

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-01-11T20:25:14.880  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3425422545263482624  
 2Mass ID (if available) : 06122793+2341028

ICRS Star Coord at Epoch: 06h 12m 27.94197s +23:41:02.84496s

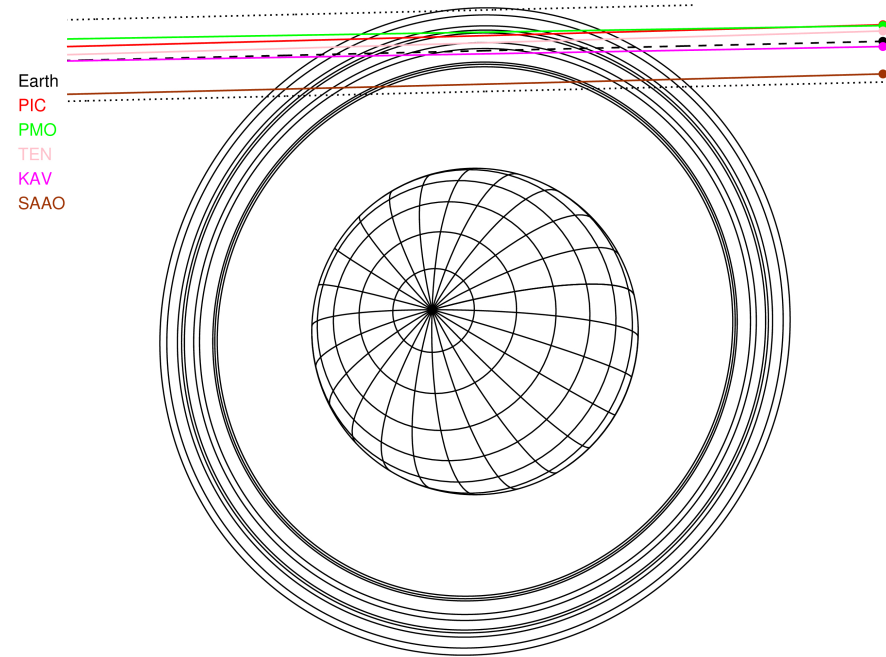
RUWE (>1.4 is poor) : 1.01  
 K magnitude : 14.764  
 G magnitude : 16.862  
 RP magnitude : 16.108  
 BP magnitude : 17.504  
 DUPflag : 0  
 Distance (au) : 18.015  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -21.89  
 Sun-Target sep (deg) : 161.64  
 Sun-Moon sep (deg) : 100.76  
 B (ring opening deg) : 72.86  
 PA of pole (deg) : 63.11

#	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



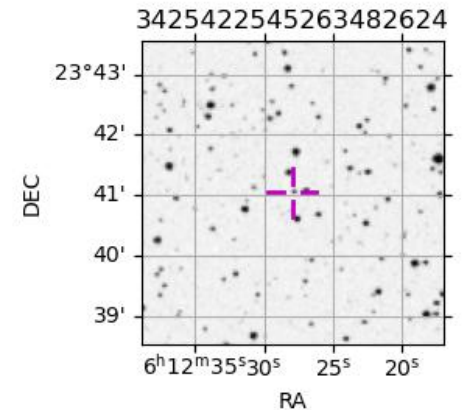
2034-01-11T20:25:14.8800 ra: 06 12 27.9420 s: +23 41 02.845 C/A 3.369° PA 181.35 deg v\_sky -21.89 km/s D 18.01 AU  
 Credit: Styled after SORA/Lucky Star

Uranus 2034-01-11T20:25:14 K14.76 G16.86 XRgt



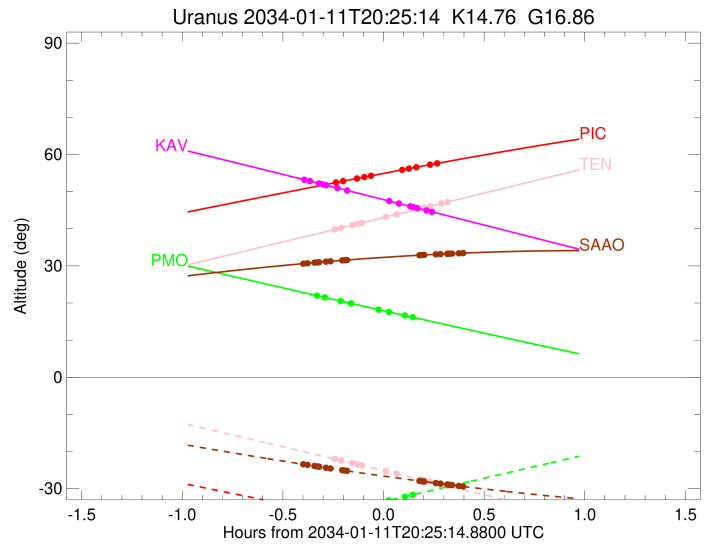
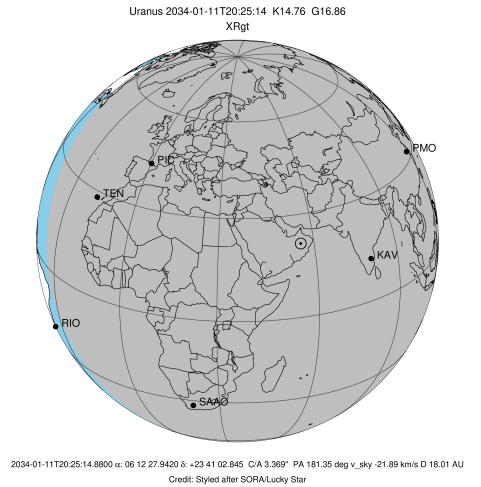
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++		+++++	JAN 11 20:11 - JAN 11 20:40	PnnRie
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	++++		++++	JAN 11 20:06 - JAN 11 20:33	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	+++++		+++++	JAN 11 20:11 - JAN 11 20:43	PnnRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++		+++++	JAN 11 20:02 - JAN 11 20:39	PnnRie
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					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	+++++		+++++	JAN 11 20:01 - JAN 11 20:48	PnnRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2034-01-11T20:27:27.860
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      : 3425422545263482624
