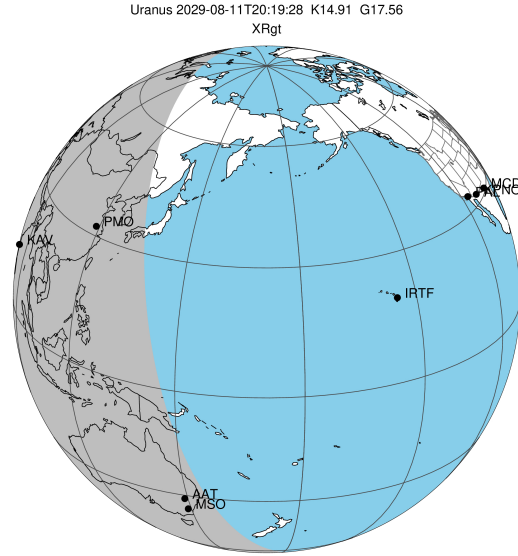


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-08-11T20:19:28.230
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3418300355615846144
 2Mass ID (if available) : 05050575+2250577

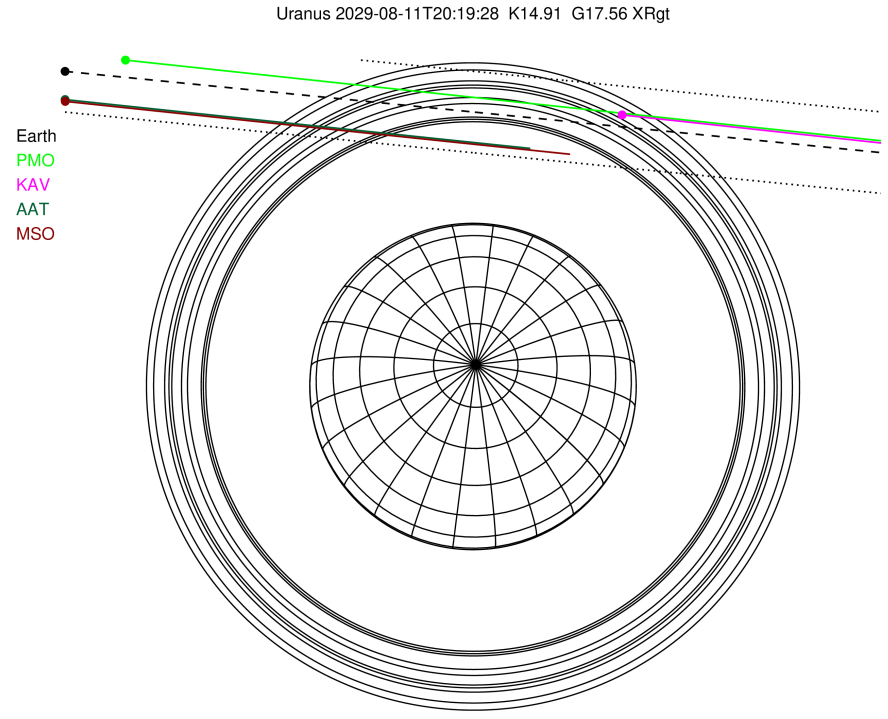
ICRS Star Coord at Epoch: 05h 05m 05.75392s +22:50:57.73781s

RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.910
 G magnitude : 17.556
 RP magnitude : 16.775
 BP magnitude : 18.196
 DUPflag : 0
 Distance (au) : 19.707
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 20.47
 Sun-Target sep (deg) : 61.66
 Sun-Moon sep (deg) : 85.21
 B (ring opening deg) : 82.26
 PA of pole (deg) : -7.46

#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

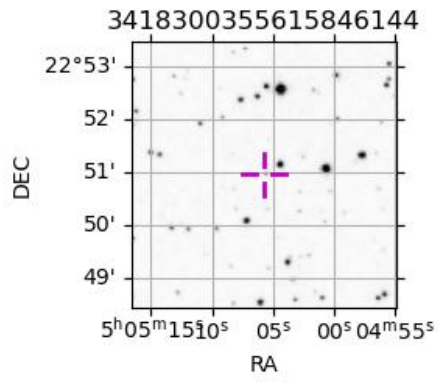


2029-08-11T20:19:28.2300 ex: 05 05 05.7539 8: +22 50 57.738 C/A 2.997" PA 174.31 deg v_sky +20.47 km/s D 19.71 AU
 Credit: Styled after SORA/Lucky Star

