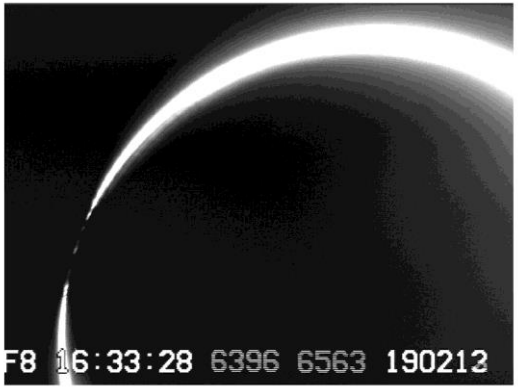
The Annular Eclipse of the Sun Observed near the s. limit in New Mexico on 2023 Oct. 14

East Valley Astronomy
Club meeting
2023 November 17



David & Joan Dunham
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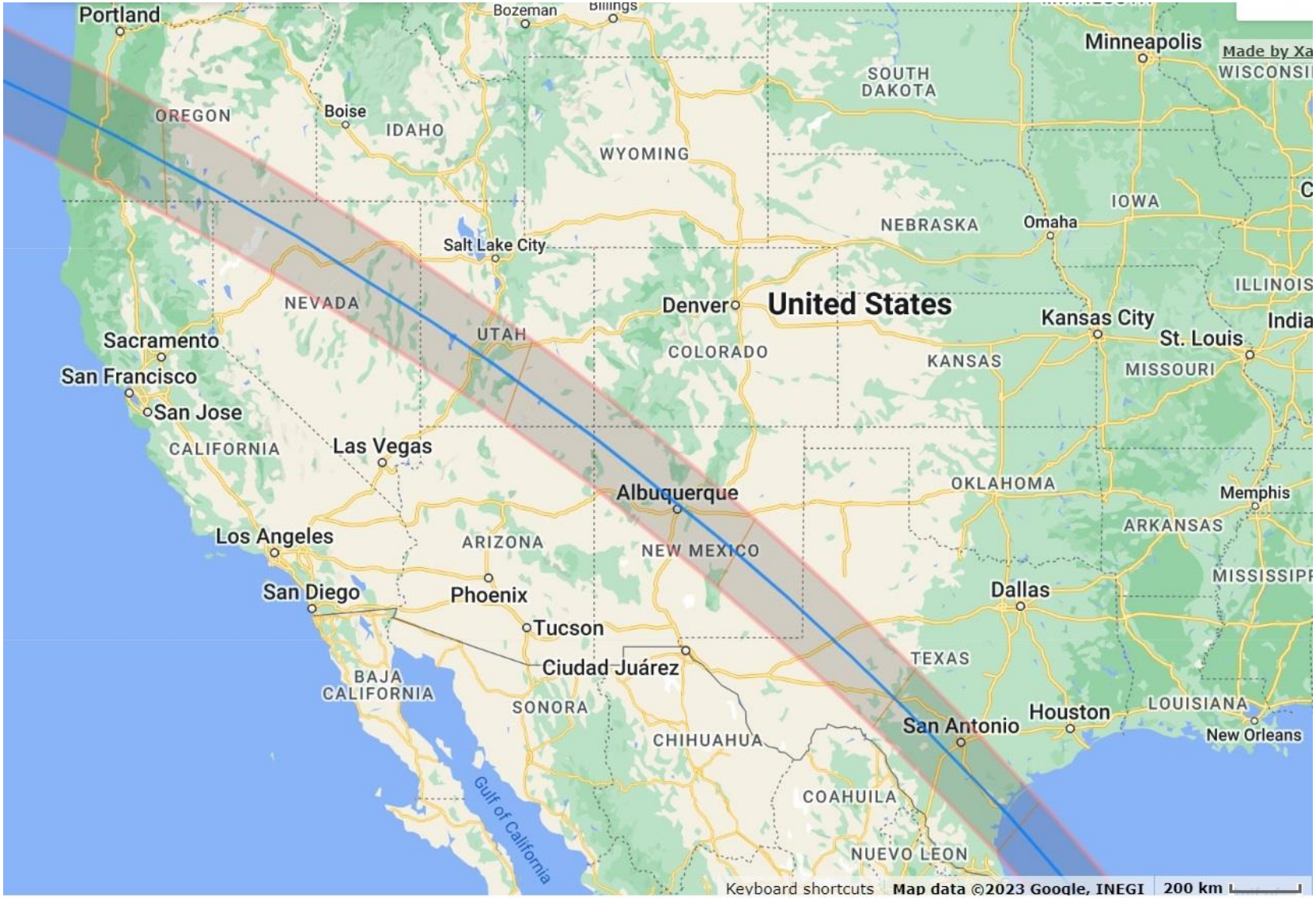
International Occultation Timing Association (IOTA)
http://occultations.org/
AZ occs: http://iota.jhuapl.edu/AZoccs.htm

