

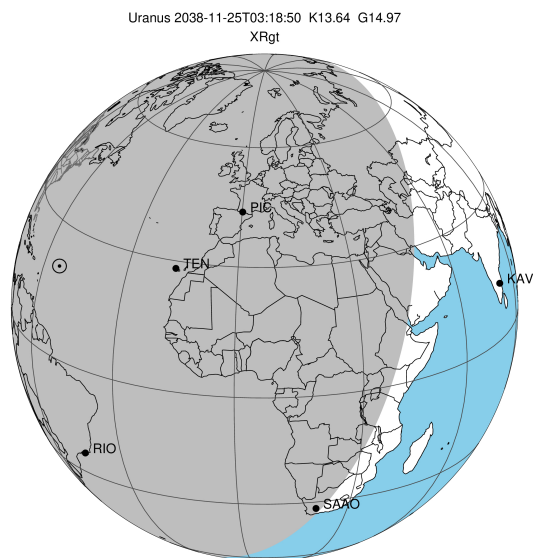
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-11-25T03:18:50.270
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 670875098522723072
 2Mass ID (if available) : 08010154+2104154

ICRS Star Coord at Epoch: 08h 01m 01.56144s +21:04:15.43721s

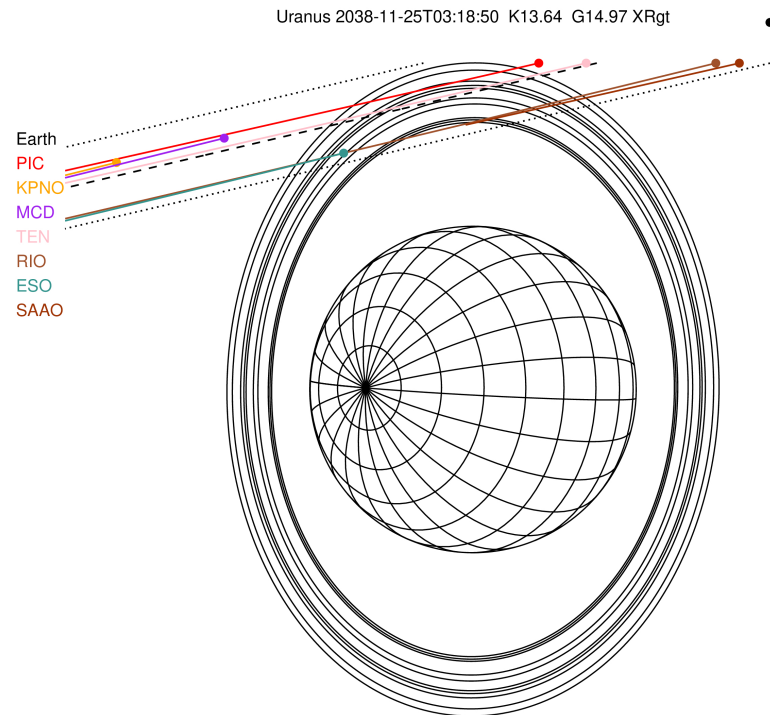
RUWE (>1.4 is poor) : 0.97
 K magnitude : 13.636
 G magnitude : 14.972
 RP magnitude : 14.523
 BP magnitude : 15.258
 DUPflag : 0
 Distance (au) : 18.078
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -10.29
 Sun-Target sep (deg) : 124.36
 Sun-Moon sep (deg) : 103.90
 B (ring opening deg) : 48.88
 PA of pole (deg) : 89.15

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

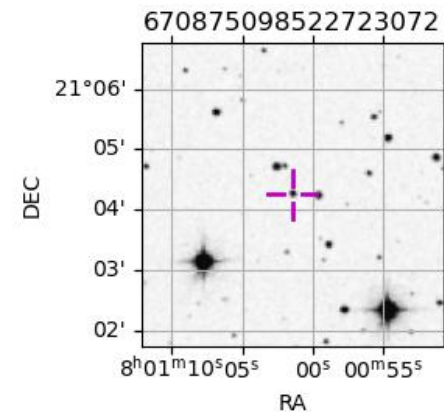


2038-11-25T03:18:50.2700 ex: 08 01 01.5614 s: +21 04 15.437 C/A 3.472° PA 193.22 deg v_sky -10.29 km/s D 18.08 AU
 Credit: Styled after SORA/Lucky Star

