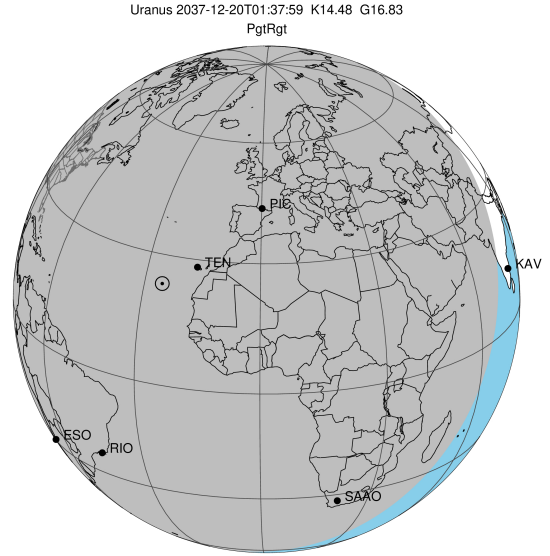


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-12-20T01:37:59.800
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 865477695882660096
 2Mass ID (if available) : 07375326+2201594

ICRS Star Coord at Epoch: 07h 37m 53.26016s +22:01:59.21843s

RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.485
 G magnitude : 16.830
 RP magnitude : 16.085
 BP magnitude : 17.431
 DUPflag : 0
 Distance (au) : 17.808
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.57
 Sun-Target sep (deg) : 155.39
 Sun-Moon sep (deg) : 54.45
 B (ring opening deg) : 54.21
 PA of pole (deg) : 85.50

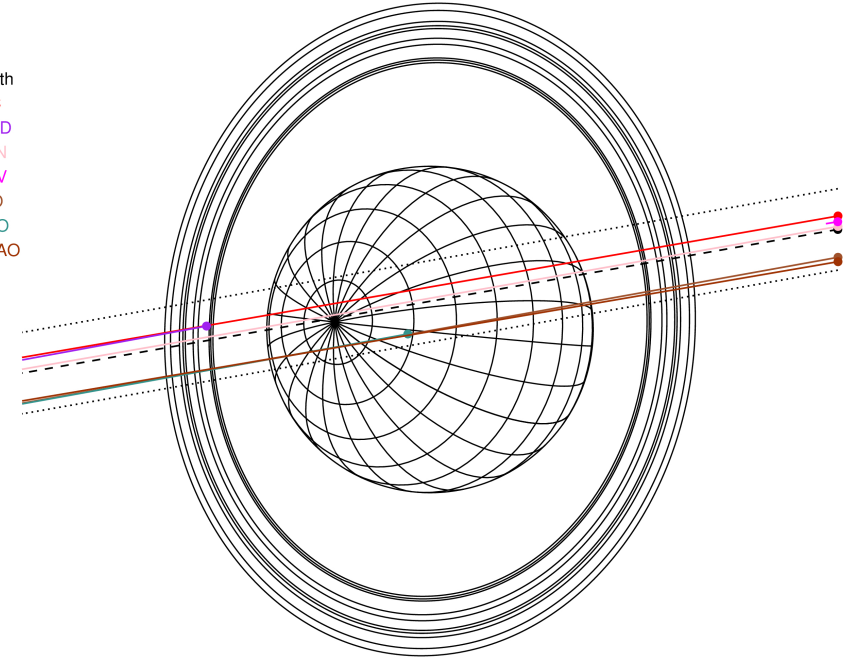
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2037-12-20T01:37:59.8000 cc: 07 37 53.2602 s: +22 01 59.218 C/A 0.3477 PA 189.98 deg v_sky -20.57 km/s D 17.81 AU
 Credit: Styled after SORA/Lucky Star

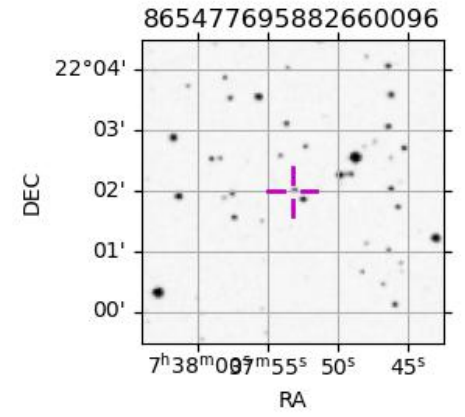
Uranus 2037-12-20T01:37:59 K14.48 G16.83 PgtRgt

Earth
 PIC
 MCD
 TEN
 KAV
 RIO
 ESO
 SAAO



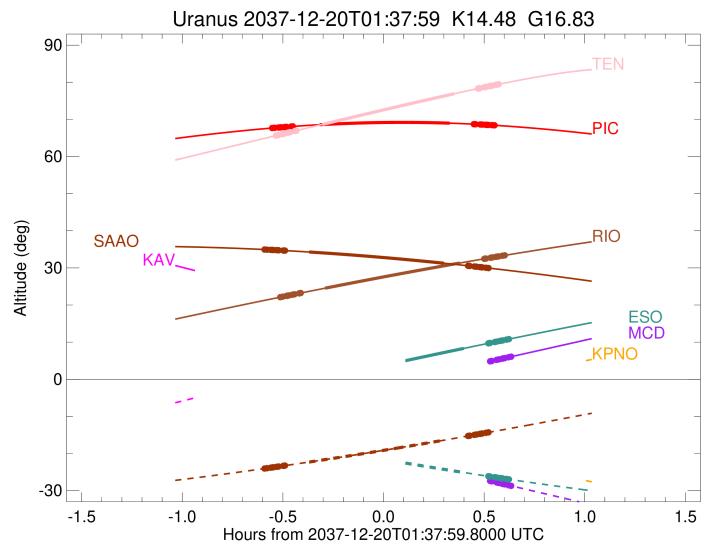
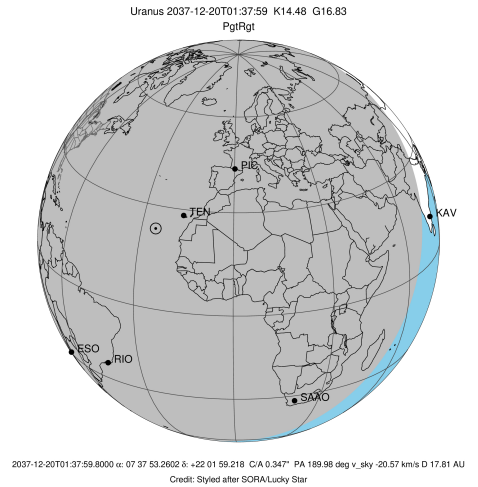
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+ +	+++++	DEC 20 01:04 - DEC 20 02:11	PieRie
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4					PnnRnn
MCD	McDonald Obs. 2.7m	30.7	256.0			+++++	DEC 20 02:11 - DEC 20 02:15	PnnRne
TEN	Teide Obs./Tenerife	28.3	343.5	+++++	+ +	+++++	DEC 20 01:05 - DEC 20 02:12	PieRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++++	+ +	+++++	DEC 20 01:07 - DEC 20 02:14	PieRie
ESO	European Southern Obs	-29.3	289.3			+++++	DEC 20 02:01 - DEC 20 02:15	PneRne
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	+++++	+ +	+++++	DEC 20 01:02 - DEC 20 02:09	PieRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



```

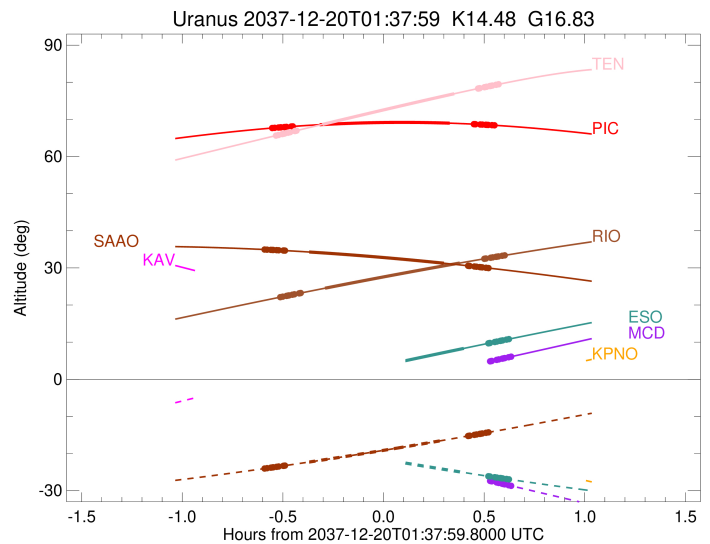
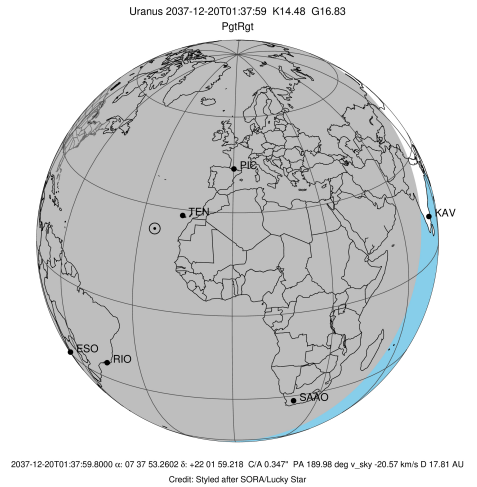
target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2037-12-20T01:38:23.420
Event type           : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : PIC
