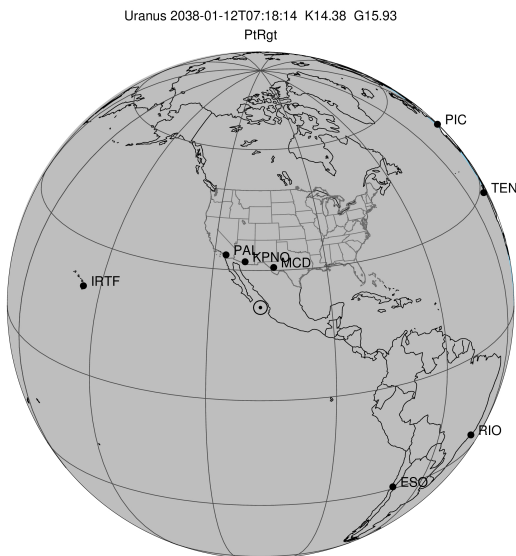


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-12T07:18:14.220
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 865602868410004352
 2Mass ID (if available) : 07334566+2211445

ICRS Star Coord at Epoch: 07h 33m 45.64377s +22:11:44.51018s

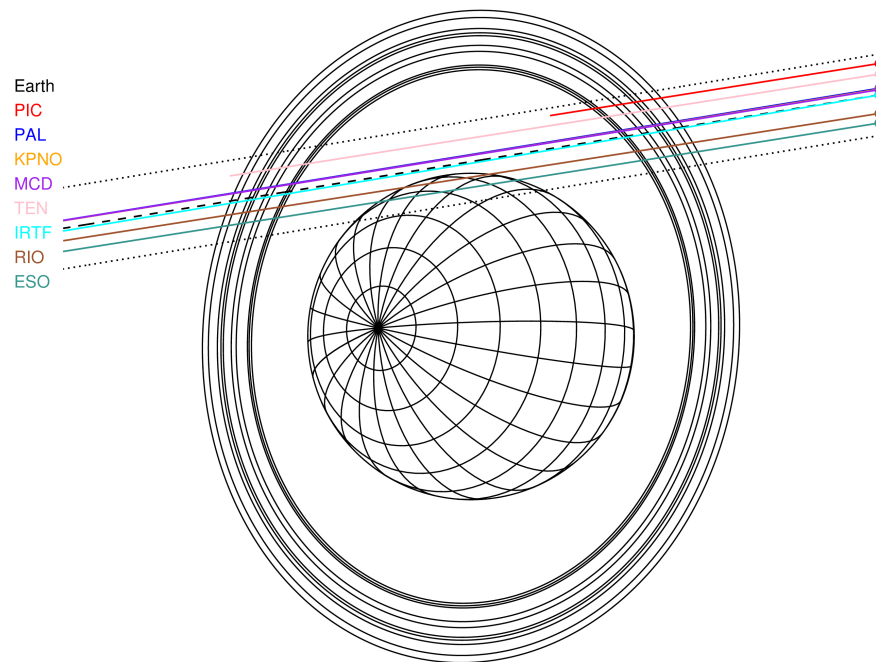
RUWE (>1.4 is poor) : 0.96
 K magnitude : 14.383
 G magnitude : 15.932
 RP magnitude : 15.442
 BP magnitude : 16.255
 DUPflag : 0
 Distance (au) : 17.720
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.29
 Sun-Target sep (deg) : 179.50
 Sun-Moon sep (deg) : 103.19
 B (ring opening deg) : 55.15
 PA of pole (deg) : 84.77

#	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



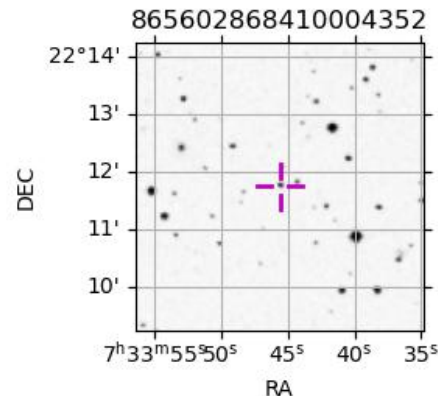
2038-01-12T07:18:14.2200 ra: 07 33 45.6438 s: +22 11 44.510 C/A 2.112° PA 189.29 deg v_sky -23.29 km/s D 17.72 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2038-01-12T07:18:14 K14.38 G15.93 PtRgt

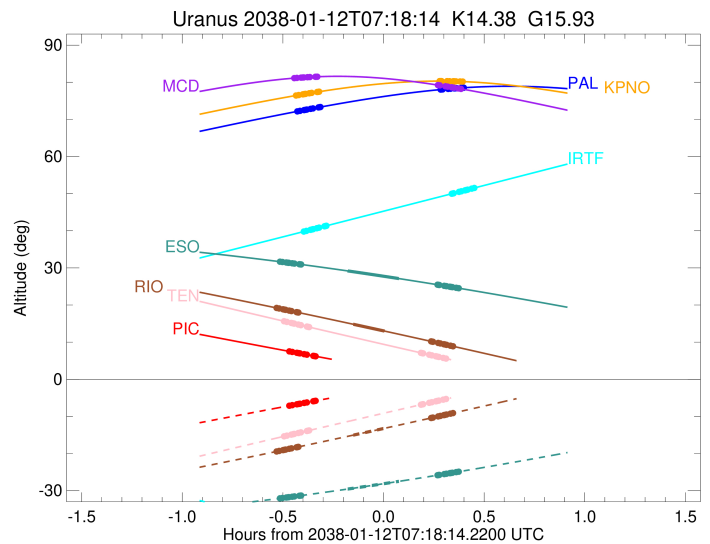
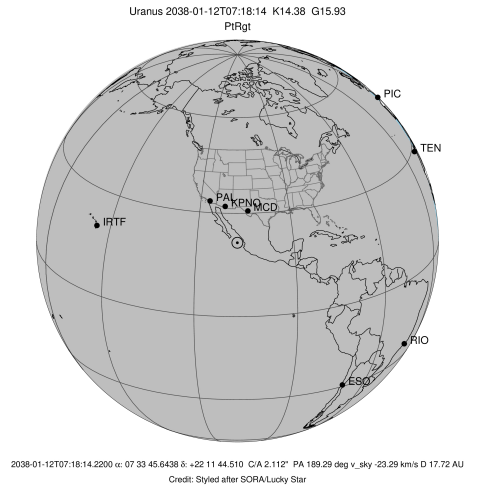


