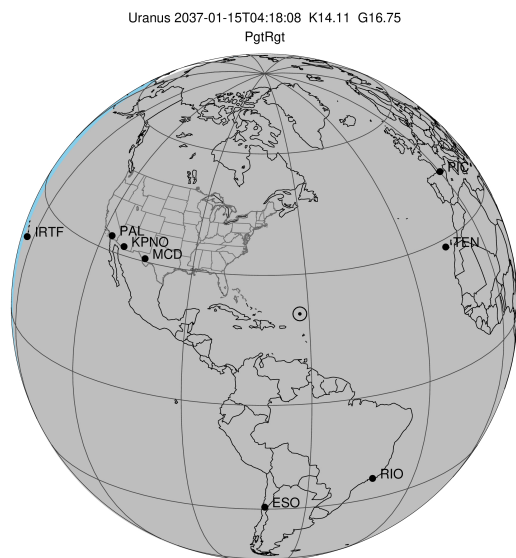


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-01-15T04:18:08.170
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3367537488605289600
 2Mass ID (if available) : 07124701+2250021

ICRS Star Coord at Epoch: 07h 12m 47.03187s +22:50:02.19769s

RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.112
 G magnitude : 16.749
 RP magnitude : 15.959
 BP magnitude : 17.423
 DUPflag : 0
 Distance (au) : 17.789
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.03
 Sun-Target sep (deg) : 171.87
 Sun-Moon sep (deg) : 173.87
 B (ring opening deg) : 59.88
 PA of pole (deg) : 80.81

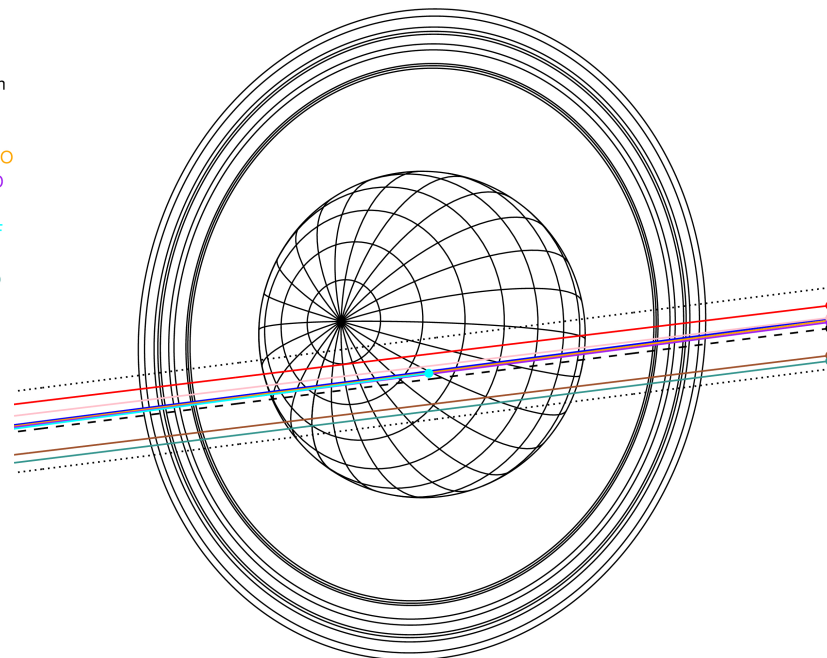
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2037-01-15T04:18:08.1700 a: 07 12 47.03187 s: +22 50 02.198 C/A 0.542" PA 7.25 deg v_sky -23.03 km/s D 17.79 AU
 Credit: Styled after SORA/Lucky Star

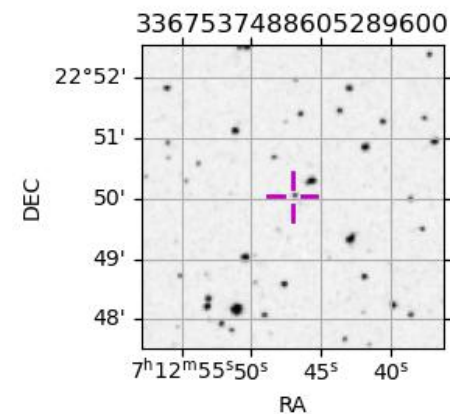
Uranus 2037-01-15T04:18:08 K14.11 G16.75 PgtRgt

Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO

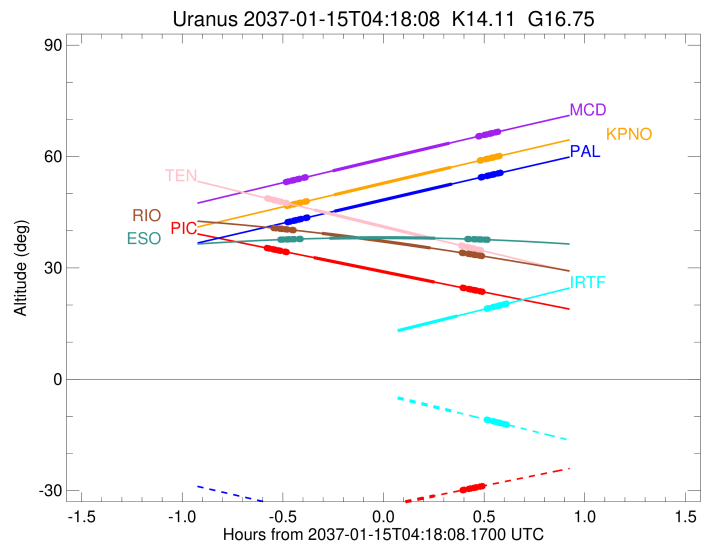
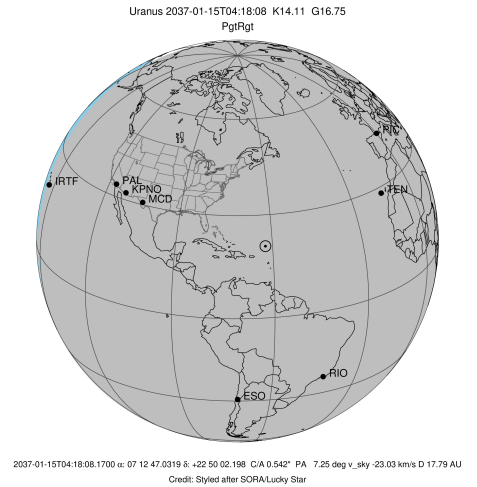


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+ +	+++++	JAN 15 03:43 - JAN 15 04:47	PieRie
PAL	Palomar Mt (200")	33.4	243.1	+++++	+ +	+++++	JAN 15 03:49 - JAN 15 04:52	PieRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	JAN 15 03:49 - JAN 15 04:52	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	JAN 15 03:48 - JAN 15 04:52	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5	+++++	+ +	+++++	JAN 15 03:43 - JAN 15 04:46	PieRie
IRTF	Mauna Kea/IRTF	19.8	204.5		+	+++++	JAN 15 04:40 - JAN 15 04:54	PneRne
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++++	+ +	+++++	JAN 15 03:45 - JAN 15 04:47	PieRie