Location             : Pic du Midi
Latitude (deg)       : 42.93656
E. Longitude (deg)   : 0.14231
Altitude (km)        : 2.890
Gaia source ID       : 865477695882660096
2Mass ID (if available) : 07375326+2201594
ICRS Star Coord at Epoch: 07h 37m 53.26016s +22:01:59.21843s
RUWE (>1.4 is poor) : 1.05
K magnitude           : 14.485
G magnitude           : 16.830
RP magnitude          : 16.085
BP magnitude          : 17.431
DUPflag              : 0
Distance (au)         : 17.808
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -20.57
Sun-Target sep (deg) : 155.39
Sun-Moon sep (deg)   : 55.13
B (ring opening deg) : 54.21
PA of pole (deg)     : 85.50
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.508
C/A sky separation (km) : 6558.5
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_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	2037-12-20T01:04:40.914		67.67	-66.12	51358.98	-25.30		
lambda	I	2037-12-20T01:05:33.637		67.74	-66.01	50026.71	-25.26		
delta	I	2037-12-20T01:06:41.994		67.82	-65.87	48300.35	-25.25		
gamma	I	2037-12-20T01:07:08.546		67.85	-65.82	47630.10	-25.24		
eta	I	2037-12-20T01:07:26.535		67.87	-65.78	47176.12	-25.23		
beta	I	2037-12-20T01:08:27.123		67.94	-65.66	45650.04	-25.22		
alpha	I	2037-12-20T01:09:03.593		67.99	-65.58	44734.93	-25.21		
4	I	2037-12-20T01:10:26.962		68.08	-65.40	42614.33	-25.17		
5	I	2037-12-20T01:10:42.709		68.10	-65.37	42210.80	-25.15		
6	I	2037-12-20T01:10:59.746		68.11	-65.33	41795.18	-25.16		
Uranus	I	2037-12-20T01:18:56.542		68.57	-64.28	25265.87		-30.63	-31.80
Uranus	E	2037-12-20T01:57:45.710		68.99	-58.44	25175.01		35.78	37.04
6	E	2037-12-20T02:04:57.923		68.72	-57.27	41879.08	25.16		
5	E	2037-12-20T02:05:11.925		68.71	-57.23	42233.87	25.16		
4	E	2037-12-20T02:05:23.715		68.70	-57.19	42534.63	25.18		
alpha	E	2037-12-20T02:06:49.328		68.64	-56.96	44711.57	25.22		
beta	E	2037-12-20T02:07:27.844		68.61	-56.85	45676.61	25.23		
eta	E	2037-12-20T02:08:27.343		68.56	-56.69	47176.12	25.24		
gamma	E	2037-12-20T02:08:44.987		68.54	-56.64	47621.56	25.25		