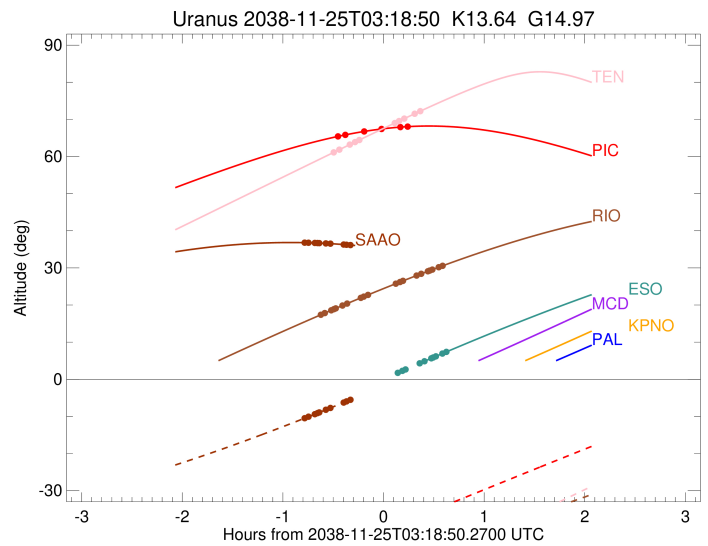
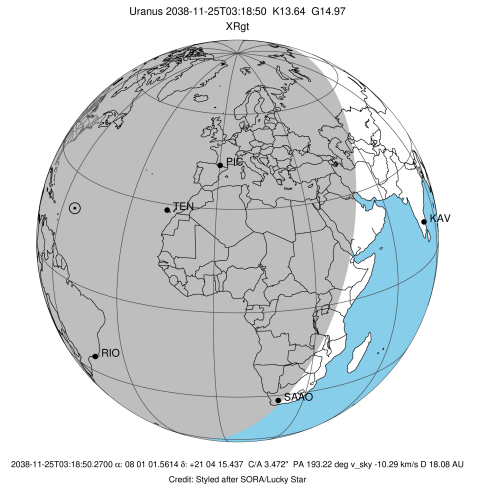


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEncode
PIC	Pic du Midi	42.9	0.1	+++		+++	NOV 25 02:51 - NOV 25 03:33	PnnRie
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
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	+++++		+++++	NOV 25 02:49 - NOV 25 03:41	PnnRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++++		+++++	NOV 25 02:41 - NOV 25 03:54	PnnRie
ESO	European Southern Obs	-29.3	289.3			+++++	NOV 25 03:47 - NOV 25 03:56	PnnRne
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	+++++			NOV 25 02:32 - NOV 25 02:59	PnnRin
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-11-25T03:20:05.230
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 670875098522723072
 2Mass ID (if available) : 08010154+2104154
 ICRS Star Coord at Epoch: 08h 01m 01.56144s +21:04:15.43721s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 13.636
 G magnitude : 14.972
 RP magnitude : 14.523
 BP magnitude : 15.258
 DUPflag : 0
 Distance (au) : 18.078
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -10.29
 Sun-Target sep (deg) : 124.36
 Sun-Moon sep (deg) : 104.77
 B (ring opening deg) : 48.88
 PA of pole (deg) : 89.15
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.624
 C/A sky separation (km) : 47517.3
 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



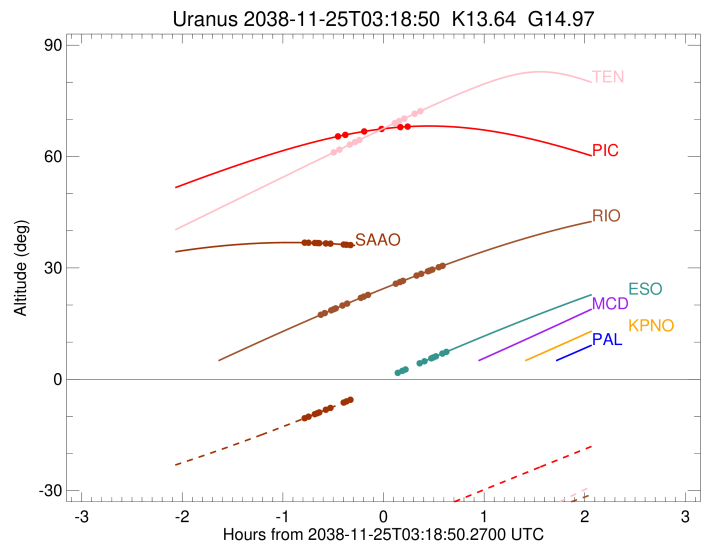
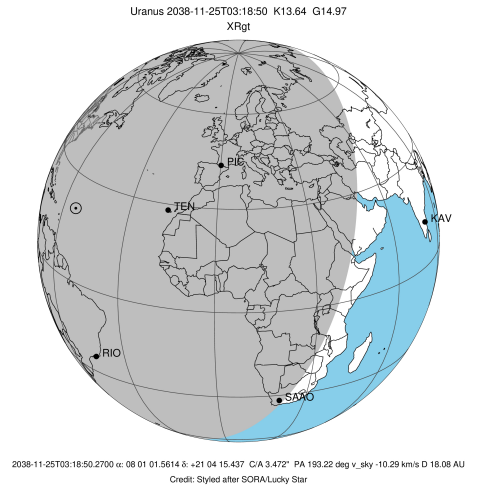
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-11-25T02:51:58.619		65.45	-45.54	51085.87	-4.78		
lambda	I	2038-11-25T02:56:08.049		65.84	-44.80	50026.71	-3.81		
delta	I	2038-11-25T03:07:31.159		66.77	-42.76	48300.35	-1.20		