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++			JAN 12 06:50 - JAN 12 06:58	PnnRin
PAL	Palomar Mt (200")	33.4	243.1	+++++		+++++	JAN 12 06:52 - JAN 12 07:42	PnnRie
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++		+++++	JAN 12 06:52 - JAN 12 07:42	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++		+++++	JAN 12 06:51 - JAN 12 07:41	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5	+++++		+++++	JAN 12 06:48 - JAN 12 07:37	PnnRie
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++		+++++	JAN 12 06:54 - JAN 12 07:45	PnnRie
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++++	+ +	+++++	JAN 12 06:46 - JAN 12 07:39	PieRie
ESO	European Southern Obs	-29.3	289.3	+++++	+ +	+++++	JAN 12 06:47 - JAN 12 07:40	PieRie
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 : 2038-01-12T07:15:30.430
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 865602868410004352
 2Mass ID (if available) : 07334566+2211445
 ICRS Star Coord at Epoch: 07h 33m 45.64377s +22:11:44.51018s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 14.383
 G magnitude : 15.932
 RP magnitude : 15.442
 BP magnitude : 16.255
 DUPflag : 0
 Distance (au) : 17.720
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.29
 Sun-Target sep (deg) : 179.50
 Sun-Moon sep (deg) : 103.10
 B (ring opening deg) : 55.15
 PA of pole (deg) : 84.77
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.507
 C/A sky separation (km) : 32222.1
 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



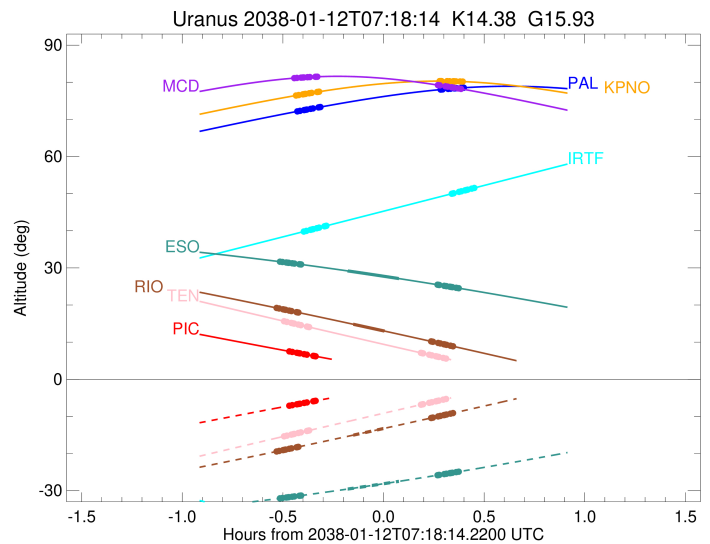
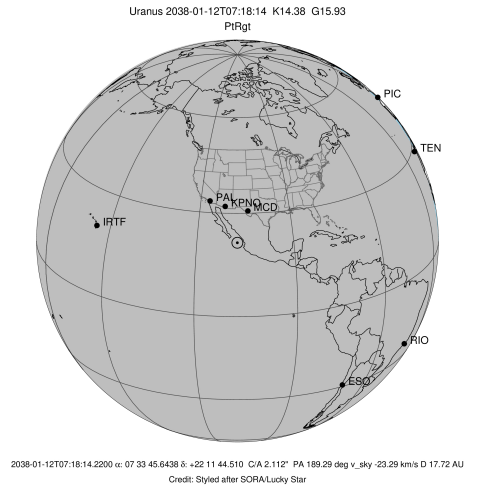
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-12T06:50:00.602		7.53	-7.15	51358.08	-21.77		
lambda	I	2038-01-12T06:51:02.655		7.36	-6.97	50026.71	-21.25		
delta	I	2038-01-12T06:52:24.981		7.13	-6.74	48300.35	-20.68		
gamma	I	2038-01-12T06:52:57.573		7.04	-6.65	47630.46	-20.43		
eta	I	2038-01-12T06:53:19.907		6.97	-6.59	47176.12	-20.25		
beta	I	2038-01-12T06:54:36.629		6.76	-6.37	45647.19	-19.62		
alpha	I	2038-01-12T06:55:23.835		6.63	-6.24	44727.84	-19.20		
4	I	2038-01-12T06:57:17.657		6.31	-5.92	42606.96	-18.06		
5	I	2038-01-12T06:57:37.914		6.25	-5.87	42239.91	-17.77		
6	I	2038-01-12T06:58:04.168		6.18	-5.79	41796.07	-17.55		