ESO	European Southern Obs	-29.3	289.3	+++++	+ +	+++++	JAN 15 03:47 - JAN 15 04:48	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

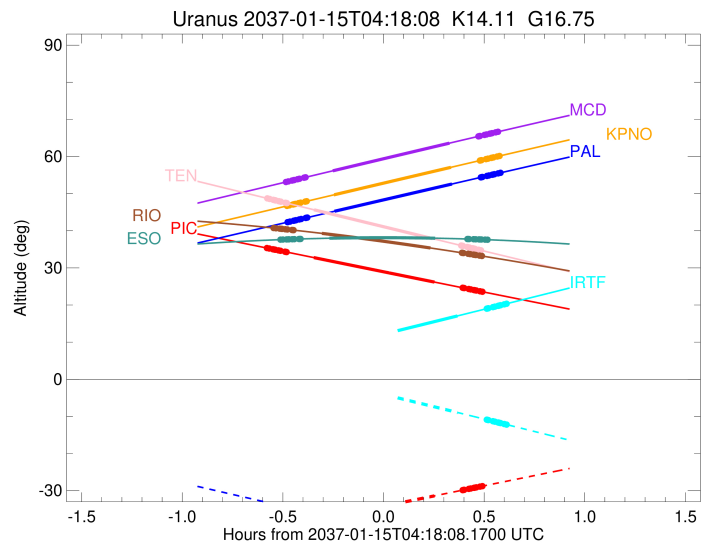
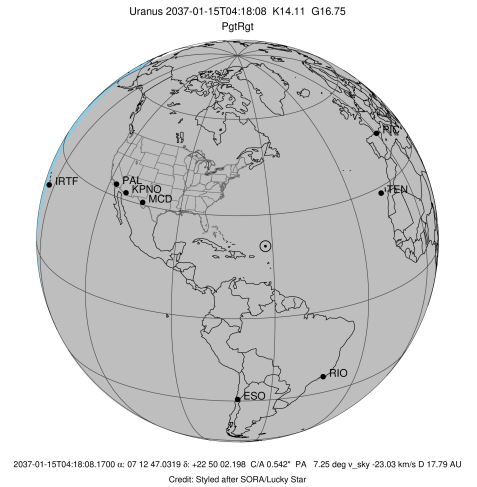


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-01-15T04:15:18.510
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 3367537488605289600
 2Mass ID (if available) : 07124701+2250021
 ICRS Star Coord at Epoch: 07h 12m 47.03187s +22:50:02.19769s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.112
 G magnitude : 16.749
 RP magnitude : 15.959
 BP magnitude : 17.423
 DUPflag : 0
 Distance (au) : 17.789
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.03
 Sun-Target sep (deg) : 171.87
 Sun-Moon sep (deg) : 174.67
 B (ring opening deg) : 59.88
 PA of pole (deg) : 80.81
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.246
 C/A sky separation (km) : 3177.8
 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	2037-01-15T03:43:10.130		35.39	-40.59	51492.37	-26.48		
lambda	I	2037-01-15T03:44:05.490		35.22	-40.42	50026.71	-26.47		
delta	I	2037-01-15T03:45:10.712		35.02	-40.23	48300.35	-26.47		
gamma	I	2037-01-15T03:45:36.200		34.94	-40.15	47625.80	-26.46		
eta	I	2037-01-15T03:45:53.194		34.89	-40.10	47176.12	-26.46		
beta	I	2037-01-15T03:46:51.280		34.71	-39.92	45641.48	-26.46		
alpha	I	2037-01-15T03:47:25.586		34.61	-39.82	44738.65	-26.45		
4	I	2037-01-15T03:48:48.823		34.35	-39.56	42542.91	-26.45		
5	I	2037-01-15T03:48:59.995		34.32	-39.53	42247.45	-26.44		
6	I	2037-01-15T03:49:14.520		34.27	-39.49	41873.95	-26.45		
Uranus	I	2037-01-15T03:57:21.450		32.78	-38.01	25131.93		-29.73	-30.88
Uranus	E	2037-01-15T04:33:19.288		26.18	-31.41	25189.03		27.44	28.53
6	E	2037-01-15T04:41:41.396		24.66	-29.88	41804.18	26.36		