delta	E	2037-12-20T02:09:11.868		68.52	-56.56	48300.35	25.26		
lambda	E	2037-12-20T02:10:20.200		68.46	-56.37	50026.71	25.27		
epsilon	E	2037-12-20T02:10:59.941		68.42	-56.26	51031.27	25.31		

```

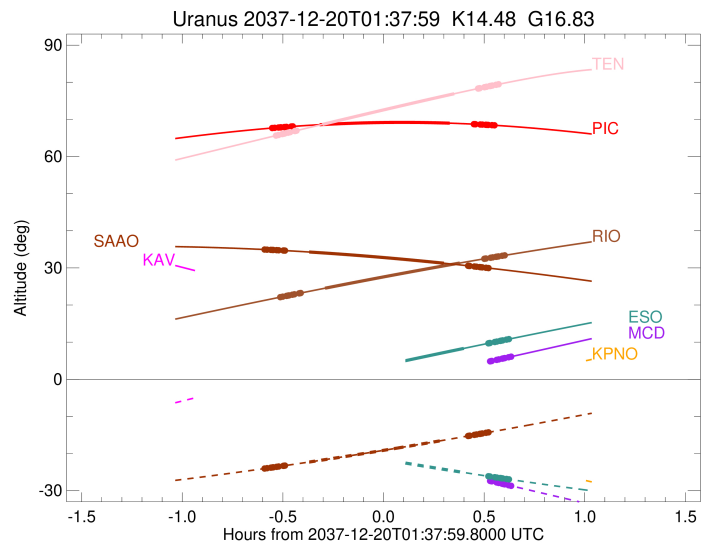
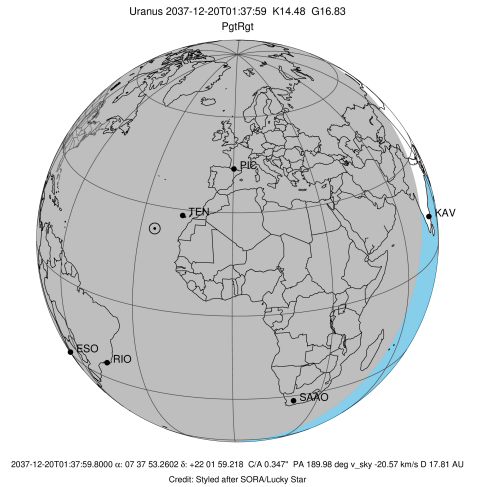
target                : Uranus
target radius (km)    : 25559.00
C/A epoch             : 2037-12-20T01:42:47.150
Event type            : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code         : MCD
Location              : McDonald Obs. 2.7m
Latitude (deg)        : 30.67158
E. Longitude (deg)    : 255.97844
Altitude (km)         : 2.075
Gaia source ID        : 865477695882660096
2Mass ID (if available) : 07375326+2201594
ICRS Star Coord at Epoch: 07h 37m 53.26016s +22:01:59.21843s
RUWE (>1.4 is poor)  : 1.05
K magnitude           : 14.485
G magnitude           : 16.830
RP magnitude          : 16.085
BP magnitude          : 17.431
DUPflag              : 0
Distance (au)         : 17.808
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s)  : -20.57
Sun-Target sep (deg)  : 155.39
Sun-Moon sep (deg)    : 53.96
B (ring opening deg)  : 54.21
PA of pole (deg)      : 85.50
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.531
C/A sky separation (km) : 6862.8
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_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	2037-12-20T01:08:18.802	-7.04x	-14.64	51364.04	-24.70		
lambda	I	2037-12-20T01:09:13.016	-6.87x	-14.83	50026.71	-24.66		
delta	I	2037-12-20T01:10:23.039	-6.65x	-15.07	48300.35	-24.65		
gamma	I	2037-12-20T01:10:50.240	-6.57x	-15.16	47630.05	-24.64		
eta	I	2037-12-20T01:11:08.664	-6.51x	-15.22	47176.12	-24.63		
beta	I	2037-12-20T01:12:10.717	-6.31x	-15.43	45650.30	-24.62		
alpha	I	2037-12-20T01:12:48.063	-6.20x	-15.56	44735.38	-24.61		
4	I	2037-12-20T01:14:13.474	-5.93x	-15.85	42614.54	-24.57		
5	I	2037-12-20T01:14:29.658	-5.88x	-15.91	42209.58	-24.55		
6	I	2037-12-20T01:14:47.084	-5.83x	-15.96	41795.28	-24.56		
