Repeatability

Repeatability testing was done using a laser diode attached along the axis of the telescope. Setting the mount a known distance from a whiteboard, the mount will be commanded to move to various altitude and azimuth positions. Image rotation will be held constant at theta3 = 0. After each move, the location of the laser on the whiteboard will be marked.

Three sets of motions will be tested:

1. Azimuth only – Move back and forth between two azimuth positions holding altitude and image rotation constant
2. Altitude only – Move back and forth between two altitude positions holding azimuth and image rotation constant
3. Altitude and Azimuth – Move between four points multiple times
   1. Test function “testRepeatability”
      1. No current method for knowing when actuators stop moving so uses a delay system
      2. Tests wide range of angles
         1. Alt 20° Az 0°
         2. Alt 30° Az -10°
         3. Alt 40° Az -20°
         4. Alt 50° Az -10°
         5. Alt 50° Az 10°
         6. Alt 45° Az 20°
         7. Alt 30° Az 10°
      3. Keeps rotation constant 0°
4. Measure the distance between dots for each test.
5. Use statistical analysis
6. Find approximate angular drift
   1. May need to set up a scale for this somehow.

Tracking Rate

1. Command telescope to an angular position and mark it
2. Command telescope to a second position and mark it
3. Command a tracking move such that it should move from that second position back to the first
4. Time how long it takes to get back to the first position
5. Calculate the speed it actually moved vs the commanded speed

Point Rotation

1. Mount two laser diodes on the front of the mount
   1. Might want to tilt the base so the functional altitude is 0 degrees to correct for skewing on the whiteboard (whiteboard perpendicular to the two lasers)
2. Command to a known alt (~15deg) and az = 0.
3. Command to rot = 0. Mark board
4. Command to various other rot angles.
5. Measure the angle created with each command. Will likely need to correct for alt != 0

Tests:

* Repeatability
  + Altitude
  + Complex
  + Long Run
* Relative Positions
  + Altitude
  + Image Rotation
* Velocity
  + Azimuth
  + Altitude
* “wobble” testing
  + Use grid of points

Point Rotation Results

Commanded to -0.1rad, 0rad, 0.1rad

corrected negative line is

  -0.0908

corrected positive line is

   0.1036