

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-20T06:50:55.850
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 865659355819944320
 2Mass ID (if available) : 07321725+2215027

ICRS Star Coord at Epoch: 07h 32m 17.24912s +22:15:02.46079s

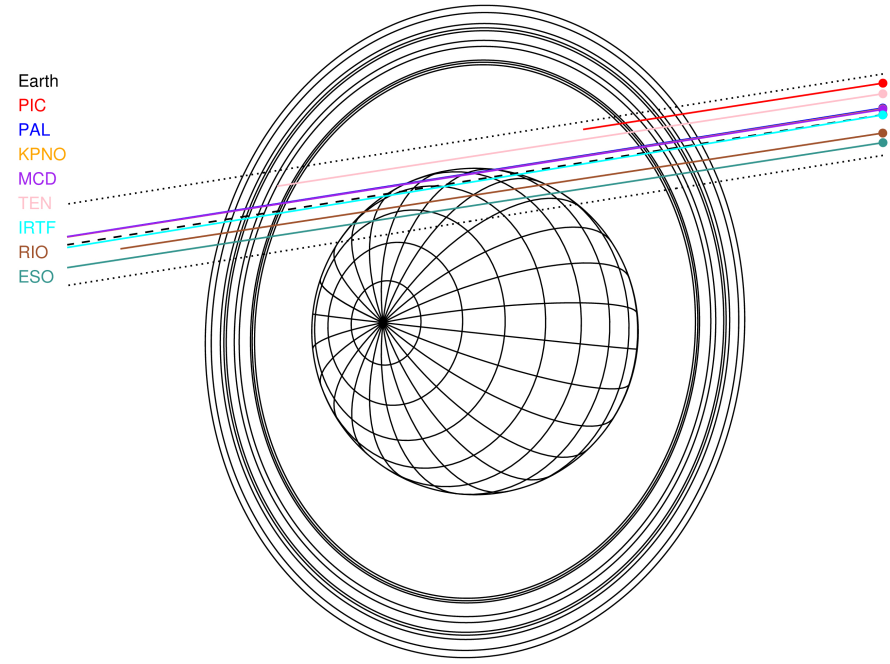
RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.155
 G magnitude : 15.681
 RP magnitude : 15.171
 BP magnitude : 16.022
 DUPflag : 0
 Distance (au) : 17.729
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.95
 Sun-Target sep (deg) : 171.48
 Sun-Moon sep (deg) : 2.89
 B (ring opening deg) : 55.48
 PA of pole (deg) : 84.50

#	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



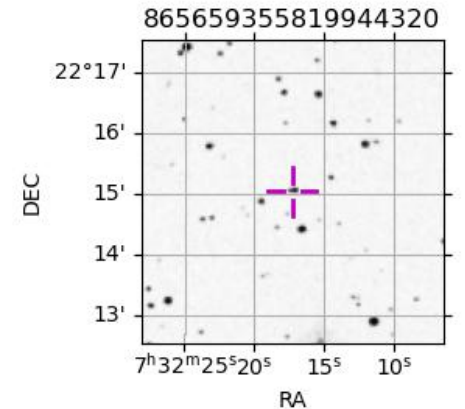
2038-01-20T06:50:55.8500 α: 07 32 17.24912 s: +22 15 02.461 C/A 1.833° PA 189.06 deg v_sky -22.95 km/s D 17.73 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2038-01-20T06:50:55 K14.15 G15.68 PgtRgt



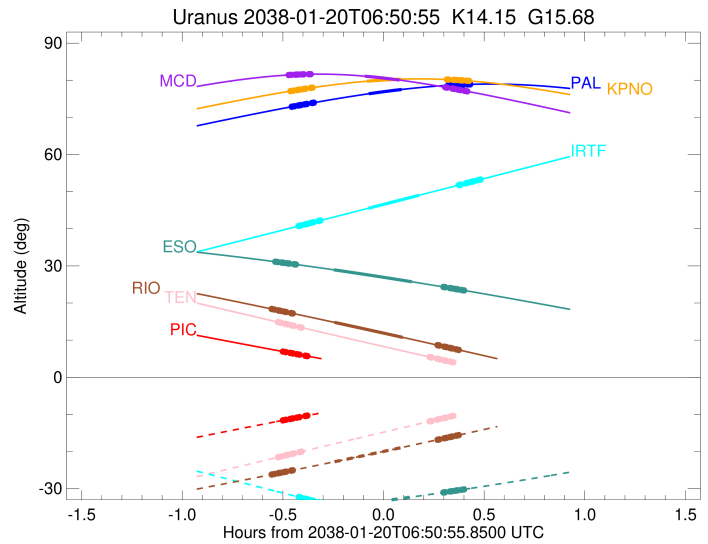
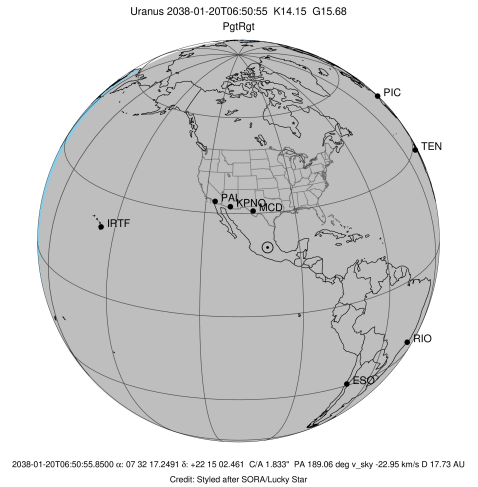
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++			JAN 20 06:20 - JAN 20 06:28	PnnRin
PAL	Palomar Mt (200")	33.4	243.1	+++++	+ +	+++++	JAN 20 06:23 - JAN 20 07:16	PieRie
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	JAN 20 06:23 - JAN 20 07:16	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	JAN 20 06:22 - JAN 20 07:16	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5	+++++		+++	JAN 20 06:19 - JAN 20 07:05	PnnRie
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	JAN 20 06:25 - JAN 20 07:20	PieRie
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++++	+ +	+++++	JAN 20 06:17 - JAN 20 07:13	PieRie
ESO	European Southern Obs	-29.3	289.3	+++++	+ +	+++++	JAN 20 06:18 - JAN 20 07:15	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            : 2038-01-20T06:48:11.200
Event type           : PgtRgt
: Uranus occs: geocentric, topocentric
: 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       : 865659355819944320
2Mass ID (if available) : 07321725+2215027
ICRS Star Coord at Epoch: 07h 32m 17.24912s +22:15:02.46079s
RUWE (>1.4 is poor) : 1.05
K magnitude           : 14.155
G magnitude           : 15.681
RP magnitude          : 15.171
BP magnitude          : 16.022
DUPflag              : 0
Distance (au)         : 17.729
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -22.95
Sun-Target sep (deg) : 171.48
Sun-Moon sep (deg)   : 3.66
B (ring opening deg) : 55.48
PA of pole (deg)     : 84.50
