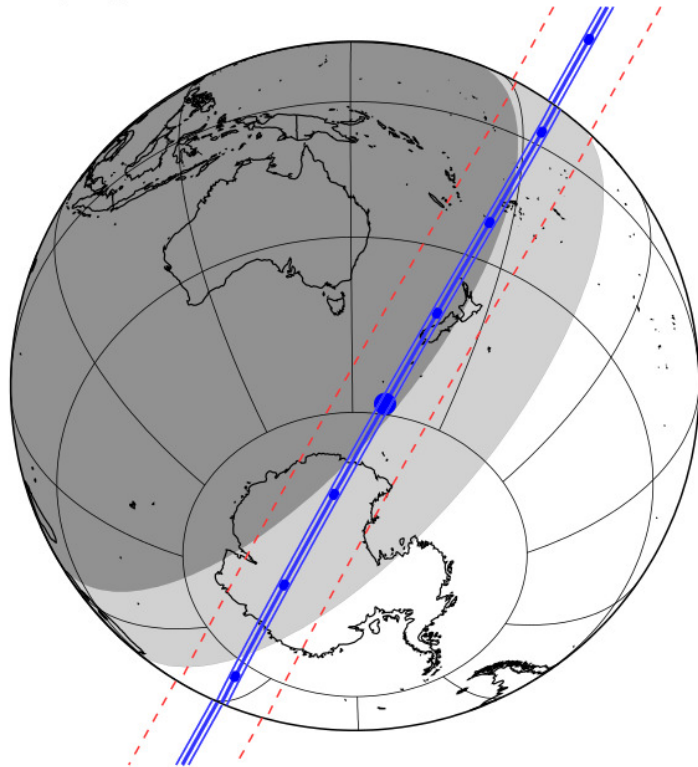


Some Upcoming Occultations

Things to look forward to for the rest of 2021 and into 2022

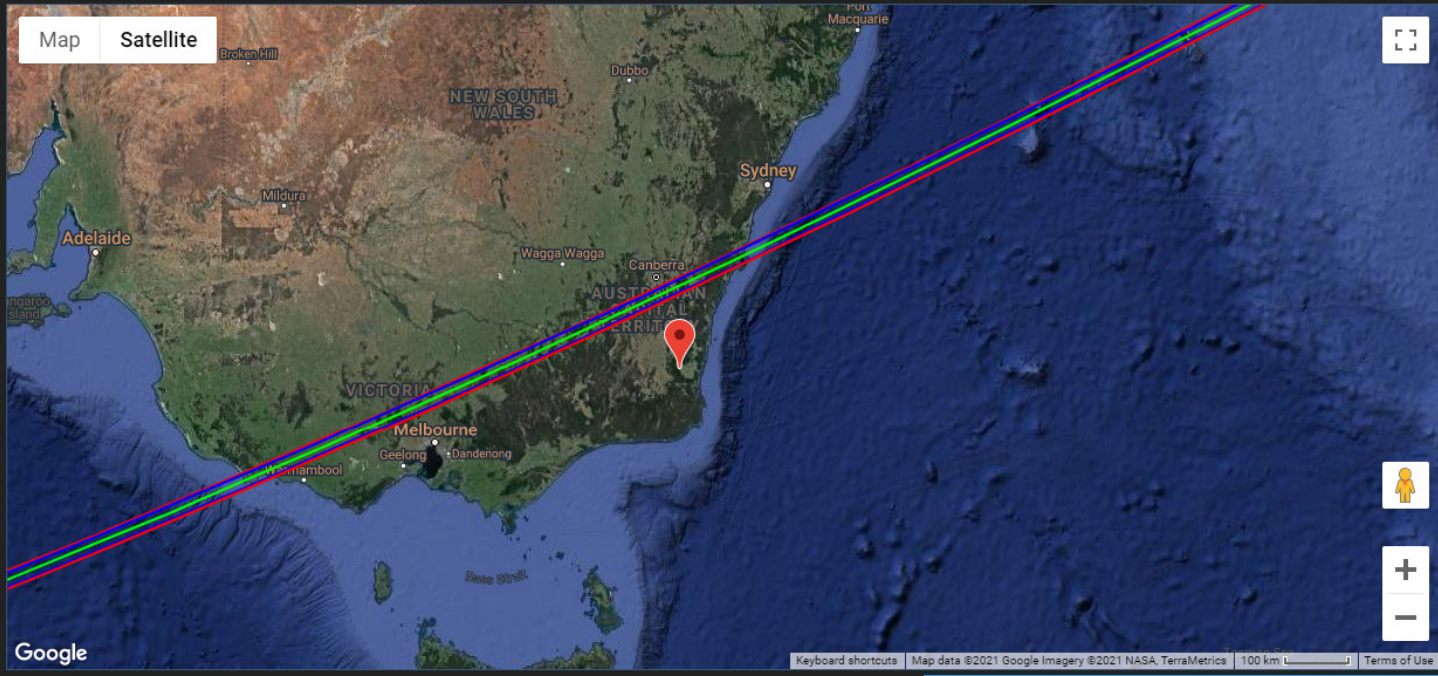
vTTSO15

Bernardinelli-Bernstein, GaiaER3+pmGaiaER3, NIMAv4 Offset: 0.0mas 0.0mas
 updated: 2021-08-31 by Lucky Star



Date	Sat. 18 Sep. 2021 16:45:01
Star position (ICRF)	02 38 42.1261 -55 41 00.579
C/A	0.046 arcsec
P/A	119.11 °
velocity	-32.14 km/s
Geocentric distance Δ	19.3982 au
G mag*	16.4
J mag*	15.9
H mag*	14.9
Magnitude drop	5.2
Uncertainty in time	27.3 sec
Uncertainty in C/A	54.4 mas
Uncertainty in projected distance	765.4 km
Probability of occultation on centrality	10.4%
Maximum duration	6.2 sec
Moon distance to the object	63.7°
Fraction of illuminated Moon	94.0 %
Solar elongation	115.6

yyyy mm dd hh:mm:ss.s	RA_star_J2000	DE_star_J2000	C/A	P/A	vel	Delta	G*	RP*	H*
2021-09-18 16:45:01.5	02 38 42.1261	-55 41 00.579	0.046	119.11	-32.14	19.3982	16.4	15.9	14.9



Prediction

Last Updated: 27/Aug/21, 08:55 UT	Prediction By: OWC
Data Sources: Horizons/GaiaEDR3	Orbit Date: 25 Aug 2021 (JPL#41)
Error (path widths): 0.130	Error in time: 1.2 sec
Err. Ellipse: 0.0113" x 0.0009"	Err. Ellipse PA: 94°
Err. Basis: Known errors	OWC Id: 150597

Event

From: 11:42:00 UT	To: 11:51:25 UT
Combined Mag: 15.01	Max Duration: 0.9 sec
Mag Drop (V): 3.19	Mag Drop (R): 3.25
Shadow Width: 19.3 km	Moon Phase: 81% sunlit
Solar Elong.: 83°	Moon Elong.: 148°