No planet occultations

6	E	2038-01-12T07:29:18.564		1.06x	-0.67x	41818.14	17.51		
5	E	2038-01-12T07:29:38.513		1.01x	-0.62x	42157.42	17.74		
4	E	2038-01-12T07:30:03.194		0.94x	-0.55x	42604.73	18.02		
alpha	E	2038-01-12T07:31:57.707		0.64x	-0.25x	44751.62	19.16		
beta	E	2038-01-12T07:32:45.615		0.51x	-0.12x	45675.35	19.58		
eta	E	2038-01-12T07:34:01.137		0.31x	0.08x	47176.12	20.20		
gamma	E	2038-01-12T07:34:23.152		0.25x	0.14x	47622.75	20.37		
delta	E	2038-01-12T07:34:56.210		0.16x	0.22x	48300.35	20.62		
lambda	E	2038-01-12T07:36:18.765		-0.05x	0.44x	50026.71	21.19		
epsilon	E	2038-01-12T07:37:25.079		-0.23x	0.62x	51446.19	21.71		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2038-01-12T07:18:57.220
Event type           : PtRgt
: Uranus occs: topocentric, not geocentric
: 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       : 865602868410004352
2Mass ID (if available) : 07334566+2211445
ICRS Star Coord at Epoch: 07h 33m 45.64377s +22:11:44.51018s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 14.383
G magnitude           : 15.932
RP magnitude          : 15.442
BP magnitude          : 16.255
DUPflag              : 0
Distance (au)         : 17.720
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -23.29
Sun-Target sep (deg) : 179.50
Sun-Moon sep (deg)   : 104.08
B (ring opening deg) : 55.15
PA of pole (deg)     : 84.77
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.188
C/A sky separation (km) : 28118.0
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
  
```

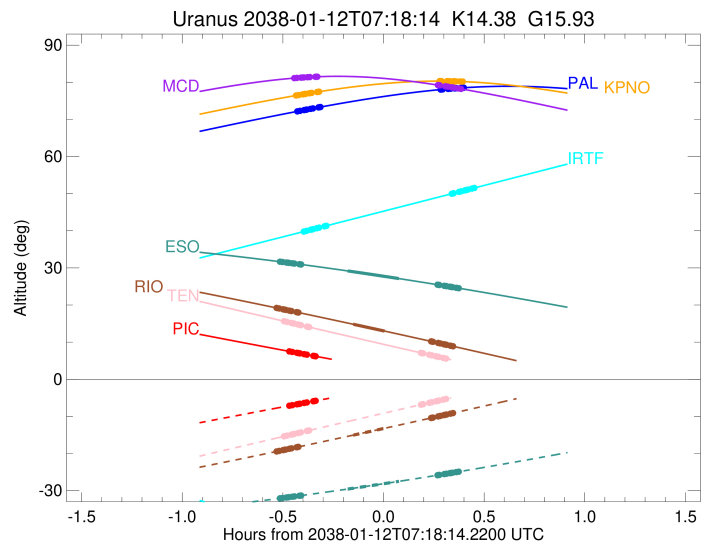
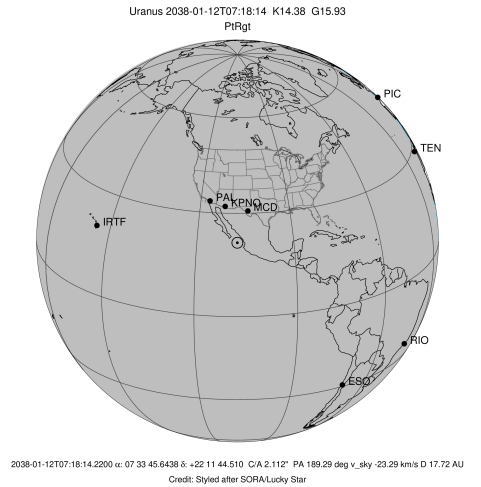


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-12T06:52:25.675		72.14	-71.86	51323.25	-23.88		
lambda	I	2038-01-12T06:53:20.533		72.30	-72.01	50026.71	-23.49		
delta	I	2038-01-12T06:54:34.651		72.51	-72.22	48300.35	-23.08		
gamma	I	2038-01-12T06:55:03.765		72.60	-72.30	47630.80	-22.91		
eta	I	2038-01-12T06:55:23.665		72.65	-72.36	47176.12	-22.79		
beta	I	2038-01-12T06:56:31.543		72.85	-72.54	45645.57	-22.35		
alpha	I	2038-01-12T06:57:12.917		72.96	-72.66	44723.73	-22.06		
4	I	2038-01-12T06:58:50.717		73.23	-72.92	42602.82	-21.27		
5	I	2038-01-12T06:59:07.058		73.28	-72.97	42251.01	-21.08		
6	I	2038-01-12T06:59:29.915		73.34	-73.03	41797.98	-20.94		

No planet occultations

6	E	2038-01-12T07:35:15.458		78.04	-77.58	41823.91	20.94		
5	E	2038-01-12T07:35:32.162		78.06	-77.60	42155.32	21.08		
4	E	2038-01-12T07:35:52.783		78.09	-77.63	42600.09	21.28		
alpha	E	2038-01-12T07:37:31.099		78.22	-77.75	44750.40	22.06		
beta	E	2038-01-12T07:38:12.993		78.27	-77.80	45677.00	22.35		
eta	E	2038-01-12T07:39:19.484		78.35	-77.88	47176.12	22.79		
gamma	E	2038-01-12T07:39:39.007		78.37	-77.90	47622.32	22.92		