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.231
C/A sky separation (km) : 28685.0
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLvl1.spk
ural11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.ural11.bsp
ural161.bsp
vgr2.ural161.bsp
peph.ural160.bsp
earthstns_itr93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
  
```

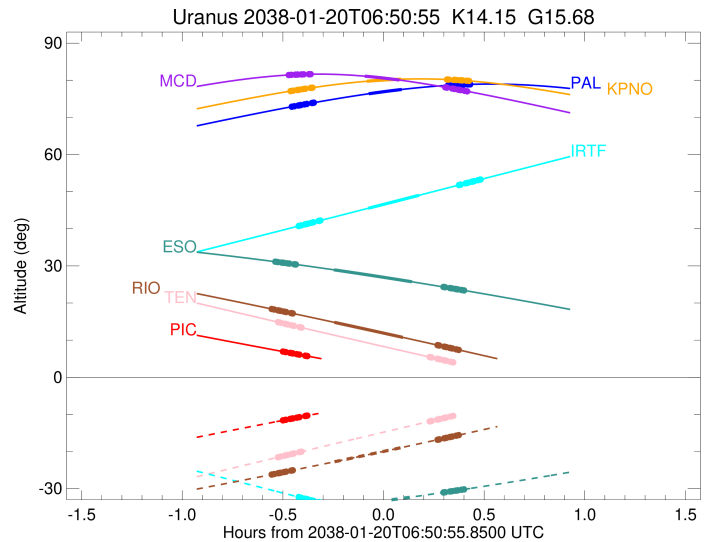
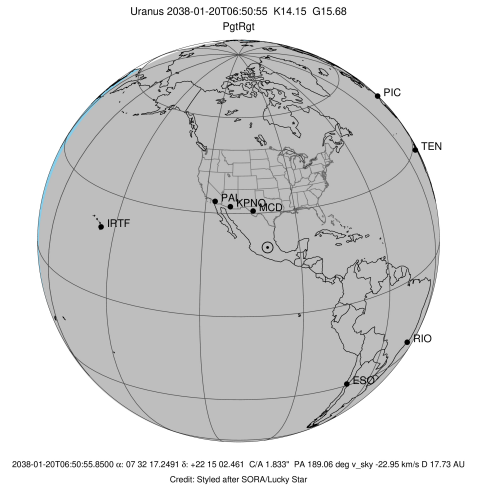


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-20T06:20:53.272		6.93	-11.62	51254.63	-22.78		
lambda	I	2038-01-20T06:21:47.782		6.78	-11.46	50026.71	-22.39		
delta	I	2038-01-20T06:23:05.597		6.56	-11.23	48300.35	-21.97		
gamma	I	2038-01-20T06:23:36.167		6.48	-11.14	47631.32	-21.80		
eta	I	2038-01-20T06:23:57.110		6.42	-11.08	47176.12	-21.67		
beta	I	2038-01-20T06:25:08.642		6.22	-10.87	45642.74	-21.22		
alpha	I	2038-01-20T06:25:52.527		6.10	-10.74	44713.88	-20.92		
4	I	2038-01-20T06:27:36.142		5.81	-10.44	42589.85	-20.13		
5	I	2038-01-20T06:27:51.564		5.76	-10.39	42277.60	-19.95		
6	I	2038-01-20T06:28:16.285		5.70	-10.32	41806.51	-19.79		

No planet occultations

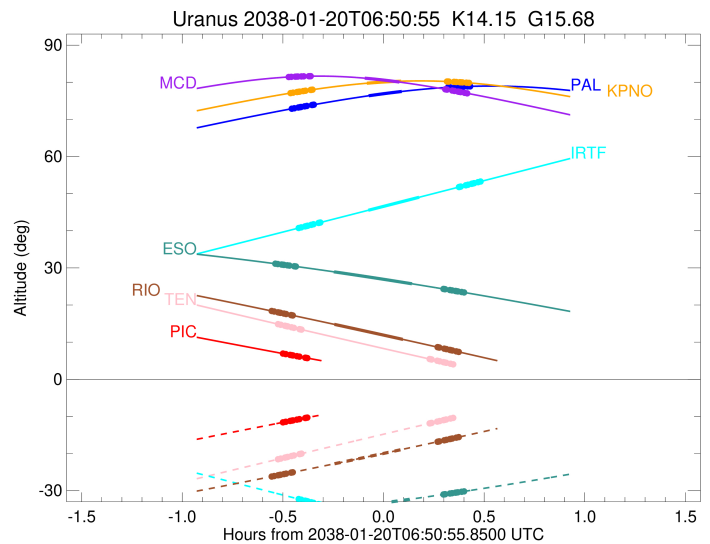
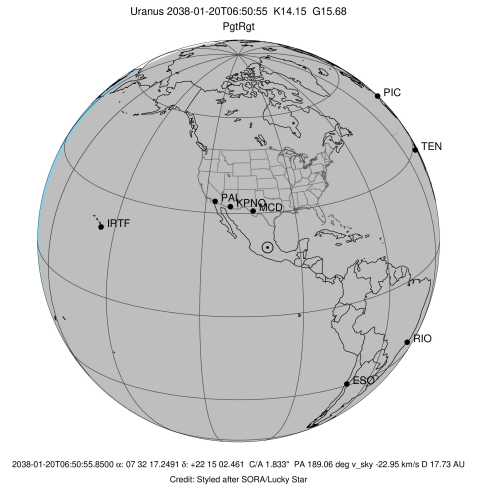
6	E	2038-01-20T07:04:50.800	-0.24x	-4.04x	41809.03	19.74
5	E	2038-01-20T07:05:10.339	-0.29x	-3.99x	42164.77	19.90
4	E	2038-01-20T07:05:32.177	-0.35x	-3.93x	42611.07	20.08
alpha	E	2038-01-20T07:07:15.832	-0.62x	-3.64x	44752.42	20.87
beta	E	2038-01-20T07:07:59.709	-0.74x	-3.52x	45672.61	21.16
eta	E	2038-01-20T07:09:10.112	-0.92x	-3.32x	47176.12	21.61
gamma	E	2038-01-20T07:09:30.753	-0.97x	-3.26x	47623.37	21.73
delta	E	2038-01-20T07:10:01.782	-1.05x	-3.18x	48300.35	21.91
lambda	E	2038-01-20T07:11:19.845	-1.26x	-2.96x	50026.71	22.32
epsilon	E	2038-01-20T07:12:24.220	-1.42x	-2.78x	51473.50	22.70

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-20T06:51:33.850
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 865659355819944320
 2Mass ID (if available) : 07321725+2215027
 ICRS Star Coord at Epoch: 07h 32m 17.24912s +22:15:02.46079s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.155
 G magnitude : 15.681
 RP magnitude : 15.171
 BP magnitude : 16.022
 DUPflag : 0
 Distance (au) : 17.729
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.95
 Sun-Target sep (deg) : 171.48
 Sun-Moon sep (deg) : 2.84
 B (ring opening deg) : 55.48
 PA of pole (deg) : 84.50
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.911
 C/A sky separation (km) : 24572.1