Target Star

Name: UCAC4 324-112760	V mag: 15.07
Constellation: Ophiuchus	R mag: 14.55
Diameter:	B mag: 16.03
RUWE: 1.35	Flags:
Gaia SourceId: 4062149458371666944	Gaia Flags:
RA [J2000]: 17 ^h 38 ^m 46 ^s .6394	RA [aprrt]: 17 ^h 40 ^m 05 ^s .7715
Dec [J2000]: -25° 20' 37".963	Dec [aprrt]: -25° 21' 21".543

Object

Name: (4337) Arecibo	Class: Outer Main-belt Asteroid
Diameter: 19.3 ± 1.6 km	Diameter: 8.70 mas
Distance: 3.0571 au	Mag: 18.20
Motion RA: 37.65 "/hr	Motion Dec: -0.32 "/hr
Moons: 0	Rings: 0

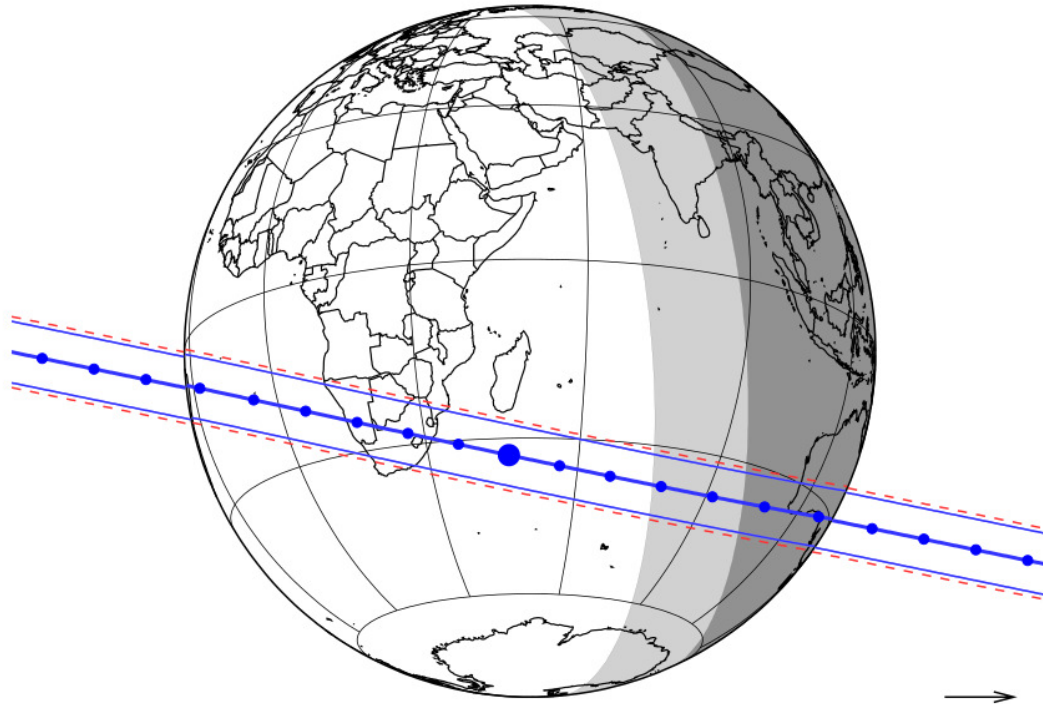
Please report observations to peter@noswonky.com and davegault@bigpond.com

