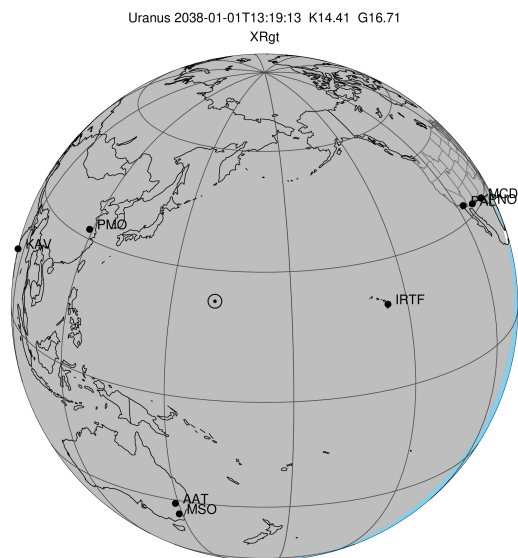


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-01T13:19:13.970
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 865677325963335680
 2Mass ID (if available) : 07354416+2207118

ICRS Star Coord at Epoch: 07h 35m 44.16077s +22:07:11.56492s

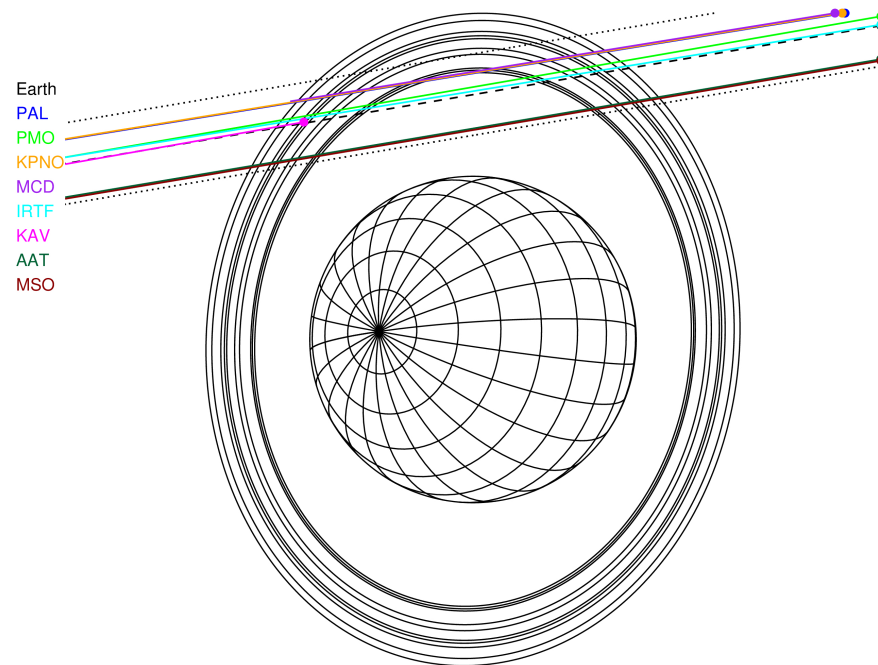
RUWE (>1.4 is poor) : 1.08
 K magnitude : 14.412
 G magnitude : 16.711
 RP magnitude : 16.015
 BP magnitude : 17.280
 DUPflag : 0
 Distance (au) : 17.740
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.71
 Sun-Target sep (deg) : 168.61
 Sun-Moon sep (deg) : 117.47
 B (ring opening deg) : 54.70
 PA of pole (deg) : 85.12

#	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



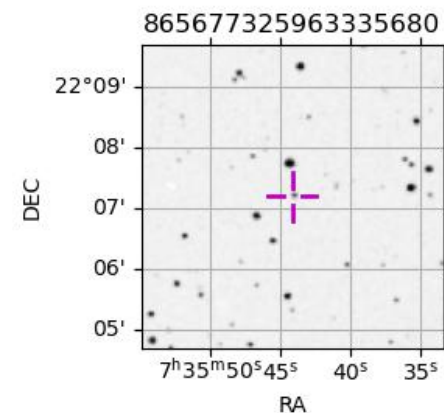
2038-01-01T13:19:13.9700 ra: 07 35 44.1608 s: +22 07 11.565 C/A 2.948" PA 189.60 deg v_sky -22.71 km/s D 17.74 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2038-01-01T13:19:13 K14.41 G16.71 XRgt

