Celestial Theodolite Update (20250623)

by Michael Heffron

The Null Hypothesis

Because a hypothesis often involves many assumptions and variables, it is impractical to demonstrate that a hypothesis is true. To overcome that problem, academic research prefers instead to reject the null hypothesis, which is the mutually exclusive opposite of the hypothesis (described in more detail by Aether Round Table 63, https://www.youtube.com/live/ryOfulIDPZ0?si=OSUnvFqik5UpJ3e6).

History

The concept of the Celestial Theodolite (CelTheo) began as a means to reject the null hypothesis “Earth is flat” and thereby demonstrate the alternative hypothesis “Earth is a globe” (as described by GLOBEBUSTERS LIVE, Episode 13.6, https://www.youtube.com/live/XeaucxLNZY0?si=QN8mcYmT6MmRbgWv). My proposal was a very simplistic approach that if the Earth is not a globe, then it should be easy to demonstrate that the uncorrected elevation of stars occluded by a mountain peak on a globe Earth (GE) is not the angle predicted for a flat Earth (FE). In other words, the goal of CelTheo was to demonstrate that the null hypothesis is false and thereby validate the hypothesis.

A simple experiment

After recording videos of peaks occluding stars via an inexpensive telescope, it is then easy to use Stellarium (or your favorite astronomy tool) to determine the elevation of the stars from the peak at the time of occlusion. Minor timing errors and inaccuracies within Stellarium are generally more than adequate to differentiate between the angle predicted for FE versus that for GE. Some people wanted greater accuracy.

My prior update (20250616) reported that Stellarium’s azimuth provided incorrect initial and final bearings for occluded stars, so I added column E (“~”) to the spreadsheet as a means to improve the accuracy by adjusting a timing offset to align the azimuth with the correct bearing.

Spreadsheet

Rather than providing data from my spreadsheet in tabular form, I’m posting my entire StarLog(20250623).xlsx spreadsheet for public review, so that everyone can inspect its data and formulas. The spreadsheet provides the elevation of stars with atmospheric correction off (the true location of the star) as viewed from the occluding peak on the ‘Peak ATM off’ tab. It also provides the “apparent” elevation of stars with atmospheric correction on (where the star “appears” to be, due to atmospheric refraction) as viewed from the observer’s location on the ‘Observer ATM on’ tab. Finally, it provides the “true” elevation of stars with atmospheric correction off as viewed from the observer’s location on the ‘Observer ATM off’ tab.

Kudos to Jesse

The celestial theodolite community owes an outstanding debt of gratitude to Jesse Path of Light for bringing NOAA’s amazing https://geodesy.noaa.gov/cgi-bin/Inv_Fwd/inverse2.prl inverse computation tool to our attention. That tool provides ellipsoidal distance between two points to the nearest fraction of a millimeter, thereby enabling exceptional celestial theodolite precision. To honor Jesse, I renamed column E from “~” to “J” in the StarLog(20250623).xlsx version of my spreadsheet.

A new adjustment method

With the much greater precision made possible by NOAA’a tool, it became possible to adjust the “J” column timing to make column Q (peak altitude) of the ‘Observer ATM off’ tab a perfect match to twice the expected globe Earth (GE) “$d^2/2R$” drop values in column R (based on the El ° ' " values in column J, as reported by Stellarium for the adjusted occlusion times in column F).