Occultation Elements

```
----- ocellmnt file for Occult BEGIN -----
<Occultations>
<Event>
<Elements>JPL#41:2021-08-25@2021-09-25[OWC],0.92,2021,9,25,11.7785,0.00010,-0.37563,11.82831,-0.11261,0.00572,-0.00022,0.00000,0.00000</Elements>
<Earth>83.8304,-25.3560,1.23,-1.05,False</Earth>
<Star>UCAC4_324-112760,17.64628872,-25.3438785,16.03,15.07,14.07,0.0,0,17.66826986,-25.3559842</Star>
<Object>4337,Arecibo,18.20,19.3,3.0571,0.0,2.510,-0.32,Outer Main-belt Asteroid,1.6</Object>
<Orbit>0,52.0447,2021,9,25,181.8806,41.2029,2.2130,0.09054,3.26030,2.96510,12.36,5.0,0.15</Orbit>
<Errors>1.130,0.0113,0.0009,94,0.0011,Known errors,1.35,0,-1,-1</Errors>
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Quaoar, GaiaER3+pmGaiaER3, NIMAv15
 updated: 2021-08-29 by Lucky Star

Offset: 0.0mas 0.0mas



yyyy mm dd hh:mm:ss.s	RA_star_J2000	DE_star_J2000	C/A	P/A	vel	Delta	G*	RP*	H*
2021-10-18 13:06:53.5	18 15 56.8579	-15 28 39.329	0.062	191.56	16.29	43.1170	14.6	14.0	13.0

Date	Mon. 18 Oct. 2021 13:06:53
Star position (ICRF)	18 15 56.8579 -15 28 39.329
C/A	0.062 arcsec
P/A	191.56 °
velocity	16.29 km/s
Geocentric distance Δ	43.1170 au
G mag*	14.6
J mag*	14.0
H mag*	13.0
Magnitude drop	4.1
Uncertainty in time	8.8 sec
Uncertainty in C/A	2.8 mas
Uncertainty in projected distance	86.6 km
Probability of occultation on centrality	100.0%
Maximum duration	68.1 sec
Moon distance to the object	88.1 °
Fraction of illuminated Moon	95.6 %
Solar elongation	68.6 °

