

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2048-04-23T11:23:44.410
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3870069415517664384
 2Mass ID (if available) : 10341746+0951179

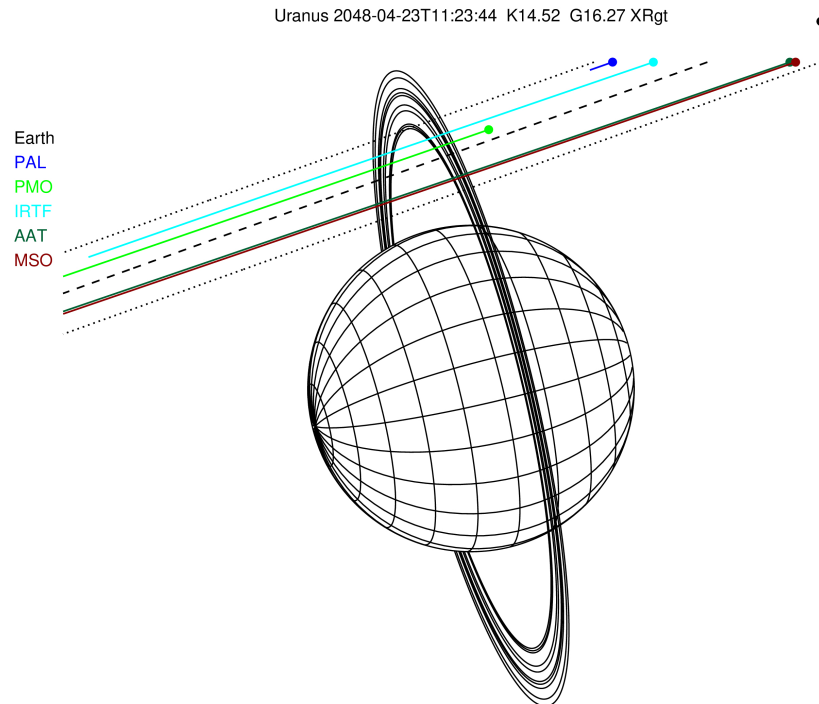
ICRS Star Coord at Epoch: 10h 34m 17.50482s +09:51:17.30212s

RUWE (>1.4 is poor) : 0.98
 K magnitude : 14.517
 G magnitude : 16.267
 RP magnitude : 15.683
 BP magnitude : 16.690
 DUPflag : 0
 Distance (au) : 17.726
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.49
 Sun-Target sep (deg) : 123.21
 Sun-Moon sep (deg) : 10.53
 B (ring opening deg) : 10.91
 PA of pole (deg) : 103.72

#	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

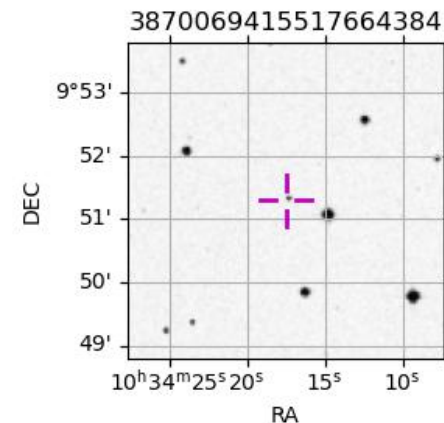


2048-04-23T11:23:44.4100 α: 10 34 17.5048 s: +09 51 17.302 C/A 2.760° PA 199.76 deg v_sky - 9.49 km/s D 17.73 AU
 Credit: Styled after SORA/Lucky Star

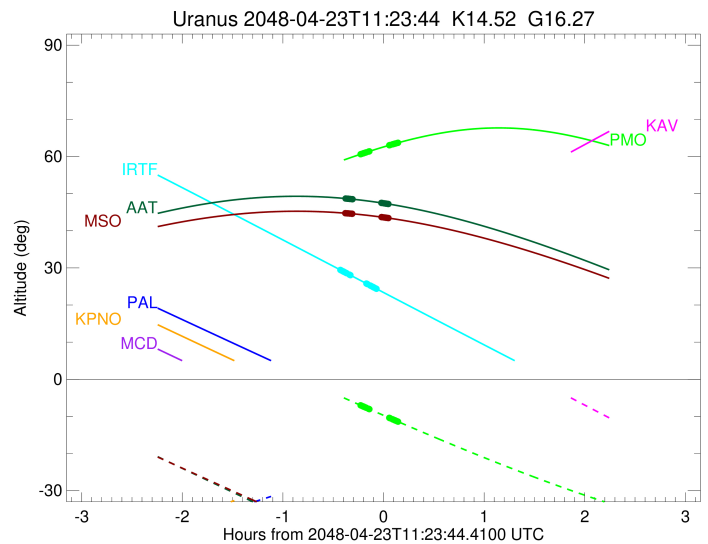
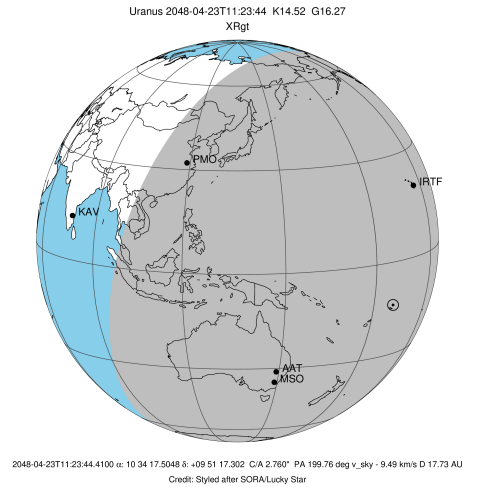