delta	E	2038-01-12T07:40:08.482		78.40	-77.93	48300.35	23.09		
lambda	E	2038-01-12T07:41:22.572		78.48	-78.00	50026.71	23.50		
epsilon	E	2038-01-12T07:42:21.326		78.54	-78.06	51416.44	23.89		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-12T07:18:35.270
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 865602868410004352
 2Mass ID (if available) : 07334566+2211445
 ICRS Star Coord at Epoch: 07h 33m 45.64377s +22:11:44.51018s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 14.383
 G magnitude : 15.932
 RP magnitude : 15.442
 BP magnitude : 16.255
 DUPflag : 0
 Distance (au) : 17.720
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.29
 Sun-Target sep (deg) : 179.50
 Sun-Moon sep (deg) : 104.07
 B (ring opening deg) : 55.15
 PA of pole (deg) : 84.77
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.181
 C/A sky separation (km) : 28025.6
 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_itrff93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



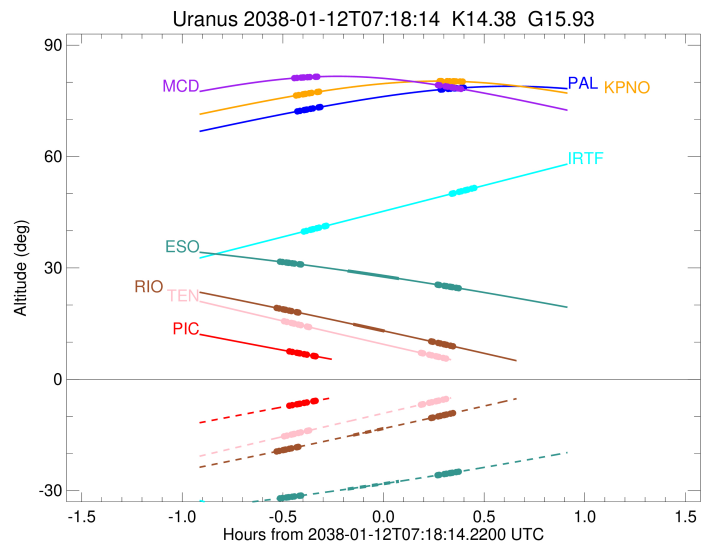
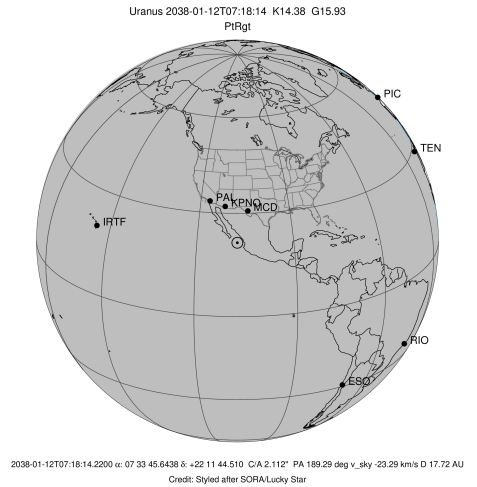
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-12T06:52:02.840	76.42	-76.09	51322.26	-23.93		
lambda	I	2038-01-12T06:52:57.543	76.57	-76.23	50026.71	-23.54		
delta	I	2038-01-12T06:54:11.497	76.75	-76.41	48300.35	-23.14		
gamma	I	2038-01-12T06:54:40.543	76.83	-76.48	47630.81	-22.96		
eta	I	2038-01-12T06:55:00.396	76.88	-76.53	47176.12	-22.84		
beta	I	2038-01-12T06:56:08.105	77.05	-76.70	45645.53	-22.40		
alpha	I	2038-01-12T06:56:49.371	77.15	-76.79	44723.63	-22.12		
4	I	2038-01-12T06:58:26.880	77.38	-77.02	42602.71	-21.34		
5	I	2038-01-12T06:58:43.148	77.42	-77.06	42251.29	-21.14		
6	I	2038-01-12T06:59:05.948	77.48	-77.11	41798.04	-21.01		

No planet occultations

6	E	2038-01-12T07:34:56.784	80.32	-79.82	41824.01	21.01		
5	E	2038-01-12T07:35:13.436	80.32	-79.82	42155.29	21.15		
4	E	2038-01-12T07:35:33.991	80.32	-79.81	42600.00	21.34		
alpha	E	2038-01-12T07:37:12.043	80.30	-79.80	44750.37	22.12		
beta	E	2038-01-12T07:37:53.838	80.29	-79.79	45677.03	22.41		
eta	E	2038-01-12T07:39:00.179	80.27	-79.77	47176.12	22.84		
gamma	E	2038-01-12T07:39:19.660	80.26	-79.76	47622.31	22.96		
delta	E	2038-01-12T07:39:49.075	80.25	-79.75	48300.35	23.14		
lambda	E	2038-01-12T07:41:03.025	80.22	-79.71	50026.71	23.55		
epsilon	E	2038-01-12T07:42:01.654	80.18	-79.68	51415.92	23.93		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-12T07:18:03.270
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 865602868410004352
 2Mass ID (if available) : 07334566+2211445
 ICRS Star Coord at Epoch: 07h 33m 45.64377s +22:11:44.51018s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 14.383