 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	2038-01-20T06:23:33.297		72.88	-65.19	51218.11	-24.62		
lambda	I	2038-01-20T06:24:22.077		73.01	-65.35	50026.71	-24.33		
delta	I	2038-01-20T06:25:33.449		73.21	-65.57	48300.35	-24.04		
gamma	I	2038-01-20T06:26:01.343		73.29	-65.66	47631.46	-23.92		
eta	I	2038-01-20T06:26:20.416		73.34	-65.71	47176.12	-23.83		
beta	I	2038-01-20T06:27:25.258		73.52	-65.92	45641.97	-23.52		
alpha	I	2038-01-20T06:28:04.859		73.63	-66.04	44710.10	-23.32		
4	I	2038-01-20T06:29:37.145		73.88	-66.32	42584.63	-22.78		
5	I	2038-01-20T06:29:50.101		73.91	-66.36	42285.75	-22.65		
6	I	2038-01-20T06:30:12.307		73.97	-66.43	41810.49	-22.55		
Uranus	I	2038-01-20T06:46:32.553		76.37	-69.34	25558.73		-0.86	-0.90
Uranus	E	2038-01-20T06:56:19.456		77.52	-70.97	25460.41		16.27	17.00
6	E	2038-01-20T07:10:08.891		78.64	-73.07	41813.46	22.55		
5	E	2038-01-20T07:10:25.902		78.65	-73.11	42160.36	22.65		
4	E	2038-01-20T07:10:45.123		78.67	-73.15	42607.99	22.78		
alpha	E	2038-01-20T07:12:17.313		78.74	-73.36	44752.09	23.32		
beta	E	2038-01-20T07:12:56.740		78.77	-73.45	45674.42	23.52		
eta	E	2038-01-20T07:14:00.254		78.82	-73.60	47176.12	23.84		
gamma	E	2038-01-20T07:14:18.966		78.83	-73.64	47622.91	23.92		
delta	E	2038-01-20T07:14:47.212		78.84	-73.70	48300.35	24.04		
lambda	E	2038-01-20T07:15:58.570		78.88	-73.86	50026.71	24.34		
epsilon	E	2038-01-20T07:16:56.725		78.91	-73.98	51448.39	24.63		

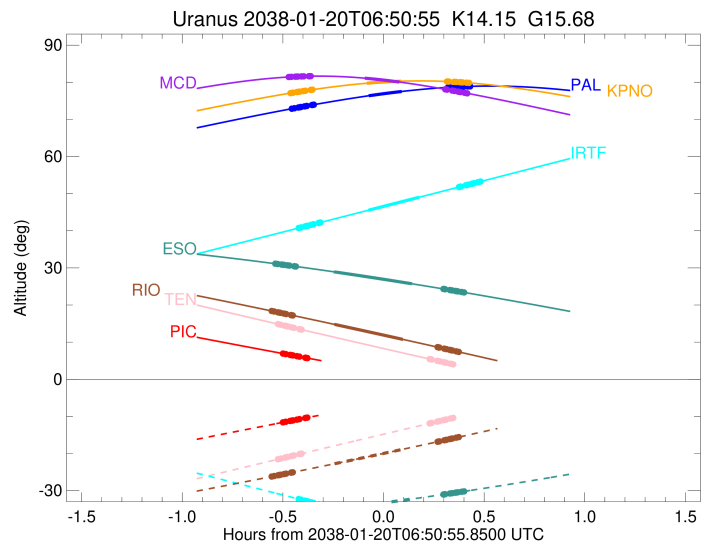
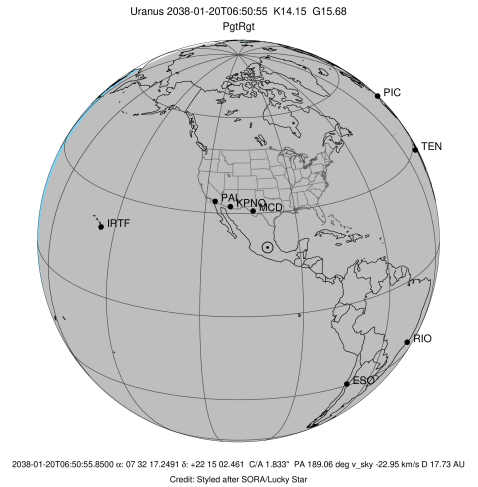
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-20T06:51:11.580
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 865659355819944320
 2Mass ID (if available) : 07321725+2215027
 ICRS Star Coord at Epoch: 07h 32m 17.24912s +22:15:02.46079s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.155
 G magnitude : 15.681
 RP magnitude : 15.171
 BP magnitude : 16.022
 DUPflag : 0
 Distance (au) : 17.729
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.95
 Sun-Target sep (deg) : 171.48
 Sun-Moon sep (deg) : 2.91
 B (ring opening deg) : 55.48
 PA of pole (deg) : 84.50
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.904
 C/A sky separation (km) : 24482.5
 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	2038-01-20T06:23:10.495		77.08	-69.69	51217.09	-24.66		
lambda	I	2038-01-20T06:23:59.151		77.20	-69.84	50026.71	-24.37		
delta	I	2038-01-20T06:25:10.395		77.38	-70.05	48300.35	-24.08		
gamma	I	2038-01-20T06:25:38.238		77.44	-70.14	47631.46	-23.96		
