

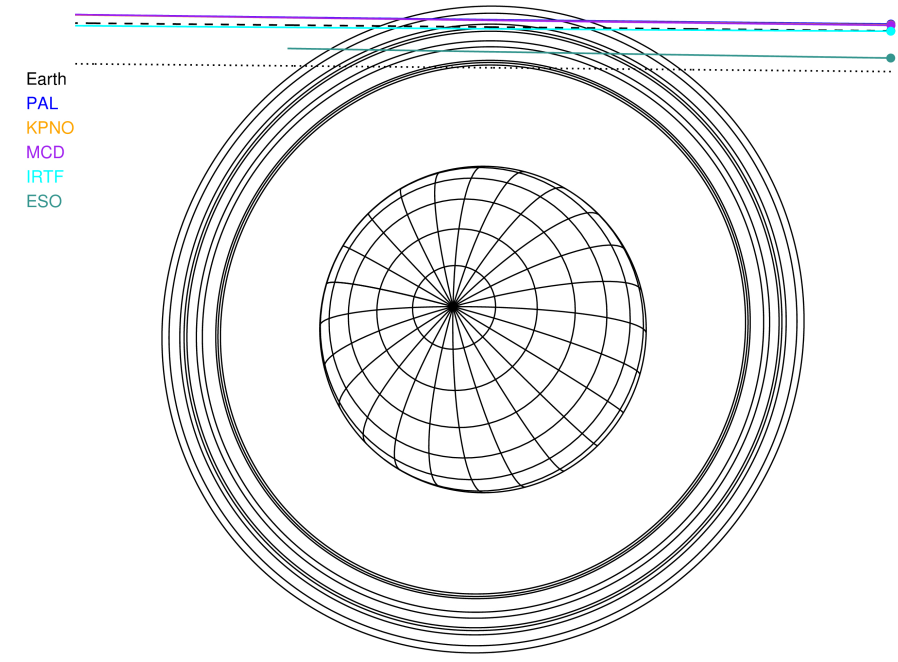
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-07T07:46:57.010
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3427825768443978624
 2Mass ID (if available) : 05530891+2338457

ICRS Star Coord at Epoch: 05h 53m 08.90485s +23:38:45.62823s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 14.787
 G magnitude : 17.515
 RP magnitude : 16.657
 BP magnitude : 18.315
 DUPflag : 0
 Distance (au) : 18.081
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.90
 Sun-Target sep (deg) : 161.57
 Sun-Moon sep (deg) : 82.28
 B (ring opening deg) : 76.64
 PA of pole (deg) : 52.65
 # a(km) ring



2033-01-07T07:46:57.0100 ra: 05 53 08.9048 s: +23 38 45.628 C/A 3.620" PA 179.45 deg v_sky -21.90 km/s D 18.08 AU
 Credit: Styled after SORA/Lucky Star

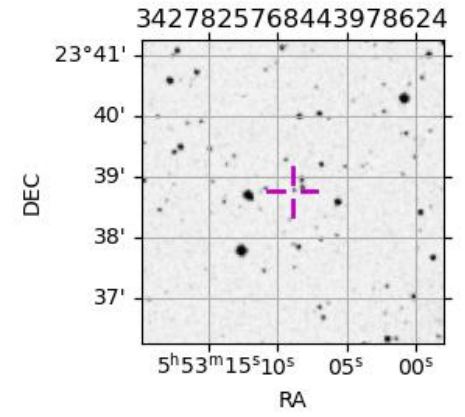
Uranus 2033-01-07T07:46:57 K14.79 G17.52 XRgt