5	E	2037-01-15T04:41:57.021		24.61	-29.83	42210.61	26.36		
4	E	2037-01-15T04:42:12.046		24.56	-29.78	42604.48	26.36		
alpha	E	2037-01-15T04:43:31.586		24.32	-29.54	44694.70	26.36		
beta	E	2037-01-15T04:44:09.133		24.21	-29.42	45680.04	26.36		
eta	E	2037-01-15T04:45:05.968		24.04	-29.25	47176.12	26.36		
gamma	E	2037-01-15T04:45:23.034		23.98	-29.20	47626.03	26.36		
delta	E	2037-01-15T04:45:48.611		23.91	-29.12	48300.35	26.37		
lambda	E	2037-01-15T04:46:54.086		23.71	-28.92	50026.71	26.37		
epsilon	E	2037-01-15T04:47:24.689		23.62	-28.83	50833.67	26.38		

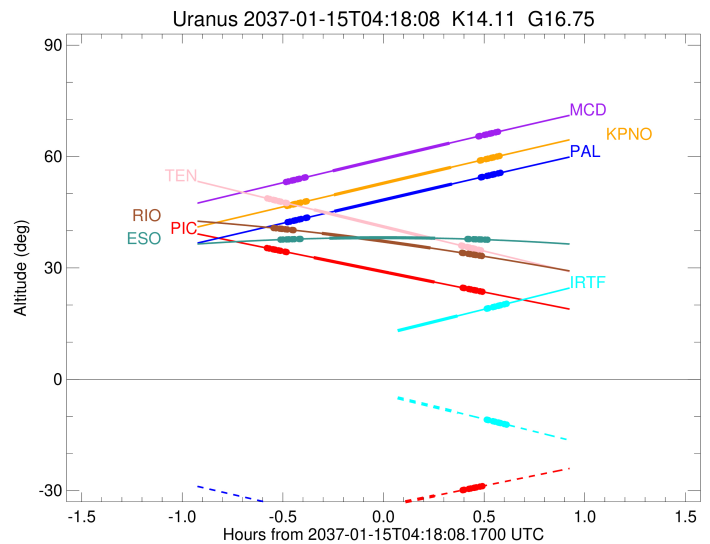
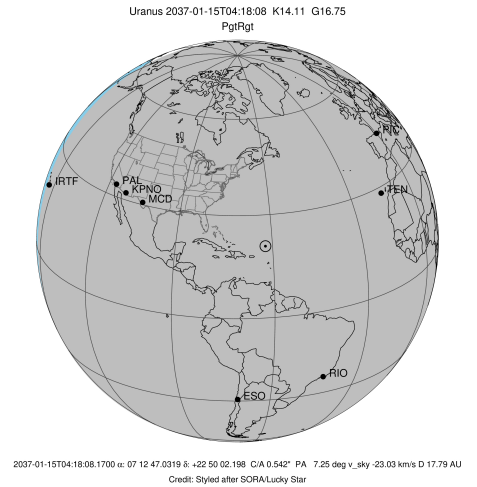
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-01-15T04:21:00.800
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3367537488605289600
 2Mass ID (if available) : 07124701+2250021
 ICRS Star Coord at Epoch: 07h 12m 47.03187s +22:50:02.19769s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.112
 G magnitude : 16.749
 RP magnitude : 15.959
 BP magnitude : 17.423
 DUPflag : 0
 Distance (au) : 17.789
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.03
 Sun-Target sep (deg) : 171.87
 Sun-Moon sep (deg) : 173.50
 B (ring opening deg) : 59.88
 PA of pole (deg) : 80.81
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.452
 C/A sky separation (km) : 5835.9
 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	2037-01-15T03:49:19.952		42.28	-34.40	51501.70	-26.46		
lambda	I	2037-01-15T03:50:15.722		42.48	-34.60	50026.71	-26.44		
delta	I	2037-01-15T03:51:21.025		42.70	-34.82	48300.35	-26.43		
gamma	I	2037-01-15T03:51:46.560		42.79	-34.91	47625.54	-26.42		
eta	I	2037-01-15T03:52:03.569		42.85	-34.97	47176.12	-26.42		
beta	I	2037-01-15T03:53:01.760		43.06	-35.17	45641.30	-26.41		