2Mass ID (if available) : 06122793+2341028
ICRS Star Coord at Epoch: 06h 12m 27.94197s +23:41:02.84496s
RUWE (>1.4 is poor) : 1.01
K magnitude          : 14.764
G magnitude          : 16.862
RP magnitude         : 16.108
BP magnitude         : 17.504
DUPflag             : 0
Distance (au)       : 18.015
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -21.89
Sun-Target sep (deg) : 161.64
Sun-Moon sep (deg)  : 101.41
B (ring opening deg) : 72.86
PA of pole (deg)    : 63.11
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.542
C/A sky separation (km) : 46276.1
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall1.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall1.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
  
```

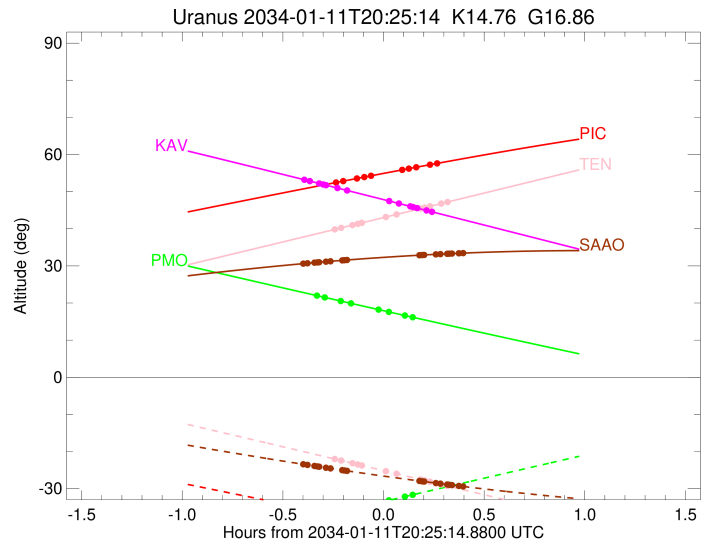
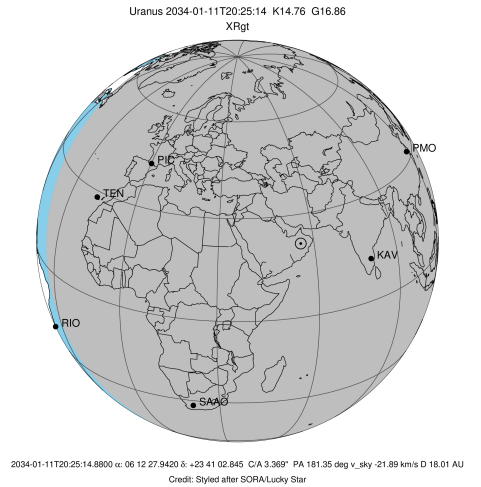


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-01-11T20:11:49.769		52.59	-37.11	50762.62	-8.89		
lambda	I	2034-01-11T20:13:15.722		52.84	-37.37	50026.71	-8.17		
delta	I	2034-01-11T20:17:22.672		53.56	-38.12	48300.35	-5.77		
gamma	I	2034-01-11T20:19:35.918		53.94	-38.53	47624.13	-4.37		
eta	I	2034-01-11T20:21:36.228		54.29	-38.89	47176.12	-3.07		

No planet occultations

eta	E	2034-01-11T20:30:44.589		55.85	-40.56	47176.12	3.07		
gamma	E	2034-01-11T20:32:44.474		56.19	-40.92	47622.47	4.37		
delta	E	2034-01-11T20:34:58.031		56.57	-41.33	48300.35	5.77		
lambda	E	2034-01-11T20:39:04.800		57.26	-42.07	50026.71	8.18		
epsilon	E	2034-01-11T20:40:33.799		57.50	-42.34	50790.65	8.90		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-01-11T20:20:58.300  
 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 : 3425422545263482624  
 2Mass ID (if available) : 06122793+2341028  