eta	I	2038-01-20T06:25:57.274		77.49	-70.19	47176.12	-23.88		
beta	I	2038-01-20T06:27:01.988		77.64	-70.39	45641.95	-23.57		
alpha	I	2038-01-20T06:27:41.509		77.73	-70.51	44710.00	-23.37		
4	I	2038-01-20T06:29:13.587		77.94	-70.78	42584.49	-22.83		
5	I	2038-01-20T06:29:26.495		77.97	-70.82	42285.95	-22.70		
6	I	2038-01-20T06:29:48.658		78.02	-70.88	41810.59	-22.61		
Uranus	I	2038-01-20T06:45:57.327		79.75	-73.59	25558.36		-1.28	-1.34
Uranus	E	2038-01-20T06:56:10.245		80.29	-75.10	25456.26		16.62	17.36
6	E	2038-01-20T07:09:49.198		80.21	-76.77	41813.53	22.60		
5	E	2038-01-20T07:10:06.169		80.20	-76.80	42160.30	22.70		
4	E	2038-01-20T07:10:25.349		80.19	-76.83	42607.93	22.83		
alpha	E	2038-01-20T07:11:57.358		80.11	-76.98	44752.08	23.36		
beta	E	2038-01-20T07:12:36.715		80.08	-77.05	45674.45	23.57		
eta	E	2038-01-20T07:13:40.122		80.02	-77.15	47176.12	23.87		
gamma	E	2038-01-20T07:13:58.803		80.00	-77.17	47622.90	23.96		
delta	E	2038-01-20T07:14:27.006		79.97	-77.22	48300.35	24.08		
lambda	E	2038-01-20T07:15:38.260		79.89	-77.32	50026.71	24.37		
epsilon	E	2038-01-20T07:16:36.320		79.83	-77.40	51447.97	24.66		

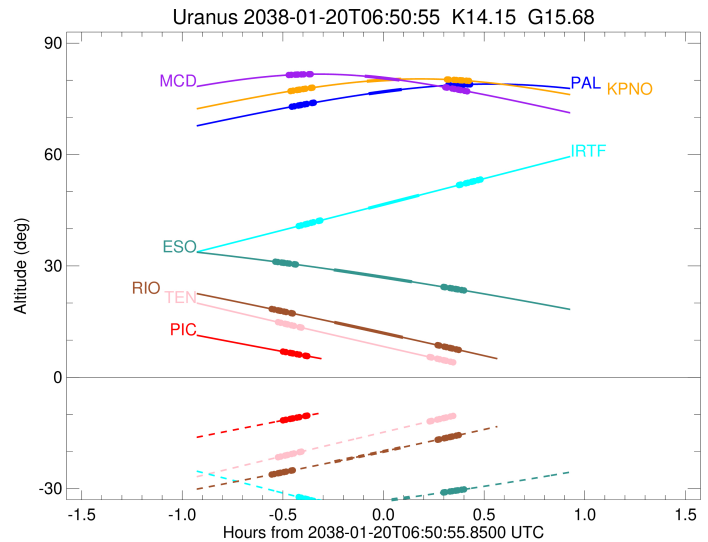
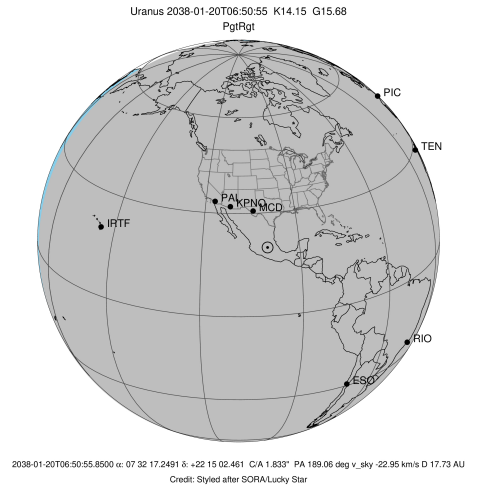
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2038-01-20T06:50:39.210
Event type          : PgtRgt
: Uranus occs: geocentric, topocentric
: 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      : 865659355819944320
2Mass ID (if available) : 07321725+2215027
ICRS Star Coord at Epoch: 07h 32m 17.24912s +22:15:02.46079s
RUWE (>1.4 is poor) : 1.05
K magnitude         : 14.155
G magnitude         : 15.681
RP magnitude        : 15.171
BP magnitude        : 16.022
DUPflag            : 0
Distance (au)       : 17.729
f0 (km)            : 0.000
g0 (km)            : 0.000
skyplane vel. (km/s) : -22.95
Sun-Target sep (deg) : 171.48
Sun-Moon sep (deg)  : 3.02
B (ring opening deg) : 55.48
PA of pole (deg)    : 84.50
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.902
C/A sky separation (km) : 24462.2
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl1.spk
ural11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.ural11.bsp
ural161.bsp
vgr2.ural161.bsp
peph.ural160.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	2038-01-20T06:22:38.463		81.42	-75.56	51216.60	-24.68		
lambda	I	2038-01-20T06:23:27.067		81.47	-75.69	50026.71	-24.39		
delta	I	2038-01-20T06:24:38.263		81.52	-75.87	48300.35	-24.10		
gamma	I	2038-01-20T06:25:06.086		81.54	-75.94	47631.46	-23.98		