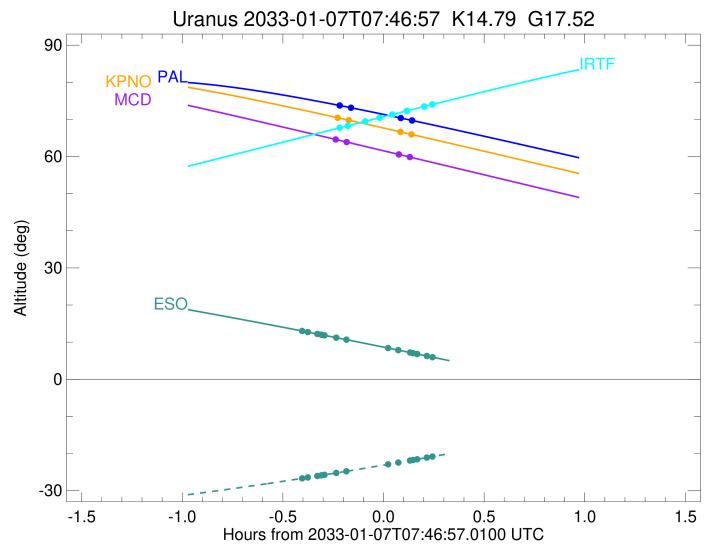
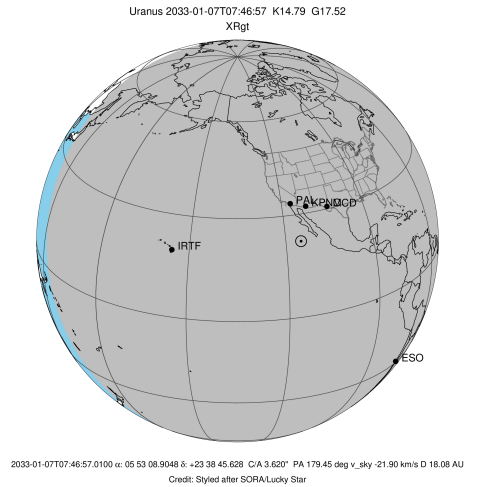
- 1 41837.2 6
- 2 42235.0 5
- 3 42571.2 4
- 4 44718.5 alpha
- 5 45661.1 beta
- 6 47176.1 eta
- 7 47626.3 gamma
- 8 48300.3 delta
- 9 50026.7 lambda
- 10 51149.4 epsilon

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	++		++	JAN 07 07:33 - JAN 07 07:56	PnnRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	++		++	JAN 07 07:32 - JAN 07 07:56	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	++		++	JAN 07 07:32 - JAN 07 07:55	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	++++		++++	JAN 07 07:33 - JAN 07 08:02	PnnRie
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European Southern Obs	-29.3	289.3	+++++++		+++++++	JAN 07 07:22 - JAN 07 08:02	PnnRie
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-07T07:45:37.060
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3427825768443978624
 2Mass ID (if available) : 05530891+2338457
 ICRS Star Coord at Epoch: 05h 53m 08.90485s +23:38:45.62823s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 14.787
 G magnitude : 17.515
 RP magnitude : 16.657
 BP magnitude : 18.315
 DUPflag : 0
 Distance (au) : 18.081
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.90
 Sun-Target sep (deg) : 161.57
 Sun-Moon sep (deg) : 83.24
 B (ring opening deg) : 76.64
 PA of pole (deg) : 52.65
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.701
 C/A sky separation (km) : 48527.0
 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



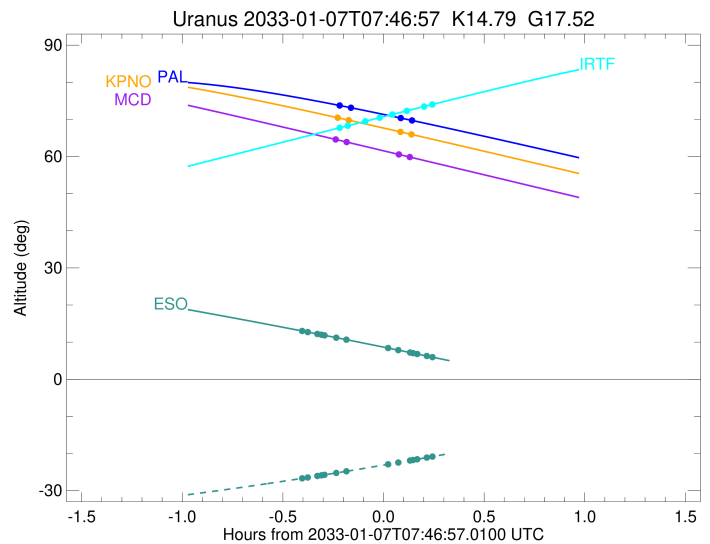
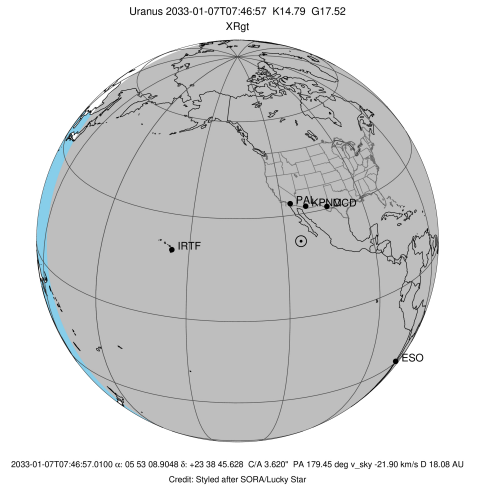
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-01-07T07:33:15.315		73.86	-78.23	51414.57	-6.99		
lambda	I	2033-01-07T07:37:18.030		73.13	-78.54	50026.71	-4.55		