Uranus	I	2037-12-20T01:22:59.764	-4.28x	-17.65	25273.37		-30.19	-31.35
Uranus	E	2037-12-20T02:02:27.431	3.38x	-25.85	25175.03		35.78	37.04
6	E	2037-12-20T02:09:48.480	4.84x	-27.39	41879.09	24.68		
5	E	2037-12-20T02:10:02.763	4.89x	-27.44	42233.97	24.68		
4	E	2037-12-20T02:10:14.778	4.93x	-27.48	42534.60	24.69		
alpha	E	2037-12-20T02:11:42.050	5.22	-27.79	44711.51	24.74		
beta	E	2037-12-20T02:12:21.307	5.35	-27.93	45676.59	24.75		
eta	E	2037-12-20T02:13:21.942	5.55	-28.14	47176.12	24.77		
gamma	E	2037-12-20T02:13:39.921	5.61	-28.20	47621.57	24.78		
delta	E	2037-12-20T02:14:07.310	5.70	-28.30	48300.35	24.79		
lambda	E	2037-12-20T02:15:16.925	5.93	-28.54	50026.71	24.81		
epsilon	E	2037-12-20T02:15:57.365	6.07	-28.69	51030.22	24.85		

```

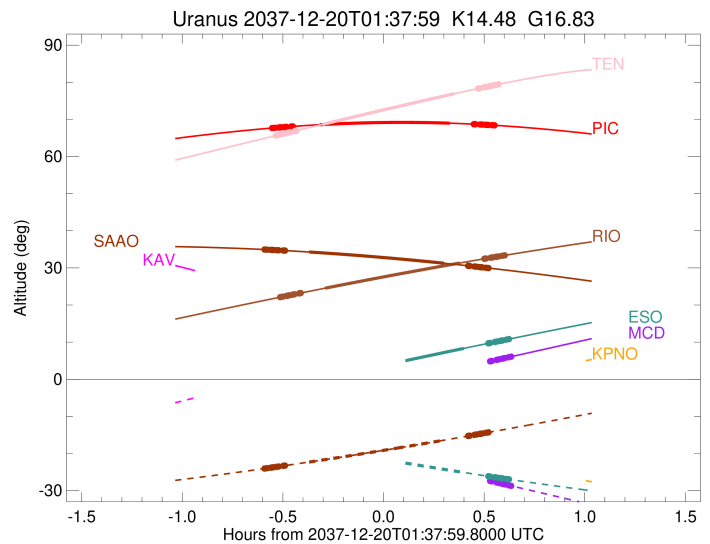
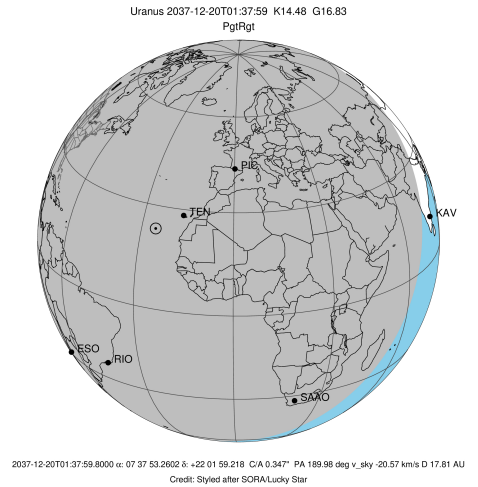
target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2037-12-20T01:39:27.890
Event type           : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : TEN
Location             : Teide Obs./Tenerife
Latitude (deg)       : 28.30050
E. Longitude (deg)   : 343.48909
Altitude (km)        : 2.395
Gaia source ID       : 865477695882660096
2Mass ID (if available) : 07375326+2201594
ICRS Star Coord at Epoch: 07h 37m 53.26016s +22:01:59.21843s
RUWE (>1.4 is poor) : 1.05
K magnitude          : 14.485
G magnitude          : 16.830
RP magnitude         : 16.085
BP magnitude         : 17.431
DUPflag             : 0
Distance (au)        : 17.808
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -20.57
Sun-Target sep (deg) : 155.39
Sun-Moon sep (deg)   : 55.02
B (ring opening deg) : 54.21
PA of pole (deg)     : 85.50
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.373
C/A sky separation (km) : 4821.8
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_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	2037-12-20T01:05:49.340		65.62	-85.26	51347.38	-25.43		
lambda	I	2037-12-20T01:06:41.306		65.81	-85.24	50026.71	-25.41		
delta	I	2037-12-20T01:07:49.255		66.05	-85.19	48300.35	-25.40		
