in Maestro.

Basically, SkyX will output some values that one needs to fill in the spreadsheet, which will then generate a file that can be imported into Maestro to update the pointing model.

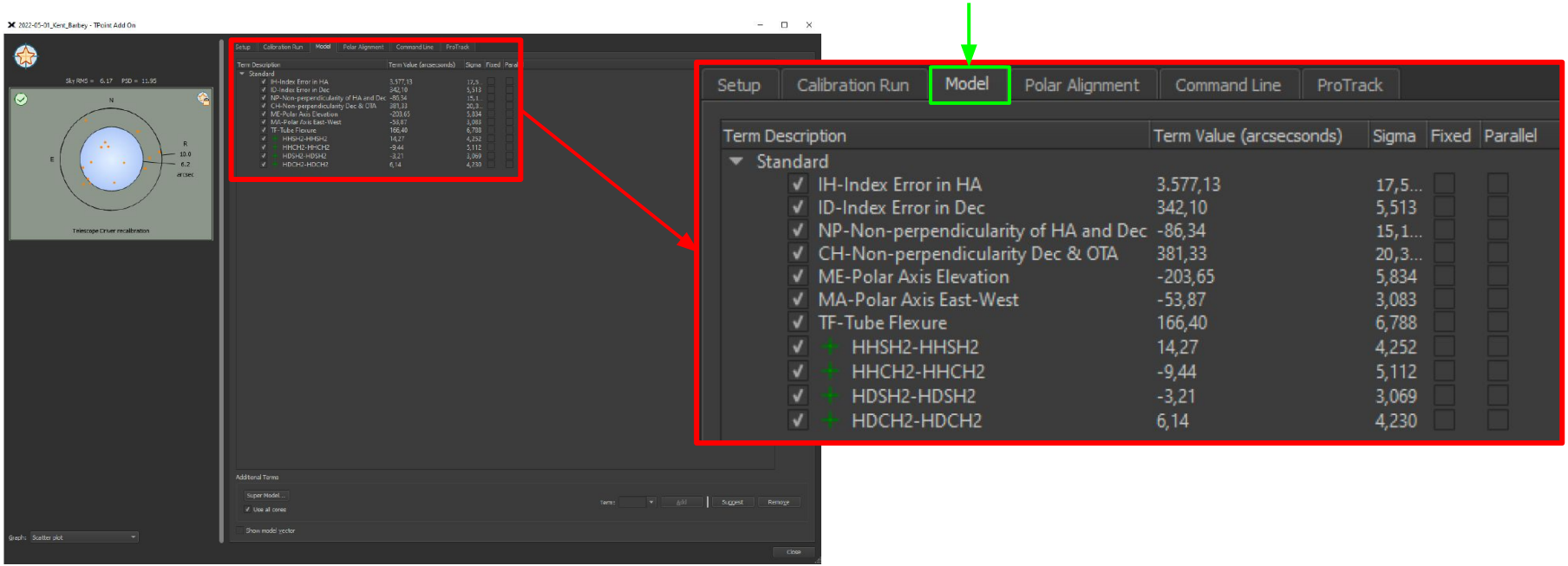
9. Calibration should start





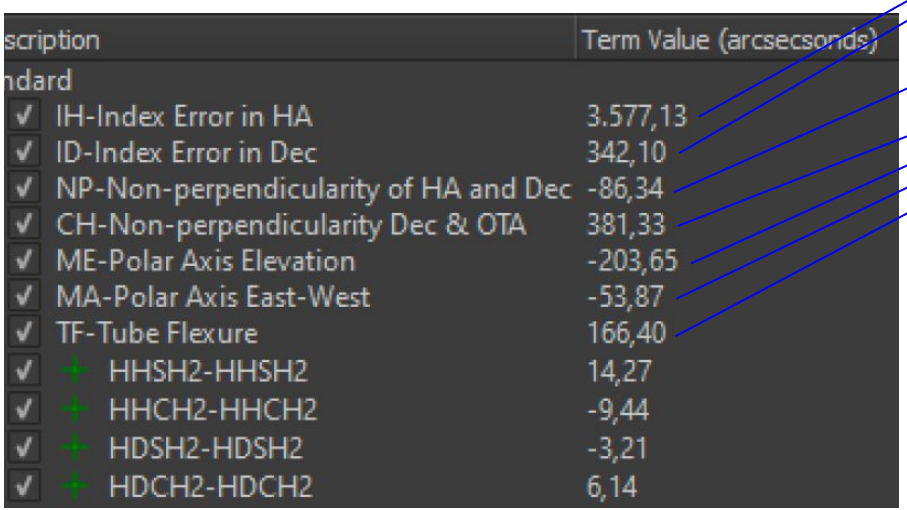
10. Converting the pointing model

Once the previous step is done, go to the *Model* tab and open the Excel sheet



11. Filling TPointToDynaCorr.xls

Fill in the Excel spreadsheet using the corresponding values produced by *TheSkyX* and generate the .txt file. Then, move it to \Program Files *\Astrometric\Maestro