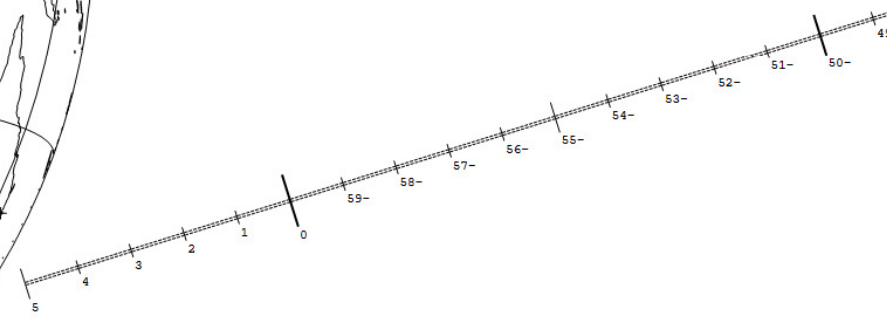
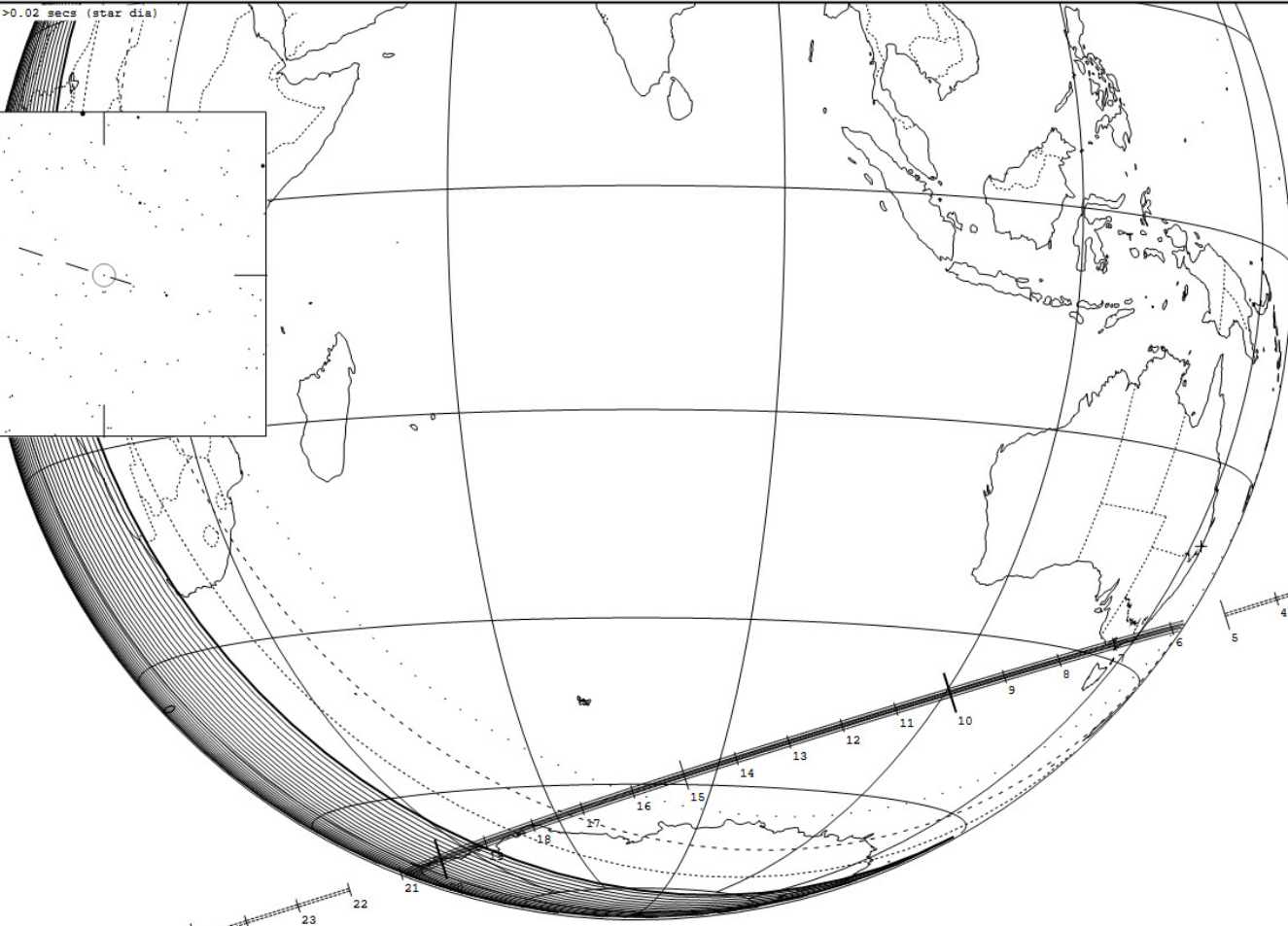
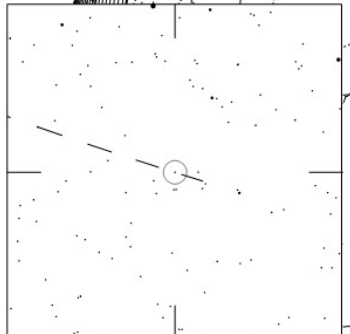
2707 Ueferji occults HIP 116020 on 2021 Oct 12 from 17h 6m to 17h 21m UT

Star: (Dia = 0.1 mas)
Mv 9.8; Mb 10.5; Mr 9.4
RA = 23 30 29.5917 (astrometric)
Dec = -7 16 45.392
[of Date: 23 31 37, -7 19 33]
Prediction of 2021 Sep 2.3
Reliable not available

Max Duration = 2.9 secs
Mag Drop = 6.6 (6.5r)
Sun : Dist = 151°
Moon: Dist = 66°
: illum = 45 %
Error 36.3x18.0 mas in PA 67°

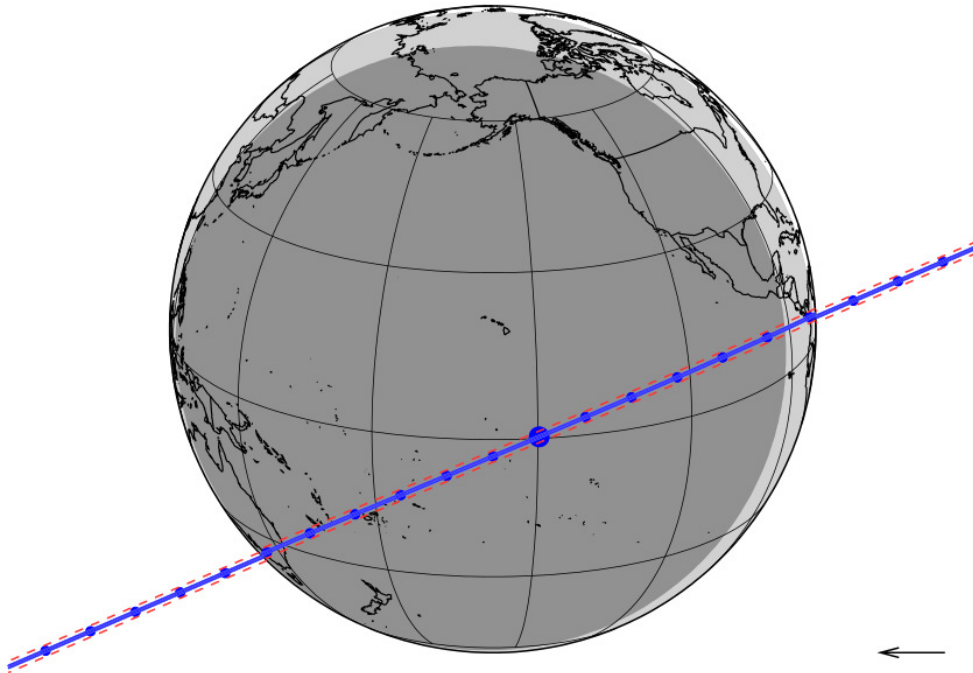
Asteroid:
Mag = 16.4
Dia = 25.43km, 17 mas
Parallax = 4.215"
Hourly dRA = -1.340s
dDec = -6.25"
JPL#342021Aug25, Known errors

Expect fades >0.02 secs (star dia)



Orus, GaiaER3+pmGaiaER3, NIMAv5
 updated: 2021-01-14 by Lucky Star

Offset: 0.0mas 0.0mas



Date	Sat. 16 Oct. 2021 10:44:19
Star position (ICRF)	01 51 41.8956 +19 49 18.792
C/A	0.794 arcsec
P/A	156.61 °
velocity	-16.09 km/s
Geocentric distance Δ	4.0142 au
G mag*	14.0
J mag*	13.5
H mag*	12.8
Magnitude drop	2.6
Uncertainty in time	7.1 sec
Uncertainty in C/A	26.7 mas
Uncertainty in projected distance	77.9 km
Probability of occultation on centrality	26.6%
Maximum duration	3.3 sec
Moon distance to the object	60.0°
Fraction of illuminated Moon	82.9 %
Solar elongation	167.7°

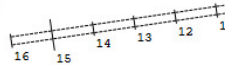
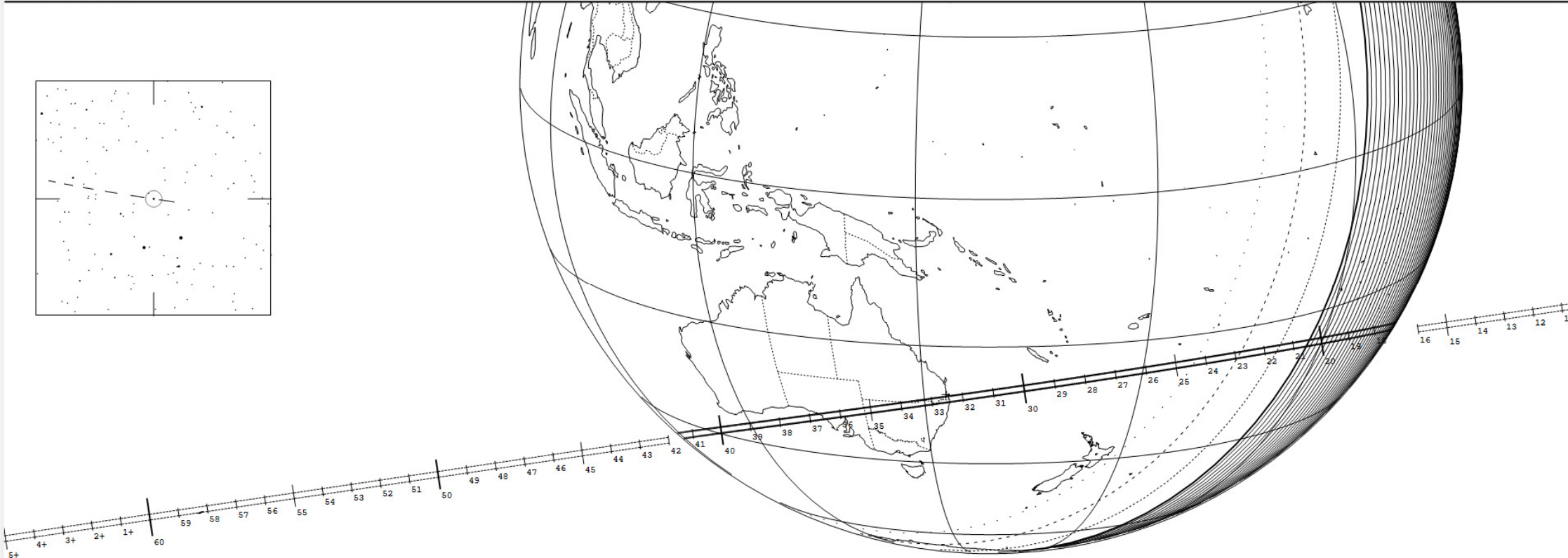
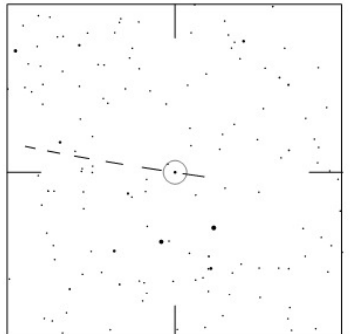
yyyy mm dd hh:mm:ss.s	RA_star_J2000	DE_star_J2000	C/A	P/A	vel	Delta	G*	RP*	H*