No planet occultations

delta	E	2038-11-25T03:17:27.665		67.41	-40.97	48300.35	1.20		
lambda	E	2038-11-25T03:28:50.180		67.92	-38.90	50026.71	3.81		
epsilon	E	2038-11-25T03:33:56.322		68.07	-37.97	51358.70	4.79		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-11-25T03:22:21.560
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 670875098522723072
 2Mass ID (if available) : 08010154+2104154
 ICRS Star Coord at Epoch: 08h 01m 01.56144s +21:04:15.43721s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 13.636
 G magnitude : 14.972
 RP magnitude : 14.523
 BP magnitude : 15.258
 DUPflag : 0
 Distance (au) : 18.078
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -10.29
 Sun-Target sep (deg) : 124.36
 Sun-Moon sep (deg) : 104.71
 B (ring opening deg) : 48.88
 PA of pole (deg) : 89.15
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.489
 C/A sky separation (km) : 45752.3
 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

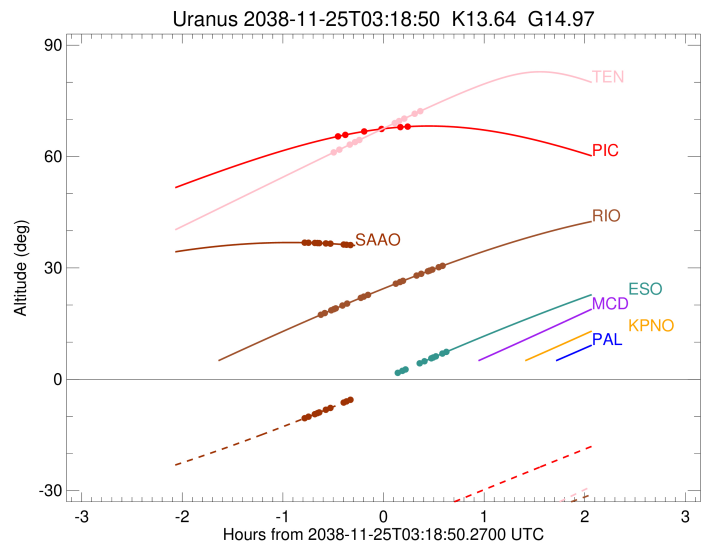
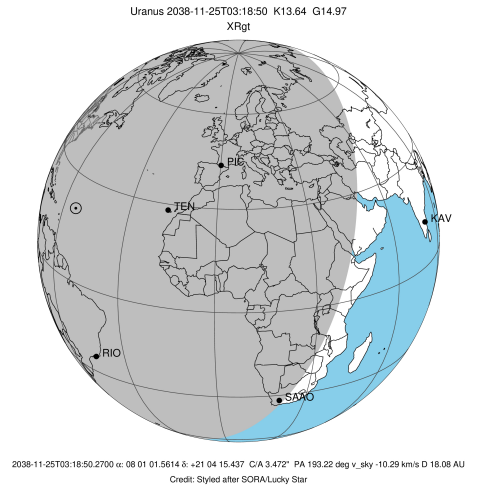


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-11-25T02:49:29.319		61.19	-62.51	51051.16	-5.95		
lambda	I	2038-11-25T02:52:33.651		61.86	-61.84	50026.71	-5.26		
delta	I	2038-11-25T02:58:48.478		63.23	-60.48	48300.35	-3.93		
gamma	I	2038-11-25T03:01:57.869		63.92	-59.79	47623.43	-3.21		
eta	I	2038-11-25T03:04:31.586		64.48	-59.23	47176.12	-2.61		