alpha	I	2037-01-15T03:53:36.183		43.18	-35.29	44737.20	-26.40		
4	I	2037-01-15T03:54:59.466		43.47	-35.58	42544.92	-26.39		
5	I	2037-01-15T03:55:10.880		43.51	-35.62	42242.99	-26.37		
6	I	2037-01-15T03:55:25.300		43.56	-35.67	41875.10	-26.38		
Uranus	I	2037-01-15T04:03:32.408		45.26	-37.37	25123.20		-30.07	-31.23
Uranus	E	2037-01-15T04:38:32.986		52.60	-44.69	25228.88		25.77	26.82
6	E	2037-01-15T04:47:07.245		54.39	-46.48	41806.19	26.45		
5	E	2037-01-15T04:47:22.450		54.44	-46.53	42205.22	26.44		
4	E	2037-01-15T04:47:37.743		54.49	-46.58	42606.58	26.45		
alpha	E	2037-01-15T04:48:56.843		54.77	-46.86	44693.12	26.47		
beta	E	2037-01-15T04:49:34.258		54.90	-46.99	45679.54	26.48		
eta	E	2037-01-15T04:50:30.839		55.09	-47.19	47176.12	26.50		
gamma	E	2037-01-15T04:50:47.805		55.15	-47.25	47625.69	26.50		
delta	E	2037-01-15T04:51:13.260		55.24	-47.33	48300.35	26.51		
lambda	E	2037-01-15T04:52:18.370		55.46	-47.56	50026.71	26.52		
epsilon	E	2037-01-15T04:52:49.391		55.57	-47.67	50849.59	26.55		

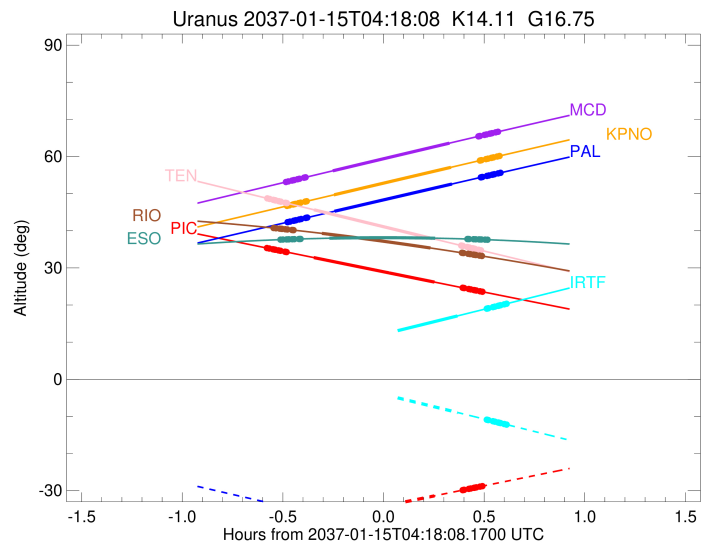
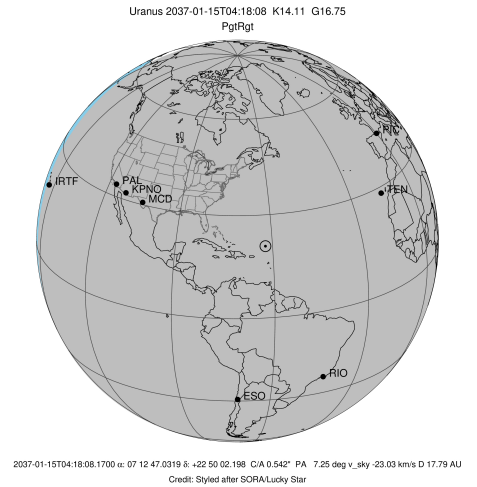
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2037-01-15T04:20:46.400
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      : 3367537488605289600
2Mass ID (if available) : 07124701+2250021
ICRS Star Coord at Epoch: 07h 12m 47.03187s +22:50:02.19769s
RUWE (>1.4 is poor) : 1.03
K magnitude          : 14.112
G magnitude          : 16.749
RP magnitude         : 15.959
BP magnitude         : 17.423
DUPflag             : 0
Distance (au)       : 17.789
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -23.03
Sun-Target sep (deg) : 171.87
Sun-Moon sep (deg)  : 173.54
B (ring opening deg) : 59.88
PA of pole (deg)    : 80.81