gamma	I	2037-12-20T01:08:15.637		66.15	-85.17	47630.23	-25.40		
eta	I	2037-12-20T01:08:33.517		66.22	-85.15	47176.12	-25.40		
beta	I	2037-12-20T01:09:33.731		66.43	-85.10	45649.42	-25.39		
alpha	I	2037-12-20T01:10:09.985		66.57	-85.06	44733.78	-25.39		
4	I	2037-12-20T01:11:32.726		66.87	-84.95	42613.72	-25.36		
5	I	2037-12-20T01:11:48.221		66.92	-84.93	42213.92	-25.35		
6	I	2037-12-20T01:12:05.189		66.98	-84.91	41794.97	-25.35		
Uranus	I	2037-12-20T01:19:45.754		68.65	-84.03	25244.60		-31.87	-33.07
Uranus	E	2037-12-20T01:59:06.067		76.92	-76.63	25176.23		35.72	36.98
6	E	2037-12-20T02:06:14.166		78.32	-75.12	41879.36	25.39		
5	E	2037-12-20T02:06:28.257		78.37	-75.07	42237.33	25.39		
4	E	2037-12-20T02:06:39.741		78.40	-75.03	42533.52	25.40		
alpha	E	2037-12-20T02:08:04.596		78.67	-74.72	44710.22	25.43		
beta	E	2037-12-20T02:08:42.820		78.79	-74.59	45676.08	25.43		
eta	E	2037-12-20T02:09:41.868		78.98	-74.38	47176.12	25.44		
gamma	E	2037-12-20T02:09:59.378		79.03	-74.32	47621.66	25.45		
delta	E	2037-12-20T02:10:26.048		79.12	-74.22	48300.35	25.45		
lambda	E	2037-12-20T02:11:33.867		79.33	-73.98	50026.71	25.46		
epsilon	E	2037-12-20T02:12:12.777		79.45	-73.84	51017.47	25.48		

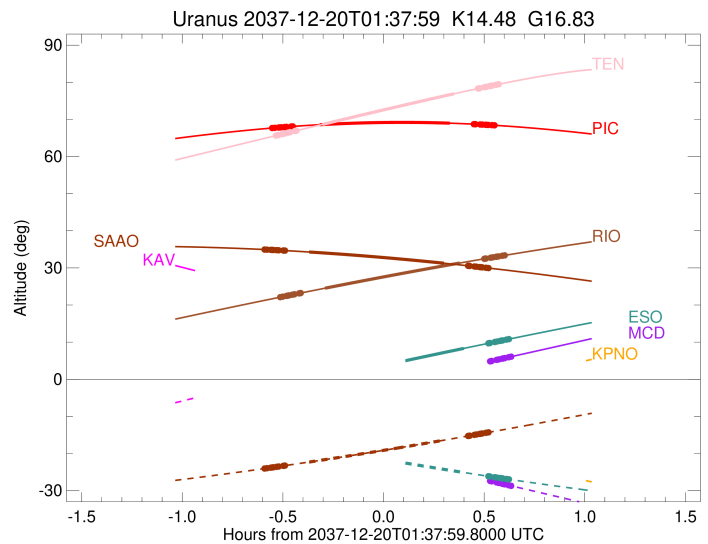
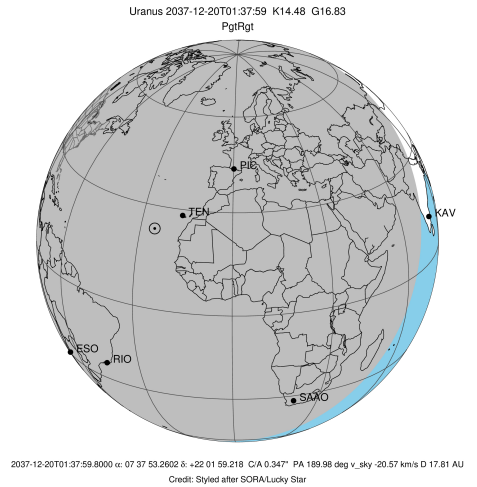
```

target                : Uranus
target radius (km)    : 25559.00
C/A epoch             : 2037-12-20T01:40:42.130
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        : 865477695882660096
2Mass ID (if available) : 07375326+2201594
ICRS Star Coord at Epoch: 07h 37m 53.26016s +22:01:59.21843s
RUWE (>1.4 is poor)  : 1.05
K magnitude           : 14.485
G magnitude           : 16.830
RP magnitude          : 16.085
BP magnitude          : 17.431
DUPflag              : 0
Distance (au)         : 17.808
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -20.57
Sun-Target sep (deg) : 155.39
Sun-Moon sep (deg)   : 54.47
B (ring opening deg) : 54.21
PA of pole (deg)     : 85.50
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.014