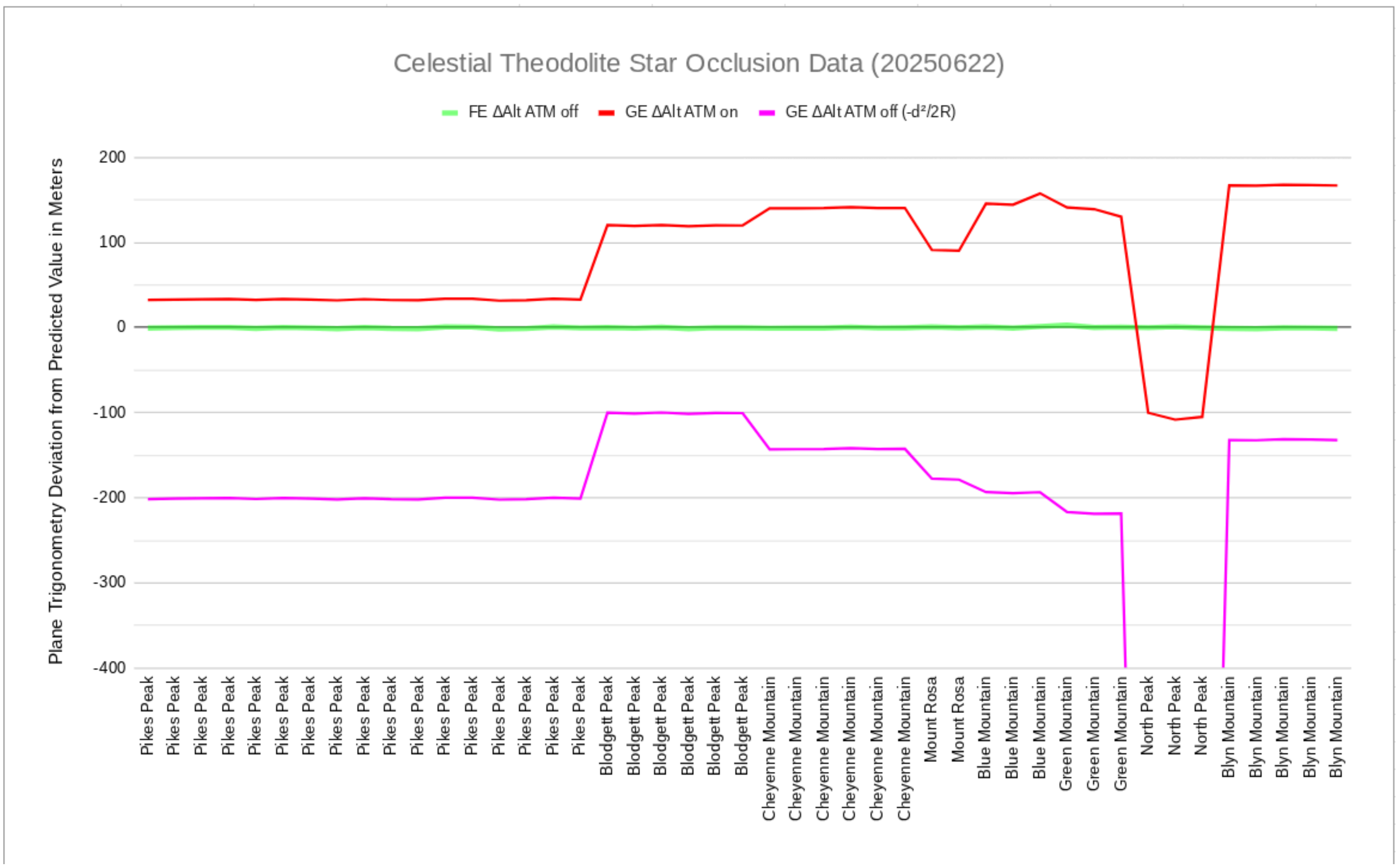
That particular angle produces twice the $d^2/2R$ drop because it allegedly views the occlusion of a star that is already $d^2/2R$ below the FE mountain peak, AND the observer experiences an additional $d^2/2R$ drop due to the alleged curvature of the GE. That quirk of the GE model will be obvious to anyone who works out the math by hand.

With this new method, there is no longer a need to determine the initial and final bearings of occluded stars; it is only necessary to adjust the uncorrected GE ‘Observer ATM off’ predictions to near perfection and then use them as the calibration standard for all other measurements. That adjustment method is logical and reasonable, given the stated celestial theodolite goal of refuting the null hypothesis.

Graph

The ‘Graph’ tab of the spreadsheet compares the various star elevations to each other in terms of how much peak_altitude = observer_altitude + distance_to_peak * tan(occluded_star_elevation) deviates from the predicted FE or GE altitude of the peak. This has come a long way since January 27, 2025.

With the GE predictions corrected to near perfection, it was easy to make those same timing adjustments to the ‘Peak ATM off’ tab and thereby discover that its column Q is a perfect match (zero deviation, as indicated by the green line on the graph) from the expected flat Earth (FE) altitude of the peak (to within the one-second accuracy of the measurement). **Thus, the “Earth is flat (not a globe)” null hypothesis was not refuted for any of the measured peaks, thereby indicating the “Earth is a globe” hypothesis is false.**



Notice that the GE red line (top) significantly deviates from the GE predicted peak altitude (despite atmospheric “correction”). By design (to ensure perfect calibration), the GE magenta line (bottom) undershoots each peak by exactly the $d^2/2R$ drop of the alleged GE curvature. The spreadsheet was designed so that, if Stellarium’s values on the ‘Observer ATM on’ tab had been perfect, the red line would overlay the green line (center, at zero deviation).

The big dip at North Peak is where Stellarium claims the actual location of the star is far below the mountain peak as viewed from the observer’s location 131 kilometers (81 miles) away. The stars were very clearly visible from the observer’s location in the 20250323-200001-GreenhornMountain.mp4 video, so CelTheo had no trouble accurately determining the altitude of the peak despite Stellarium’s claim that the stars were far below the peak (from the observer’s location) at the time of occlusion.