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.470
C/A sky separation (km) : 6066.3
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
    
```



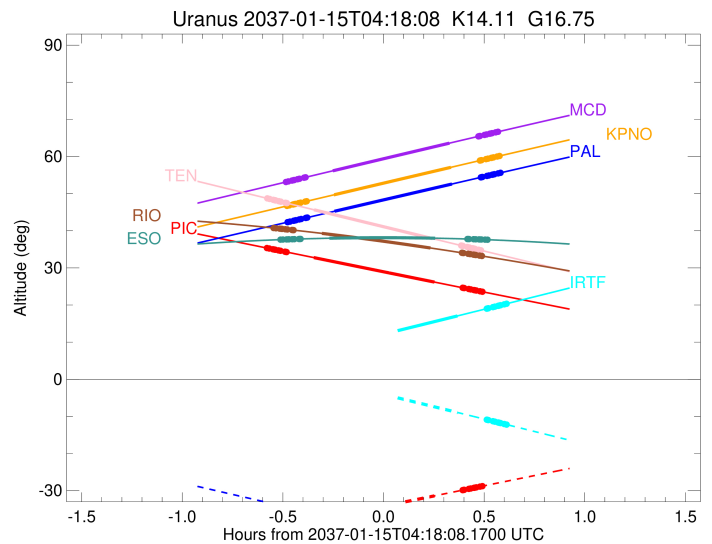
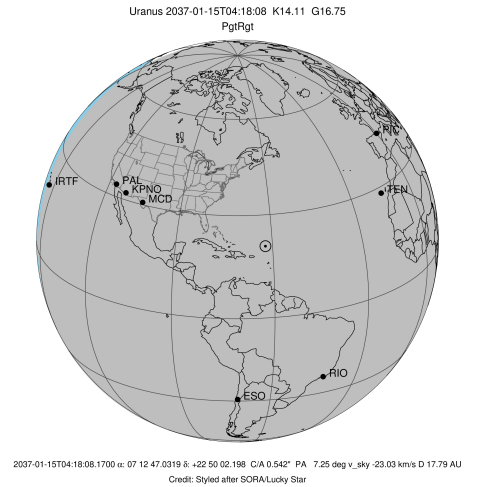
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2037-01-15T03:49:09.612		46.66	-38.72	51502.71	-26.49		
lambda	I	2037-01-15T03:50:05.378		46.86	-38.92	50026.71	-26.46		
delta	I	2037-01-15T03:51:10.633		47.09	-39.15	48300.35	-26.45		
gamma	I	2037-01-15T03:51:36.151		47.18	-39.24	47625.51	-26.44		
eta	I	2037-01-15T03:51:53.147		47.24	-39.30	47176.12	-26.44		
beta	I	2037-01-15T03:52:51.300		47.45	-39.50	45641.28	-26.42		
alpha	I	2037-01-15T03:53:25.708		47.57	-39.62	44737.04	-26.42		
4	I	2037-01-15T03:54:48.928		47.86	-39.92	42545.14	-26.40		
5	I	2037-01-15T03:55:00.359		47.90	-39.96	42242.51	-26.38		
6	I	2037-01-15T03:55:14.757		47.95	-40.01	41875.22	-26.39		
Uranus	I	2037-01-15T04:03:21.693		49.68	-41.73	25122.77		-30.09	-31.25
Uranus	E	2037-01-15T04:38:15.157		57.10	-49.14	25232.20		25.63	26.67
6	E	2037-01-15T04:46:50.465		58.91	-50.96	41806.34	26.46		
5	E	2037-01-15T04:47:05.640		58.96	-51.01	42204.84	26.45		
4	E	2037-01-15T04:47:20.951		59.02	-51.06	42606.73	26.46		
alpha	E	2037-01-15T04:48:40.016		59.30	-51.34	44693.01	26.48		
beta	E	2037-01-15T04:49:17.419		59.43	-51.47	45679.51	26.49		
eta	E	2037-01-15T04:50:13.978		59.63	-51.67	47176.12	26.51		
gamma	E	2037-01-15T04:50:30.936		59.69	-51.73	47625.66	26.51		
delta	E	2037-01-15T04:50:56.381		59.77	-51.82	48300.35	26.52		
lambda	E	2037-01-15T04:52:01.460		60.00	-52.05	50026.71	26.54		
epsilon	E	2037-01-15T04:52:32.508		60.11	-52.16	50850.71	26.56		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-01-15T04:20:22.170