C/A sky separation (km) : 179.0
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_itrf93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
  
```



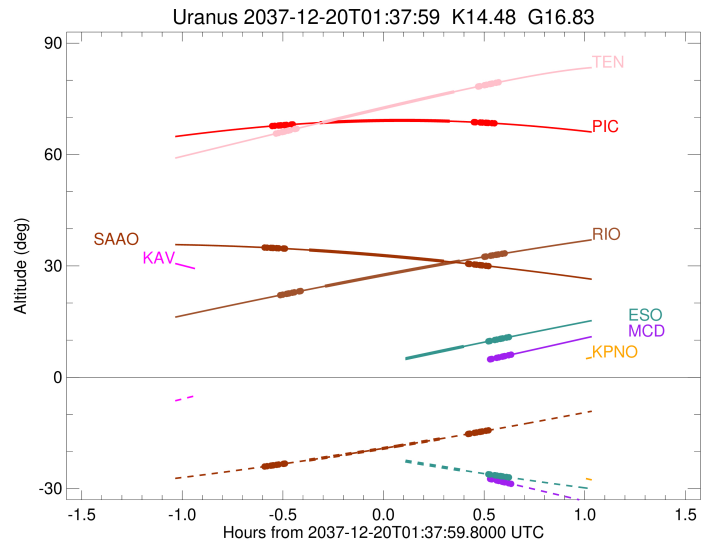
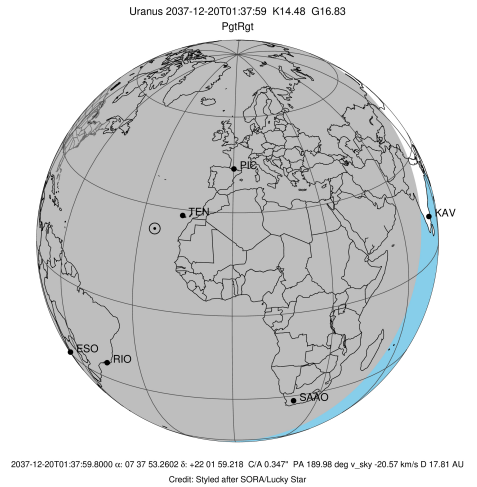
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2037-12-20T01:07:07.324		22.10	-37.45	51312.55	-25.41		
lambda	I	2037-12-20T01:07:57.932		22.26	-37.55	50026.71	-25.41		
delta	I	2037-12-20T01:09:05.875		22.46	-37.67	48300.35	-25.41		
gamma	I	2037-12-20T01:09:32.234		22.54	-37.73	47630.58	-25.41		
eta	I	2037-12-20T01:09:50.119		22.60	-37.76	47176.12	-25.41		
beta	I	2037-12-20T01:10:50.351		22.78	-37.87	45647.74	-25.41		
alpha	I	2037-12-20T01:11:26.666		22.89	-37.94	44730.36	-25.42		
4	I	2037-12-20T01:12:49.230		23.14	-38.09	42611.61	-25.41		
5	I	2037-12-20T01:13:04.294		23.19	-38.12	42223.09	-25.40		
6	I	2037-12-20T01:13:21.378		23.24	-38.15	41794.75	-25.41		
Uranus	I	2037-12-20T01:20:35.549		24.54	-38.93	25197.74		-34.53	-35.77
Uranus	E	2037-12-20T02:00:47.274		31.32	-42.27	25200.22		34.39	35.63
6	E	2037-12-20T02:08:04.653		32.46	-42.69	41879.74	25.50		
5	E	2037-12-20T02:08:19.303		32.49	-42.70	42247.16	25.50		
4	E	2037-12-20T02:08:30.192		32.52	-42.71	42530.75	25.50		
alpha	E	2037-12-20T02:09:54.673		32.74	-42.78	44706.46	25.52		
beta	E	2037-12-20T02:10:32.826		32.83	-42.82	45674.46	25.51		
eta	E	2037-12-20T02:11:31.766		32.98	-42.87	47176.12	25.52		
gamma	E	2037-12-20T02:11:49.239		33.03	-42.88	47621.98	25.52		
delta	E	2037-12-20T02:12:15.824		33.09	-42.90	48300.35	25.52		
lambda	E	2037-12-20T02:13:23.475		33.26	-42.95	50026.71	25.52		
epsilon	E	2037-12-20T02:14:00.792		33.36	-42.98	50979.07	25.52		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-12-20T01:41:41.780
 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 : 865477695882660096
 2Mass ID (if available) : 07375326+2201594
 ICRS Star Coord at Epoch: 07h 37m 53.26016s +22:01:59.21843s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.485
 G magnitude : 16.830