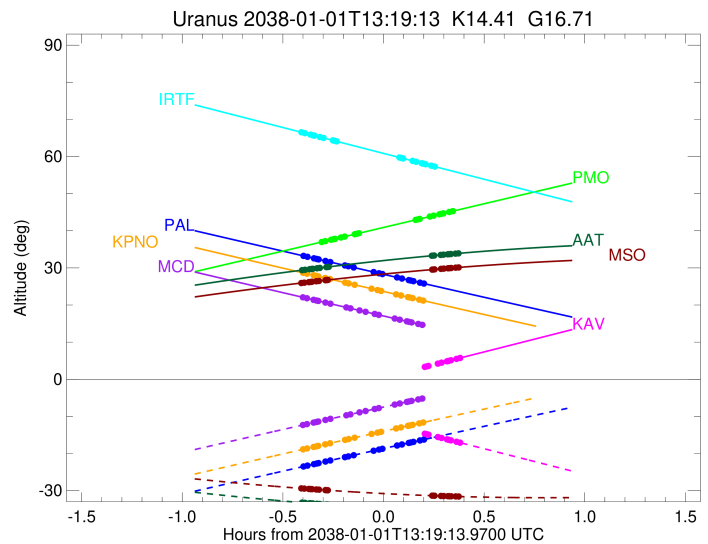
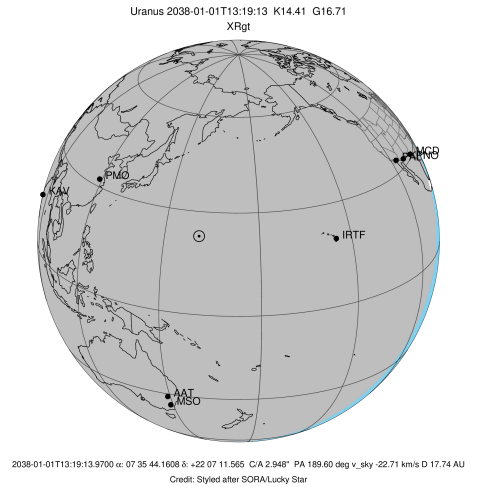


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1	+++++		+++++	JAN 01 12:55 - JAN 01 13:31	PnnRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++		+++++	JAN 01 13:00 - JAN 01 13:40	PnnRie
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++		+++++	JAN 01 12:54 - JAN 01 13:31	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++		+++++	JAN 01 12:54 - JAN 01 13:31	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++		+++++	JAN 01 12:54 - JAN 01 13:34	PnnRie
KAV	Kavalur Observatory	12.6	78.8			+++	JAN 01 13:39 - JAN 01 13:42	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	+++++		+++++	JAN 01 12:54 - JAN 01 13:41	PnnRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++		+++++	JAN 01 12:54 - JAN 01 13:41	PnnRie



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-01T13:15:44.340
 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 : 865677325963335680
 2Mass ID (if available) : 07354416+2207118
 ICRS Star Coord at Epoch: 07h 35m 44.16077s +22:07:11.56492s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 14.412
 G magnitude : 16.711
 RP magnitude : 16.015
 BP magnitude : 17.280
 DUPflag : 0
 Distance (au) : 17.740
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.71
 Sun-Target sep (deg) : 168.61
 Sun-Moon sep (deg) : 118.23
 B (ring opening deg) : 54.70
 PA of pole (deg) : 85.12
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.197
 C/A sky separation (km) : 41132.0
 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

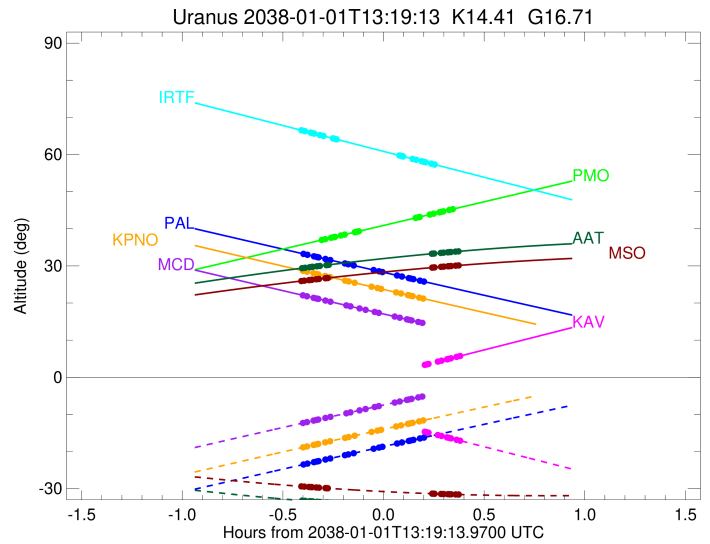
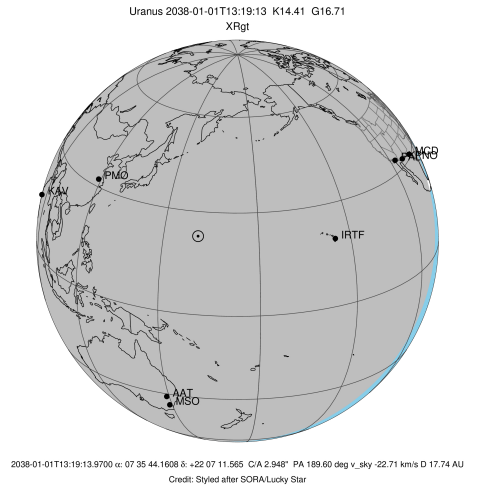


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-01T12:55:01.799		33.31	-23.57	51501.67	-16.46		
lambda	I	2038-01-01T12:56:34.508		32.98	-23.25	50026.71	-15.43		
delta	I	2038-01-01T12:58:31.244		32.58	-22.86	48300.35	-14.12		
gamma	I	2038-01-01T12:59:19.871		32.41	-22.69	47627.71	-13.53		
eta	I	2038-01-01T12:59:53.756		32.29	-22.58	47176.12	-13.11		
beta	I	2038-01-01T13:01:56.928		31.86	-22.16	45660.40	-11.49		
alpha	I	2038-01-01T13:03:20.661		31.57	-21.88	44748.17	-10.28		
4	I	2038-01-01T13:07:39.471		30.68	-21.00	42614.50	-6.11		
5	I	2038-01-01T13:09:01.909		30.39	-20.72	42169.32	-4.65		
6	I	2038-01-01T13:10:34.520		30.07	-20.41	41808.71	-3.06		