No planet occultations

lambda	E	2033-01-07T07:52:02.497		70.38	-79.12	50026.71	4.55		
epsilon	E	2033-01-07T07:56:24.044		69.54	-79.11	51544.31	6.98		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-01-07T07:45:13.620
Event type          : XRgt
: No Uranus occs
: Ring occs: geocentric, topocentric
Observer code       : KPNO
Location            : Kitt Peak Natl Obs
Latitude (deg)      : 31.96333
E. Longitude (deg)  : 248.40000
Altitude (km)       : 2.120
Gaia source ID      : 3427825768443978624
2Mass ID (if available) : 05530891+2338457
ICRS Star Coord at Epoch: 05h 53m 08.90485s +23:38:45.62823s
RUWE (>1.4 is poor) : 1.06
K magnitude         : 14.787
G magnitude         : 17.515
RP magnitude        : 16.657
BP magnitude        : 18.315
DUPflag            : 0
Distance (au)       : 18.081
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -21.90
Sun-Target sep (deg) : 161.57
Sun-Moon sep (deg)  : 83.23
B (ring opening deg) : 76.64
PA of pole (deg)    : 52.65
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.694
C/A sky separation (km) : 48441.9
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl.spk
urall1.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall1.bsp
ural161.bsp
vgr2.ural161.bsp
peph.ural160.bsp
earthstns_itrf93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
    