 G magnitude : 15.932
 RP magnitude : 15.442
 BP magnitude : 16.255
 DUPflag : 0
 Distance (au) : 17.720
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.29
 Sun-Target sep (deg) : 179.50
 Sun-Moon sep (deg) : 104.05
 B (ring opening deg) : 55.15
 PA of pole (deg) : 84.77
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.179
 C/A sky separation (km) : 28001.5
 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



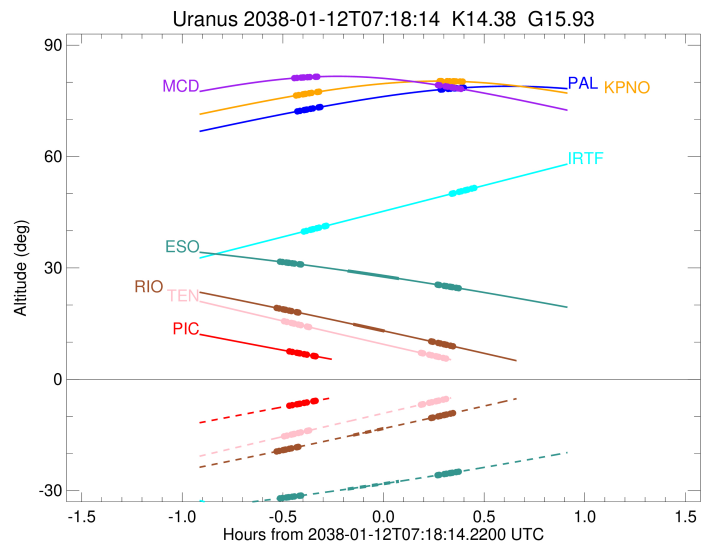
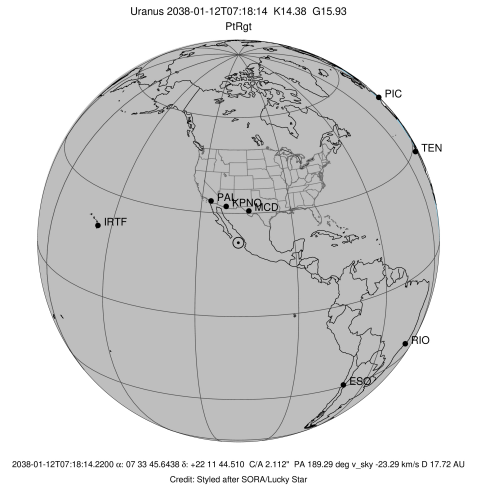
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-12T06:51:31.094		81.11	-80.66	51321.77	-23.95		
lambda	I	2038-01-12T06:52:25.731		81.18	-80.72	50026.71	-23.56		
delta	I	2038-01-12T06:53:39.621		81.26	-80.80	48300.35	-23.16		
gamma	I	2038-01-12T06:54:08.642		81.29	-80.82	47630.81	-22.98		
eta	I	2038-01-12T06:54:28.476		81.31	-80.84	47176.12	-22.86		
beta	I	2038-01-12T06:55:36.123		81.37	-80.90	45645.52	-22.43		
alpha	I	2038-01-12T06:56:17.351		81.41	-80.93	44723.58	-22.14		
4	I	2038-01-12T06:57:54.757		81.48	-80.99	42602.66	-21.37		
5	I	2038-01-12T06:58:10.998		81.49	-81.00	42251.41	-21.17		
6	I	2038-01-12T06:58:33.781		81.50	-81.02	41798.06	-21.03		

No planet occultations

6	E	2038-01-12T07:34:25.922		79.25	-78.83	41824.02	21.03		
5	E	2038-01-12T07:34:42.561		79.21	-78.79	42155.29	21.16		
4	E	2038-01-12T07:35:03.101		79.16	-78.74	42600.00	21.36		
alpha	E	2038-01-12T07:36:41.088		78.93	-78.52	44750.37	22.13		
beta	E	2038-01-12T07:37:22.858		78.83	-78.42	45677.03	22.42		
eta	E	2038-01-12T07:38:29.164		78.66	-78.26	47176.12	22.85		
gamma	E	2038-01-12T07:38:48.636		78.61	-78.21	47622.31	22.98		
delta	E	2038-01-12T07:39:18.038		78.54	-78.14	48300.35	23.15		
lambda	E	2038-01-12T07:40:31.957		78.35	-77.95	50026.71	23.55		
epsilon	E	2038-01-12T07:41:30.566		78.19	-77.80	51415.94	23.94		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2038-01-12T07:14:27.250
Event type           : PtRgt
: Uranus occs: topocentric, not geocentric
: 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       : 865602868410004352
2Mass ID (if available) : 07334566+2211445
ICRS Star Coord at Epoch: 07h 33m 45.64377s +22:11:44.51018s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 14.383
G magnitude           : 15.932
RP magnitude          : 15.442
BP magnitude          : 16.255
DUPflag              : 0
Distance (au)         : 17.720
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -23.29
Sun-Target sep (deg) : 179.50
Sun-Moon sep (deg)   : 103.16
B (ring opening deg) : 55.15
PA of pole (deg)     : 84.77
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.389
C/A sky separation (km) : 30702.1
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
  