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++		+++++	APR 23 11:10 - APR 23 11:32	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	+++++		+++++	APR 23 10:58 - APR 23 11:19	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					PnnRnn
AAT	Siding Spring (AAT)	-31.3	149.1	+++++		+++++	APR 23 11:01 - APR 23 11:26	PnnRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++		+++++	APR 23 11:01 - APR 23 11:26	PnnRie



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2048-04-23T11:26:59.390
 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 : 3870069415517664384
 2Mass ID (if available) : 10341746+0951179
 ICRS Star Coord at Epoch: 10h 34m 17.50482s +09:51:17.30212s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 14.517
 G magnitude : 16.267
 RP magnitude : 15.683
 BP magnitude : 16.690
 DUPflag : 0
 Distance (au) : 17.727
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.49
 Sun-Target sep (deg) : 123.21
 Sun-Moon sep (deg) : 10.51
 B (ring opening deg) : 10.91
 PA of pole (deg) : 103.72
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.908
 C/A sky separation (km) : 37387.0
 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



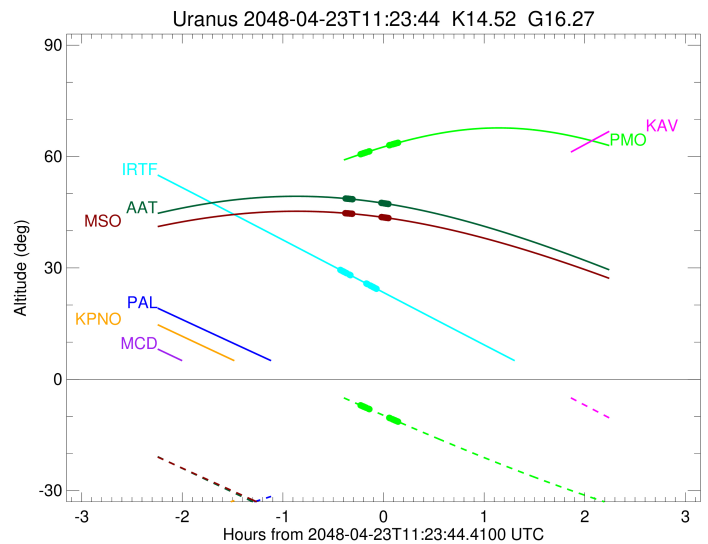
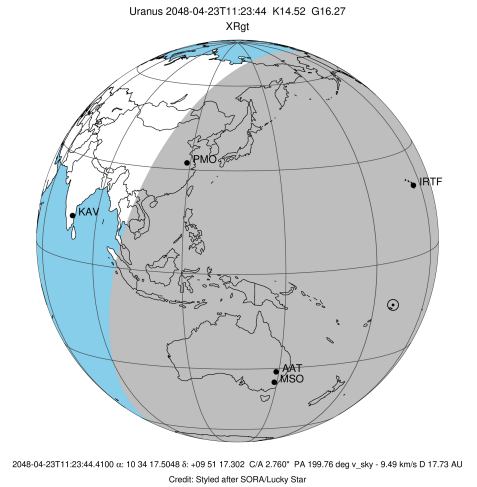
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2048-04-23T11:10:13.007		60.64	-7.04	50887.09	-35.21		
lambda	I	2048-04-23T11:10:37.860		60.71	-7.12	50026.71	-34.25		
delta	I	2048-04-23T11:11:29.489		60.84	-7.29	48300.35	-32.60		
gamma	I	2048-04-23T11:11:50.288		60.89	-7.36	47629.74	-31.89		
eta	I	2048-04-23T11:12:04.629		60.92	-7.41	47176.12	-31.37		
beta	I	2048-04-23T11:12:54.914		61.05	-7.57	45641.30	-29.46		
alpha	I	2048-04-23T11:13:26.784		61.13	-7.68	44751.75	-28.22		
4	I	2048-04-23T11:14:48.076		61.32	-7.95	42593.49	-24.43		
5	I	2048-04-23T11:15:01.638		61.36	-7.99	42166.64	-23.44		
6	I	2048-04-23T11:15:21.296		61.41	-8.06	41821.62	-22.74		