```

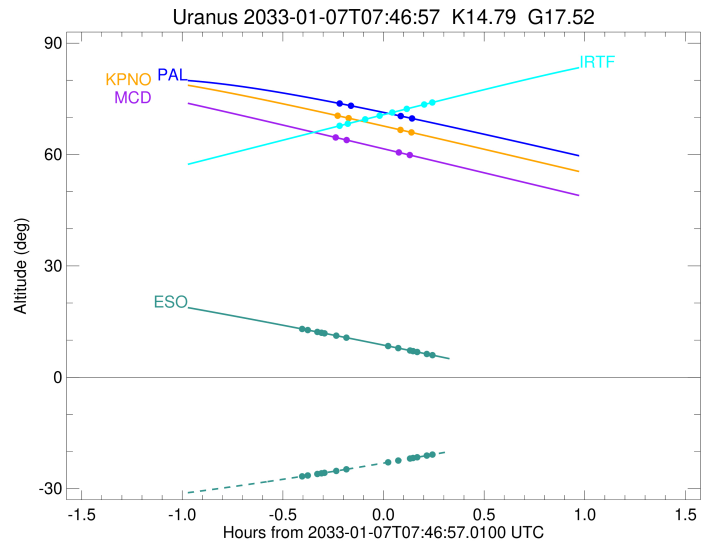
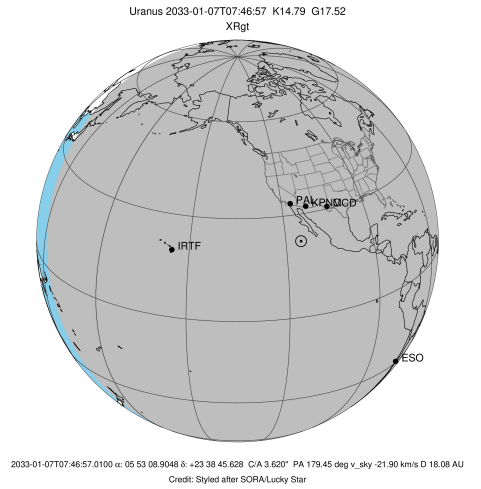


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-01-07T07:32:40.151		70.58	-80.52	51412.70	-7.10		
lambda	I	2033-01-07T07:36:36.311		69.79	-80.48	50026.71	-4.73		

No planet occultations

lambda	E	2033-01-07T07:51:57.577		66.65	-79.60	50026.71	4.73		
epsilon	E	2033-01-07T07:56:12.627		65.77	-79.18	51544.75	7.10		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-07T07:44:41.280
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 3427825768443978624
 2Mass ID (if available) : 05530891+2338457
 ICRS Star Coord at Epoch: 05h 53m 08.90485s +23:38:45.62823s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 14.787
 G magnitude : 17.515
 RP magnitude : 16.657
 BP magnitude : 18.315
 DUPflag : 0
 Distance (au) : 18.081
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.90
 Sun-Target sep (deg) : 161.57
 Sun-Moon sep (deg) : 83.20
 B (ring opening deg) : 76.64
 PA of pole (deg) : 52.65
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.693
 C/A sky separation (km) : 48427.6
 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

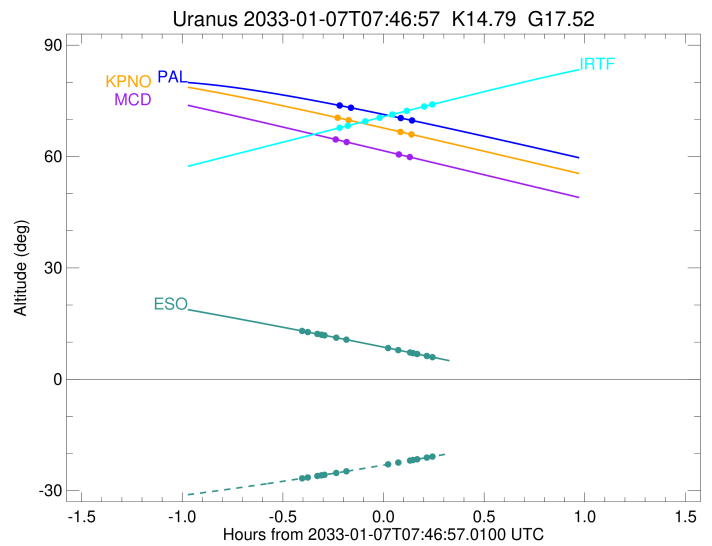
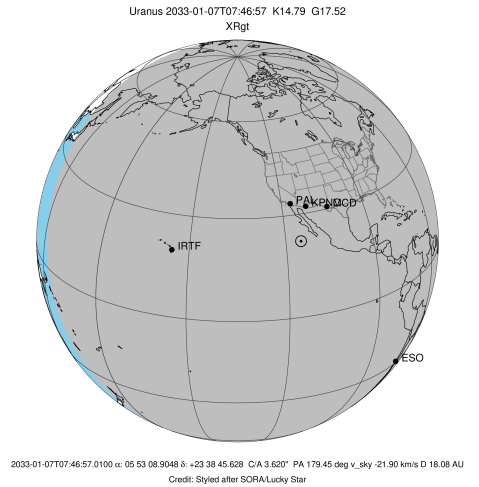


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-01-07T07:32:05.246		64.73	-79.46	51412.13	-7.12		
lambda	I	2033-01-07T07:36:00.408		63.89	-78.88	50026.71	-4.76		

No planet occultations

lambda	E	2033-01-07T07:51:28.848		60.57	-76.31	50026.71	4.76		
epsilon	E	2033-01-07T07:55:42.990		59.66	-75.54	51544.76	7.11		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-07T07:48:36.510
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 3427825768443978624
 2Mass ID (if available) : 05530891+2338457
 ICRS Star Coord at Epoch: 05h 53m 08.90485s +23:38:45.62823s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 14.787
 G magnitude : 17.515
 RP magnitude : 16.657
 BP magnitude : 18.315
 DUPflag : 0
 Distance (au) : 18.081
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.90
 Sun-Target sep (deg) : 161.57
 Sun-Moon sep (deg) : 83.17
 B (ring opening deg) : 76.64
 PA of pole (deg) : 52.65
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.591
 C/A sky separation (km) : 47094.9
 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