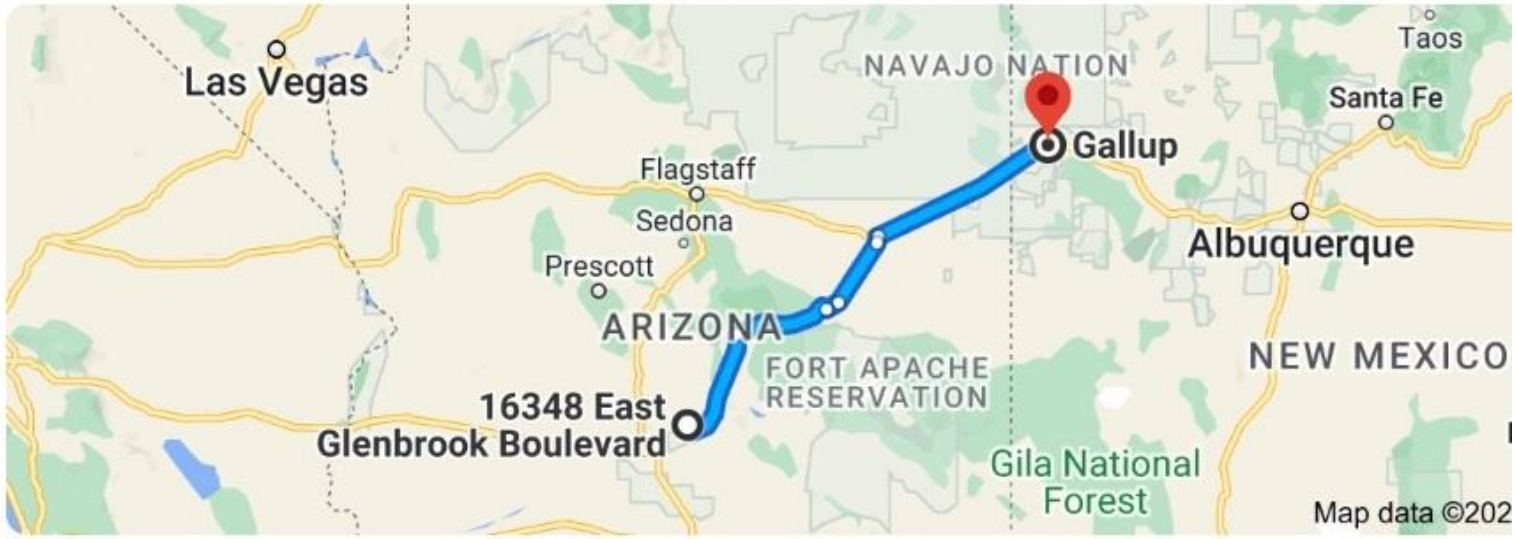
Annular Solar Eclipse, 2023 Oct. 14
Where to observe?



Annular Solar Eclipse, 2023 Oct. 14
Where to observe?

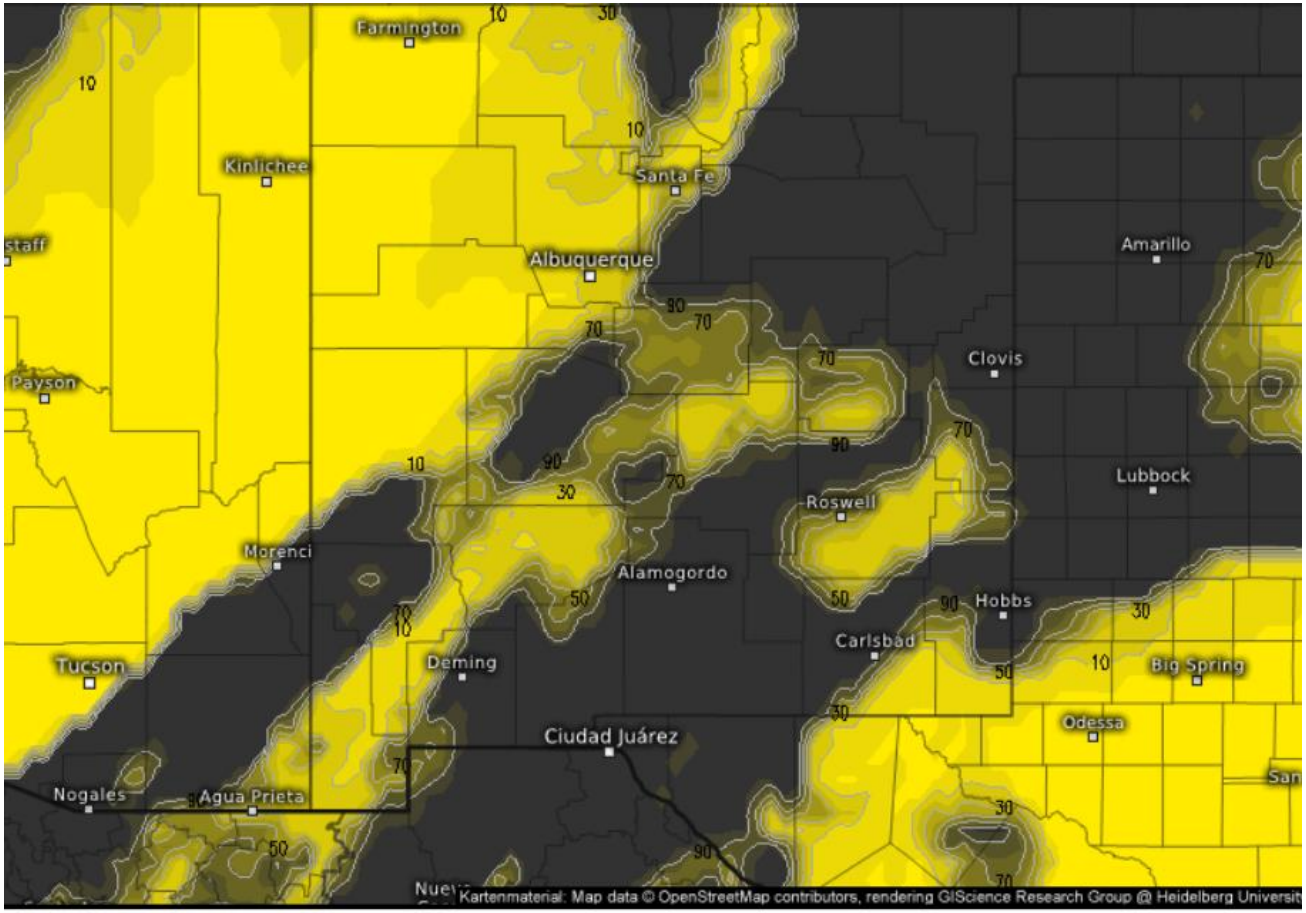
16348 E Glenbrook Blvd, Fountain Hills, AZ 85268