 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 : 3367537488605289600
 2Mass ID (if available) : 07124701+2250021
 ICRS Star Coord at Epoch: 07h 12m 47.03187s +22:50:02.19769s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.112
 G magnitude : 16.749
 RP magnitude : 15.959
 BP magnitude : 17.423
 DUPflag : 0
 Distance (au) : 17.789
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.03
 Sun-Target sep (deg) : 171.87
 Sun-Moon sep (deg) : 173.60
 B (ring opening deg) : 59.88
 PA of pole (deg) : 80.81
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.488
 C/A sky separation (km) : 6294.7
 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	2037-01-15T03:48:50.031		53.09	-45.10	51503.75	-26.52		
lambda	I	2037-01-15T03:49:45.773		53.29	-45.30	50026.71	-26.49		
delta	I	2037-01-15T03:50:50.958		53.53	-45.54	48300.35	-26.48		
gamma	I	2037-01-15T03:51:16.451		53.62	-45.63	47625.48	-26.47		
eta	I	2037-01-15T03:51:33.429		53.68	-45.69	47176.12	-26.47		
beta	I	2037-01-15T03:52:31.526		53.89	-45.90	45641.26	-26.45		
alpha	I	2037-01-15T03:53:05.907		54.01	-46.02	44736.87	-26.44		
4	I	2037-01-15T03:54:29.038		54.31	-46.32	42545.37	-26.42		
5	I	2037-01-15T03:54:40.483		54.35	-46.36	42242.01	-26.41		
6	I	2037-01-15T03:54:54.854		54.40	-46.41	41875.34	-26.42		
Uranus	I	2037-01-15T04:03:01.500		56.15	-48.16	25122.42		-30.10	-31.26
Uranus	E	2037-01-15T04:37:47.207		63.60	-55.62	25235.40		25.49	26.53
6	E	2037-01-15T04:46:23.458		65.43	-57.45	41806.48	26.47		
5	E	2037-01-15T04:46:38.602		65.48	-57.51	42204.48	26.46		
4	E	2037-01-15T04:46:53.927		65.53	-57.56	42606.86	26.47		
alpha	E	2037-01-15T04:48:12.946		65.81	-57.84	44692.91	26.49		
beta	E	2037-01-15T04:48:50.331		65.94	-57.97	45679.47	26.51		