No planet occultations

eta	E	2038-11-25T03:25:27.103		68.99	-54.63	47176.12	2.61		
gamma	E	2038-11-25T03:28:01.211		69.54	-54.07	47625.73	3.22		
delta	E	2038-11-25T03:31:09.394		70.20	-53.38	48300.35	3.94		
lambda	E	2038-11-25T03:37:22.931		71.51	-52.01	50026.71	5.28		
epsilon	E	2038-11-25T03:41:23.201		72.35	-51.12	51389.79	5.98		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-11-25T03:24:41.710
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 670875098522723072
 2Mass ID (if available) : 08010154+2104154
 ICRS Star Coord at Epoch: 08h 01m 01.56144s +21:04:15.43721s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 13.636
 G magnitude : 14.972
 RP magnitude : 14.523
 BP magnitude : 15.258
 DUPflag : 0
 Distance (au) : 18.078
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -10.29
 Sun-Target sep (deg) : 124.36
 Sun-Moon sep (deg) : 104.15
 B (ring opening deg) : 48.88
 PA of pole (deg) : 89.15
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.105
 C/A sky separation (km) : 40713.9
 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

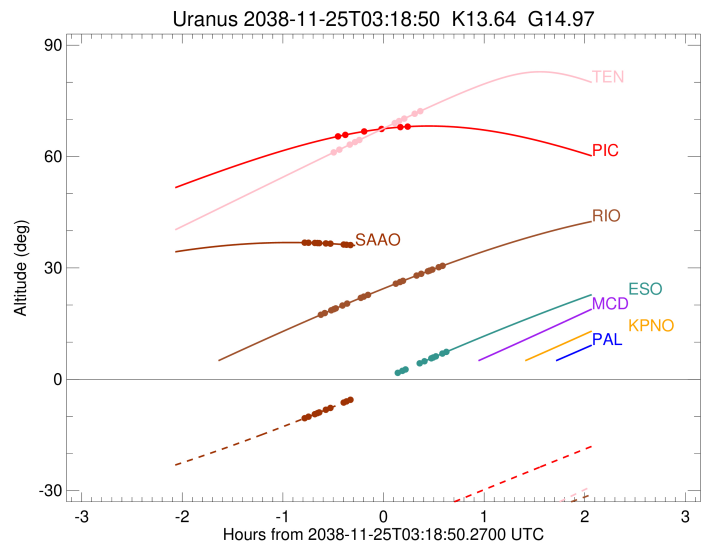
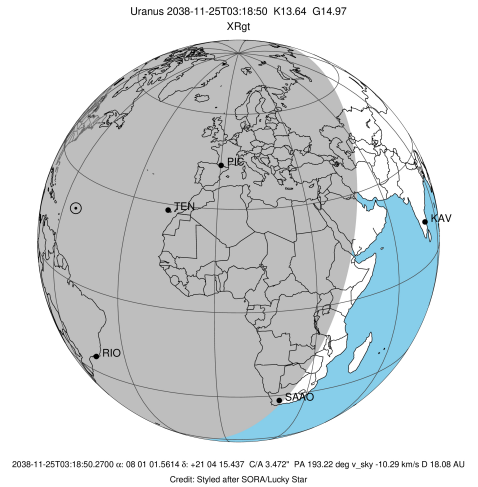


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-11-25T02:41:51.622		17.45	-46.50	50979.32	-8.17		
lambda	I	2038-11-25T02:43:51.519		17.84	-46.49	50026.71	-7.79		
delta	I	2038-11-25T02:47:42.100		18.58	-46.46	48300.35	-7.17		
gamma	I	2038-11-25T02:49:18.575		18.89	-46.44	47622.28	-6.89		
eta	I	2038-11-25T02:50:24.313		19.10	-46.43	47176.12	-6.69		
beta	I	2038-11-25T02:54:22.055		19.86	-46.36	45677.25	-5.92		
alpha	I	2038-11-25T02:57:06.489		20.38	-46.30	44749.43	-5.34		
4	I	2038-11-25T03:05:28.926		21.96	-46.05	42553.12	-3.38		
5	I	2038-11-25T03:06:43.729		22.19	-46.01	42313.58	-3.05		
6	I	2038-11-25T03:09:29.664		22.71	-45.90	41869.13	-2.29		