Gallup, New Mexico



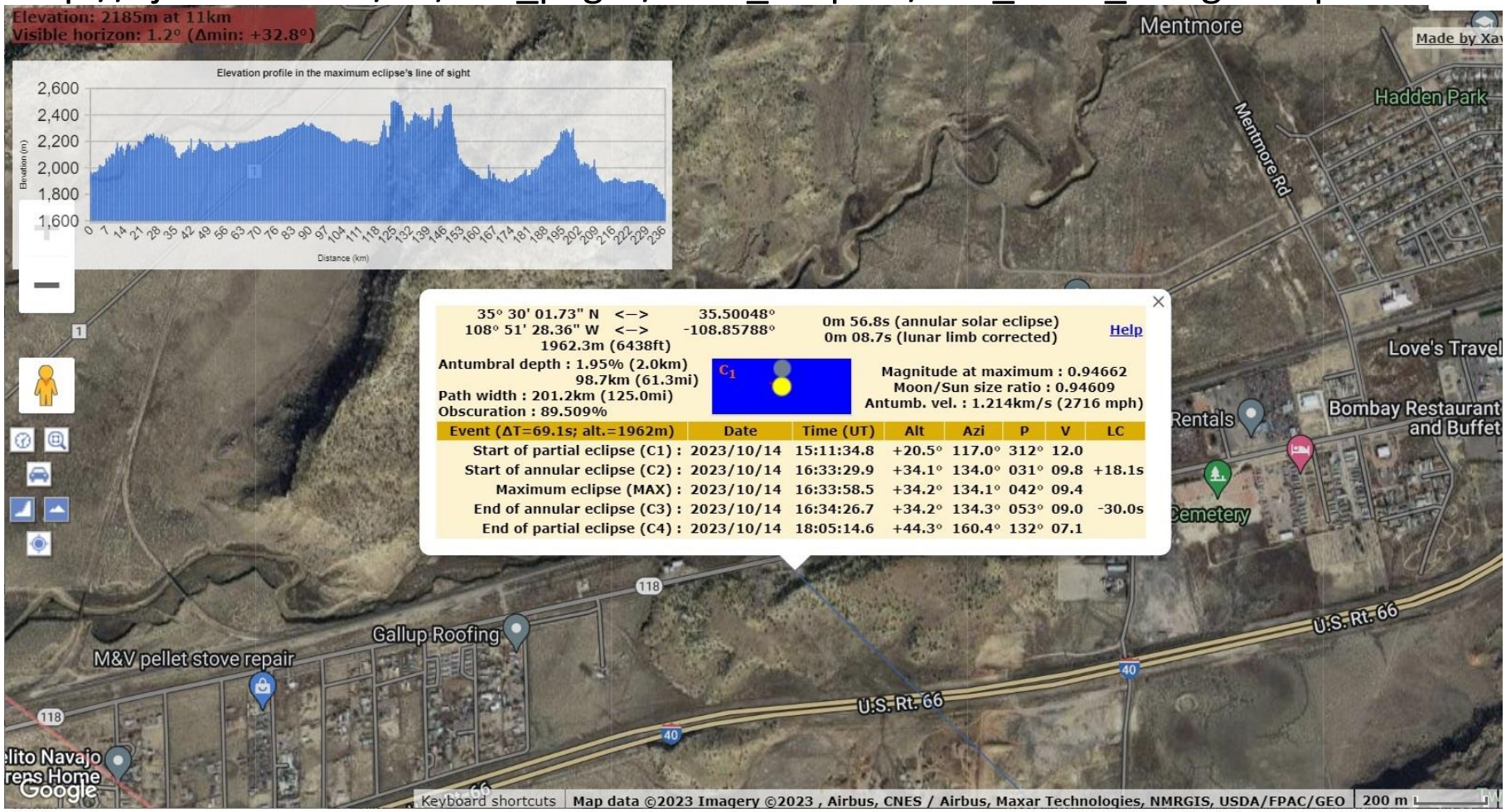
4 hr 8 min (255.9 mi) via I-40 E

Annular Solar Eclipse, 2023 Oct. 14
Cloud cover Forecast



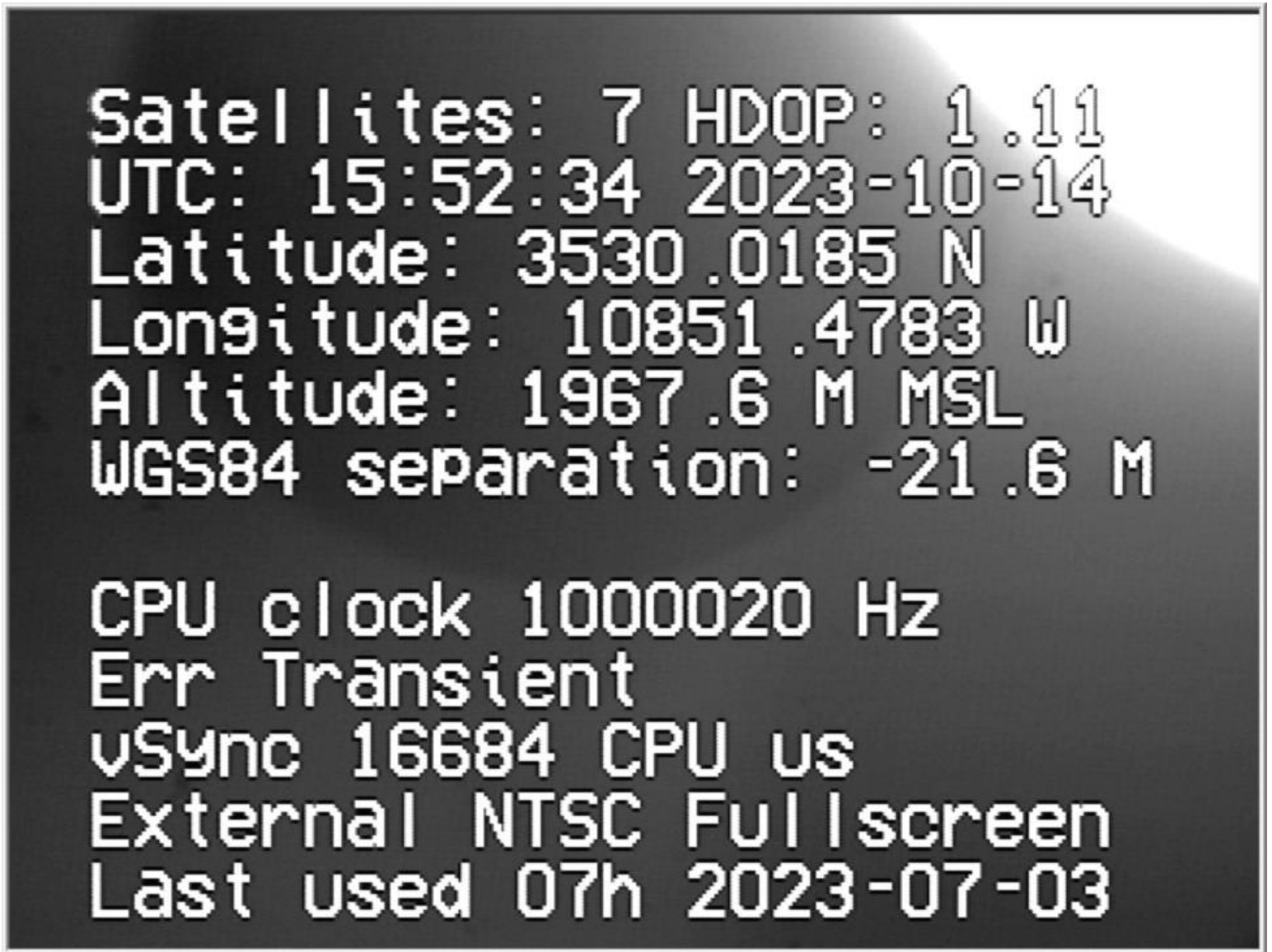
Used Xavier Jubier's interactive Google map

http://xjubier.free.fr/en/site_pages/solar_eclipses/ASE_2023_GoogleMapFull.html



S Limit near Gallup, NM 20231014 near NM 118
35.5008 -108.8584 = 35d 30' 03" N, 108d 51' 30" W, h 1960m (6430 ft.)
annularity lasts 0m 08.7s limb corrected but need to simulate with Occult
Max eclipse at 16:33:58 UT, alt. +34.2, az 134.1 of 2023 Oct 14
Oct 11 was at that alt. at 22:00 UT = 3pm MST
Runcam settings gain 4 brightness 84, saved but used gain 2, brightness 32 for best sunspot views
16:34 UT = 12:34 EDT = 11:34 CDT = 10:34 MDT = 9:34 MST

Annular Solar Eclipse, 2023 Oct. 14
Where exactly we observed, from GPS



Annular Solar Eclipse, 2023 Oct. 14

Near a gift shop being renovated on west side of Mentmore, NM

Annular Solar Eclipse, 2023 Oct. 14

The gift shop looking west from our observation site in Mentmore, NM

Annular Solar Eclipse, 2023 Oct. 14
Pictures of our site looking east from our vehicle

Annular Solar Eclipse, 2023 Oct. 14
Pictures of our site on west side of Mentmore, NM