eta	E	2037-01-15T04:49:46.859		66.14	-58.17	47176.12	26.52		
gamma	E	2037-01-15T04:50:03.807		66.20	-58.23	47625.64	26.53		
delta	E	2037-01-15T04:50:29.237		66.29	-58.32	48300.35	26.53		
lambda	E	2037-01-15T04:51:34.276		66.52	-58.55	50026.71	26.55		
epsilon	E	2037-01-15T04:52:05.344		66.63	-58.66	50851.76	26.58		

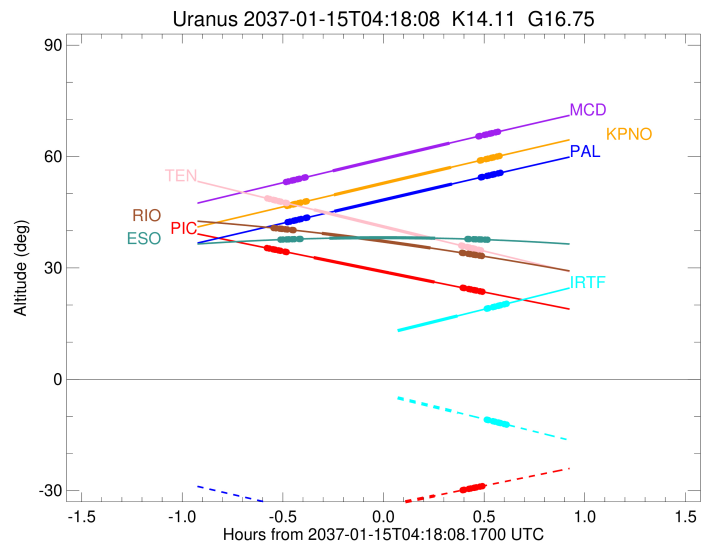
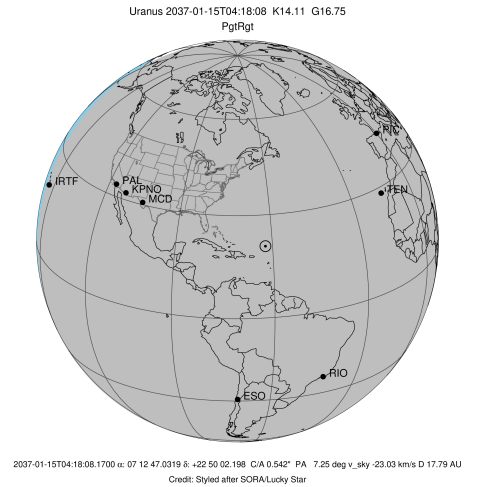
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-01-15T04:15:03.440
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 3367537488605289600
 2Mass ID (if available) : 07124701+2250021
 ICRS Star Coord at Epoch: 07h 12m 47.03187s +22:50:02.19769s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.112
 G magnitude : 16.749
 RP magnitude : 15.959
 BP magnitude : 17.423
 DUPflag : 0
 Distance (au) : 17.789
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.03
 Sun-Target sep (deg) : 171.87
 Sun-Moon sep (deg) : 174.61
 B (ring opening deg) : 59.88
 PA of pole (deg) : 80.81
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.391
 C/A sky separation (km) : 5043.1
 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	2037-01-15T03:43:16.585		48.78	-55.77	51500.28	-26.56		
lambda	I	2037-01-15T03:44:12.108		48.57	-55.57	50026.71	-26.53		
delta	I	2037-01-15T03:45:17.184		48.33	-55.33	48300.35	-26.52		
gamma	I	2037-01-15T03:45:42.628		48.24	-55.24	47625.59	-26.52		
eta	I	2037-01-15T03:45:59.579		48.18	-55.17	47176.12	-26.51		
beta	I	2037-01-15T03:46:57.565		47.96	-54.96	45641.33	-26.50		
alpha	I	2037-01-15T03:47:31.856		47.84	-54.84	44737.46	-26.49		
4	I	2037-01-15T03:48:54.867		47.53	-54.53	42544.53	-26.48		
5	I	2037-01-15T03:49:06.198		47.49	-54.49	42243.83	-26.47		
6	I	2037-01-15T03:49:20.593		47.44	-54.44	41874.89	-26.48		