 ICRS Star Coord at Epoch: 06h 12m 27.94197s +23:41:02.84496s  
 RUWE (>1.4 is poor) : 1.01  
 K magnitude : 14.764  
 G magnitude : 16.862  
 RP magnitude : 16.108  
 BP magnitude : 17.504  
 DUPflag : 0  
 Distance (au) : 18.014  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -21.89  
 Sun-Target sep (deg) : 161.64  
 Sun-Moon sep (deg) : 101.18  
 B (ring opening deg) : 72.86  
 PA of pole (deg) : 63.11  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 3.585  
 C/A sky separation (km) : 46845.8  
 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



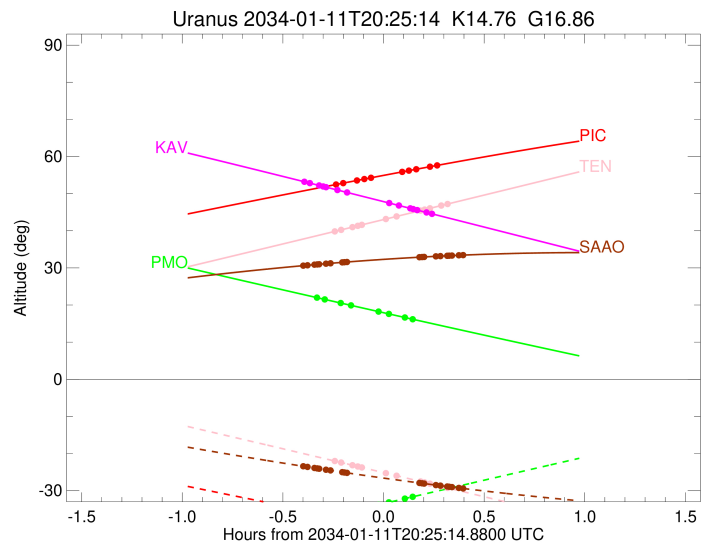
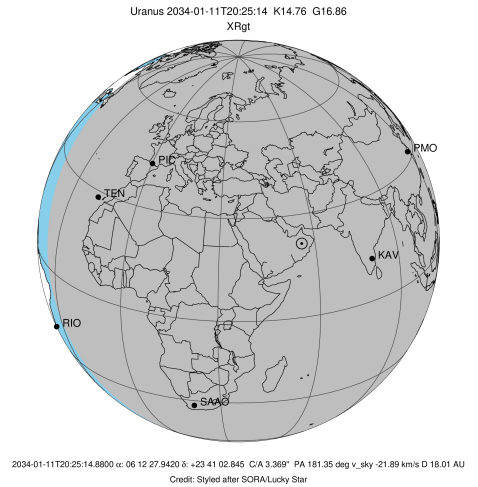
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-01-11T20:06:12.093		21.83	-37.52	50760.37	-8.20		
lambda	I	2034-01-11T20:07:45.793		21.51	-37.19	50026.71	-7.40		
delta	I	2034-01-11T20:12:32.702		20.53	-36.18	48300.35	-4.58		
gamma	I	2034-01-11T20:15:40.535		19.88	-35.52	47623.81	-2.60		

No planet occultations

gamma	E	2034-01-11T20:23:39.589		18.26	-33.83	47622.80	2.60		
delta	E	2034-01-11T20:26:47.987		17.62	-33.17	48300.35	4.58		
lambda	E	2034-01-11T20:31:35.364		16.65	-32.16	50026.71	7.39		
epsilon	E	2034-01-11T20:33:12.075		16.32	-31.82	50783.51	8.19		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-01-11T20:28:48.850  
 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 : 3425422545263482624  
 2Mass ID (if available) : 06122793+2341028  
 ICRS Star Coord at Epoch: 06h 12m 27.94197s +23:41:02.84496s  
 RUWE (>1.4 is poor) : 1.01  
 K magnitude : 14.764  
 G magnitude : 16.862  
 RP magnitude : 16.108  
 BP magnitude : 17.504  
 DUPflag : 0  
 Distance (au) : 18.015  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -21.89  
 Sun-Target sep (deg) : 161.64  