scription	Term Value (arcsecsonds)
ndard	
IH-Index Error in HA	3.577,13
ID-Index Error in Dec	342,10
NP-Non-perpendicularity of HA and Dec	-86,34
CH-Non-perpendicularity Dec & OTA	381,33
ME-Polar Axis Elevation	-203,65
MA-Polar Axis East-West	-53,87
TF-Tube Flexure	166,40
HHSH2-HHSH2	14,27
HHCH2-HHCH2	-9,44
HDSH2-HDSH2	-3,21
HDCH2-HDCH2	6,14

Tpoint term	description	value	units
IH	hour angle index error	395.9	arcseconds
ID	declination index error	342.9	arcseconds
PHH	polynomial term producing hour angle shift proportional to hour angle	0.0	arcseconds/radian
PDD	polynomial term producing declination shift proportional to declination	0.0	arcseconds/radian
NP or NPL	H.A./dec non-perpendicularity	0.0	arcseconds
DNP	dynamic H.A./dec non-perpendicularity	0.0	arcseconds
CH or CHL	east-west collimation error	-541.1	arcseconds
ME	polar-axis misalignment altitude	-128.2	arcseconds
MA	polar-axis misalignment left-right	110.9	arcseconds
TF	tube flexure (sine)	49.9	arcseconds
TX	tube flexure (tangent)	0.0	arcseconds
FO	fork flexure	38.9	arcseconds
FLOP	vertical sag	0.0	arcseconds
HHSHn	harmonic term producing hour angle shift proportional to sin(HA)	0.0	arcseconds
HHCHn	harmonic term producing hour angle shift proportional to cos(HA)	0.0	arcseconds
Frequency	frequency of above harmonic	1	
HHSHn	ditto	0.0	arcseconds
HHCHn	ditto	0.0	arcseconds
Frequency	ditto	2	
HDSDn	harmonic term producing declination shift proportional to sin(dec)	0.0	arcseconds
HDCDn	harmonic term producing declination shift proportional to cos(dec)	0.0	arcseconds
Frequency	frequency of above harmonic	1	
HDSDn	ditto	0.0	arcseconds
HDCDn	ditto	0.0	arcseconds
Frequency	ditto	6	

12. Open *Maestro* and import the pointing model

Maestro

Objects | Status | Actions | Settings | Windows | Messages

Diagnostics | Motors & Gearing | Encoders & Limits | High Drives | Dynamic Correction

Standard Coefficients

IX - Index Error Axial X	+0.1	arcsec
IY - Index Error Axial Y	-69.9	arcsec
SX - Scale Error Axial X	+0.0	arcsec/rev
SY - Scale Error Axial Y	+0.0	arcsec/rev
YX - Y/X non-perp.	-0.5	arcsec
YXD - Y/X non-perp. Dynamic	+0.0	arcsec
OY - OTA/Y non-perp.	+147.9	arcsec
SA - Scope Pole Error Vert.	+57.4	arcsec
SH - Scope Pole Error Horiz.	+162.6	arcsec
FS - Tube Flexure Sin-Law	+235.9	arcsec
FT - Tube Flexure Tan-Law	+0.0	arcsec
FF - Fork Flexure	-64.5	arcsec
FL - Optical Flop	+0.0	arcsec

Harmonic Coefficients

	Frequency (cyc/rev)	Magnitude (arsec)	Phase (deg)
Harmonic 1 Axial X	1.00	0.0	+0.0
Harmonic 1 Axial Y	1.00	0.0	+0.0
Harmonic 2 Axial X	2.00	0.0	+0.0
Harmonic 2 Axial Y	4.00	16.5	+45.0

Dynamic Corrections

Import from maestroSavedDCsettings.txt

Enable Dynamic Corrections

Block Calibrations and Client "sync"

Refraction Correction

Enabled Refraction Correction

Atmospheric pressure 1000mB Use

Barometric pressure 1000mB Use

Temp 20degC

Site Elevation 0m

29/05/22 18:42:51 : Maestro: version 3.00.111 initialization complete
29/05/22 18:43:15 : Maestro: loaded sky object database
29/05/22 18:43:21 : Status: Local standard date has been set.
29/05/22 18:43:21 : Status: Local standard time has been set.
29/05/22 18:43:27 : Status: Alignment completed.

ATCS connection: UP | Maestro v3.00.111 © 2004-2018 Astrometric Instruments, Inc. | 18:44:40

Congratulations!
You have calibrated TELESTO