No planet occultations

6	E	2048-04-23T11:27:14.980		63.05	-10.41	41858.92	22.75		
5	E	2048-04-23T11:27:21.591		63.06	-10.43	42160.86	23.45		
4	E	2048-04-23T11:27:44.967		63.11	-10.51	42616.44	24.44		
alpha	E	2048-04-23T11:29:02.382		63.28	-10.76	44726.00	28.23		
beta	E	2048-04-23T11:29:34.474		63.35	-10.86	45651.16	29.47		
eta	E	2048-04-23T11:30:24.970		63.45	-11.03	47176.12	31.38		
gamma	E	2048-04-23T11:30:39.347		63.48	-11.07	47631.01	31.90		
delta	E	2048-04-23T11:31:00.098		63.53	-11.14	48300.35	32.61		
lambda	E	2048-04-23T11:31:51.708		63.63	-11.31	50026.71	34.26		
epsilon	E	2048-04-23T11:32:32.184		63.72	-11.44	51437.67	35.23		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2048-04-23T11:14:48.740
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      : 3870069415517664384
2Mass ID (if available) : 10341746+0951179
ICRS Star Coord at Epoch: 10h 34m 17.50482s +09:51:17.30212s
RUWE (>1.4 is poor) : 0.98
K magnitude         : 14.517
G magnitude         : 16.267
RP magnitude        : 15.683
BP magnitude        : 16.690
DUPflag            : 0
Distance (au)       : 17.726
f0 (km)            : 0.000
g0 (km)            : 0.000
skyplane vel. (km/s) : -9.49
Sun-Target sep (deg) : 123.21
Sun-Moon sep (deg)  : 11.45
B (ring opening deg) : 10.91
PA of pole (deg)    : 103.72
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.040
C/A sky separation (km) : 39079.6
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall11.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
    