```



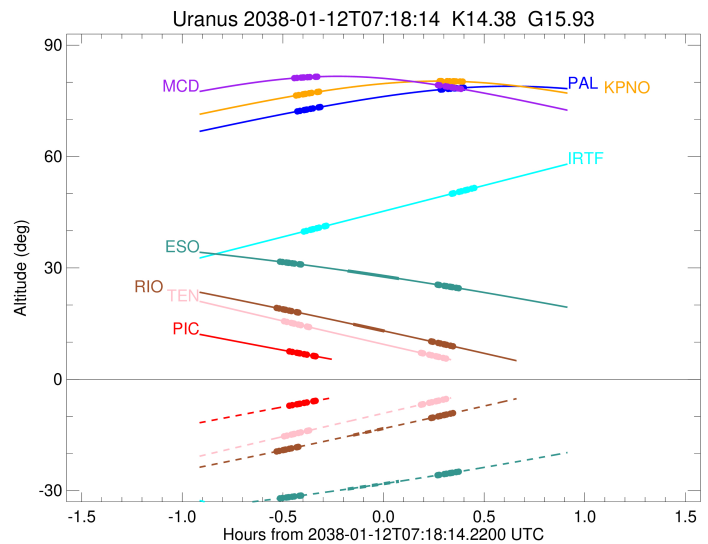
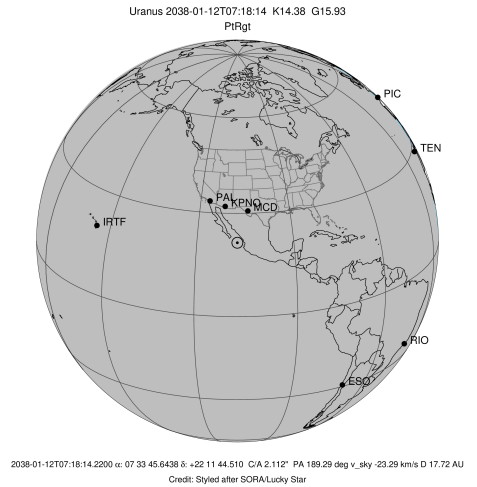
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-12T06:48:27.636		15.66	-15.40	51344.08	-22.53		
lambda	I	2038-01-12T06:49:26.867		15.45	-15.19	50026.71	-22.06		
delta	I	2038-01-12T06:50:46.005		15.17	-14.91	48300.35	-21.55		
gamma	I	2038-01-12T06:51:17.232		15.06	-14.80	47630.61	-21.34		
eta	I	2038-01-12T06:51:38.607		14.99	-14.72	47176.12	-21.19		
beta	I	2038-01-12T06:52:51.808		14.73	-14.47	45646.51	-20.63		
alpha	I	2038-01-12T06:53:36.659		14.57	-14.31	44726.18	-20.27		
4	I	2038-01-12T06:55:23.873		14.20	-13.93	42605.35	-19.28		
5	I	2038-01-12T06:55:42.463		14.13	-13.87	42244.48	-19.03		
6	I	2038-01-12T06:56:07.312		14.04	-13.78	41796.75	-18.84		

No planet occultations

6	E	2038-01-12T07:29:22.367		7.12	-6.86	41820.26	18.79		
5	E	2038-01-12T07:29:40.961		7.05	-6.79	42156.44	18.98		
4	E	2038-01-12T07:30:03.987		6.97	-6.71	42603.08	19.22		
alpha	E	2038-01-12T07:31:51.995		6.60	-6.34	44751.23	20.21		
beta	E	2038-01-12T07:32:37.552		6.45	-6.19	45675.98	20.57		
eta	E	2038-01-12T07:33:49.603		6.20	-5.94	47176.12	21.11		
gamma	E	2038-01-12T07:34:10.674		6.13	-5.87	47622.59	21.27		
delta	E	2038-01-12T07:34:42.386		6.02	-5.76	48300.35	21.48		
lambda	E	2038-01-12T07:36:01.809		5.75	-5.49	50026.71	21.98		
epsilon	E	2038-01-12T07:37:05.375		5.53	-5.27	51435.92	22.45		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2038-01-12T07:21:27.480
Event type          : PtRgt
: Uranus occs: topocentric, not geocentric
: 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      : 865602868410004352
2Mass ID (if available) : 07334566+2211445
ICRS Star Coord at Epoch: 07h 33m 45.64377s +22:11:44.51018s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 14.383
G magnitude          : 15.932
RP magnitude         : 15.442
BP magnitude         : 16.255
DUPflag             : 0
Distance (au)       : 17.720
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -23.29
Sun-Target sep (deg) : 179.50
Sun-Moon sep (deg)  : 103.97
B (ring opening deg) : 55.15
PA of pole (deg)    : 84.77
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.081
C/A sky separation (km) : 26750.2
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
    