 Sun-Moon sep (deg) : 101.24  
 B (ring opening deg) : 72.86  
 PA of pole (deg) : 63.11  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 3.456  
 C/A sky separation (km) : 45153.1  
 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\_itrfr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk

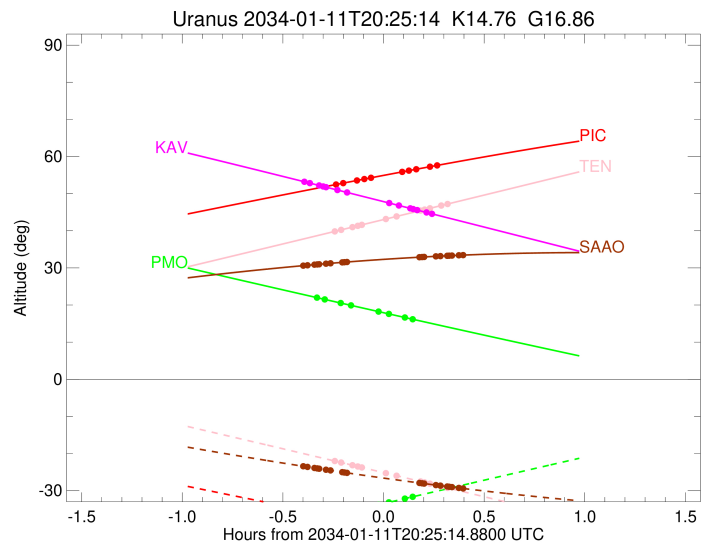
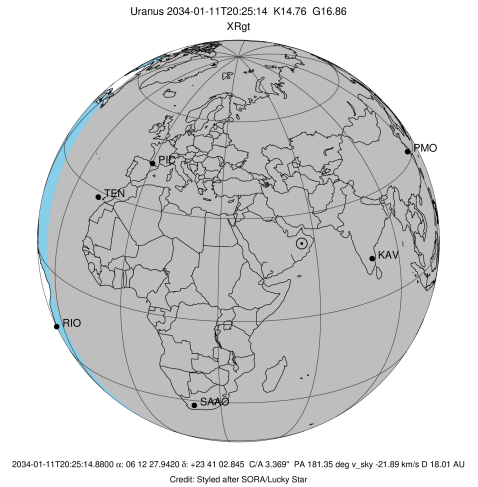


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-01-11T20:11:22.347		39.97	-22.17	50769.45	-10.00		
lambda	I	2034-01-11T20:12:38.647		40.25	-22.44	50026.71	-9.41		
delta	I	2034-01-11T20:16:02.140		40.99	-23.16	48300.35	-7.53		
gamma	I	2034-01-11T20:17:37.907		41.34	-23.51	47624.61	-6.57		
eta	I	2034-01-11T20:18:50.154		41.61	-23.77	47176.12	-5.83		
beta	I	2034-01-11T20:25:53.818		43.16	-25.29	45681.19	-1.14		

No planet occultations

beta	E	2034-01-11T20:29:12.284		43.88	-26.00	45681.22	1.15		
eta	E	2034-01-11T20:36:15.586		45.43	-27.52	47176.12	5.84		
gamma	E	2034-01-11T20:37:27.375		45.69	-27.78	47622.11	6.58		
delta	E	2034-01-11T20:39:03.401		46.05	-28.13	48300.35	7.54		
lambda	E	2034-01-11T20:42:26.579		46.79	-28.86	50026.71	9.42		
epsilon	E	2034-01-11T20:43:45.944		47.08	-29.15	50801.79	10.02		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-01-11T20:21:51.830  
 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 : 3425422545263482624  
 2Mass ID (if available) : 06122793+2341028  
 ICRS Star Coord at Epoch: 06h 12m 27.94197s +23:41:02.84496s  
 RUWE (>1.4 is poor) : 1.01  
 K magnitude : 14.764  
 G magnitude : 16.862  
 RP magnitude : 16.108  
 BP magnitude : 17.504  
 DUPflag : 0  
 Distance (au) : 18.014  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -21.89  
 Sun-Target sep (deg) : 161.64  