2021-10-16 10:44:19.7	01 51 41.8956	+19 49 18.792	0.794	156.61	-16.09	4.0142	14.0	13.5	12.8

535 Montague occults HIP 18692 on 2021 Oct 18 from 15h 17m to 15h 42m UT

Star: (Dia < 0.1 mas)
Mv 8.2
RA = 4 0 16.7415 (astrometric)
Dec = 14 18 20.875
[of Date: 4 1 30, 14 22 3]
Prediction of 2021 Sep 2.3
Reliable not available

Max Duration = 11.8 secs
Mag Drop = 5.3 (0.0r)
Sun : Dist = 144°
Moon: Dist = 58°
illum = 96 %
Error 27.3x4.0 mas in PA 70°

Asteroid:
Mag = 13.4
Dia = 77.48km, 62 mas
Parallax = 5.135"
Hourly dRA = -1.237s
dDec = -2.79"
JPL#712021Aug25, Known errors

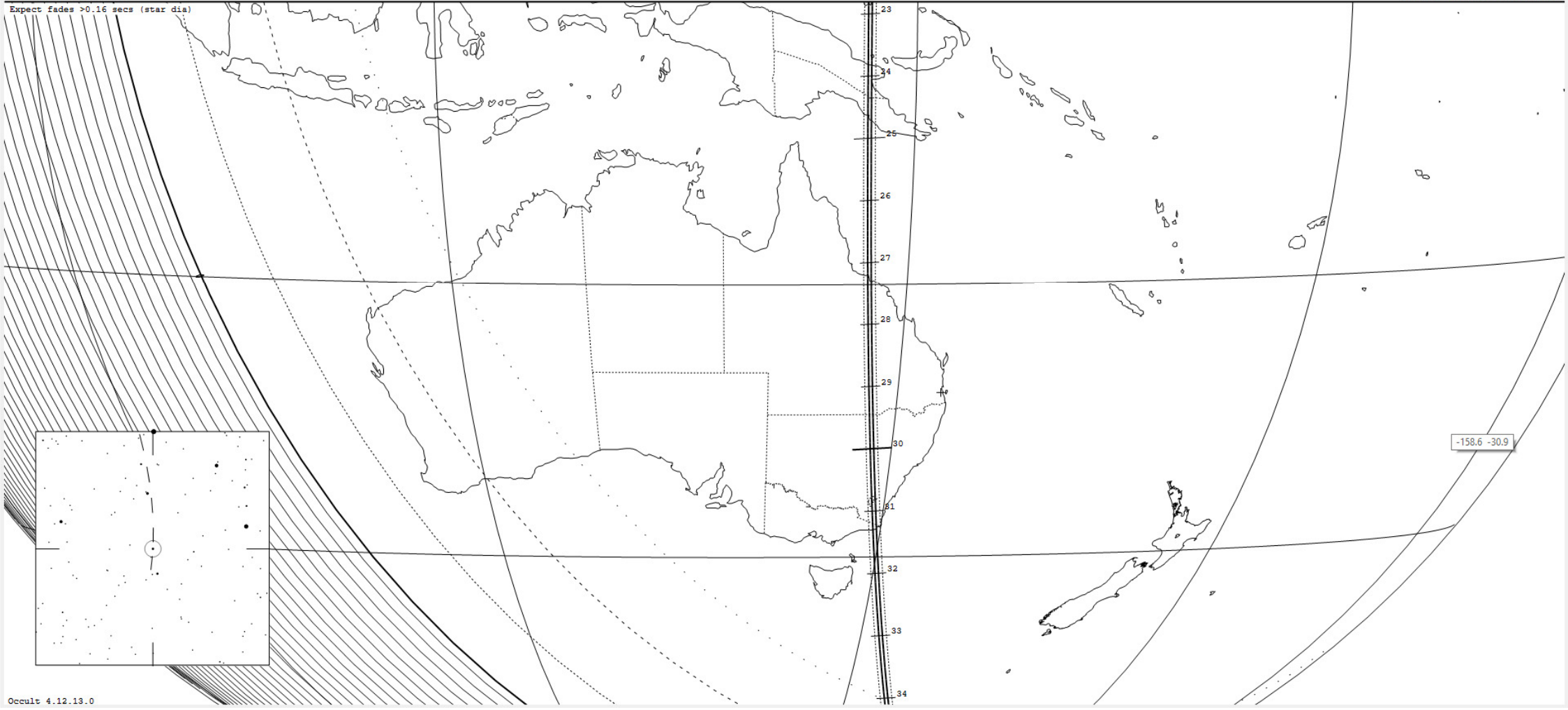


6925 Susumu occults TYC 579-00479-1 on 2021 Oct 28 from 11h 6m to 11h 36m UT

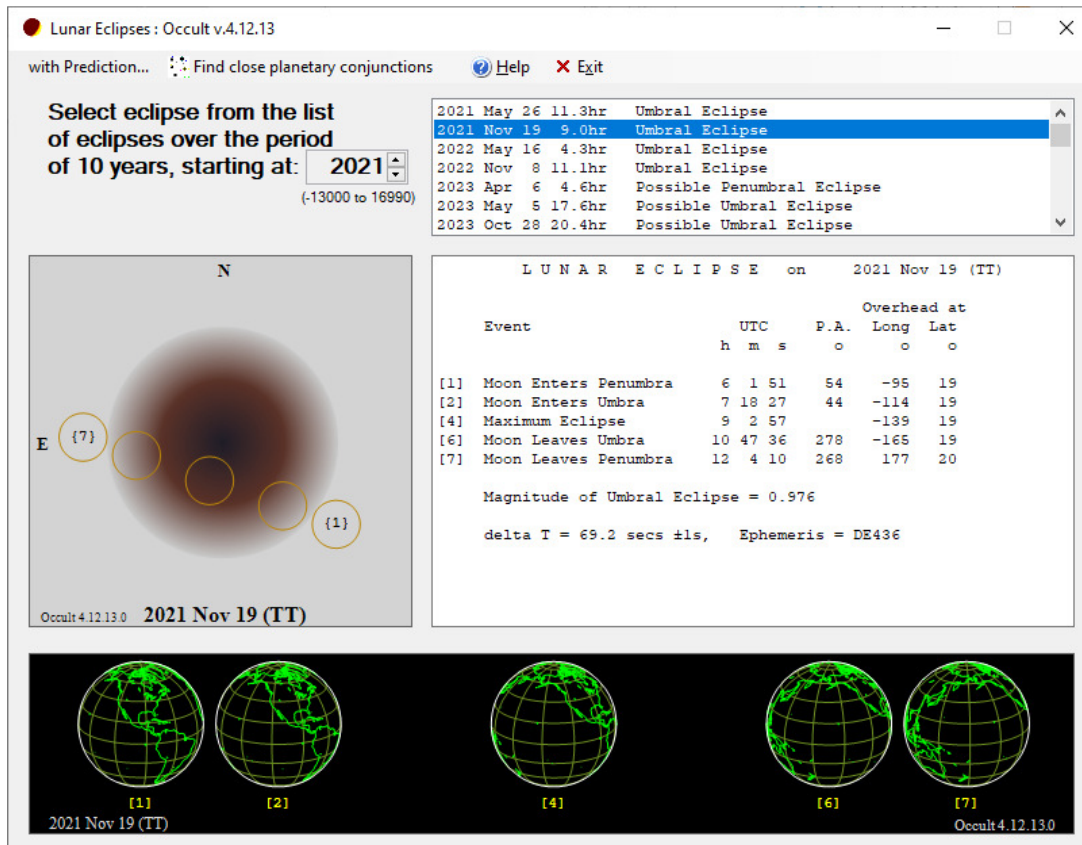
Star: (Dia = 0.8 mas)
Mv 7.7; Mp 9.0; Mr 7.0
RA = 23 3 54.2196 (astrometric)
Dec = 2 49 14.623
[of Date: 23 5 1, 2 56 19]
Prediction of 2021 Sep 2.3
Reliable not available

Max Duration = 3.4 secs
Mag Drop = 9.1 (9.4r)
Sun : Dist = 133°
Moon: Dist = 131°
: illum = 54 %
Error 18.7x4.4 mas in PA 78°

Asteroid:
Mag = 16.8
Dia = 23.42km, 17 mas
Parallax = 4.533"
Hourly dRA = 0.069s
dDec = -18.01"
JPL#412021Aug24, Known errors



2021 Nov 19 – *Almost* Total Lunar Eclipse

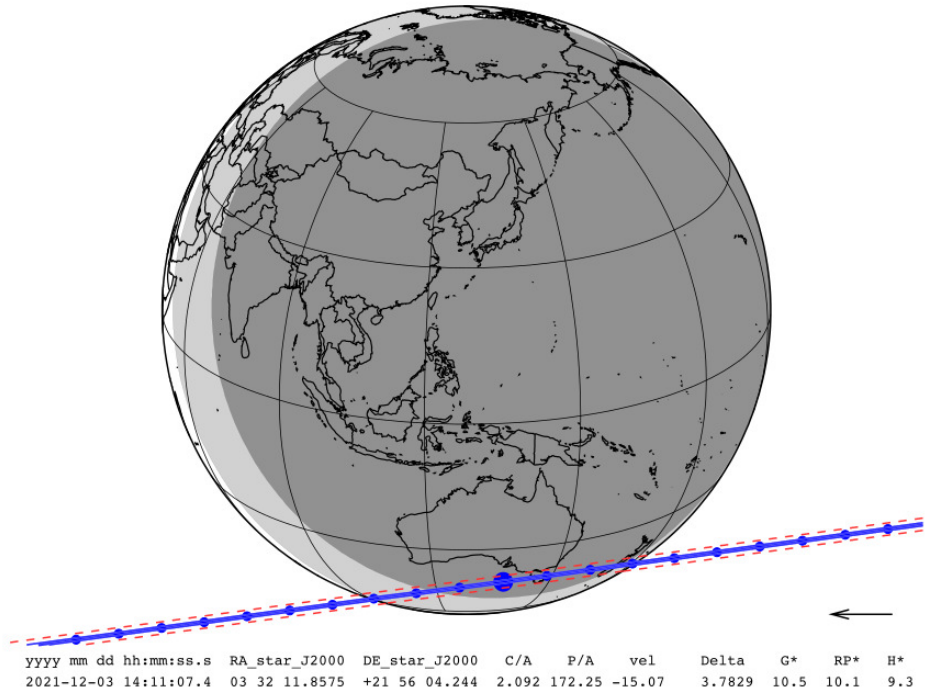


Lunar occultations of 13 Tau for Sydney and north and New Zealand
14 Tau as seen from much of Eastern Australia

Both are suspected close doubles.

Eurybates, GaiaER3+pmGaiaER3, NIMAv5
 updated: 2021-09-08 by Lucky Star