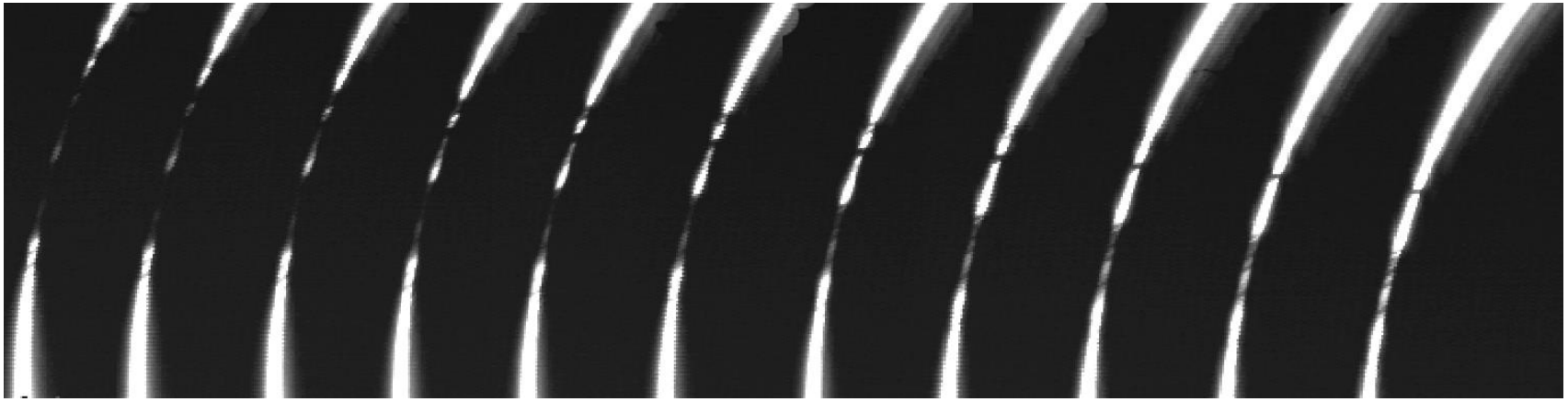
Annular Solar Eclipse, 2023 Oct. 14

Showing how we shaded the recording laptop to operate it

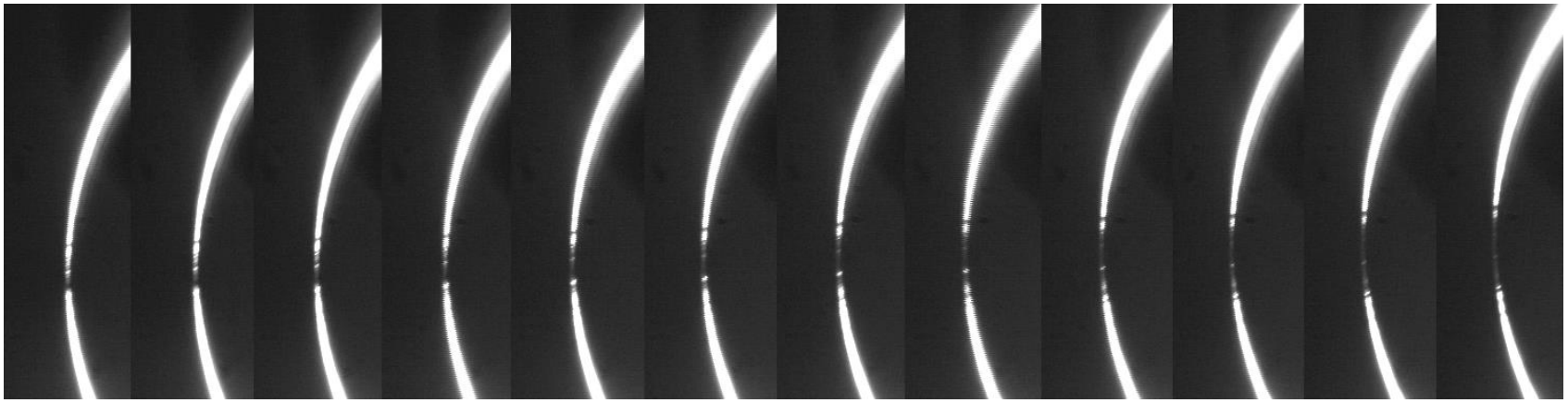
Annular Solar Eclipse, 2023 Oct. 14

Annular Solar Eclipse, 2023 Oct. 14
focused on sunspot and recorded its disappearance