 Sun-Moon sep (deg) : 101.54  
 B (ring opening deg) : 72.86  
 PA of pole (deg) : 63.11  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 3.325  
 C/A sky separation (km) : 43447.2  
 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

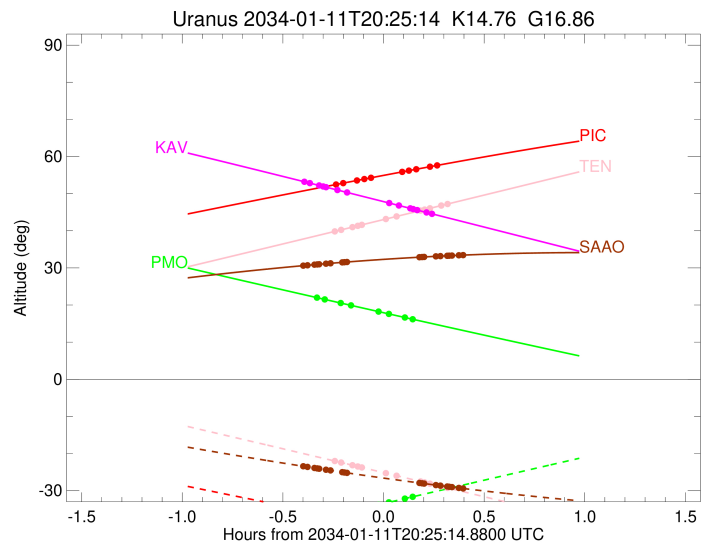
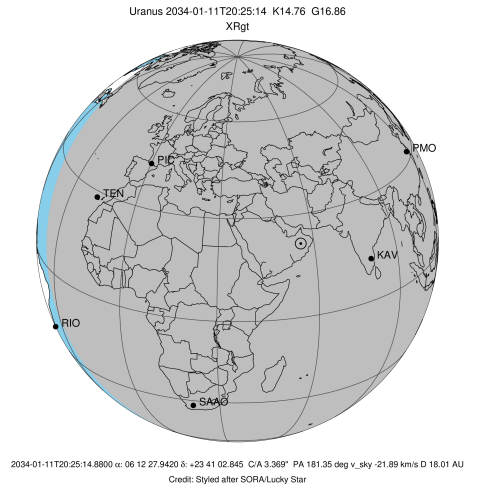
Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-01-11T20:02:11.891	53.08	-71.04	50782.70	-11.54		
lambda	I	2034-01-11T20:03:18.517	52.83	-70.81	50026.71	-11.08		
delta	I	2034-01-11T20:06:04.988	52.21	-70.23	48300.35	-9.64		
gamma	I	2034-01-11T20:07:17.562	51.93	-69.97	47625.22	-8.96		
eta	I	2034-01-11T20:08:09.088	51.74	-69.79	47176.12	-8.47		
beta	I	2034-01-11T20:11:29.766	50.98	-69.07	45680.29	-6.41		
alpha	I	2034-01-11T20:14:26.819	50.31	-68.44	44719.64	-4.45		

No planet occultations

alpha	E	2034-01-11T20:26:56.534	47.47	-65.72	44732.39	4.45		
beta	E	2034-01-11T20:29:51.156	46.81	-65.07	45680.58	6.40		
eta	E	2034-01-11T20:33:12.000	46.05	-64.33	47176.12	8.45		
gamma	E	2034-01-11T20:34:03.234	45.85	-64.14	47621.81	8.95		
delta	E	2034-01-11T20:35:16.324	45.58	-63.87	48300.35	9.62		
lambda	E	2034-01-11T20:38:03.149	44.94	-63.25	50026.71	11.05		
epsilon	E	2034-01-11T20:39:12.749	44.68	-62.99	50815.36	11.52		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2034-01-11T20:26:13.880
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      : 3425422545263482624
2Mass ID (if available) : 06122793+2341028
ICRS Star Coord at Epoch: 06h 12m 27.94197s +23:41:02.84496s
RUWE (>1.4 is poor) : 1.01
K magnitude          : 14.764
G magnitude          : 16.862
RP magnitude         : 16.108
BP magnitude         : 17.504
DUPflag             : 0
Distance (au)       : 18.015