Offset: 0.0mas 0.0mas



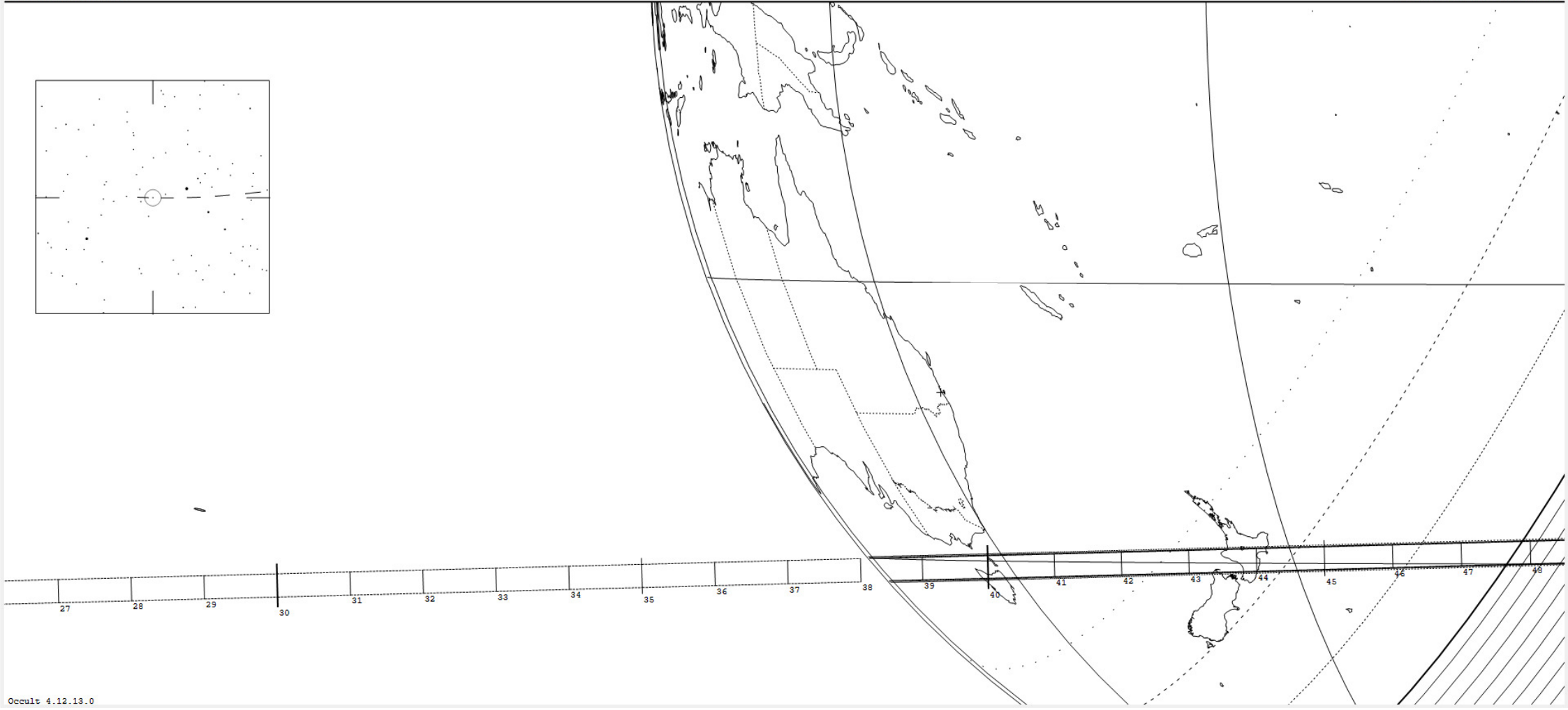
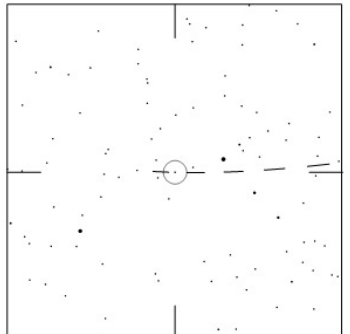
Date	Fri. 3 Dec. 2021 14:11:07
Star position (ICRF)	03 32 11.8575 +21 56 04.244
C/A	2.092 arcsec
P/A	172.25 °
velocity	-15.07 km/s
Geocentric distance Δ	3.7829 au
G mag*	10.5
J mag*	10.1
H mag*	9.3
Magnitude drop	5.6
Uncertainty in time	9.7 sec
Uncertainty in C/A	34.9 mas
Uncertainty in projected distance	95.8 km
Probability of occultation on centrality	26.2%
Maximum duration	4.2 sec
Moon distance to the object	174.4°
Fraction of illuminated Moon	0.8 %
Solar elongation	164.0°

39 Laetitia occults TYC 0280-00775-1 on 2022 Jan 6 from 15h 38m to 15h 58m UT

Star: (Dia < 0.1 mas)
 Mv 9.6
 RA = 12 9 9.8033 (astrometric)
 Dec = 0 32 36.691
 [of Date: 12 10 17, 0 25 19]
 Prediction of 2021 Jun 12.0
 Reliable not available

Max Duration = 19.1 secs
 Mag Drop = 2.1 (0.0r)
 Sun : Dist = 104°
 Moon: Dist = 157°
 : illum = 20 %
 Error 19.3x2.7 mas in PA 103°

Asteroid: (in DAMIT, ISAM)
 Mag = 11.6
 Dia = 158 ±16km, 82 mas
 Parallax = 3.303"
 Hourly dRA = 1.030s
 dDec = 0.41"
 JPL#1112021May03, Known errors



333 Badenia occults HIP 51898 on 2022 Mar 26 from 9h 38m to 9h 51m UT

Star: (Dia < 0.1 mas)
Mv 8.2
RA = 10 36 11.0965 (astrometric)
Dec = 9 36 25.460
[of Date: 10 37 22, 9 29 29]
Prediction of 2021 Jun 12.1
Reliable not available

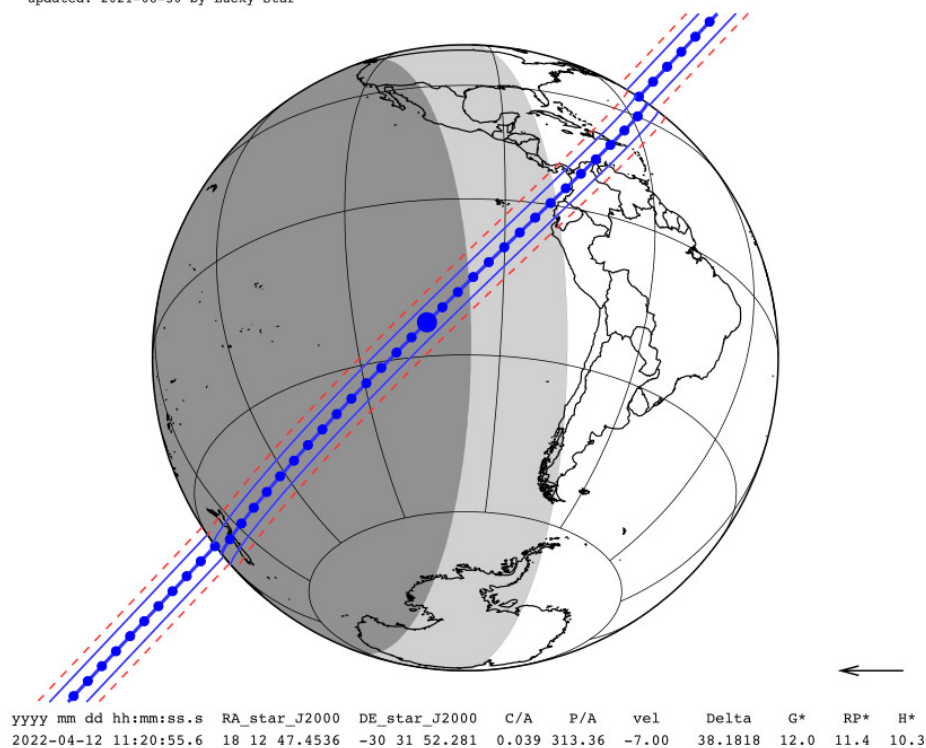
Max Duration = 6.3 secs
Mag Drop = 6.7 (0.0r)
Sun : Dist = 152°