```

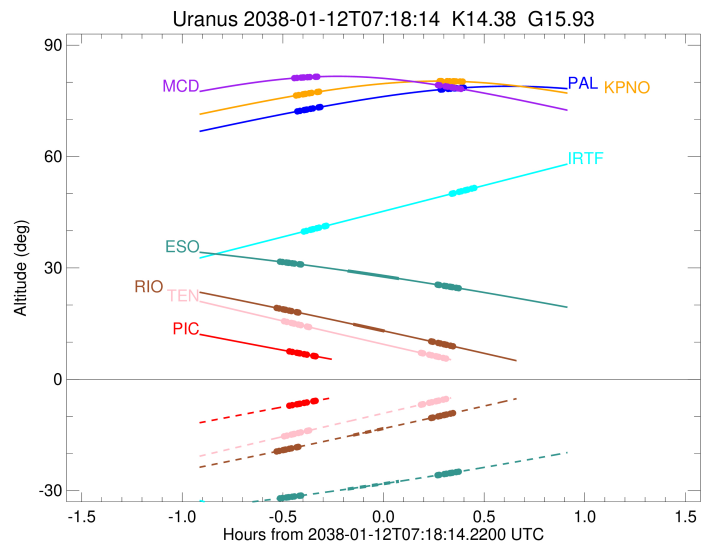
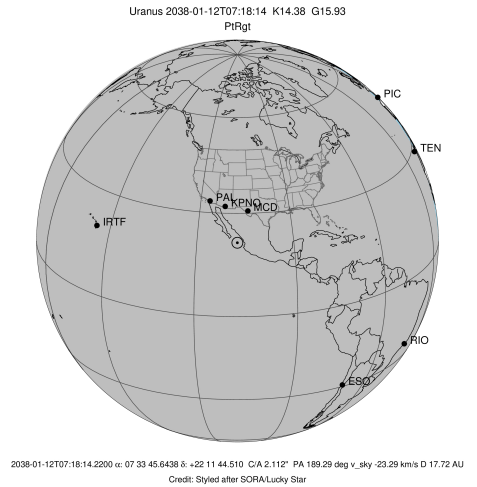


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-12T06:54:22.188		39.77	-39.76	51312.98	-24.26		
lambda	I	2038-01-12T06:55:15.719		39.97	-39.97	50026.71	-23.91		
delta	I	2038-01-12T06:56:28.472		40.25	-40.24	48300.35	-23.55		
gamma	I	2038-01-12T06:56:56.996		40.36	-40.35	47630.88	-23.39		
eta	I	2038-01-12T06:57:16.481		40.44	-40.43	47176.12	-23.29		
beta	I	2038-01-12T06:58:22.833		40.69	-40.68	45645.15	-22.90		
alpha	I	2038-01-12T06:59:03.198		40.85	-40.84	44722.55	-22.65		
4	I	2038-01-12T07:00:38.161		41.21	-41.20	42601.55	-21.97		
5	I	2038-01-12T07:00:53.756		41.27	-41.26	42254.09	-21.79		
6	I	2038-01-12T07:01:16.049		41.36	-41.35	41798.66	-21.68		

No planet occultations

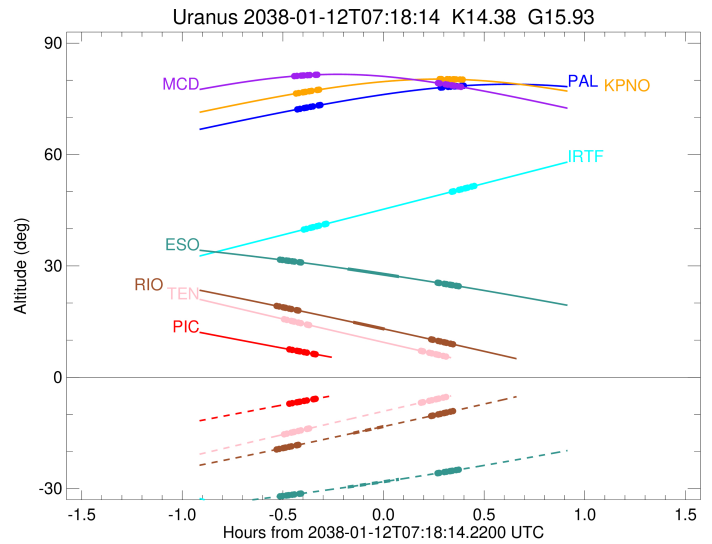
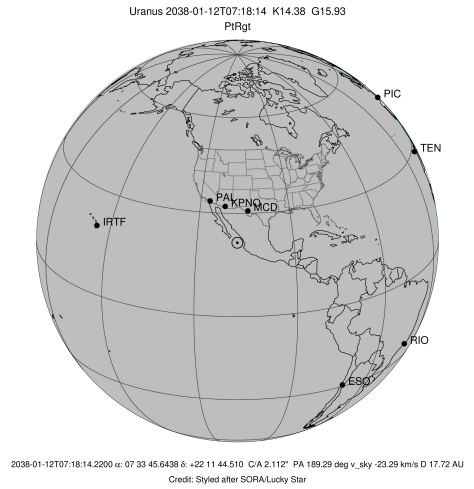
6	E	2038-01-12T07:38:34.310		49.97	-49.96	41825.85	21.72		
5	E	2038-01-12T07:38:50.432		50.03	-50.02	42154.99	21.84		
4	E	2038-01-12T07:39:10.266		50.11	-50.10	42598.44	22.02		
alpha	E	2038-01-12T07:40:45.599		50.48	-50.47	44749.87	22.70		
beta	E	2038-01-12T07:41:26.392		50.64	-50.62	45677.50	22.96		
eta	E	2038-01-12T07:42:31.211		50.89	-50.87	47176.12	23.35		
gamma	E	2038-01-12T07:42:50.275		50.96	-50.95	47622.18	23.45		
delta	E	2038-01-12T07:43:19.096		51.07	-51.06	48300.35	23.61		
lambda	E	2038-01-12T07:44:31.653		51.35	-51.34	50026.71	23.97		
epsilon	E	2038-01-12T07:45:28.847		51.57	-51.56	51405.40	24.33		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-12T07:14:00.980
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 865602868410004352
 2Mass ID (if available) : 07334566+2211445
 ICRS Star Coord at Epoch: 07h 33m 45.64377s +22:11:44.51018s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 14.383
 G magnitude : 15.932
 RP magnitude : 15.442
 BP magnitude : 16.255
 DUPflag : 0
 Distance (au) : 17.720
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.29
 Sun-Target sep (deg) : 179.50
 Sun-Moon sep (deg) : 103.21
 B (ring opening deg) : 55.15
 PA of pole (deg) : 84.77
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.918
 C/A sky separation (km) : 24654.5
 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	2038-01-12T06:46:16.685		19.23	-19.47	51291.49	-24.89		
lambda	I	2038-01-12T06:47:07.902		19.07	-19.30	50026.71	-24.59		
delta	I	2038-01-12T06:48:18.519		18.84	-19.08	48300.35	-24.29		
gamma	I	2038-01-12T06:48:46.139		18.76	-18.99	47631.04	-24.17		
eta	I	2038-01-12T06:49:04.996		18.70	-18.93	47176.12	-24.08		
beta	I	2038-01-12T06:50:09.091		18.49	-18.73	45644.39	-23.76		
alpha	I	2038-01-12T06:50:48.007		18.37	-18.61	44720.27	-23.56		
4	I	2038-01-12T06:52:18.963		18.08	-18.32	42599.04	-23.00		
5	I	2038-01-12T06:52:33.451		18.04	-18.27	42259.72	-22.85		
6	I	2038-01-12T06:52:55.031		17.97	-18.20	41800.08	-22.77		