 RP magnitude : 16.085
 BP magnitude : 17.431
 DUPflag : 0
 Distance (au) : 17.808
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.57
 Sun-Target sep (deg) : 155.39
 Sun-Moon sep (deg) : 54.07
 B (ring opening deg) : 54.21
 PA of pole (deg) : 85.50
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.006
 C/A sky separation (km) : 71.6
 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	2037-12-20T01:07:48.834		-2.21x	-16.72	51314.23	-25.18		
lambda	I	2037-12-20T01:08:39.967		-2.04x	-16.86	50026.71	-25.18		
delta	I	2037-12-20T01:09:48.522		-1.81x	-17.05	48300.35	-25.18		
gamma	I	2037-12-20T01:10:15.119		-1.72x	-17.13	47630.56	-25.18		
eta	I	2037-12-20T01:10:33.164		-1.66x	-17.18	47176.12	-25.18		
beta	I	2037-12-20T01:11:33.935		-1.46x	-17.35	45647.81	-25.19		
alpha	I	2037-12-20T01:12:10.570		-1.34x	-17.45	44730.51	-25.19		
4	I	2037-12-20T01:13:33.875		-1.06x	-17.68	42611.71	-25.18		
5	I	2037-12-20T01:13:49.091		-1.01x	-17.72	42222.70	-25.18		
6	I	2037-12-20T01:14:06.322		-0.96x	-17.77	41794.75	-25.18		
Uranus	I	2037-12-20T01:21:25.021		0.49x	-18.96	25199.06		-34.45	-35.69
Uranus	E	2037-12-20T02:01:56.488		8.31	-25.11	25200.01		34.40	35.64
6	E	2037-12-20T02:09:17.198		9.69	-26.13	41879.74	25.30		
5	E	2037-12-20T02:09:31.963		9.73	-26.17	42247.16	25.30		
4	E	2037-12-20T02:09:42.937		9.77	-26.19	42530.75	25.30		
alpha	E	2037-12-20T02:11:08.072		10.03	-26.38	44706.46	25.32		
beta	E	2037-12-20T02:11:46.520		10.15	-26.47	45674.46	25.32		
eta	E	2037-12-20T02:12:45.914		10.33	-26.60	47176.12	25.32		
gamma	E	2037-12-20T02:13:03.522		10.39	-26.64	47621.98	25.32		
delta	E	2037-12-20T02:13:30.311		10.47	-26.70	48300.35	25.32		
lambda	E	2037-12-20T02:14:38.480		10.68	-26.86	50026.71	25.33		
epsilon	E	2037-12-20T02:15:16.075		10.79	-26.94	50978.88	25.33		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-12-20T01:35:53.410
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : SAAO
 Location : So. Afr. Astro. Obs. (Sutherland)
 Latitude (deg) : -32.37953
 E. Longitude (deg) : 20.81070