eta	I	2038-01-20T06:25:25.109		81.55	-75.99	47176.12	-23.89		
beta	I	2038-01-20T06:26:29.778		81.58	-76.15	45641.95	-23.58		
alpha	I	2038-01-20T06:27:09.271		81.60	-76.25	44709.96	-23.38		
4	I	2038-01-20T06:28:41.278		81.64	-76.47	42584.43	-22.85		
5	I	2038-01-20T06:28:54.169		81.64	-76.50	42286.04	-22.72		
6	I	2038-01-20T06:29:16.319		81.65	-76.55	41810.64	-22.62		
Uranus	I	2038-01-20T06:45:22.102		81.11	-78.50	25558.26		-1.40	-1.46
Uranus	E	2038-01-20T06:55:40.800		80.06	-79.27	25455.57		16.68	17.42
6	E	2038-01-20T07:09:17.708		78.12	-79.56	41813.53	22.61		
5	E	2038-01-20T07:09:34.672		78.08	-79.56	42160.30	22.71		
4	E	2038-01-20T07:09:53.844		78.03	-79.55	42607.93	22.84		
alpha	E	2038-01-20T07:11:25.822		77.78	-79.53	44752.08	23.37		
beta	E	2038-01-20T07:12:05.167		77.67	-79.51	45674.45	23.57		
eta	E	2038-01-20T07:13:08.557		77.49	-79.48	47176.12	23.88		
gamma	E	2038-01-20T07:13:27.234		77.44	-79.47	47622.90	23.97		
delta	E	2038-01-20T07:13:55.431		77.36	-79.46	48300.35	24.09		
lambda	E	2038-01-20T07:15:06.672		77.16	-79.41	50026.71	24.37		
epsilon	E	2038-01-20T07:16:04.725		77.00	-79.37	51448.02	24.66		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-20T06:47:06.260
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 865659355819944320
 2Mass ID (if available) : 07321725+2215027
 ICRS Star Coord at Epoch: 07h 32m 17.24912s +22:15:02.46079s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.155
 G magnitude : 15.681
 RP magnitude : 15.171
 BP magnitude : 16.022
 DUPflag : 0
 Distance (au) : 17.729
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.95
 Sun-Target sep (deg) : 171.48
 Sun-Moon sep (deg) : 3.79
 B (ring opening deg) : 55.48
 PA of pole (deg) : 84.50
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.113
 C/A sky separation (km) : 27174.3
 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



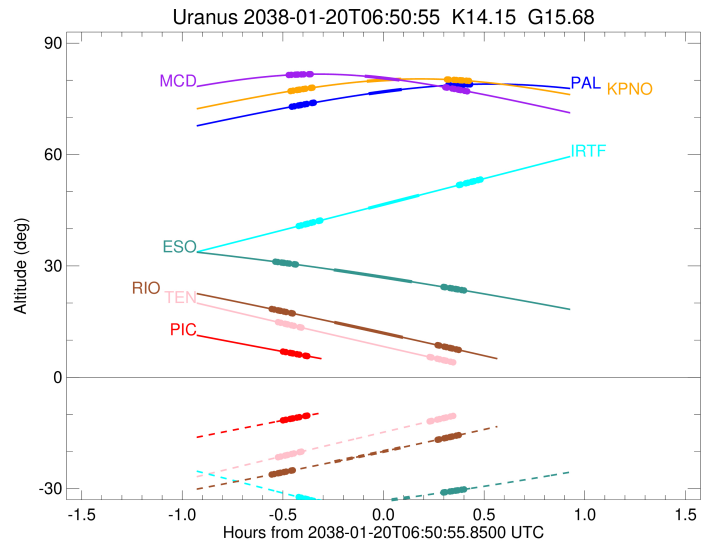
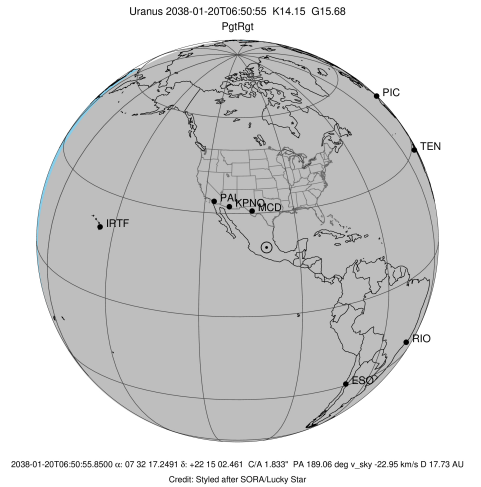
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-20T06:19:25.498		14.86	-21.56	51239.94	-23.42		
lambda	I	2038-01-20T06:20:17.817		14.68	-21.37	50026.71	-23.07		
delta	I	2038-01-20T06:21:33.234		14.41	-21.10	48300.35	-22.68		
gamma	I	2038-01-20T06:22:02.799		14.31	-20.99	47631.38	-22.55		
eta	I	2038-01-20T06:22:23.038		14.24	-20.92	47176.12	-22.44		
beta	I	2038-01-20T06:23:32.030		14.00	-20.67	45642.41	-22.04		
alpha	I	2038-01-20T06:24:14.273		13.85	-20.52	44712.35	-21.79		
4	I	2038-01-20T06:25:53.469		13.50	-20.16	42587.77	-21.10		