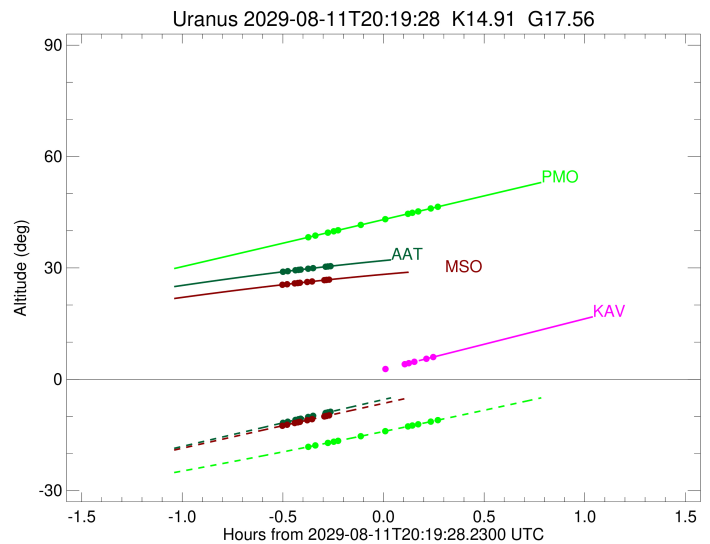
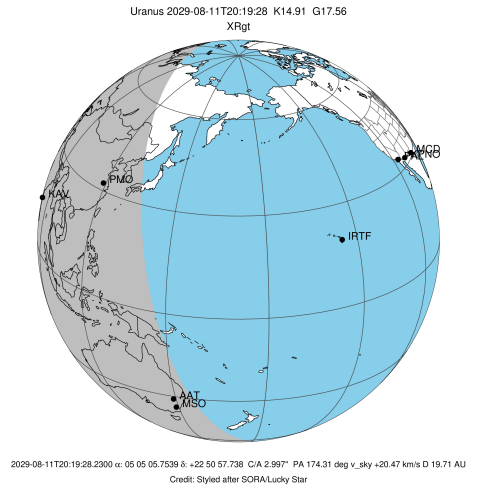


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++		+++++	AUG 11 19:57 - AUG 11 20:34	PnnRie
KPNO	Kitt Peak Natl Obs	32.0	248.4					PnnRnn
MCD	McDonald Obs. 2.7m	30.7	256.0					PnnRnn
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8			++	AUG 11 20:32 - AUG 11 20:33	PnnRne
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European Southern Obs	-29.3	289.3					PnnRnn
AAT	Siding Spring (AAT)	-31.3	149.1	+++++			AUG 11 19:49 - AUG 11 20:03	PnnRin
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++			AUG 11 19:49 - AUG 11 20:03	PnnRin



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-08-11T20:16:21.890
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3418300355615846144
 2Mass ID (if available) : 05050575+2250577
 ICRS Star Coord at Epoch: 05h 05m 05.75392s +22:50:57.73781s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.910
 G magnitude : 17.556
 RP magnitude : 16.775
 BP magnitude : 18.196
 DUPflag : 0
 Distance (au) : 19.707
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 20.47
 Sun-Target sep (deg) : 61.66
 Sun-Moon sep (deg) : 85.93
 B (ring opening deg) : 82.26
 PA of pole (deg) : -7.46
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.151
 C/A sky separation (km) : 45031.7
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.bsp
 earthstns_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

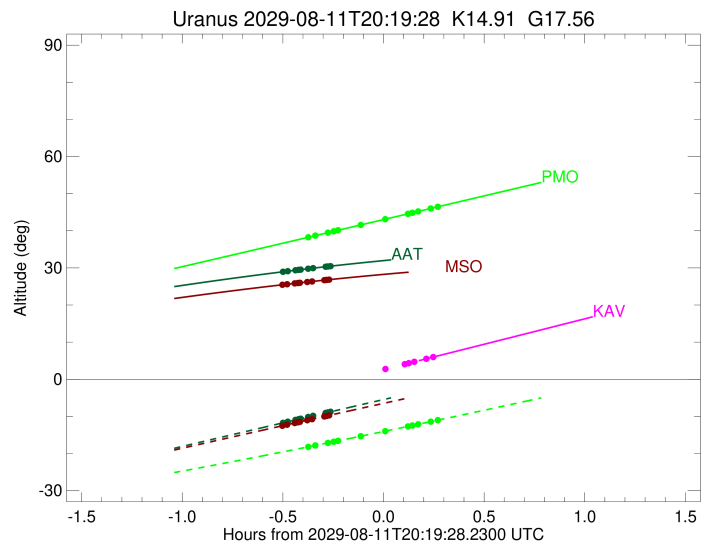
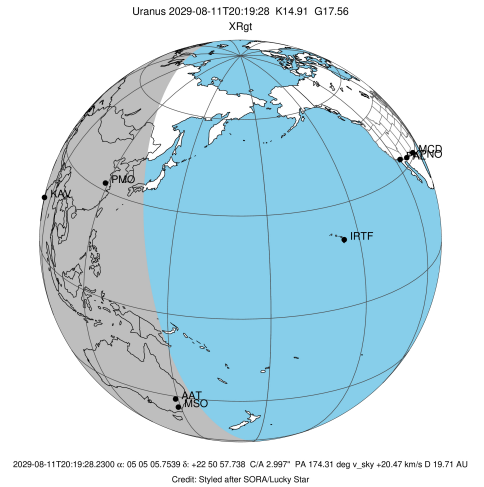