No planet occultations

6	E	2038-01-01T13:16:08.817		28.91	-19.29	41816.33	3.07		
5	E	2038-01-01T13:17:34.211		28.62	-19.00	42157.81	4.65		
4	E	2038-01-01T13:18:57.828		28.33	-18.72	42604.47	6.10		
alpha	E	2038-01-01T13:23:18.247		27.43	-17.85	44751.35	10.27		
beta	E	2038-01-01T13:24:43.669		27.14	-17.56	45675.79	11.47		
eta	E	2038-01-01T13:26:45.701		26.72	-17.15	47176.12	13.09		
gamma	E	2038-01-01T13:27:19.277		26.60	-17.04	47622.67	13.51		
delta	E	2038-01-01T13:28:08.374		26.43	-16.88	48300.35	14.10		
lambda	E	2038-01-01T13:30:05.365		26.03	-16.49	50026.71	15.40		
epsilon	E	2038-01-01T13:31:34.890		25.72	-16.19	51446.06	16.42		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-01T13:22:43.330
 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 : 865677325963335680
 2Mass ID (if available) : 07354416+2207118
 ICRS Star Coord at Epoch: 07h 35m 44.16077s +22:07:11.56492s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 14.412
 G magnitude : 16.711
 RP magnitude : 16.015
 BP magnitude : 17.280
 DUPflag : 0
 Distance (au) : 17.740
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.71
 Sun-Target sep (deg) : 168.61
 Sun-Moon sep (deg) : 117.72
 B (ring opening deg) : 54.70
 PA of pole (deg) : 85.12
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.028
 C/A sky separation (km) : 38956.2
 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_itrff93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



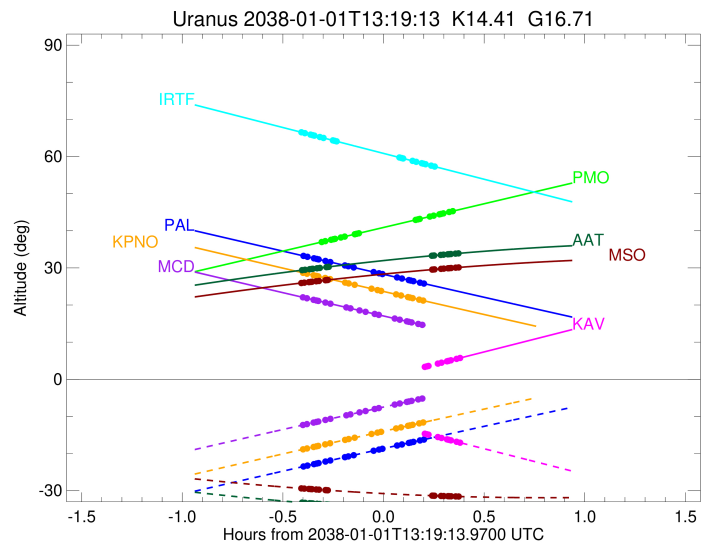
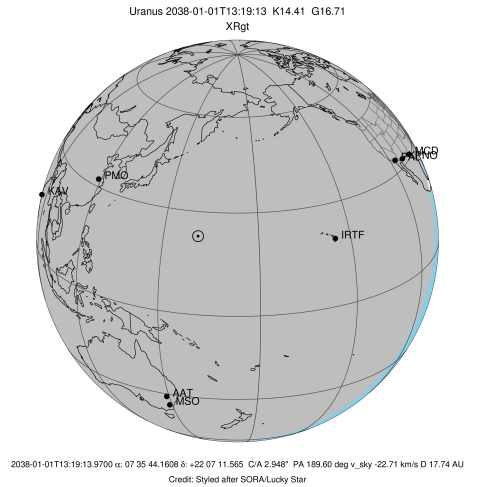
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-01T13:00:29.702		36.91	-47.72	51489.08	-17.99		
lambda	I	2038-01-01T13:01:53.171		37.21	-48.02	50026.71	-17.13		
delta	I	2038-01-01T13:03:37.061		37.57	-48.38	48300.35	-16.08		
gamma	I	2038-01-01T13:04:19.460		37.72	-48.53	47628.10	-15.62		
eta	I	2038-01-01T13:04:48.696		37.83	-48.64	47176.12	-15.29		
beta	I	2038-01-01T13:06:32.085		38.19	-49.00	45658.51	-14.07		
alpha	I	2038-01-01T13:07:38.918		38.43	-49.24	44746.27	-13.19		
4	I	2038-01-01T13:10:37.476		39.06	-49.87	42616.10	-10.59		
5	I	2038-01-01T13:11:19.900		39.21	-50.02	42178.98	-9.89		
6	I	2038-01-01T13:11:59.759		39.35	-50.16	41802.47	-9.33		