Baily's Beads images at 1-second intervals



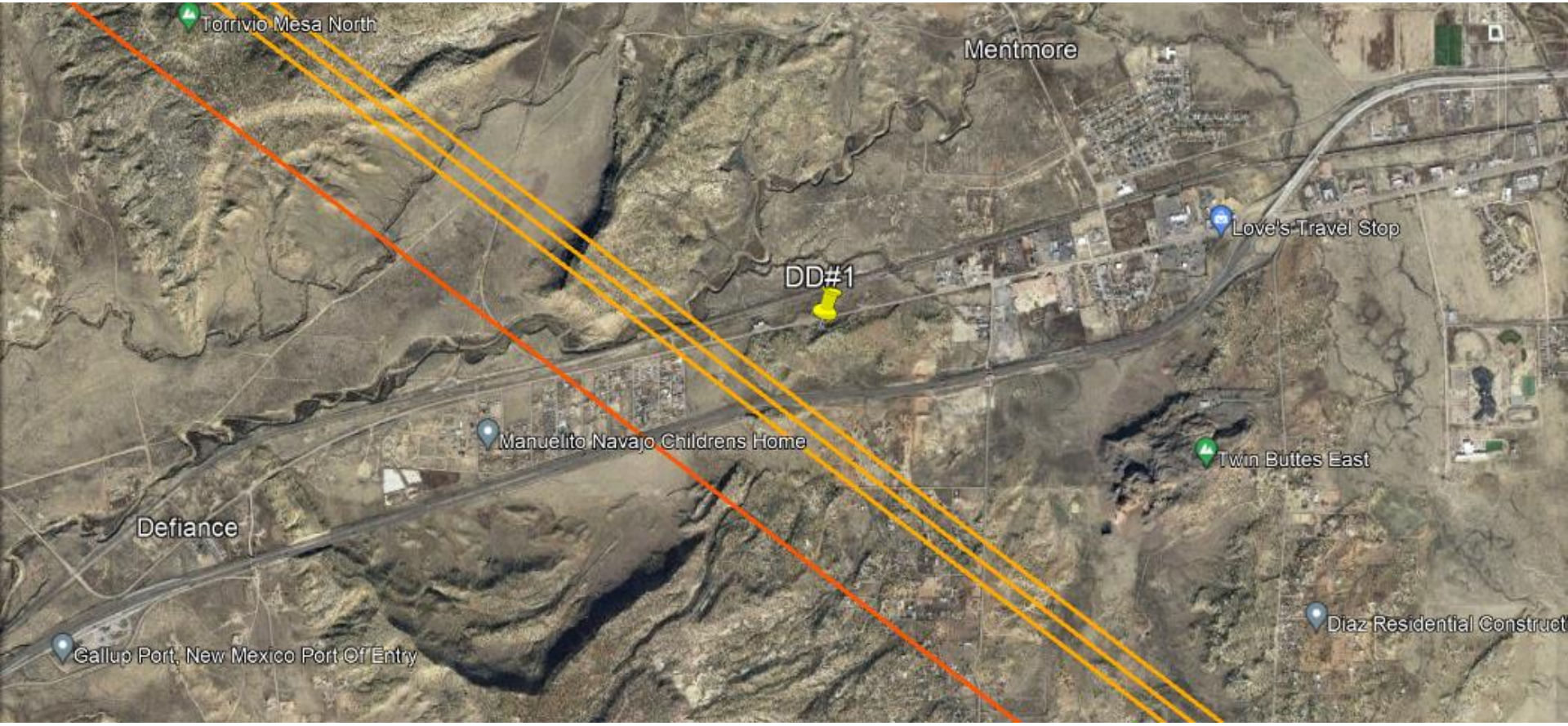
Near 2nd Contact, shortly before annularity



Near 3rd Contact, following annularity

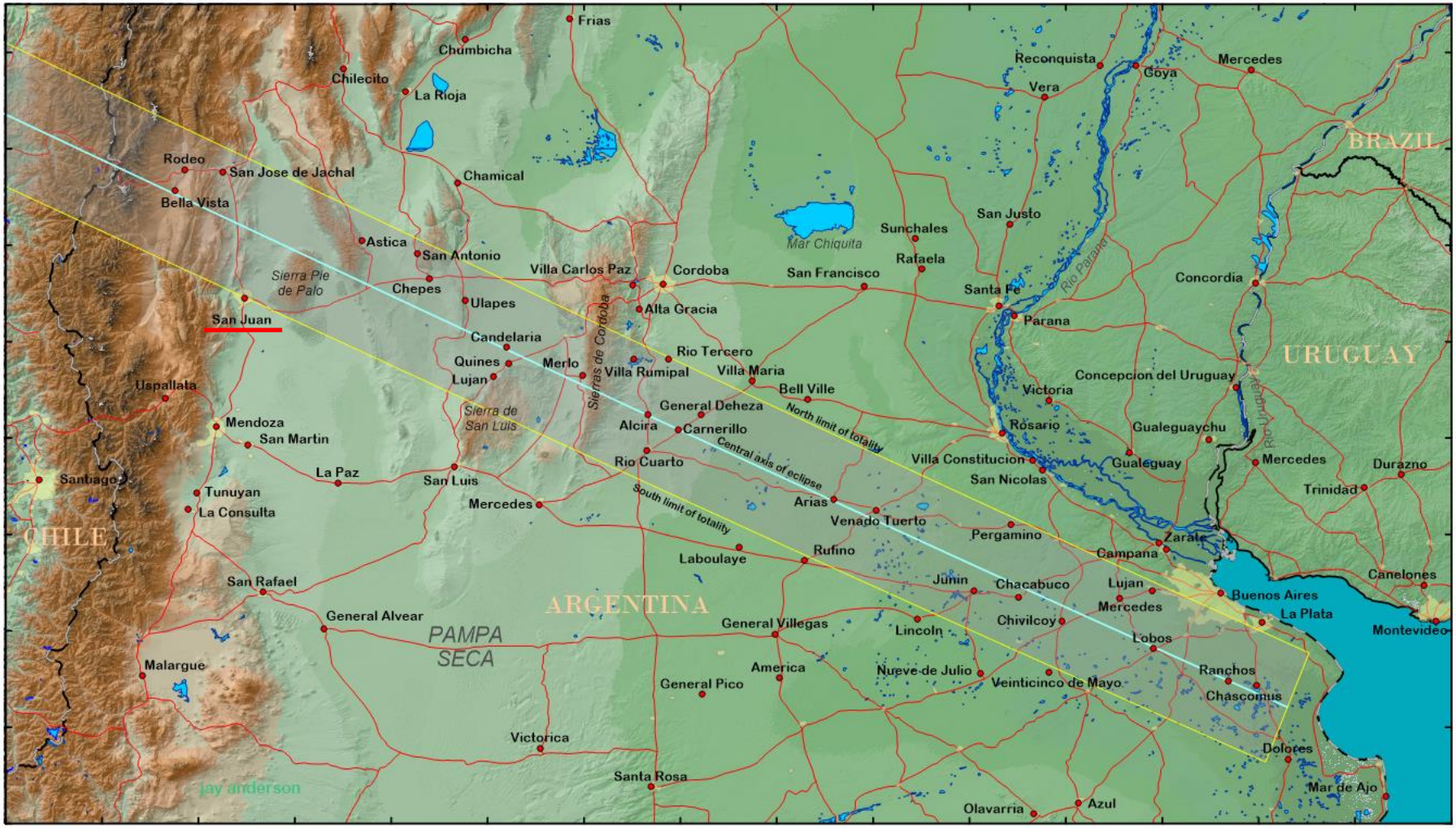
The video can be seen in the annular eclipse section of the 2023 N. American grazing occultations page at https://occultations.org/publications/rasc/2023/nam23grz.htm