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-08-11T19:57:18.526		38.31	-18.16	51019.88	-9.07		
lambda	I	2029-08-11T19:59:10.878		38.71	-17.82	50026.71	-8.46		
delta	I	2029-08-11T20:02:55.939		39.50	-17.14	48300.35	-6.85		
gamma	I	2029-08-11T20:04:40.448		39.87	-16.82	47626.46	-6.04		
eta	I	2029-08-11T20:05:59.043		40.15	-16.58	47176.12	-5.41		
beta	I	2029-08-11T20:12:42.588		41.58	-15.34	45676.21	-1.97		

No planet occultations

beta	E	2029-08-11T20:20:00.473		43.13	-13.98	45678.50	1.97		
eta	E	2029-08-11T20:26:43.341		44.56	-12.71	47176.12	5.41		
gamma	E	2029-08-11T20:28:02.576		44.84	-12.46	47629.45	6.03		
delta	E	2029-08-11T20:29:46.809		45.21	-12.13	48300.35	6.83		
lambda	E	2029-08-11T20:33:32.445		46.01	-11.42	50026.71	8.44		
epsilon	E	2029-08-11T20:34:56.969		46.31	-11.15	50763.88	9.04		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-08-11T20:14:51.160
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 3418300355615846144
 2Mass ID (if available) : 05050575+2250577
 ICRS Star Coord at Epoch: 05h 05m 05.75392s +22:50:57.73781s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.910
 G magnitude : 17.556
 RP magnitude : 16.775
 BP magnitude : 18.196
 DUPflag : 0
 Distance (au) : 19.707
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 20.47
 Sun-Target sep (deg) : 61.66
 Sun-Moon sep (deg) : 85.34
 B (ring opening deg) : 82.26
 PA of pole (deg) : -7.46
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.134
 C/A sky separation (km) : 44795.6
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.bsp
 earthstns_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

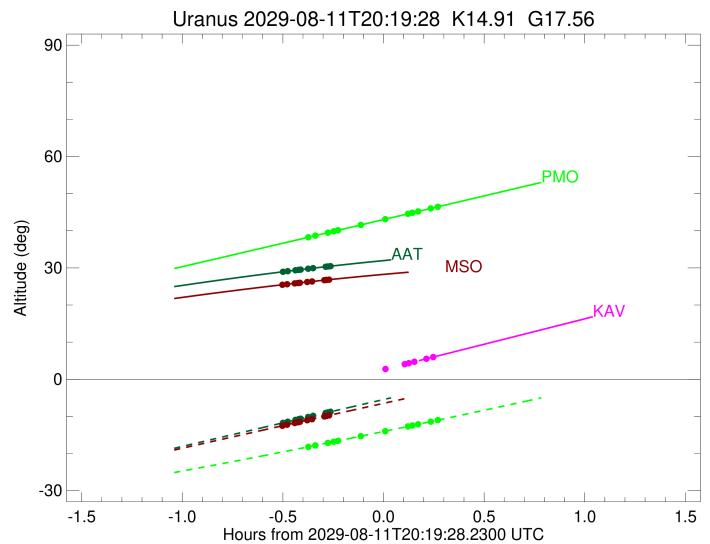
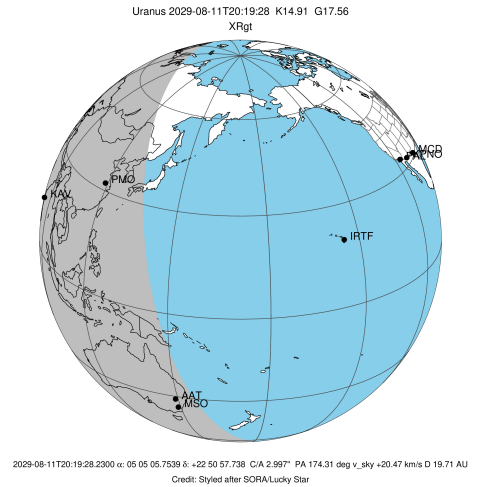