5	I	2038-01-20T06:26:07.888		13.45	-20.11	42280.97	-20.94		
6	I	2038-01-20T06:26:31.635		13.37	-20.03	41808.05	-20.80		

No planet occultations

6	E	2038-01-20T07:04:38.653		5.46	-11.90	41810.59	20.74		
5	E	2038-01-20T07:04:57.219		5.40	-11.83	42163.03	20.87		
4	E	2038-01-20T07:05:18.067		5.33	-11.76	42610.02	21.03		
alpha	E	2038-01-20T07:06:57.423		4.99x	-11.41	44752.36	21.71		
beta	E	2038-01-20T07:07:39.668		4.84x	-11.26	45673.28	21.96		
eta	E	2038-01-20T07:08:47.583		4.61x	-11.02	47176.12	22.35		
gamma	E	2038-01-20T07:09:07.537		4.55x	-10.95	47623.20	22.46		
delta	E	2038-01-20T07:09:37.582		4.44x	-10.84	48300.35	22.61		
lambda	E	2038-01-20T07:10:53.308		4.19x	-10.58	50026.71	22.98		
epsilon	E	2038-01-20T07:11:55.542		3.98x	-10.36	51465.03	23.32		

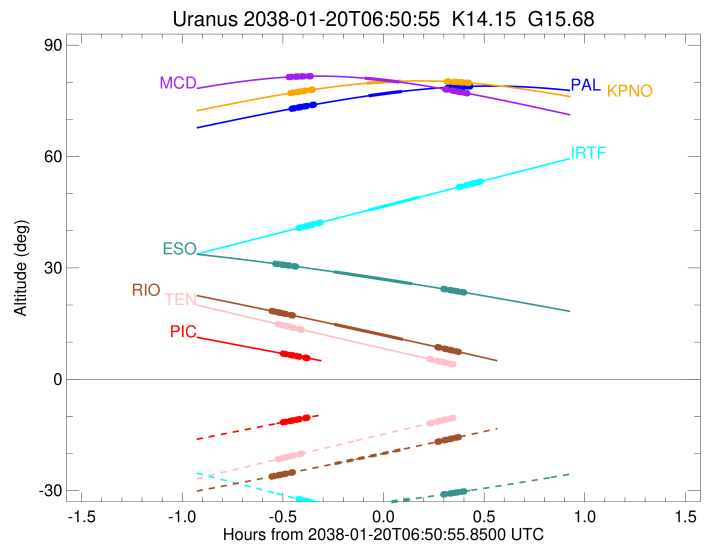
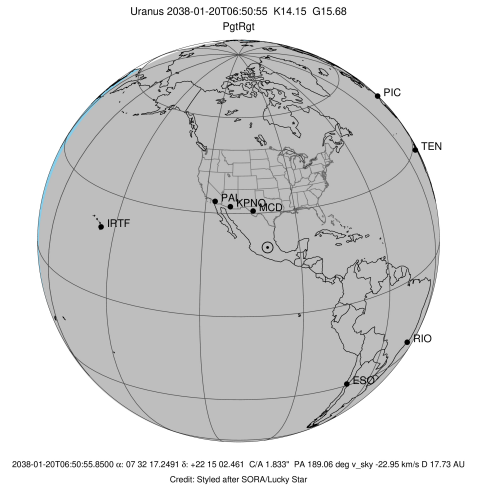
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2038-01-20T06:54:06.850
Event type           : PgtRgt
: Uranus occs: geocentric, topocentric
: 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       : 865659355819944320
2Mass ID (if available) : 07321725+2215027
ICRS Star Coord at Epoch: 07h 32m 17.24912s +22:15:02.46079s
RUWE (>1.4 is poor) : 1.05
K magnitude           : 14.155
G magnitude           : 15.681
RP magnitude          : 15.171
BP magnitude          : 16.022
DUPflag              : 0
Distance (au)        : 17.729
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -22.95
Sun-Target sep (deg) : 171.48
Sun-Moon sep (deg)   : 2.26
B (ring opening deg) : 55.48
PA of pole (deg)     : 84.50
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.803
C/A sky separation (km) : 23182.3
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLvl1.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
    
```



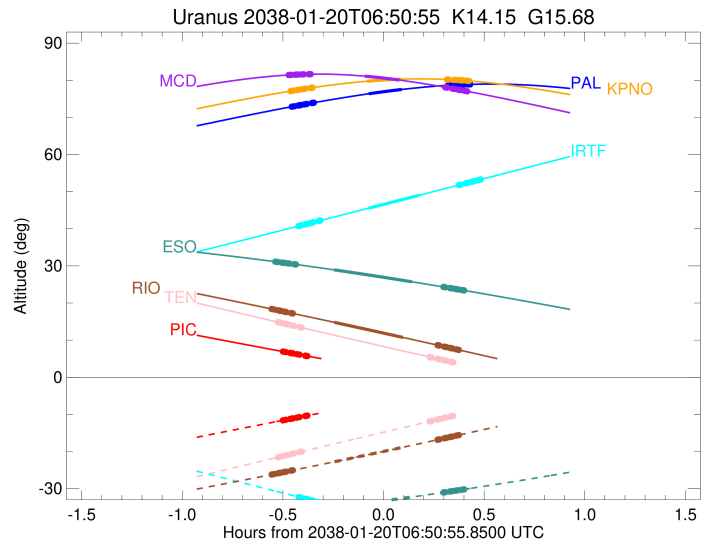
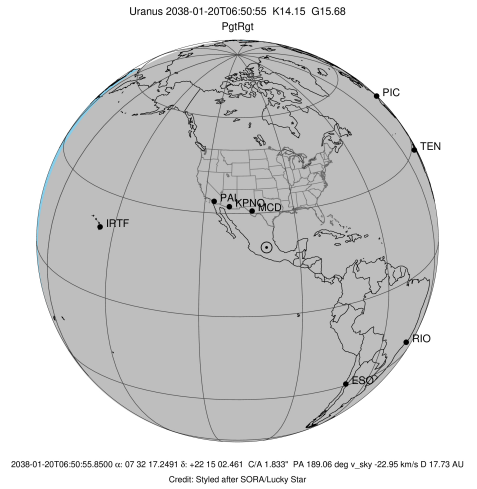
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-20T06:25:37.031		40.73	-32.26	51207.35	-24.91		
lambda	I	2038-01-20T06:26:24.770		40.92	-32.44	50026.71	-24.65		
delta	I	2038-01-20T06:27:35.153		41.19	-32.71	48300.35	-24.40		
gamma	I	2038-01-20T06:28:02.625		41.29	-32.82	47631.49	-24.29		
eta	I	2038-01-20T06:28:21.398		41.37	-32.89	47176.12	-24.22		
beta	I	2038-01-20T06:29:25.151		41.61	-33.14	45641.79	-23.95		
alpha	I	2038-01-20T06:30:04.050		41.76	-33.29	44709.02	-23.78		
4	I	2038-01-20T06:31:34.393		42.11	-33.63	42583.07	-23.31		
5	I	2038-01-20T06:31:46.867		42.15	-33.68	42287.98	-23.20		
6	I	2038-01-20T06:32:08.663		42.24	-33.76	41811.72	-23.12		