John Irwin's calculation gave longer the annularity we saw

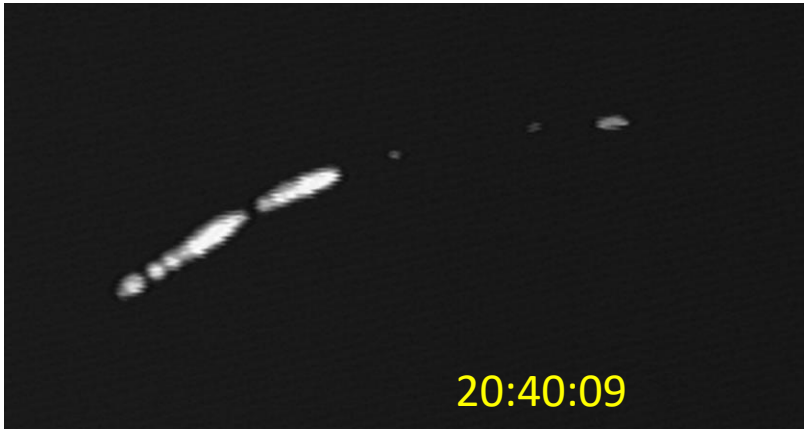


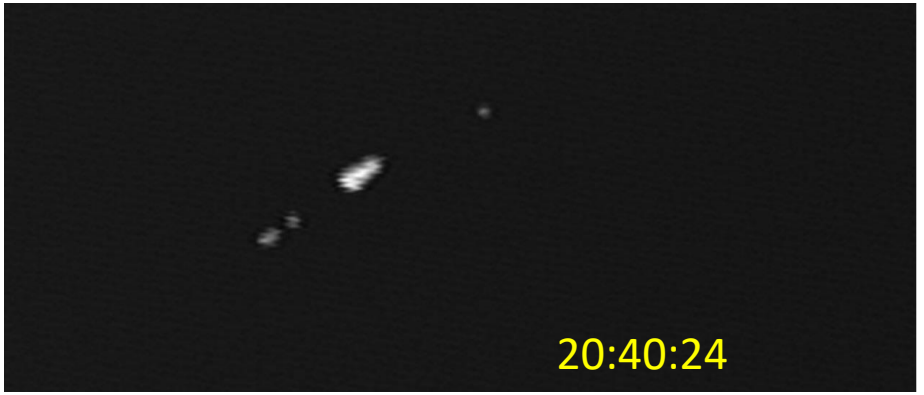
For the coordinates that David gave for his site, it was only (-0.47 ± 0.10) km from the predicted true-limb southern limit. The corresponding duration is (22.1 ± 2.0) seconds, which encompasses his rough estimate of 21 seconds.
This is for a solar radius of (959.95 ± 0.05)" at one AU, as shown by the orange lines on the map.

Total Solar Eclipse, 2019 July 2 in Argentina



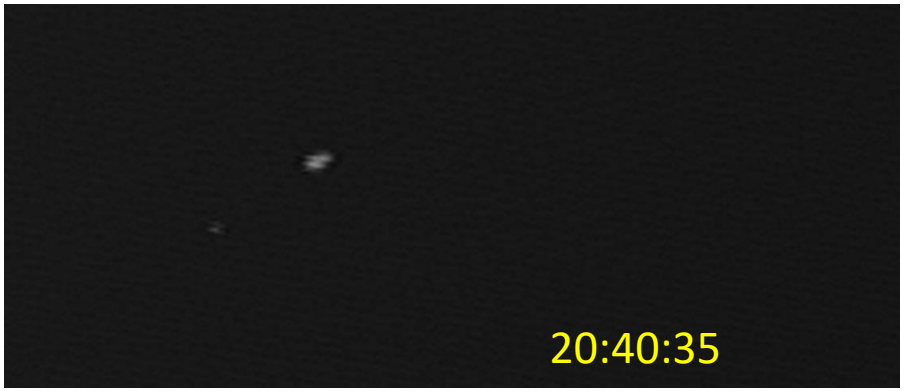
Baily's Beads B&W image with a 5-inch Maksutov



