Narration of slides shown at the East Valley Astronomy Club Meeting in Gilbert, AZ and online 2023 November 17

*1. This presentation describes our observations made near the southern limit of last month's annular eclipse in New Mexico. I won't have time to discuss the slides in much detail; they will be posted where you can access later for more information. We tried to observe the 2012 annular eclipse from the northern edge of its path, but made a mistake interpreting our hand-held GPS instructions and ended up observing from about 15 miles outside of the path of annularity. So we wanted to make up for that failure by obtaining a good timed recording of this year's eclipse. We don't expect to be able to try the next annular eclipse in the USA in 2048.

*2. This shows the path across the USA. At the northern limit, the high mountains near the Moon's south pole cause most of the Bailys beads, due to the reflection of the shadow through its inflection point above the Earth's surface, so most "limit" observers headed there. Thus, we decided to record the less-popular southern limit

*3. The Gallup, New Mexico area was the shortest drive for us.

*4. The GFS cloud forecast 2 days before showed clear sky (yellow) over the Gallup area, between two areas of expected cloud (dark), so we proceeded with our Gallup area plan; the forecast didn't change.

*5. We used Jubier's Google map, taking into account the topography of both the Earth and Moon, to select a site near New Mexico Hwy 118.

*6. This shows the GPS coordinates of our observing site.

*7. We were near a closed gift shop on the west side of Mentmore, NM, about halfway between Gallup and the Arizona border; the afternoon before, site resident gave us permission to observe there.

*8. View west from our protected site.

*9. View looking east. Two friendly dogs joined us, but left before annularity.

*10. Our 127mm GoTo Schmidt-Maksutov with recording laptop in a rollerbag on a foldable table under a black towel. The signal from the camera goes through the black IOTA Video Time Inserter on the ground before being fed to the laptop.

*11. You can see the laptop screen, left of Joan's hand; binoculars with solar filters also on the table.

*12. Our Runcam Astro camera with low settings gain = 2 and brightness = 32 to prevent overexposure and focus well on sunspots.

*13. We recorded occultations of these two sunspots about 20 minutes before annularity.

*14. We expected 8s, but had 21s of annularity; this shows many beads before and after annularity. I'll show part of our video following the slides.

*15. John Irwin's calculation confirmed that we should have had the 21s annularity we saw. After annularity, chickens on the property announced the "second dawn" as the sunlight increased.

*16. In 2019, we travelled to Argentina with the same telescope for a total eclipse.

*17. Baily's beads during the 2019 eclipse.

*18. Color pictures of the 2019 eclipse with another camera.

*19. In the 1980's, we, and others in IOTA, observed solar eclipses from near the path edges, to record Baily's beads near the path edges to measure the solar diameter. We analyzed these and past eclipse observations, to try to see how the diameter might vary with time.
By measuring many dozens of Baily's bead phenomena, we thought we achieved results to a few hundredths of an arc second. However, when we

got two or more observers video recording the eclipse at both limits and comparing different pairs, we found systematic errors (with different equipment) that showed the real errors were 0.2” or more, and even larger with older non-video observations. not as good as we thought and probably no real variations of the solar radius that we could measure.

Now, we let others analyze the observations, to try to improve their predictions for future eclipses.

*20. Bruenjes’ good recording of the 2017 eclipse near its southern limit may encourage others to try near-limit locations for next year’s eclipse; if time, I’ll show part of it, but with the link, you can see it yourself on your computer.

Now I’ll show part of our video.