No planet occultations

6	E	2038-11-25T03:26:06.667		25.74	-45.05	41858.25	2.30		
5	E	2038-11-25T03:29:04.207		26.27	-44.87	42312.98	3.07		
4	E	2038-11-25T03:30:24.761		26.50	-44.78	42574.87	3.39		
alpha	E	2038-11-25T03:38:35.043		27.94	-44.19	44750.17	5.38		
beta	E	2038-11-25T03:41:20.358		28.41	-43.98	45680.65	5.97		
eta	E	2038-11-25T03:45:15.225		29.08	-43.66	47176.12	6.75		
gamma	E	2038-11-25T03:46:21.099		29.27	-43.56	47627.29	6.95		
delta	E	2038-11-25T03:47:55.957		29.54	-43.43	48300.35	7.24		
lambda	E	2038-11-25T03:51:44.197		30.17	-43.09	50026.71	7.88		
epsilon	E	2038-11-25T03:54:39.741		30.66	-42.82	51449.79	8.27		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-11-25T03:26:47.310
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 670875098522723072
 2Mass ID (if available) : 08010154+2104154
 ICRS Star Coord at Epoch: 08h 01m 01.56144s +21:04:15.43721s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 13.636
 G magnitude : 14.972
 RP magnitude : 14.523
 BP magnitude : 15.258
 DUPflag : 0
 Distance (au) : 18.078
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -10.29
 Sun-Target sep (deg) : 124.36
 Sun-Moon sep (deg) : 103.71
 B (ring opening deg) : 48.88
 PA of pole (deg) : 89.15
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.110
 C/A sky separation (km) : 40782.5
 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



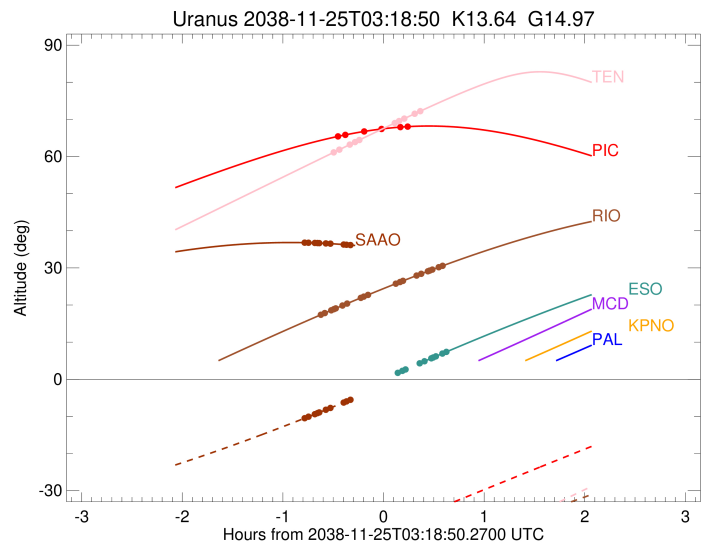
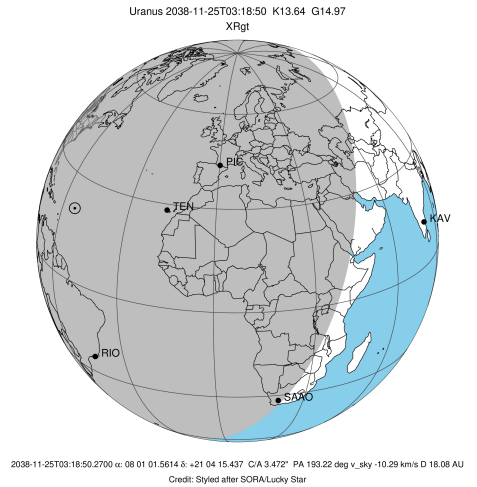
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-11-25T02:43:09.040	-7.21x	-33.93	50982.23	-7.99			
lambda	I	2038-11-25T02:45:12.160	-6.79x	-34.16	50026.71	-7.61			
delta	I	2038-11-25T02:49:08.430	-5.98x	-34.58	48300.35	-6.99			
gamma	I	2038-11-25T02:50:47.381	-5.64x	-34.75	47622.31	-6.71			
eta	I	2038-11-25T02:51:54.857	-5.41x	-34.87	47176.12	-6.51			
beta	I	2038-11-25T02:55:59.221	-4.58x	-35.28	45677.36	-5.75			
alpha	I	2038-11-25T02:58:48.746	-4.01x	-35.56	44749.57	-5.17			
4	I	2038-11-25T03:07:32.203	-2.24x	-36.37	42553.73	-3.19			
5	I	2038-11-25T03:08:51.837	-1.97x	-36.48	42313.83	-2.86			
6	I	2038-11-25T03:11:53.372	-1.36x	-36.75	41868.57	-2.05			