No planet occultations

6	E	2038-01-01T13:28:47.263		42.92	-53.72	41825.69	9.34		
5	E	2038-01-01T13:29:20.056		43.04	-53.83	42155.02	9.90		
4	E	2038-01-01T13:30:03.449		43.19	-53.99	42598.54	10.61		
alpha	E	2038-01-01T13:33:03.095		43.83	-54.62	44750.06	13.22		
beta	E	2038-01-01T13:34:11.363		44.07	-54.86	45677.23	14.09		
eta	E	2038-01-01T13:35:53.232		44.43	-55.22	47176.12	15.32		
gamma	E	2038-01-01T13:36:22.041		44.54	-55.32	47622.32	15.65		
delta	E	2038-01-01T13:37:04.724		44.69	-55.47	48300.35	16.12		
lambda	E	2038-01-01T13:38:48.389		45.06	-55.84	50026.71	17.17		
epsilon	E	2038-01-01T13:40:08.034		45.34	-56.12	51424.05	18.03		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2038-01-01T13:15:34.370
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      : 865677325963335680
2Mass ID (if available) : 07354416+2207118
ICRS Star Coord at Epoch: 07h 35m 44.16077s +22:07:11.56492s
RUWE (>1.4 is poor) : 1.08
K magnitude         : 14.412
G magnitude         : 16.711
RP magnitude        : 16.015
BP magnitude        : 17.280
DUPflag            : 0
Distance (au)       : 17.740
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -22.71
Sun-Target sep (deg) : 168.61
Sun-Moon sep (deg)  : 118.19
B (ring opening deg) : 54.70
PA of pole (deg)    : 85.12
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.203
C/A sky separation (km) : 41215.3
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_itrff93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
    