Uranus	I	2038-01-20T06:46:25.673		45.53	-37.06	25546.50		-5.71	-5.98
Uranus	E	2038-01-20T07:01:32.749		49.03	-40.56	25400.87		20.82	21.71
6	E	2038-01-20T07:13:23.427		51.77	-43.31	41815.05	23.17		
5	E	2038-01-20T07:13:39.954		51.83	-43.37	42159.14	23.25		
4	E	2038-01-20T07:13:58.676		51.90	-43.44	42606.79	23.36		
alpha	E	2038-01-20T07:15:28.778		52.25	-43.79	44751.87	23.83		
beta	E	2038-01-20T07:16:07.406		52.40	-43.94	45675.01	24.01		
eta	E	2038-01-20T07:17:09.673		52.64	-44.18	47176.12	24.28		
gamma	E	2038-01-20T07:17:28.038		52.71	-44.25	47622.76	24.36		
delta	E	2038-01-20T07:17:55.796		52.82	-44.36	48300.35	24.47		
lambda	E	2038-01-20T07:19:05.985		53.09	-44.63	50026.71	24.72		
epsilon	E	2038-01-20T07:20:02.879		53.31	-44.85	51438.68	24.98		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-20T06:46:37.920
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 865659355819944320
 2Mass ID (if available) : 07321725+2215027
 ICRS Star Coord at Epoch: 07h 32m 17.24912s +22:15:02.46079s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.155
 G magnitude : 15.681
 RP magnitude : 15.171
 BP magnitude : 16.022
 DUPflag : 0
 Distance (au) : 17.729
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.95
 Sun-Target sep (deg) : 171.48
 Sun-Moon sep (deg) : 3.74
 B (ring opening deg) : 55.48
 PA of pole (deg) : 84.50
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.643
 C/A sky separation (km) : 21130.9
 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	2038-01-20T06:17:34.829		18.40	-26.21	51185.48	-25.39		
lambda	I	2038-01-20T06:18:20.748		18.25	-26.07	50026.71	-25.17		
delta	I	2038-01-20T06:19:29.612		18.03	-25.86	48300.35	-24.96		
gamma	I	2038-01-20T06:19:56.450		17.95	-25.78	47631.54	-24.88		
eta	I	2038-01-20T06:20:14.779		17.89	-25.72	47176.12	-24.82		
beta	I	2038-01-20T06:21:16.947		17.69	-25.54	45641.49	-24.60		
alpha	I	2038-01-20T06:21:54.863		17.57	-25.42	44706.99	-24.46		
4	I	2038-01-20T06:23:22.506		17.29	-25.15	42580.13	-24.08		
5	I	2038-01-20T06:23:34.257		17.25	-25.12	42291.91	-23.98		
6	I	2038-01-20T06:23:55.536		17.18	-25.05	41814.09	-23.92		
Uranus	I	2038-01-20T06:36:19.654		14.78	-22.75	25511.89		-11.15	-11.66
Uranus	E	2038-01-20T06:56:43.329		10.74	-18.86	25340.37		24.75	25.77
6	E	2038-01-20T07:07:01.090		8.66	-16.84	41816.93	23.84		
5	E	2038-01-20T07:07:17.113		8.61	-16.79	42157.94	23.90		
4	E	2038-01-20T07:07:35.310		8.55	-16.73	42605.36	23.99		
alpha	E	2038-01-20T07:09:03.305		8.25	-16.44	44751.55	24.36		