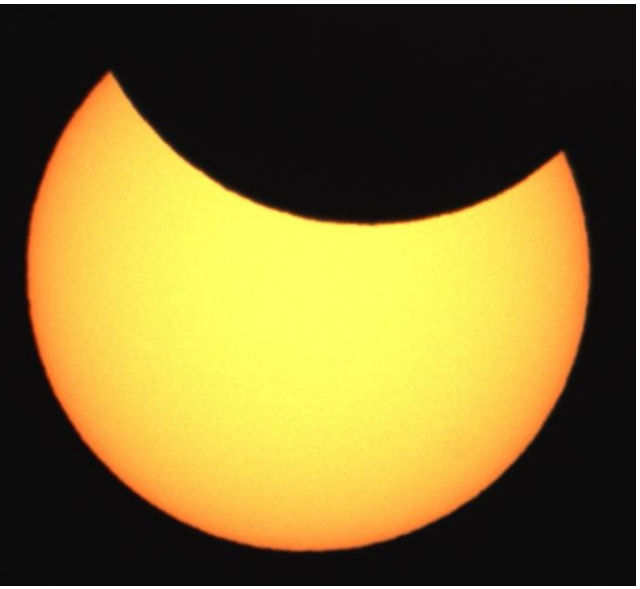


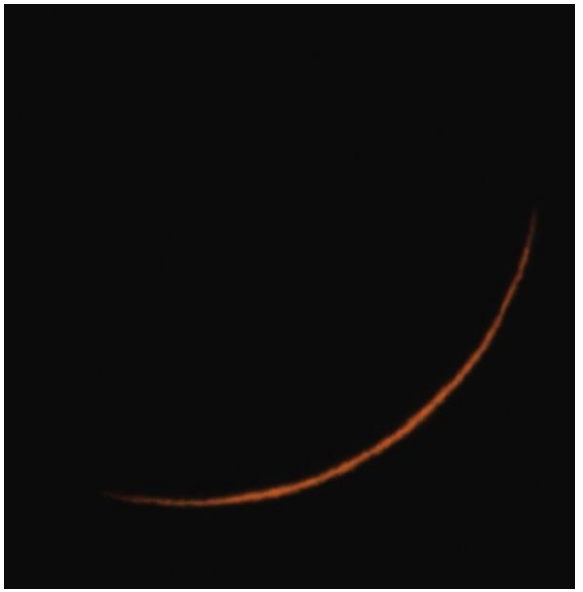
Times are UT of 2019 July 02

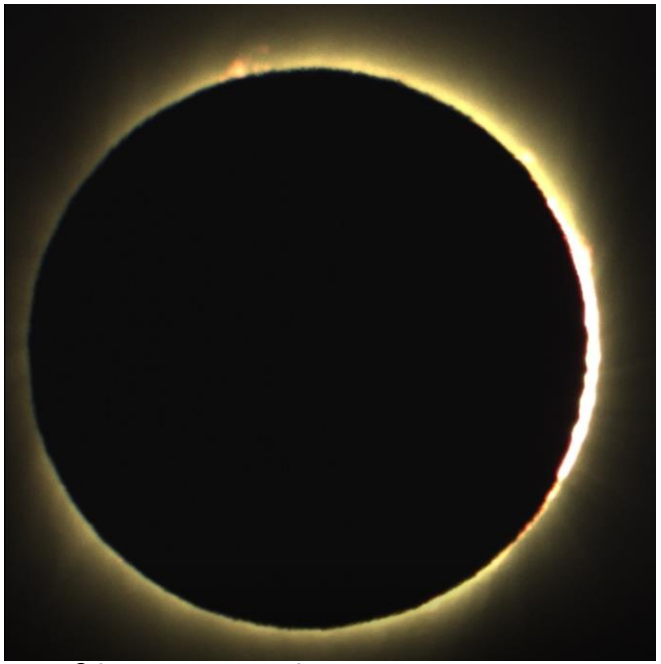
Long. 68° 31.153′ W.
Lat. 31° 32.160′ S.
H 628m

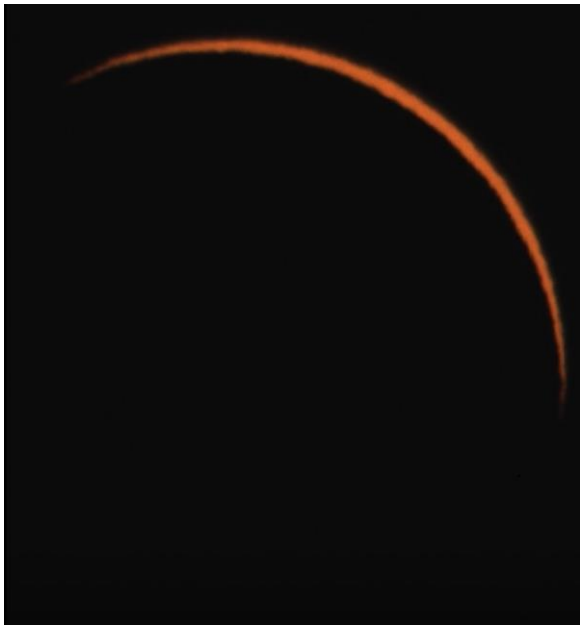


Color images with a 4-inch refractor; totality only 4 sec









2nd Contact Diamond Ring – without filter - Totality

Crescent After Totality

Conclusions

- In the 1980's, we, and others in IOTA, observed solar eclipses from near the path edges, to try to measure solar radius variations.
- Comparisons between pairs of stations at each limit of later well-observed eclipses showed that systematic errors were larger than we first thought. There are likely no real variations of the solar radius that we could measure.
- Now, we let others analyze, to try to improve their predictions for future eclipses.

View this good recording of the 2017 TSE by
Fred Bruenjes from near the southern limit in Missouri

https://www.youtube.com/watch?v=uufiAGwzE8U

This should encourage some to observe the 2024 April 8th total solar eclipse near the path edges

We were not able to show this at the EVAC meeting, which we hoped to do after showing the other slides of the presentation, and our recording of October's annular eclipse