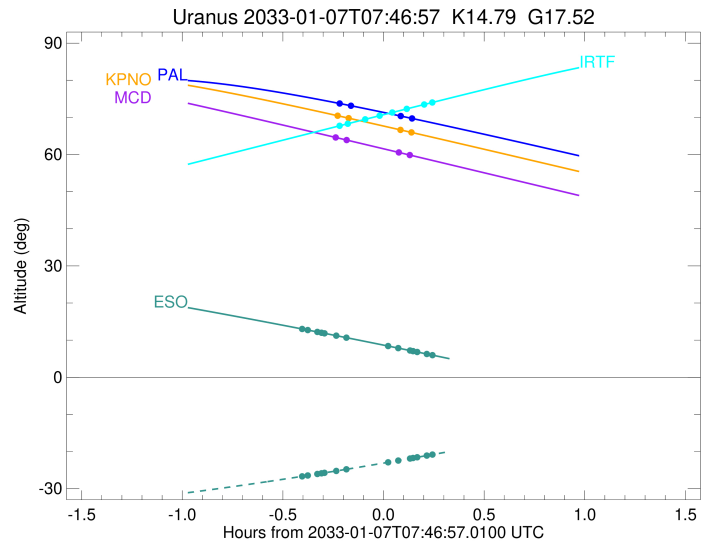
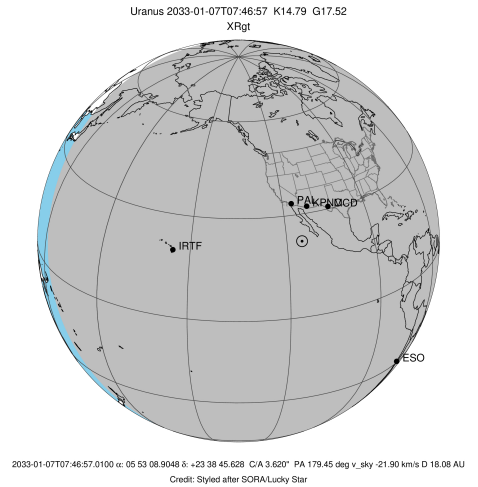
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-01-07T07:33:25.437	67.64	-49.27	51390.31	-8.72		
lambda	I	2033-01-07T07:36:19.804	68.30	-49.94	50026.71	-7.03		
delta	I	2033-01-07T07:41:33.274	69.50	-51.15	48300.35	-3.93		
gamma	I	2033-01-07T07:45:57.495	70.50	-52.16	47629.74	-1.12		

No planet occultations

gamma	E	2033-01-07T07:49:24.666	71.28	-52.96	47629.33	1.12		
delta	E	2033-01-07T07:53:49.204	72.29	-53.98	48300.35	3.93		
lambda	E	2033-01-07T07:59:02.536	73.47	-55.18	50026.71	7.03		
epsilon	E	2033-01-07T08:02:15.300	74.19	-55.92	51550.90	8.73		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-07T07:42:57.550
 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 : 3427825768443978624
 2Mass ID (if available) : 05530891+2338457
 ICRS Star Coord at Epoch: 05h 53m 08.90485s +23:38:45.62823s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 14.787
 G magnitude : 17.515
 RP magnitude : 16.657
 BP magnitude : 18.315
 DUPflag : 0
 Distance (au) : 18.081
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.90
 Sun-Target sep (deg) : 161.57
 Sun-Moon sep (deg) : 82.53
 B (ring opening deg) : 76.64
 PA of pole (deg) : 52.65
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.318
 C/A sky separation (km) : 43508.3
 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	2033-01-07T07:22:27.003		13.05	-26.73	51333.26	-11.78		
lambda	I	2033-01-07T07:24:23.553		12.71	-26.45	50026.71	-10.76		
delta	I	2033-01-07T07:27:15.008		12.21	-26.05	48300.35	-9.35		
gamma	I	2033-01-07T07:28:29.218		11.99	-25.87	47630.92	-8.69		
eta	I	2033-01-07T07:29:23.090		11.83	-25.74	47176.12	-8.19		
beta	I	2033-01-07T07:32:51.046		11.21	-25.24	45680.71	-6.15		
alpha	I	2033-01-07T07:35:49.083		10.68	-24.80	44752.43	-4.26		

No planet occultations

alpha	E	2033-01-07T07:48:22.850		8.40	-22.90	44750.08	4.26		
beta	E	2033-01-07T07:51:21.116		7.85	-22.44	45675.40	6.14		
eta	E	2033-01-07T07:54:50.221		7.21	-21.89	47176.12	8.18		
gamma	E	2033-01-07T07:55:43.836		7.04	-21.75	47627.72	8.67		
delta	E	2033-01-07T07:56:58.582		6.81	-21.56	48300.35	9.33		
lambda	E	2033-01-07T07:59:50.477		6.28	-21.10	50026.71	10.74		
epsilon	E	2033-01-07T08:02:06.385		5.85	-20.74	51555.30	11.74		