```

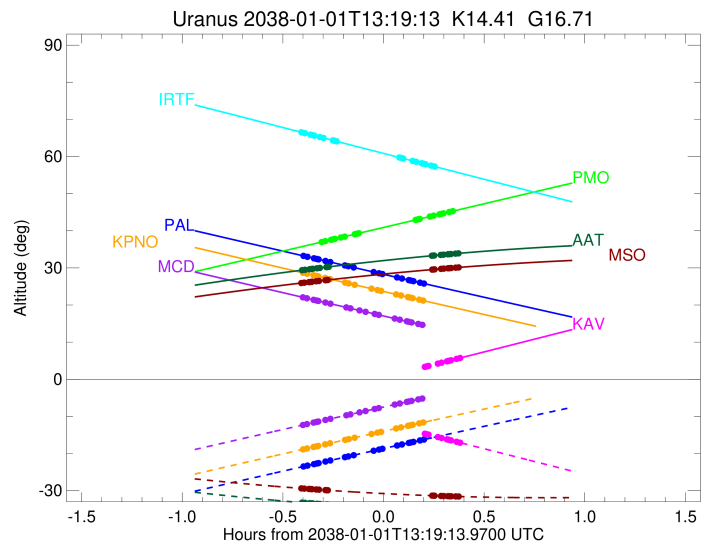
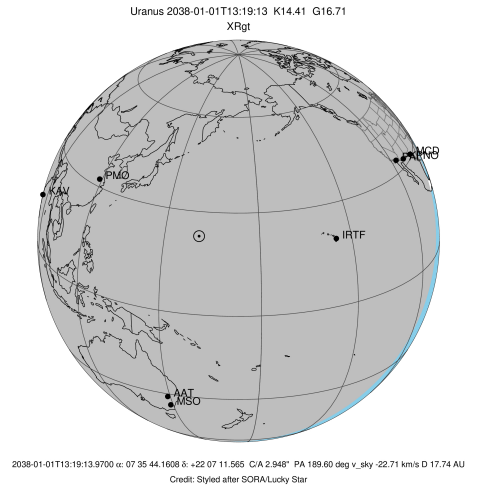


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-01T12:54:53.913		28.75	-18.95	51502.21	-16.38		
lambda	I	2038-01-01T12:56:27.169		28.42	-18.63	50026.71	-15.34		
delta	I	2038-01-01T12:58:24.668		28.01	-18.23	48300.35	-14.02		
gamma	I	2038-01-01T12:59:13.665		27.84	-18.07	47627.69	-13.43		
eta	I	2038-01-01T12:59:47.826		27.72	-17.95	47176.12	-13.00		
beta	I	2038-01-01T13:01:52.197		27.28	-17.53	45660.48	-11.36		
alpha	I	2038-01-01T13:03:17.000		26.99	-17.24	44748.26	-10.13		
4	I	2038-01-01T13:07:42.237		26.06	-16.34	42614.37	-5.85		
5	I	2038-01-01T13:09:09.599		25.76	-16.05	42168.77	-4.30		
6	I	2038-01-01T13:10:53.780		25.39	-15.70	41809.35	-2.51		

No planet occultations

6	E	2038-01-01T13:15:28.650		24.44	-14.77	41815.60	2.51		
5	E	2038-01-01T13:17:05.601		24.10	-14.44	42158.09	4.30		
4	E	2038-01-01T13:18:34.146		23.79	-14.15	42604.76	5.85		
alpha	E	2038-01-01T13:23:01.008		22.87	-13.25	44751.39	10.12		
beta	E	2038-01-01T13:24:27.510		22.57	-12.96	45675.73	11.34		
eta	E	2038-01-01T13:26:30.749		22.14	-12.55	47176.12	12.98		
gamma	E	2038-01-01T13:27:04.604		22.02	-12.44	47622.68	13.40		
delta	E	2038-01-01T13:27:54.076		21.85	-12.27	48300.35	13.99		
lambda	E	2038-01-01T13:29:51.842		21.44	-11.88	50026.71	15.30		
epsilon	E	2038-01-01T13:31:21.922		21.13	-11.58	51446.84	16.34		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-01T13:15:25.880
 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 : 865677325963335680
 2Mass ID (if available) : 07354416+2207118
 ICRS Star Coord at Epoch: 07h 35m 44.16077s +22:07:11.56492s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 14.412
 G magnitude : 16.711
 RP magnitude : 16.015
 BP magnitude : 17.280
 DUPflag : 0
 Distance (au) : 17.740
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.71
 Sun-Target sep (deg) : 168.61
 Sun-Moon sep (deg) : 118.11
 B (ring opening deg) : 54.70
 PA of pole (deg) : 85.12
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.217
 C/A sky separation (km) : 41395.1
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



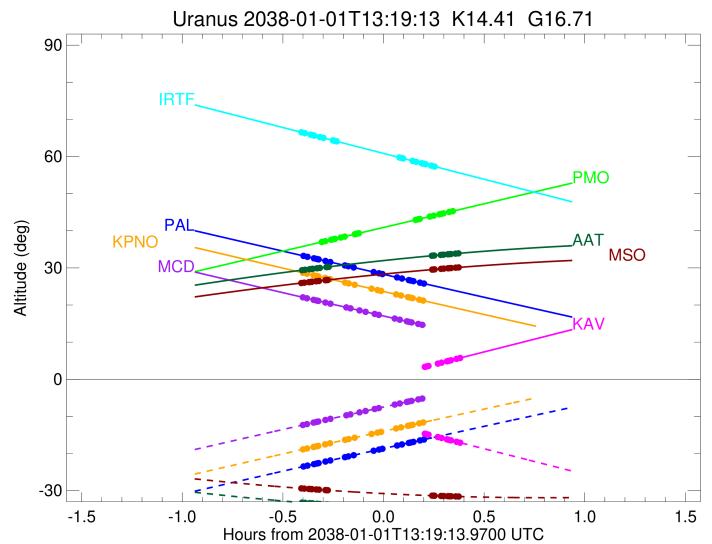
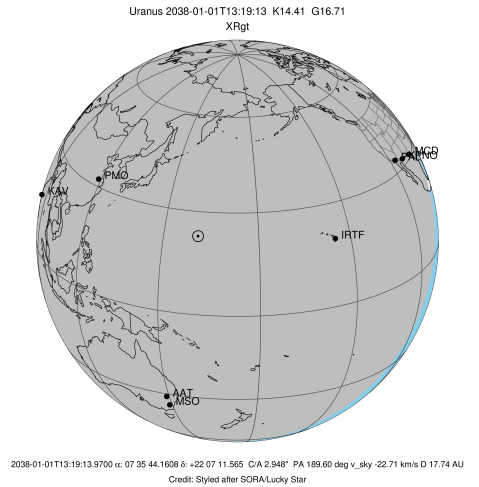
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-01T12:54:50.986		22.15	-12.39	51503.43	-16.21		
lambda	I	2038-01-01T12:56:25.380		21.82	-12.07	50026.71	-15.15		
delta	I	2038-01-01T12:58:24.479		21.40	-11.67	48300.35	-13.81		
gamma	I	2038-01-01T12:59:14.260		21.23	-11.50	47627.65	-13.21		
eta	I	2038-01-01T12:59:49.013		21.10	-11.39	47176.12	-12.77		
beta	I	2038-01-01T13:01:55.987		20.66	-10.96	45660.68	-11.09		
alpha	I	2038-01-01T13:03:23.171		20.36	-10.66	44748.44	-9.82		
4	I	2038-01-01T13:08:04.056		19.38	-9.72	42614.07	-5.27		
5	I	2038-01-01T13:09:45.969		19.02	-9.38	42167.42	-3.46		
6	I	2038-01-01T13:12:37.878		18.42	-8.81	41823.60	0.28		

No planet occultations

6	E	2038-01-01T13:13:14.227		18.30	-8.68	41824.67	-0.38		
5	E	2038-01-01T13:16:10.167		17.69	-8.10	42158.83	3.46		
4	E	2038-01-01T13:17:53.269		17.33	-7.75	42605.39	5.26		
alpha	E	2038-01-01T13:22:35.793		16.35	-6.82	44751.48	9.81		
beta	E	2038-01-01T13:24:04.688		16.05	-6.52	45675.60	11.07		
eta	E	2038-01-01T13:26:10.537		15.61	-6.11	47176.12	12.75		
gamma	E	2038-01-01T13:26:44.987		15.49	-5.99	47622.71	13.18		
delta	E	2038-01-01T13:27:35.249		15.32	-5.83	48300.35	13.78		
lambda	E	2038-01-01T13:29:34.628		14.91	-5.43	50026.71	15.12		
epsilon	E	2038-01-01T13:31:05.847		14.60	-5.13	51448.47	16.16		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2038-01-01T13:16:51.130
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      : 865677325963335680
2Mass ID (if available) : 07354416+2207118
ICRS Star Coord at Epoch: 07h 35m 44.16077s +22:07:11.56492s
RUWE (>1.4 is poor) : 1.08
K magnitude         : 14.412
G magnitude         : 16.711
RP magnitude        : 16.015
BP magnitude        : 17.280
DUPflag            : 0
Distance (au)       : 17.740
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -22.71
Sun-Target sep (deg) : 168.61
Sun-Moon sep (deg)  : 118.46
B (ring opening deg) : 54.70
PA of pole (deg)    : 85.12
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.983
C/A sky separation (km) : 38381.5
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
    
```