 Altitude (km) : 1.768
 Gaia source ID : 865477695882660096
 2Mass ID (if available) : 07375326+2201594
 ICRS Star Coord at Epoch: 07h 37m 53.26016s +22:01:59.21843s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.485
 G magnitude : 16.830
 RP magnitude : 16.085
 BP magnitude : 17.431
 DUPflag : 0
 Distance (au) : 17.808
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.57
 Sun-Target sep (deg) : 155.39
 Sun-Moon sep (deg) : 55.04
 B (ring opening deg) : 54.21
 PA of pole (deg) : 85.50
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.025
 C/A sky separation (km) : 322.8
 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	2037-12-20T01:02:27.008		34.95	-24.06	51308.99	-25.54		
lambda	I	2037-12-20T01:03:17.212		34.91	-23.95	50026.71	-25.54		
delta	I	2037-12-20T01:04:24.806		34.86	-23.81	48300.35	-25.54		
gamma	I	2037-12-20T01:04:51.030		34.84	-23.75	47630.61	-25.54		
eta	I	2037-12-20T01:05:08.826		34.83	-23.71	47176.12	-25.54		
beta	I	2037-12-20T01:06:08.763		34.78	-23.58	45647.59	-25.54		
alpha	I	2037-12-20T01:06:44.909		34.75	-23.50	44730.04	-25.54		
4	I	2037-12-20T01:08:07.071		34.69	-23.33	42611.40	-25.53		
5	I	2037-12-20T01:08:22.028		34.68	-23.29	42223.89	-25.52		
6	I	2037-12-20T01:08:39.042		34.66	-23.26	41794.76	-25.53		
Uranus	I	2037-12-20T01:15:50.079		34.28	-22.29	25195.32		-34.66	-35.90
Uranus	E	2037-12-20T01:55:57.526		31.27	-16.42	25199.81		34.41	35.65
6	E	2037-12-20T02:03:14.617		30.57	-15.27	41879.74	25.50		
5	E	2037-12-20T02:03:29.254		30.54	-15.23	42246.93	25.49		
4	E	2037-12-20T02:03:40.158		30.52	-15.21	42530.81	25.50		
alpha	E	2037-12-20T02:05:04.660		30.38	-14.98	44706.56	25.51		
beta	E	2037-12-20T02:05:42.824		30.32	-14.88	45674.51	25.51		
eta	E	2037-12-20T02:06:41.785		30.22	-14.72	47176.12	25.50		
gamma	E	2037-12-20T02:06:59.266		30.19	-14.67	47621.97	25.50		
delta	E	2037-12-20T02:07:25.864		30.15	-14.60	48300.35	25.50		
lambda	E	2037-12-20T02:08:33.552		30.03	-14.42	50026.71	25.50		
epsilon	E	2037-12-20T02:09:10.943		29.97	-14.32	50980.36	25.50		