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-08-11T19:55:39.728	-2.72x	-58.04	51023.46	-9.38			
lambda	I	2029-08-11T19:57:28.590	-2.31x	-57.81	50026.71	-8.79			
delta	I	2029-08-11T20:01:03.998	-1.51x	-57.34	48300.35	-7.21			
gamma	I	2029-08-11T20:02:42.667	-1.14x	-57.12	47626.38	-6.44			
eta	I	2029-08-11T20:03:55.934	-0.87x	-56.95	47176.12	-5.85			
beta	I	2029-08-11T20:09:37.824	0.41x	-56.15	45675.63	-2.89			

No planet occultations

beta	E	2029-08-11T20:20:03.997	2.76x	-54.58	45678.94	2.88			
eta	E	2029-08-11T20:25:45.356	4.05x	-53.68	47176.12	5.83			
gamma	E	2029-08-11T20:26:59.297	4.33x	-53.48	47629.52	6.43			
delta	E	2029-08-11T20:28:37.754	4.70x	-53.21	48300.35	7.19			
lambda	E	2029-08-11T20:32:13.895	5.51	-52.61	50026.71	8.75			
epsilon	E	2029-08-11T20:33:35.386	5.82	-52.38	50762.41	9.34			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-08-11T20:17:31.180
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 3418300355615846144
 2Mass ID (if available) : 05050575+2250577
 ICRS Star Coord at Epoch: 05h 05m 05.75392s +22:50:57.73781s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.910
 G magnitude : 17.556
 RP magnitude : 16.775
 BP magnitude : 18.196
 DUPflag : 0
 Distance (au) : 19.707
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 20.47
 Sun-Target sep (deg) : 61.66
 Sun-Moon sep (deg) : 85.76
 B (ring opening deg) : 82.26
 PA of pole (deg) : -7.46
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.660
 C/A sky separation (km) : 38014.7
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.bsp
 earthstns_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

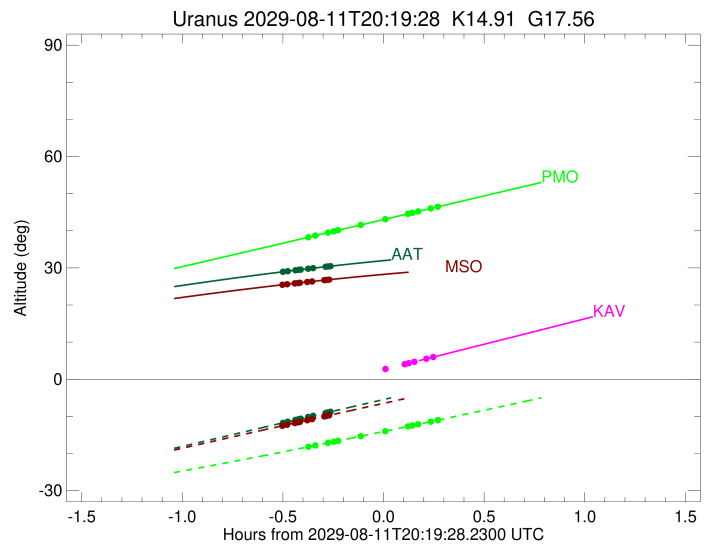
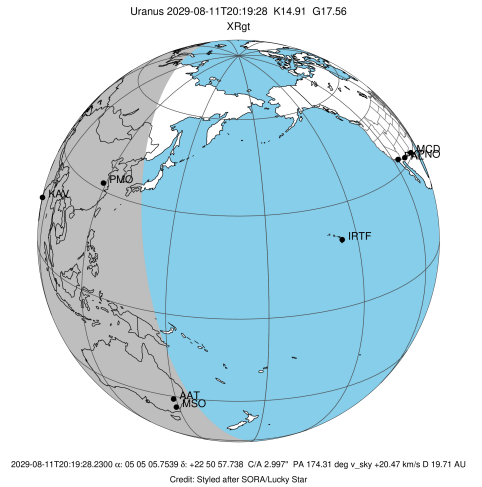