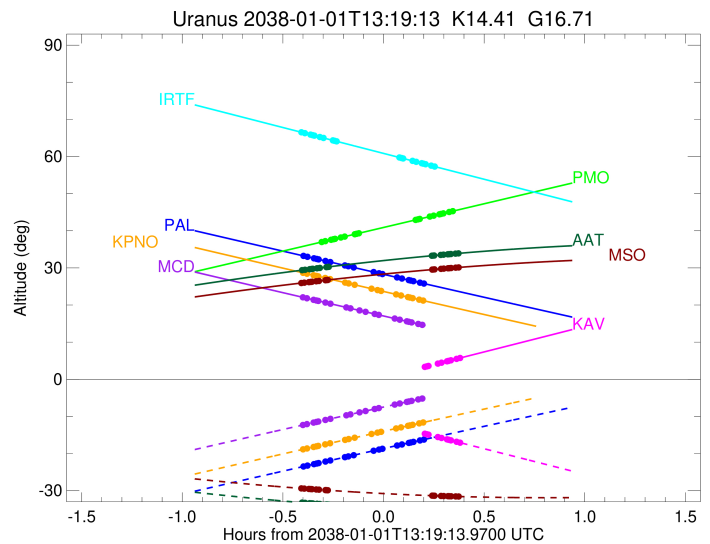
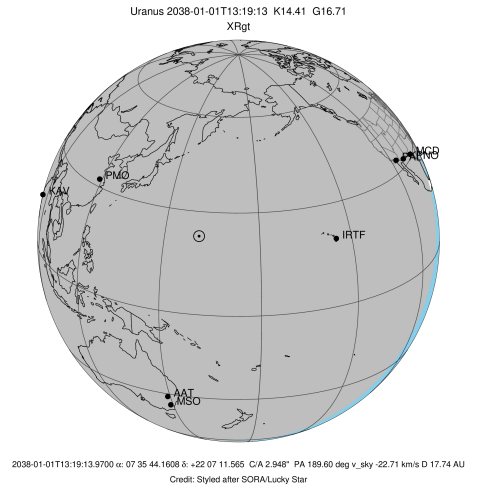


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-01T12:54:28.020		66.60	-55.23	51483.11	-18.51		
lambda	I	2038-01-01T12:55:48.661		66.29	-54.92	50026.71	-17.69		
delta	I	2038-01-01T12:57:29.033		65.90	-54.54	48300.35	-16.69		
gamma	I	2038-01-01T12:58:09.828		65.74	-54.38	47628.26	-16.25		
eta	I	2038-01-01T12:58:37.912		65.63	-54.28	47176.12	-15.94		
beta	I	2038-01-01T13:00:16.748		65.25	-53.90	45657.84	-14.79		
alpha	I	2038-01-01T13:01:20.090		65.01	-53.65	44745.55	-13.97		
4	I	2038-01-01T13:04:06.195		64.36	-53.02	42616.34	-11.59		
5	I	2038-01-01T13:04:44.464		64.21	-52.87	42181.72	-10.96		
6	I	2038-01-01T13:05:20.803		64.07	-52.73	41801.31	-10.47		

No planet occultations

6	E	2038-01-01T13:23:57.837		59.75	-48.46	41827.06	10.46		
5	E	2038-01-01T13:24:27.177		59.63	-48.34	42154.89	10.95		
4	E	2038-01-01T13:25:06.565		59.48	-48.19	42597.51	11.58		
alpha	E	2038-01-01T13:27:54.196		58.83	-47.55	44749.81	13.96		
beta	E	2038-01-01T13:28:59.128		58.58	-47.30	45677.44	14.77		
eta	E	2038-01-01T13:30:36.756		58.20	-46.93	47176.12	15.92		
gamma	E	2038-01-01T13:31:04.510		58.10	-46.82	47622.26	16.23		
delta	E	2038-01-01T13:31:45.733		57.94	-46.67	48300.35	16.67		
lambda	E	2038-01-01T13:33:26.259		57.55	-46.28	50026.71	17.66		
epsilon	E	2038-01-01T13:34:43.651		57.25	-45.99	51420.95	18.48		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-01T13:24:07.050
 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 : 865677325963335680
 2Mass ID (if available) : 07354416+2207118
 ICRS Star Coord at Epoch: 07h 35m 44.16077s +22:07:11.56492s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 14.412
 G magnitude : 16.711
 RP magnitude : 16.015
 BP magnitude : 17.280
 DUPflag : 0
 Distance (au) : 17.740
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.71
 Sun-Target sep (deg) : 168.61
 Sun-Moon sep (deg) : 117.04
 B (ring opening deg) : 54.70
 PA of pole (deg) : 85.12
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.965
 C/A sky separation (km) : 38143.5
 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