Moon: Dist = 134°
: illum = 37 %
Error 10.0x2.1 mas in PA 116°

Asteroid: (in DAMIT)
Mag = 14.9
Dia = 74 ±7km, 39 mas
Parallax = 3.350"
Hourly dRA = -1.447s
dDec = 6.33"
JPL#512021May03, Known errors



Ixion, GaiaER3+pmGaiaER3, NIMAv11
 updated: 2021-08-30 by Lucky Star

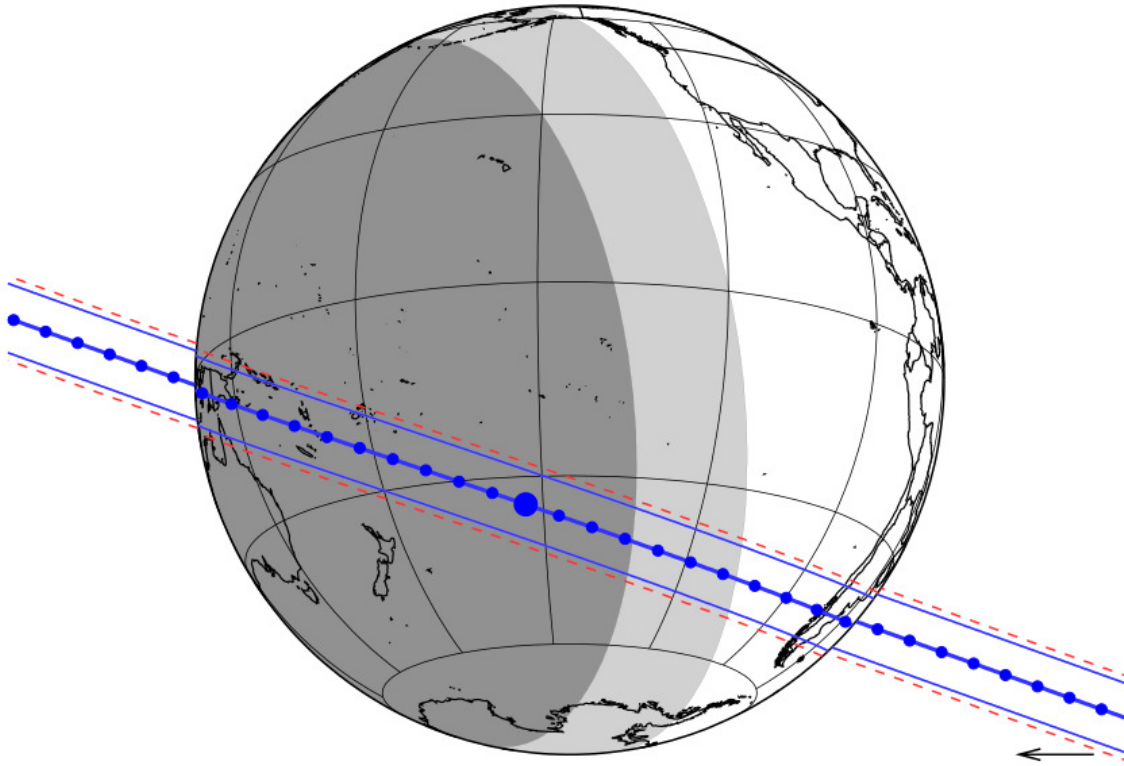
Offset: 0.0mas 0.0mas



Date	Tue. 12 Apr. 2022 11:20:55
Star position (ICRF)	18 12 47.4536 -30 31 52.281
C/A	0.039 arcsec
P/A	313.36 °
velocity	-7.00 km/s
Geocentric distance Δ	38.1818 au
G mag*	12.0
J mag*	11.4
H mag*	10.3
Magnitude drop	6.5
Uncertainty in time	22.5 sec
Uncertainty in C/A	6.6 mas
Uncertainty in projected distance	182.2 km
Probability of occultation on centrality	86.8%
Maximum duration	78.5 sec
Moon distance to the object	124.9°
Fraction of illuminated Moon	79.3 %
Solar elongation	109.0°

Quaoar, GaiaER3+pmGaiaER3, NIMAv15
 updated: 2021-08-30 by Lucky Star

Offset: 0.0mas 0.0mas

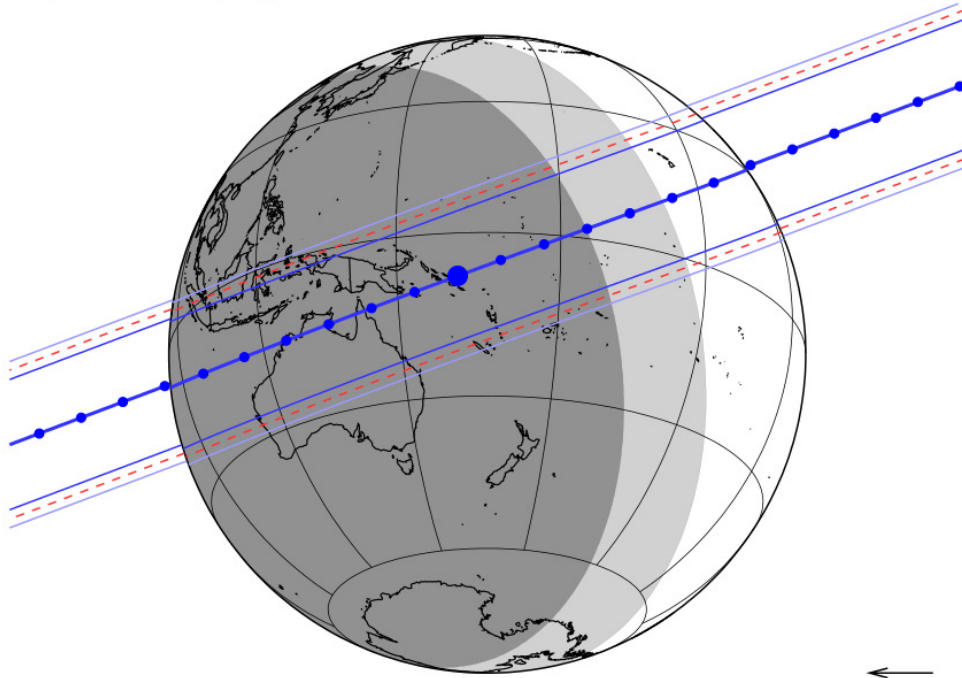


Date	Mon. 25 Apr. 2022 13:56:10
Star position (ICRF)	18 28 47.6537 -15 11 42.634
C/A	0.073 arcsec
P/A	199.68 °
velocity	-9.65 km/s
Geocentric distance Δ	42.2819 au
G mag*	14.7
J mag*	13.6
H mag*	11.2
Magnitude drop	3.4
Uncertainty in time	23.0 sec
Uncertainty in C/A	4.0 mas
Uncertainty in projected distance	121.4 km
Probability of occultation on centrality	100.0%
Maximum duration	115.1 sec
Moon distance to the object	56.2°
Fraction of illuminated Moon	27.7 %
Solar elongation	117.3°

