

Gemini Telescope Design

GoTo Problems and Cures

This is a brief description of possible causes of imprecise goto slews in general and with a Pulsar1 or Pulsar2 controller in particular.

- 1) **Polar alignment.** The most common reason. It shows as a Dec drift at high declinations (50 degree and above). Not having a drift near the celestial equator is NOT a sign of good polar alignment. The most effective test is to make a 3-4 hour long slew ONLY in RA and plate solve the image at start and finish. If there is a difference in the DEC value between start and finish, you have poor polar alignment or large flexures.



Please always do this test before claiming that your controller or mount does not function correctly.

How do I cure it? Use King's method in the C2A program:

http://www.geminitlescope.com/Manuals/Pulsar2_C2A_manual_eng.pdf

Polemaster or SharpCap. Drift methods are not reliable.

- 2) **Inconsistent or imprecise coordinates.** Pulsar has no precession correction built in. Using J2000 coordinates gives errors. Databases may also contain errors. You should send Jnow coordinates to Pulsar.



- 3) **Meridian flips.** If the optical axis is not perpendicular (more the rule than the exception) to the declination axis it results in large errors in RA after a meridian flip.

How do I cure it? Use flip correction (Mount Parameters menu) or align the optical axis with shims. Flip correction will not work with a poor polar alignment. Flip correction will never work at all near the pole.

- 4) **Ra axis is not perpendicular to the Dec axis.** This shows up in a small RA error when you do large movement in DEC. You normally cannot cure this unless with „mapping”.



- 5) **Atmospheric refraction.** This can be several arcminutes under 30 degrees of altitude. Use refraction correction (User Parameters).

- 6) **Flexure of mechanical parts.** A not properly fixed camera can tilt several arcminutes after a meridian flip. Use conic collars and 3 setscrews on drawtubes.

- 7) **Diagonals.** They are practically never exactly „diagonal” and introduce huge errors when they are rotated for a more comfortable view.



- 8) **Motor stalling or slip**. The motors of the mount may stall at some position/speed or the clutch may slip. To find out if this is the case, make a goto of cca 20-30 degree, then return to the starting point. If the mount does not return to the starting point precisely, there may be a stalling/slip problem. It always stops short of the target if the motors stall or the clutch slips. Checking voltage, current settings and reducing goto speed and ramp may solve the problem.

Generally speaking, a pointing precision under a few arcminutes with medium to large telescopes is NOT possible without the use of a pointing model that corrects the various errors.

You can find further reading on this topic under this link.
http://www.dfmengineering.com/news_eng_article_4.html

www.geminitelescope.com