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -21.89
Sun-Target sep (deg) : 161.64
Sun-Moon sep (deg)  : 101.20
B (ring opening deg) : 72.86
PA of pole (deg)    : 63.11
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.961
C/A sky separation (km) : 38684.7
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall1.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall1.bsp
ural61.bsp
vgr2.ural61.bsp
peph.ural60.bsp
earthstns_itrfr93_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	2034-01-11T20:01:42.843		30.64	-23.49	50814.56	-14.67		
lambda	I	2034-01-11T20:02:36.894		30.71	-23.62	50026.71	-14.40		
delta	I	2034-01-11T20:04:40.313		30.87	-23.90	48300.35	-13.56		
gamma	I	2034-01-11T20:05:30.717		30.94	-24.02	47626.28	-13.18		
eta	I	2034-01-11T20:06:05.199		30.98	-24.10	47176.12	-12.92		
beta	I	2034-01-11T20:08:05.613		31.13	-24.37	45678.13	-11.95		
alpha	I	2034-01-11T20:09:29.265		31.24	-24.56	44709.38	-11.22		
4	I	2034-01-11T20:13:03.821		31.50	-25.04	42526.02	-9.09		
5	I	2034-01-11T20:13:30.297		31.53	-25.10	42288.25	-8.79		
6	I	2034-01-11T20:14:24.038		31.59	-25.22	41830.27	-8.25		

No planet occultations

6	E	2034-01-11T20:35:59.804		32.88	-27.93	41860.02	8.25		
5	E	2034-01-11T20:36:43.235		32.92	-28.02	42230.63	8.79		
4	E	2034-01-11T20:37:16.226		32.95	-28.09	42538.00	9.10		
alpha	E	2034-01-11T20:40:52.491		33.11	-28.51	44741.42	11.22		
beta	E	2034-01-11T20:42:13.462		33.17	-28.66	45678.53	11.95		
eta	E	2034-01-11T20:44:13.712		33.26	-28.89	47176.12	12.93		
gamma	E	2034-01-11T20:44:47.797		33.28	-28.95	47621.30	13.19		
delta	E	2034-01-11T20:45:38.549		33.32	-29.05	48300.35	13.57		
lambda	E	2034-01-11T20:47:41.891		33.40	-29.27	50026.71	14.41		
epsilon	E	2034-01-11T20:48:38.959		33.43	-29.38	50859.63	14.68		