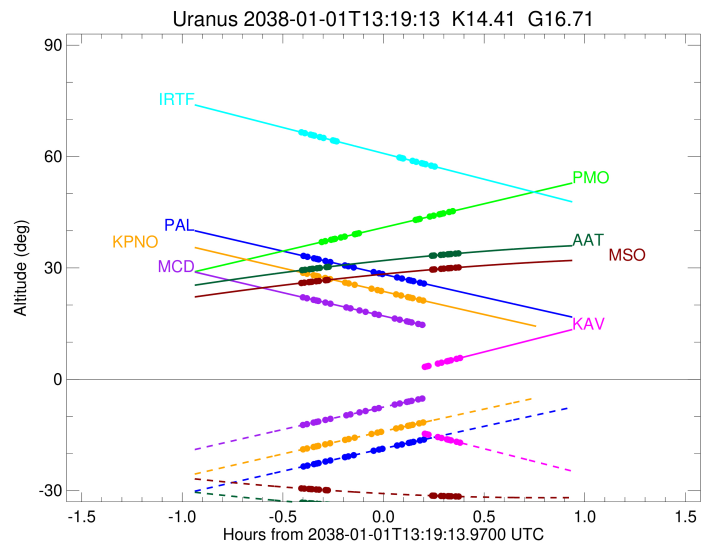
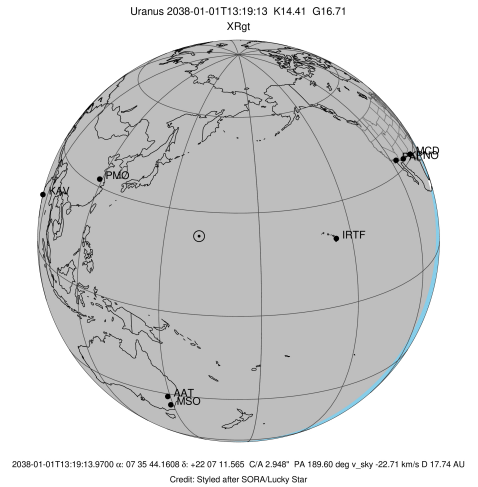


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-01T13:01:04.827	-3.55x	-7.75	51484.41	-18.27			
lambda	I	2038-01-01T13:02:26.555	-3.24x	-8.06	50026.71	-17.48			
delta	I	2038-01-01T13:04:08.046	-2.86x	-8.44	48300.35	-16.52			
gamma	I	2038-01-01T13:04:49.243	-2.71x	-8.60	47628.23	-16.10			
eta	I	2038-01-01T13:05:17.580	-2.60x	-8.70	47176.12	-15.80			
beta	I	2038-01-01T13:06:57.147	-2.23x	-9.08	45657.90	-14.70			
alpha	I	2038-01-01T13:08:00.802	-1.99x	-9.32	44745.60	-13.92			
4	I	2038-01-01T13:10:46.865	-1.37x	-9.95	42616.34	-11.66			
5	I	2038-01-01T13:11:24.870	-1.22x	-10.09	42181.74	-11.06			
6	I	2038-01-01T13:12:00.845	-1.09x	-10.23	41801.29	-10.59			

No planet occultations

6	E	2038-01-01T13:31:31.789	3.33x	-14.67	41828.04	10.61			
5	E	2038-01-01T13:32:00.673	3.44x	-14.78	42154.83	11.08			
4	E	2038-01-01T13:32:39.596	3.59x	-14.93	42596.67	11.68			
alpha	E	2038-01-01T13:35:26.644	4.22x	-15.56	44749.54	13.96			
beta	E	2038-01-01T13:36:31.695	4.47x	-15.81	45677.67	14.74			
eta	E	2038-01-01T13:38:09.637	4.84x	-16.18	47176.12	15.85			
gamma	E	2038-01-01T13:38:37.515	4.94x	-16.29	47622.20	16.15			
delta	E	2038-01-01T13:39:18.958	5.10	-16.45	48300.35	16.58			
lambda	E	2038-01-01T13:41:00.113	5.49	-16.83	50026.71	17.54			
epsilon	E	2038-01-01T13:42:17.779	5.78	-17.13	51415.70	18.34			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-01T13:20:13.480
 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 : 865677325963335680
 2Mass ID (if available) : 07354416+2207118
 ICRS Star Coord at Epoch: 07h 35m 44.16077s +22:07:11.56492s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 14.412
 G magnitude : 16.711
 RP magnitude : 16.015
 BP magnitude : 17.280
 DUPflag : 0
 Distance (au) : 17.740
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.71
 Sun-Target sep (deg) : 168.61
 Sun-Moon sep (deg) : 117.80
 B (ring opening deg) : 54.70
 PA of pole (deg) : 85.12
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.532
 C/A sky separation (km) : 32579.1
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.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

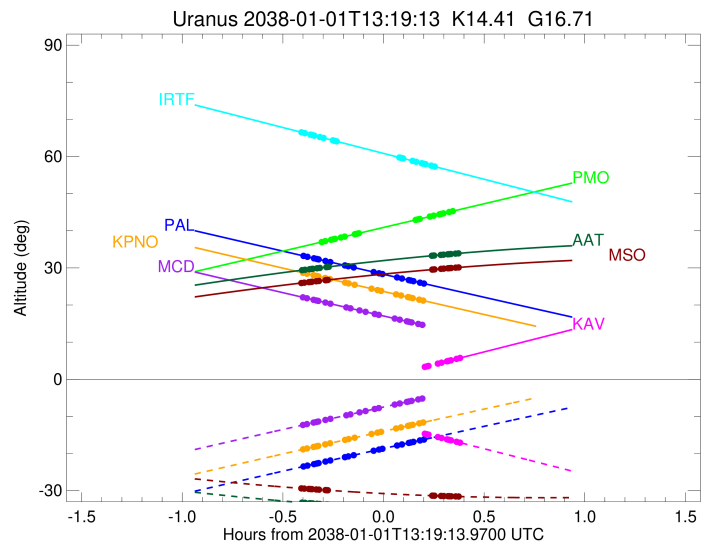
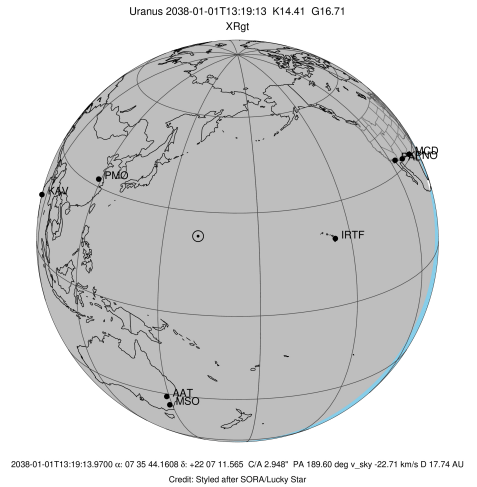