```

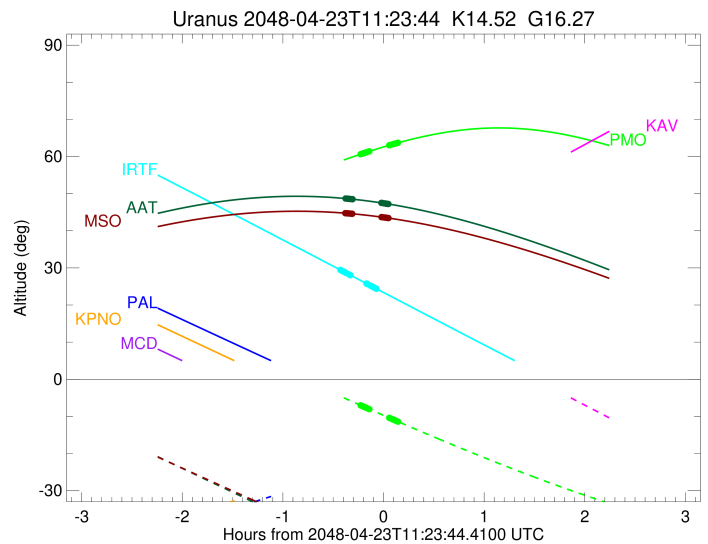
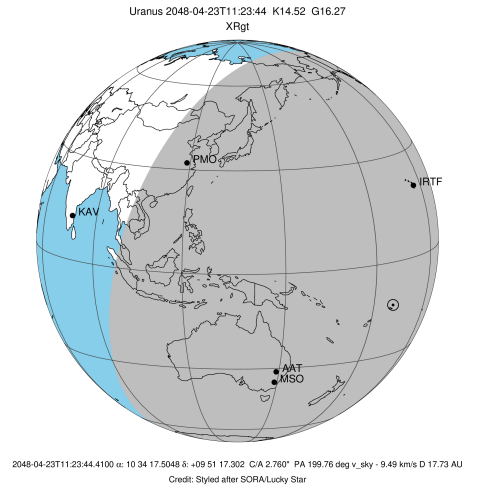


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2048-04-23T10:58:09.454		29.42	-56.13	50902.85	-32.66		
lambda	I	2048-04-23T10:58:36.844		29.31	-56.10	50026.71	-31.55		
delta	I	2048-04-23T10:59:33.222		29.09	-56.03	48300.35	-29.65		
gamma	I	2048-04-23T10:59:56.148		29.00	-56.00	47629.97	-28.82		
eta	I	2048-04-23T11:00:12.060		28.94	-55.99	47176.12	-28.22		
beta	I	2048-04-23T11:01:08.506		28.72	-55.92	45641.13	-25.96		
alpha	I	2048-04-23T11:01:44.817		28.57	-55.87	44751.17	-24.45		
4	I	2048-04-23T11:03:21.802		28.19	-55.75	42597.03	-19.74		
5	I	2048-04-23T11:03:40.054		28.12	-55.73	42162.87	-18.45		
6	I	2048-04-23T11:04:03.934		28.03	-55.70	41825.75	-17.52		

No planet occultations

6	E	2048-04-23T11:13:36.338		25.77	-54.88	41855.06	17.49		
5	E	2048-04-23T11:13:46.423		25.73	-54.87	42158.23	18.42		
4	E	2048-04-23T11:14:15.149		25.62	-54.82	42615.94	19.70		
alpha	E	2048-04-23T11:15:48.355		25.26	-54.67	44728.42	24.38		
beta	E	2048-04-23T11:16:24.965		25.11	-54.61	45649.99	25.88		
eta	E	2048-04-23T11:17:21.859		24.89	-54.52	47176.12	28.13		
gamma	E	2048-04-23T11:17:37.869		24.82	-54.50	47631.15	28.72		
delta	E	2048-04-23T11:18:00.840		24.73	-54.46	48300.35	29.54		
lambda	E	2048-04-23T11:18:57.444		24.51	-54.36	50026.71	31.43		
epsilon	E	2048-04-23T11:19:40.954		24.34	-54.29	51422.97	32.51		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2048-04-23T11:18:36.910
 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 : 3870069415517664384
 2Mass ID (if available) : 10341746+0951179
 ICRS Star Coord at Epoch: 10h 34m 17.50482s +09:51:17.30212s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 14.517
 G magnitude : 16.267
 RP magnitude : 15.683
 BP magnitude : 16.690
 DUPflag : 0
 Distance (au) : 17.726
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.49
 Sun-Target sep (deg) : 123.21
 Sun-Moon sep (deg) : 10.78
 B (ring opening deg) : 10.91
 PA of pole (deg) : 103.72
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.495
 C/A sky separation (km) : 32083.0
 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

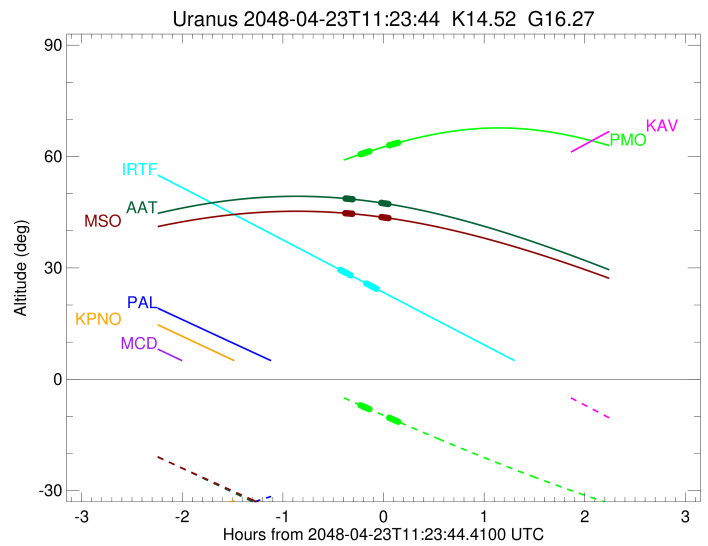
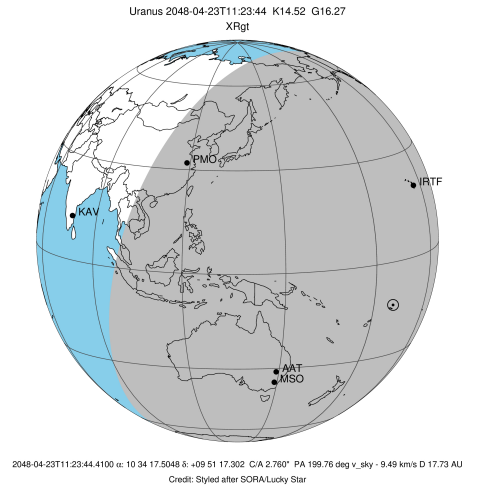


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2048-04-23T11:01:15.232		48.68	-44.72	50845.46	-40.36		
lambda	I	2048-04-23T11:01:35.717		48.67	-44.79	50026.71	-39.74		
delta	I	2048-04-23T11:02:19.723		48.64	-44.94	48300.35	-38.70		
gamma	I	2048-04-23T11:02:37.169		48.63	-45.00	47629.03	-38.26		
eta	I	2048-04-23T11:02:49.056		48.62	-45.04	47176.12	-37.94		
beta	I	2048-04-23T11:03:30.011		48.59	-45.18	45642.21	-36.79		
alpha	I	2048-04-23T11:03:55.533		48.57	-45.27	44752.43	-36.09		
4	I	2048-04-23T11:04:56.205		48.52	-45.48	42584.25	-33.92		