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-08-11T19:49:33.514		28.96	-11.73	51120.04	-13.19		
lambda	I	2029-08-11T19:50:56.857		29.12	-11.43	50026.71	-12.92		
delta	I	2029-08-11T19:53:14.061		29.37	-10.95	48300.35	-12.23		
gamma	I	2029-08-11T19:54:09.996		29.47	-10.76	47624.71	-11.93		
eta	I	2029-08-11T19:54:47.949		29.54	-10.62	47176.12	-11.71		
beta	I	2029-08-11T19:57:01.104		29.78	-10.16	45668.40	-10.92		
alpha	I	2029-08-11T19:58:32.020		29.94	-9.84	44701.91	-10.31		
4	I	2029-08-11T20:02:16.347		30.32	-9.06	42564.92	-8.72		
5	I	2029-08-11T20:02:53.826		30.39	-8.92	42239.33	-8.44		
6	I	2029-08-11T20:03:43.111		30.47	-8.75	41842.98	-8.03		

No planet occultations

6	E	2029-08-11T20:31:21.403		32.95	-3.01x	41871.98	8.02		
5	E	2029-08-11T20:32:14.450		33.02	-2.83x	42298.86	8.43		
4	E	2029-08-11T20:32:48.957		33.06	-2.71x	42602.36	8.71		
alpha	E	2029-08-11T20:36:27.812		33.33	-1.96x	44684.62	10.29		
beta	E	2029-08-11T20:38:01.873		33.44	-1.64x	45681.20	10.90		
eta	E	2029-08-11T20:40:14.157		33.60	-1.18x	47176.12	11.69		
gamma	E	2029-08-11T20:40:52.697		33.64	-1.05x	47630.65	11.90		
delta	E	2029-08-11T20:41:48.268		33.71	-0.86x	48300.35	12.20		
lambda	E	2029-08-11T20:44:05.825		33.86	-0.39x	50026.71	12.89		
epsilon	E	2029-08-11T20:45:00.969		33.92	-0.21x	50744.53	13.15		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-08-11T20:17:33.960
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : MSO
 Location : Mt. Stromlo Observatory
 Latitude (deg) : -35.32000
 E. Longitude (deg) : 149.00833
 Altitude (km) : 0.770
 Gaia source ID : 3418300355615846144
 2Mass ID (if available) : 05050575+2250577
 ICRS Star Coord at Epoch: 05h 05m 05.75392s +22:50:57.73781s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.910
 G magnitude : 17.556
 RP magnitude : 16.775
 BP magnitude : 18.196
 DUPflag : 0
 Distance (au) : 19.707
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 20.47
 Sun-Target sep (deg) : 61.66
 Sun-Moon sep (deg) : 85.70
 B (ring opening deg) : 82.26
 PA of pole (deg) : -7.46
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.641
 C/A sky separation (km) : 37751.1
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.bsp
 earthstns_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-08-11T19:49:22.463		25.46	-12.52	51123.34	-13.32		
lambda	I	2029-08-11T19:50:45.218		25.60	-12.24	50026.71	-13.06		
delta	I	2029-08-11T19:53:00.860		25.83	-11.79	48300.35	-12.38		
gamma	I	2029-08-11T19:53:56.081		25.93	-11.60	47624.66	-12.09		
eta	I	2029-08-11T19:54:33.512		25.99	-11.47	47176.12	-11.88		
beta	I	2029-08-11T19:56:44.633		26.21	-11.04	45668.19	-11.11		
alpha	I	2029-08-11T19:58:13.840		26.35	-10.74	44702.26	-10.52		
4	I	2029-08-11T20:01:52.875		26.70	-10.00	42564.27	-8.98		
5	I	2029-08-11T20:02:29.282		26.76	-9.88	42238.13	-8.72		
6	I	2029-08-11T20:03:16.831		26.83	-9.72	41842.31	-8.32		

No planet occultations

6	E	2029-08-11T20:31:53.274		29.20	-4.03x	41872.35	8.31		
5	E	2029-08-11T20:32:44.578		29.26	-3.87x	42299.56	8.71		
4	E	2029-08-11T20:33:18.014		29.30	-3.76x	42602.82	8.97		
alpha	E	2029-08-11T20:36:51.569		29.54	-3.06x	44684.63	10.50		
beta	E	2029-08-11T20:38:23.912		29.64	-2.75x	45681.21	11.09		
eta	E	2029-08-11T20:40:34.154		29.78	-2.33x	47176.12	11.85		
gamma	E	2029-08-11T20:41:12.169		29.82	-2.20x	47630.68	12.06		
delta	E	2029-08-11T20:42:07.021		29.88	-2.02x	48300.35	12.35		
lambda	E	2029-08-11T20:44:23.005		30.02	-1.58x	50026.71	13.03		
epsilon	E	2029-08-11T20:45:17.568		30.07	-1.40x	50744.32	13.28		