No planet occultations

6	E	2038-11-25T03:27:17.518	1.71x	-37.94	41858.62	2.06			
5	E	2038-11-25T03:30:30.644	2.35x	-38.15	42313.09	2.87			
4	E	2038-11-25T03:31:56.143	2.63x	-38.25	42574.66	3.21			
alpha	E	2038-11-25T03:40:26.549	4.30x	-38.76	44750.18	5.22			
beta	E	2038-11-25T03:43:16.699	4.86x	-38.91	45680.65	5.81			
eta	E	2038-11-25T03:47:17.675	5.64	-39.12	47176.12	6.58			
gamma	E	2038-11-25T03:48:25.145	5.85	-39.17	47627.29	6.79			
delta	E	2038-11-25T03:50:02.227	6.17	-39.25	48300.35	7.07			
lambda	E	2038-11-25T03:53:55.531	6.92	-39.41	50026.71	7.71			
epsilon	E	2038-11-25T03:56:54.815	7.49	-39.53	51450.32	8.10			

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch             : 2038-11-25T03:14:19.400
Event type            : XRgt
: No Uranus occs
: Ring occs: geocentric, topocentric
Observer code         : SAAO
Location              : So. Afr. Astro. Obs. (Sutherland)
Latitude (deg)        : -32.37953
E. Longitude (deg)    : 20.81070
Altitude (km)         : 1.768
Gaia source ID        : 670875098522723072
2Mass ID (if available) : 08010154+2104154
ICRS Star Coord at Epoch: 08h 01m 01.56144s +21:04:15.43721s
RUWE (>1.4 is poor) : 0.97
K magnitude           : 13.636
G magnitude           : 14.972
RP magnitude          : 14.523
BP magnitude          : 15.258
DUPflag              : 0
Distance (au)         : 18.078
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -10.29
Sun-Target sep (deg)  : 124.36
Sun-Moon sep (deg)    : 104.54
B (ring opening deg) : 48.88
PA of pole (deg)      : 89.15
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.103
C/A sky separation (km) : 40691.3
NAIF SPICE kernels    : RAJobs_U111+rgf15.spk
URKALLvl1.spk
ural11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.ural11.bsp
ural61.bsp
vgr2.ural61.bsp
peph.ural60.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	2038-11-25T02:32:12.074		36.79	-10.42	50973.79	-8.32		
lambda	I	2038-11-25T02:34:09.122		36.77	-10.07	50026.71	-7.94		
delta	I	2038-11-25T02:37:55.435		36.72	-9.40	48300.35	-7.31		
gamma	I	2038-11-25T02:39:30.083		36.69	-9.12	47622.23	-7.02		
eta	I	2038-11-25T02:40:34.538		36.67	-8.92	47176.12	-6.82		
beta	I	2038-11-25T02:44:27.477		36.59	-8.22	45677.05	-6.05		
alpha	I	2038-11-25T02:47:08.224		36.53	-7.73	44749.18	-5.47		
4	I	2038-11-25T02:55:15.589		36.29	-6.24	42552.28	-3.53		
5	I	2038-11-25T02:56:26.909		36.25	-6.02	42313.22	-3.21		
6	I	2038-11-25T02:59:01.662		36.15	-5.55	41869.80	-2.49		

No planet occultations

6	E	2038-11-25T03:16:44.805		35.32	-2.22x	41858.22	2.49		
5	E	2038-11-25T03:19:31.881		35.16	-1.69x	42313.02	3.21		
4	E	2038-11-25T03:20:49.020		35.08	-1.45x	42574.72	3.53		
alpha	E	2038-11-25T03:28:47.182		34.57	0.08x	44750.25	5.47		
beta	E	2038-11-25T03:31:30.010		34.38	0.60x	45680.68	6.05		
eta	E	2038-11-25T03:35:22.111		34.10	1.35x	47176.12	6.82		
gamma	E	2038-11-25T03:36:27.327		34.02	1.56x	47627.25	7.02		
delta	E	2038-11-25T03:38:01.330		33.90	1.86x	48300.35	7.30		
lambda	E	2038-11-25T03:41:47.825		33.61	2.60x	50026.71	7.93		
epsilon	E	2038-11-25T03:44:42.006		33.37	3.16x	51447.37	8.31		