5	I	2048-04-23T11:05:04.523		48.52	-45.51	42177.98	-33.37		
6	I	2048-04-23T11:05:19.257		48.50	-45.56	41812.82	-32.98		

No planet occultations

6	E	2048-04-23T11:22:31.345		47.51	-49.11	41866.83	32.95		
5	E	2048-04-23T11:22:34.644		47.50	-49.12	42169.72	33.33		
4	E	2048-04-23T11:22:51.562		47.48	-49.18	42616.08	33.88		
alpha	E	2048-04-23T11:23:48.745		47.42	-49.37	44719.56	36.05		
beta	E	2048-04-23T11:24:14.674		47.39	-49.46	45654.48	36.74		
eta	E	2048-04-23T11:24:55.832		47.34	-49.60	47176.12	37.89		
gamma	E	2048-04-23T11:25:07.777		47.32	-49.64	47630.56	38.21		
delta	E	2048-04-23T11:25:25.208		47.30	-49.70	48300.35	38.64		
lambda	E	2048-04-23T11:26:09.283		47.25	-49.85	50026.71	39.68		
epsilon	E	2048-04-23T11:26:45.435		47.21	-49.97	51475.32	40.30		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2048-04-23T11:18:33.410
 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 : 3870069415517664384
 2Mass ID (if available) : 10341746+0951179
 ICRS Star Coord at Epoch: 10h 34m 17.50482s +09:51:17.30212s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 14.517
 G magnitude : 16.267
 RP magnitude : 15.683
 BP magnitude : 16.690
 DUPflag : 0
 Distance (au) : 17.726
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.49
 Sun-Target sep (deg) : 123.21
 Sun-Moon sep (deg) : 10.76
 B (ring opening deg) : 10.91
 PA of pole (deg) : 103.72
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.470
 C/A sky separation (km) : 31753.8
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2048-04-23T11:01:05.761		44.73	-43.58	50843.29	-40.56		
lambda	I	2048-04-23T11:01:26.085		44.72	-43.64	50026.71	-39.96		
delta	I	2048-04-23T11:02:09.834		44.69	-43.78	48300.35	-38.95		
gamma	I	2048-04-23T11:02:27.167		44.68	-43.84	47628.98	-38.52		
eta	I	2048-04-23T11:02:38.971		44.68	-43.88	47176.12	-38.21		
beta	I	2048-04-23T11:03:19.615		44.65	-44.01	45642.27	-37.10		
alpha	I	2048-04-23T11:03:44.932		44.63	-44.09	44752.43	-36.42		
4	I	2048-04-23T11:04:44.948		44.59	-44.29	42583.75	-34.31		
5	I	2048-04-23T11:04:53.115		44.59	-44.31	42178.66	-33.78		
6	I	2048-04-23T11:05:07.690		44.58	-44.36	41812.40	-33.41		

No planet occultations

6	E	2048-04-23T11:22:36.731		43.68	-47.73	41867.21	33.38		
5	E	2048-04-23T11:22:39.950		43.68	-47.74	42170.28	33.75		
4	E	2048-04-23T11:22:56.655		43.66	-47.79	42616.00	34.28		
alpha	E	2048-04-23T11:23:53.189		43.60	-47.97	44719.20	36.38		
beta	E	2048-04-23T11:24:18.923		43.58	-48.05	45654.67	37.05		
eta	E	2048-04-23T11:24:59.765		43.53	-48.18	47176.12	38.16		
gamma	E	2048-04-23T11:25:11.626		43.52	-48.22	47630.53	38.47		
delta	E	2048-04-23T11:25:28.944		43.50	-48.27	48300.35	38.89		
lambda	E	2048-04-23T11:26:12.759		43.46	-48.41	50026.71	39.90		
epsilon	E	2048-04-23T11:26:48.776		43.42	-48.52	51477.33	40.50		