Uranus	I	2038-01-12T07:09:13.815		14.82	-15.05	25558.83		-0.68	-0.71
Uranus	E	2038-01-12T07:18:33.064		12.98	-13.21	25467.25		15.88	16.59
6	E	2038-01-12T07:32:25.264		10.21	-10.43	41828.20	22.70		
5	E	2038-01-12T07:32:40.719		10.16	-10.38	42154.83	22.78		
4	E	2038-01-12T07:32:59.632		10.09	-10.32	42596.41	22.93		
alpha	E	2038-01-12T07:34:31.527		9.78	-10.01	44749.18	23.48		
beta	E	2038-01-12T07:35:11.060		9.65	-9.87	45678.05	23.68		
eta	E	2038-01-12T07:36:13.989		9.44	-9.66	47176.12	24.00		
gamma	E	2038-01-12T07:36:32.539		9.38	-9.60	47622.03	24.08		
delta	E	2038-01-12T07:37:00.633		9.28	-9.50	48300.35	24.21		
lambda	E	2038-01-12T07:38:11.513		9.04	-9.27	50026.71	24.50		
epsilon	E	2038-01-12T07:39:07.022		8.85	-9.08	51392.60	24.80		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-12T07:15:17.250
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 865602868410004352
 2Mass ID (if available) : 07334566+2211445
 ICRS Star Coord at Epoch: 07h 33m 45.64377s +22:11:44.51018s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 14.383
 G magnitude : 15.932
 RP magnitude : 15.442
 BP magnitude : 16.255
 DUPflag : 0
 Distance (au) : 17.720
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.29
 Sun-Target sep (deg) : 179.50
 Sun-Moon sep (deg) : 103.48
 B (ring opening deg) : 55.15
 PA of pole (deg) : 84.77
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.794
 C/A sky separation (km) : 23060.6
 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	2038-01-12T06:47:17.722		31.68	-32.08	51278.41	-25.49		
lambda	I	2038-01-12T06:48:07.171		31.59	-31.98	50026.71	-25.23		
delta	I	2038-01-12T06:49:15.948		31.45	-31.85	48300.35	-24.97		
gamma	I	2038-01-12T06:49:42.807		31.40	-31.80	47631.12	-24.86		
eta	I	2038-01-12T06:50:01.136		31.36	-31.76	47176.12	-24.79		
beta	I	2038-01-12T06:51:03.358		31.24	-31.64	45643.96	-24.51		
alpha	I	2038-01-12T06:51:41.095		31.17	-31.56	44718.87	-24.34		
4	I	2038-01-12T06:53:08.923		30.99	-31.39	42597.42	-23.86		
5	I	2038-01-12T06:53:22.646		30.96	-31.36	42263.14	-23.73		
6	I	2038-01-12T06:53:43.606		30.92	-31.32	41801.06	-23.66		
Uranus	I	2038-01-12T07:07:31.970		29.19	-29.58	25543.58		-6.43	-6.73
Uranus	E	2038-01-12T07:22:48.523		27.13	-27.50	25401.39		21.06	21.96
6	E	2038-01-12T07:34:19.437		25.47	-25.85	41830.20	23.62		
5	E	2038-01-12T07:34:34.317		25.44	-25.81	42154.89	23.69		
4	E	2038-01-12T07:34:52.419		25.39	-25.76	42594.62	23.82		
alpha	E	2038-01-12T07:36:21.122		25.18	-25.55	44748.52	24.29		
beta	E	2038-01-12T07:36:59.408		25.08	-25.45	45678.49	24.46		
eta	E	2038-01-12T07:38:00.392		24.93	-25.30	47176.12	24.73		
gamma	E	2038-01-12T07:38:18.392		24.89	-25.25	47621.90	24.80		
delta	E	2038-01-12T07:38:45.686		24.82	-25.19	48300.35	24.91		
lambda	E	2038-01-12T07:39:54.630		24.65	-25.01	50026.71	25.17		
epsilon	E	2038-01-12T07:40:48.237		24.51	-24.88	51380.60	25.43		