beta	E	2038-01-20T07:09:41.150		8.12	-16.31	45675.64	24.50		
eta	E	2038-01-20T07:10:42.220		7.91	-16.11	47176.12	24.72		
gamma	E	2038-01-20T07:11:00.262		7.85	-16.05	47622.59	24.78		
delta	E	2038-01-20T07:11:27.570		7.76	-15.96	48300.35	24.86		
lambda	E	2038-01-20T07:12:36.721		7.52	-15.73	50026.71	25.06		
epsilon	E	2038-01-20T07:13:32.462		7.33	-15.55	51427.97	25.28		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-20T06:47:53.300
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 865659355819944320
 2Mass ID (if available) : 07321725+2215027
 ICRS Star Coord at Epoch: 07h 32m 17.24912s +22:15:02.46079s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.155
 G magnitude : 15.681
 RP magnitude : 15.171
 BP magnitude : 16.022
 DUPflag : 0
 Distance (au) : 17.729
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.95
 Sun-Target sep (deg) : 171.48
 Sun-Moon sep (deg) : 3.49
 B (ring opening deg) : 55.48
 PA of pole (deg) : 84.50
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.519
 C/A sky separation (km) : 19531.9
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-20T06:18:40.613		31.13	-36.73	51172.10	-25.91		
lambda	I	2038-01-20T06:19:25.063		31.04	-36.66	50026.71	-25.71		
delta	I	2038-01-20T06:20:32.424		30.91	-36.56	48300.35	-25.54		
gamma	I	2038-01-20T06:20:58.648		30.85	-36.52	47631.56	-25.47		
eta	I	2038-01-20T06:21:16.550		30.82	-36.49	47176.12	-25.41		
beta	I	2038-01-20T06:22:17.214		30.69	-36.39	45641.35	-25.23		
alpha	I	2038-01-20T06:22:54.200		30.62	-36.33	44705.75	-25.11		
4	I	2038-01-20T06:24:19.425		30.45	-36.19	42578.26	-24.80		
5	I	2038-01-20T06:24:30.641		30.42	-36.18	42294.26	-24.71		
6	I	2038-01-20T06:24:51.401		30.38	-36.14	41815.65	-24.67		
Uranus	I	2038-01-20T06:36:09.832		28.94	-34.98	25482.74		-14.25	-14.90
Uranus	E	2038-01-20T06:59:24.869		25.72	-32.25	25299.70		27.16	28.25
6	E	2038-01-20T07:08:46.155		24.34	-31.04	41818.64	24.61		
5	E	2038-01-20T07:09:01.642		24.30	-31.00	42157.02	24.65		
4	E	2038-01-20T07:09:19.260		24.25	-30.96	42604.01	24.71		
alpha	E	2038-01-20T07:10:44.784		24.04	-30.77	44751.20	25.05		
beta	E	2038-01-20T07:11:21.638		23.94	-30.69	45676.19	25.17		
eta	E	2038-01-20T07:12:21.126		23.79	-30.56	47176.12	25.35		
gamma	E	2038-01-20T07:12:38.717		23.75	-30.52	47622.45	25.40		
delta	E	2038-01-20T07:13:05.371		23.68	-30.46	48300.35	25.47		
lambda	E	2038-01-20T07:14:12.921		23.51	-30.30	50026.71	25.64		
epsilon	E	2038-01-20T07:15:07.023		23.37	-30.18	51417.39	25.83		