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-01T12:54:44.625		29.37	-33.21	51443.76	-21.57		
lambda	I	2038-01-01T12:55:51.272		29.50	-33.29	50026.71	-21.04		
delta	I	2038-01-01T12:57:14.464		29.65	-33.39	48300.35	-20.45		
gamma	I	2038-01-01T12:57:47.492		29.72	-33.43	47629.11	-20.19		
eta	I	2038-01-01T12:58:10.021		29.76	-33.46	47176.12	-20.02		
beta	I	2038-01-01T12:59:27.379		29.91	-33.55	45653.90	-19.37		
alpha	I	2038-01-01T13:00:14.977		29.99	-33.60	44740.54	-18.94		
4	I	2038-01-01T13:02:10.511		30.21	-33.73	42616.02	-17.74		
5	I	2038-01-01T13:02:33.869		30.25	-33.75	42199.32	-17.43		
6	I	2038-01-01T13:02:58.420		30.30	-33.78	41796.50	-17.23		

No planet occultations

6	E	2038-01-01T13:33:39.057		33.28	-35.34	41839.08	17.24		
5	E	2038-01-01T13:33:56.921		33.30	-35.35	42157.05	17.45		
4	E	2038-01-01T13:34:21.255		33.33	-35.36	42586.91	17.76		
alpha	E	2038-01-01T13:36:18.101		33.50	-35.43	44746.08	18.96		
beta	E	2038-01-01T13:37:07.095		33.56	-35.46	45679.56	19.39		
eta	E	2038-01-01T13:38:23.033		33.66	-35.49	47176.12	20.04		
gamma	E	2038-01-01T13:38:45.167		33.69	-35.51	47621.67	20.22		
delta	E	2038-01-01T13:39:18.521		33.74	-35.52	48300.35	20.48		
lambda	E	2038-01-01T13:40:41.603		33.85	-35.56	50026.71	21.07		
epsilon	E	2038-01-01T13:41:44.632		33.93	-35.59	51367.99	21.60		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-01T13:20:07.470
 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 : 865677325963335680
 2Mass ID (if available) : 07354416+2207118
 ICRS Star Coord at Epoch: 07h 35m 44.16077s +22:07:11.56492s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 14.412
 G magnitude : 16.711
 RP magnitude : 16.015
 BP magnitude : 17.280
 DUPflag : 0
 Distance (au) : 17.740
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.71
 Sun-Target sep (deg) : 168.61
 Sun-Moon sep (deg) : 117.76
 B (ring opening deg) : 54.70
 PA of pole (deg) : 85.12
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.513
 C/A sky separation (km) : 32337.2
 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_itrff93_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	2038-01-01T12:54:31.204		25.90	-29.38	51442.03	-21.67		
lambda	I	2038-01-01T12:55:37.462		26.02	-29.45	50026.71	-21.15		
delta	I	2038-01-01T12:57:00.217		26.17	-29.55	48300.35	-20.57		
gamma	I	2038-01-01T12:57:33.051		26.22	-29.58	47629.15	-20.32		
eta	I	2038-01-01T12:57:55.444		26.26	-29.61	47176.12	-20.14		
beta	I	2038-01-01T12:59:12.292		26.40	-29.69	45653.75	-19.51		
alpha	I	2038-01-01T12:59:59.534		26.48	-29.74	44740.33	-19.09		
4	I	2038-01-01T13:01:54.019		26.68	-29.86	42615.96	-17.92		
5	I	2038-01-01T13:02:17.088		26.71	-29.88	42199.98	-17.62		
6	I	2038-01-01T13:02:41.441		26.76	-29.91	41796.39	-17.42		

No planet occultations

6	E	2038-01-01T13:33:45.566		29.54	-31.36	41839.48	17.44		
5	E	2038-01-01T13:34:03.241		29.57	-31.37	42157.23	17.63		
4	E	2038-01-01T13:34:27.285		29.60	-31.38	42586.53	17.94		
alpha	E	2038-01-01T13:36:23.093		29.74	-31.44	44745.92	19.11		
beta	E	2038-01-01T13:37:11.731		29.80	-31.46	45679.62	19.53		
eta	E	2038-01-01T13:38:27.161		29.90	-31.50	47176.12	20.17		
gamma	E	2038-01-01T13:38:49.159		29.92	-31.51	47621.65	20.34		
delta	E	2038-01-01T13:39:22.321		29.96	-31.52	48300.35	20.59		
lambda	E	2038-01-01T13:40:44.970		30.06	-31.56	50026.71	21.17		
epsilon	E	2038-01-01T13:41:47.610		30.14	-31.59	51365.87	21.70		