yyyy mm dd hh:mm:ss.s	RA_star_J2000	DE_star_J2000	C/A	P/A	vel	Delta	G*	RP*	H*
2022-04-25 13:56:10.4	18 28 47.6537	-15 11 42.634	0.073	199.68	-9.65	42.2819	14.7	13.6	11.2

Pluto, GaiaER3+pmGaiaER3, NIMAv8PLU055
 updated: 2021-09-01 by Lucky Star

Offset: 0.0mas 0.0mas



yyyy mm dd hh:mm:ss.s	RA_star_J2000	DE_star_J2000	C/A	P/A	vel	Delta	G*	RP*	H*
2022-06-01 16:16:31.0	20 02 18.4471	-22 33 02.280	0.068	339.34	-14.93	33.8404	12.6	11.9	10.2

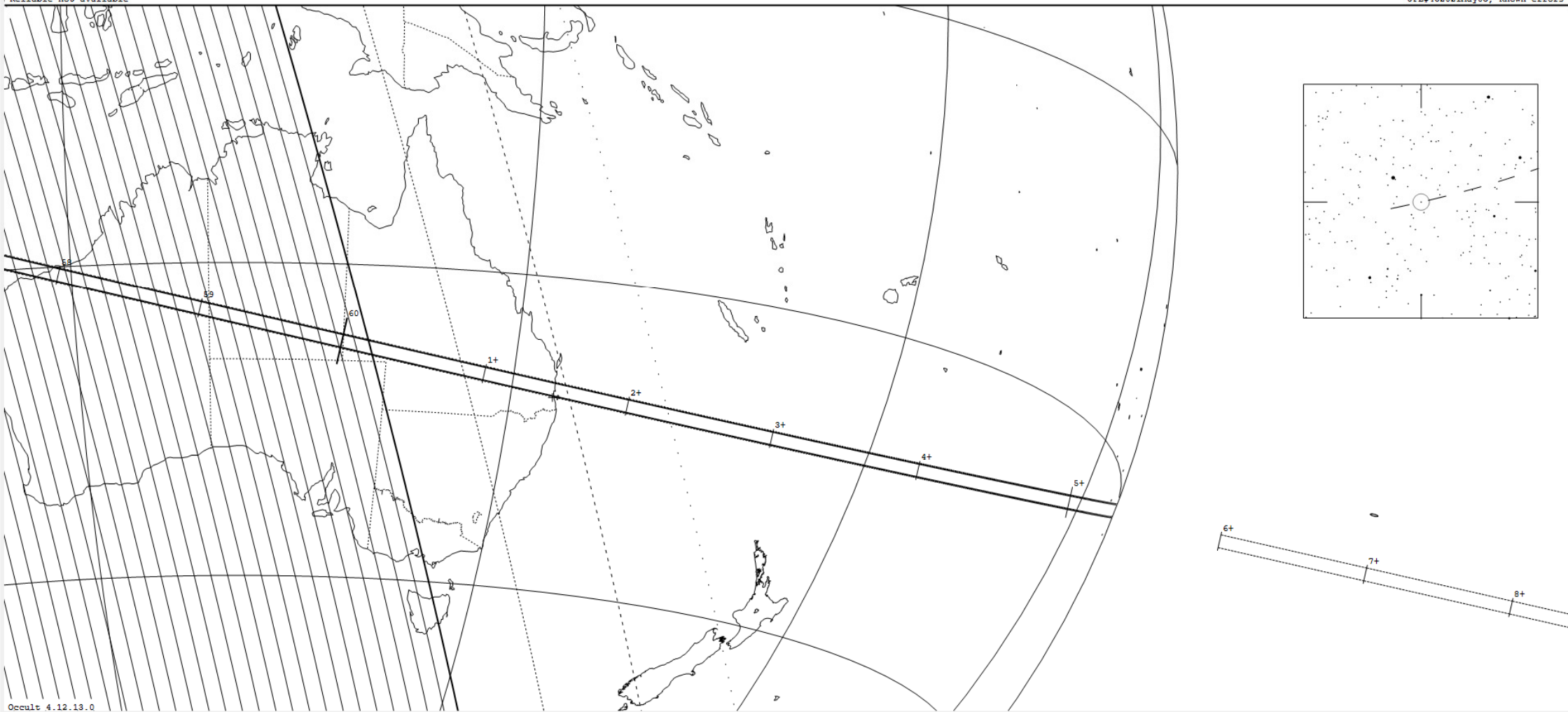
Date	Wed. 1 Jun. 2022 16:16:31
Star position (ICRF)	20 02 18.4471 -22 33 02.280
C/A	0.068 arcsec
P/A	339.34 °
velocity	-14.93 km/s
Geocentric distance Δ	33.8404 au
G mag*	12.6
J mag*	11.9
H mag*	10.2
Magnitude drop	1.9
Uncertainty in time	27.3 sec
Uncertainty in C/A	7.1 mas
Uncertainty in projected distance	174.6 km
Probability of occultation on centrality	100.0%
Maximum duration	163.5 sec
Moon distance to the object	156.8°
Fraction of illuminated Moon	4.4 %
Solar elongation	132.3°

667 Denise occults TYC 5768-01712-1 on 2022 Nov 6 from 8h 53m to 9h 5m UT

Star: (Dia < 0.1 mas)
Mv 9.6
RA = 20 43 34.3887 (astrometric)
Dec = -14 23 32.578
[of Date: 20 44 50, -14 18 40]
Prediction of 2021 Jun 12.8
Reliable not available

Max Duration = 5.3 secs
Mag Drop = 6.1 (0.0r)
Sun : Dist = 66°
Moon: Dist = 69°
: illum = 95 %
Error 10.3x2.6 mas in PA 104°

Asteroid:
Mag = 15.7
Dia = 89.49km, 35 mas
Parallax = 2.540"
Hourly dRA = 1.624s
dDec = -5.36"
JPL#452021May03, Known errors



The End

Questions?