Uranus	I	2037-01-15T03:57:25.872		45.65	-52.66	25124.48		-30.02	-31.18
Uranus	E	2037-01-15T04:32:46.161		37.89	-44.87	25213.70		26.41	27.48
6	E	2037-01-15T04:41:16.189		36.03	-43.00	41805.40	26.39		
5	E	2037-01-15T04:41:31.570		35.98	-42.94	42207.28	26.38		
4	E	2037-01-15T04:41:46.778		35.92	-42.88	42605.80	26.39		
alpha	E	2037-01-15T04:43:06.130		35.63	-42.59	44693.72	26.40		
beta	E	2037-01-15T04:43:43.639		35.49	-42.46	45679.75	26.40		
eta	E	2037-01-15T04:44:40.383		35.29	-42.25	47176.12	26.41		
gamma	E	2037-01-15T04:44:57.408		35.23	-42.18	47625.82	26.42		
delta	E	2037-01-15T04:45:22.941		35.13	-42.09	48300.35	26.42		
lambda	E	2037-01-15T04:46:28.275		34.90	-41.85	50026.71	26.43		
epsilon	E	2037-01-15T04:46:59.163		34.78	-41.74	50843.08	26.45		

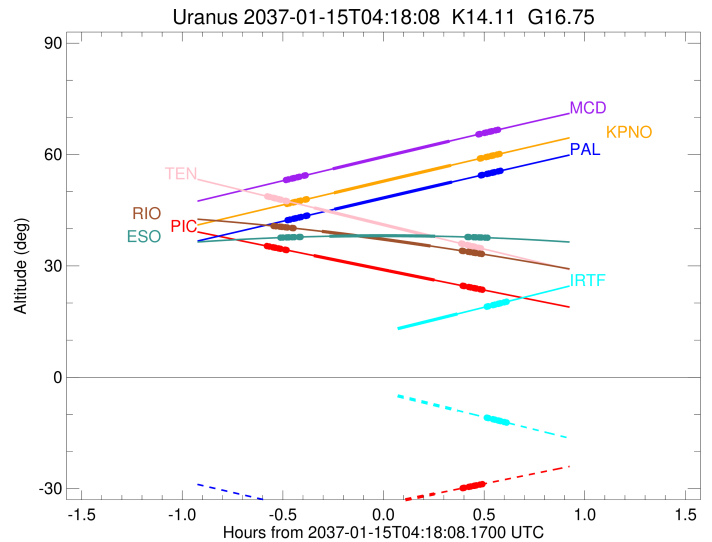
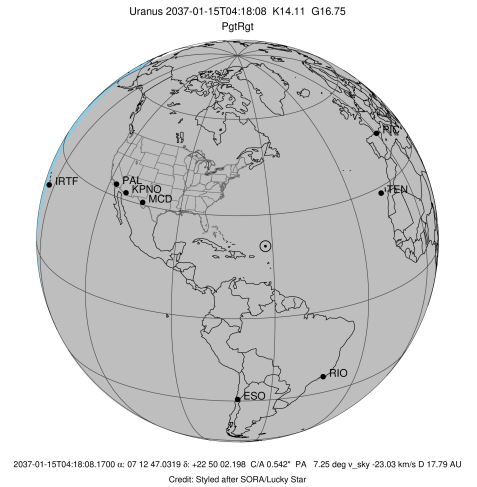
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2037-01-15T04:22:32.970
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      : 3367537488605289600
2Mass ID (if available) : 07124701+2250021
ICRS Star Coord at Epoch: 07h 12m 47.03187s +22:50:02.19769s
RUWE (>1.4 is poor) : 1.03
K magnitude         : 14.112
G magnitude         : 16.749
RP magnitude        : 15.959
BP magnitude        : 17.423
DUPflag            : 0
Distance (au)       : 17.789
f0 (km)            : 0.000
g0 (km)            : 0.000
skyplane vel. (km/s) : -23.03
Sun-Target sep (deg) : 171.87
Sun-Moon sep (deg)  : 173.16
B (ring opening deg) : 59.88
PA of pole (deg)    : 80.81
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.477
C/A sky separation (km) : 6159.3
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_itr93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
    
```



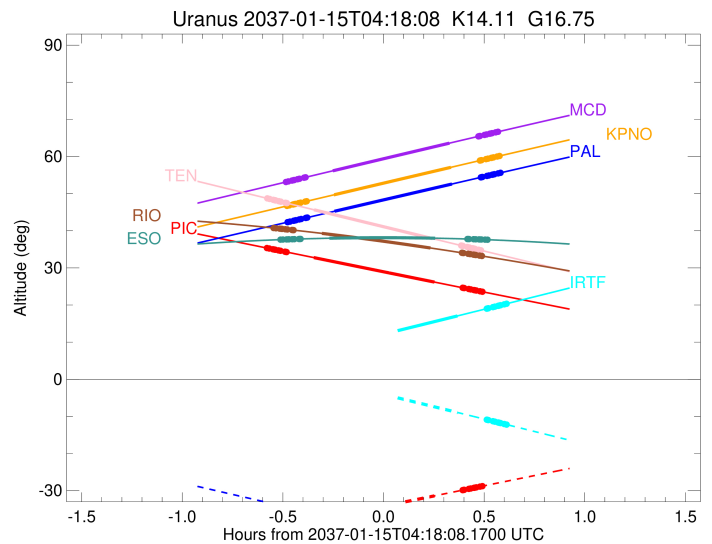
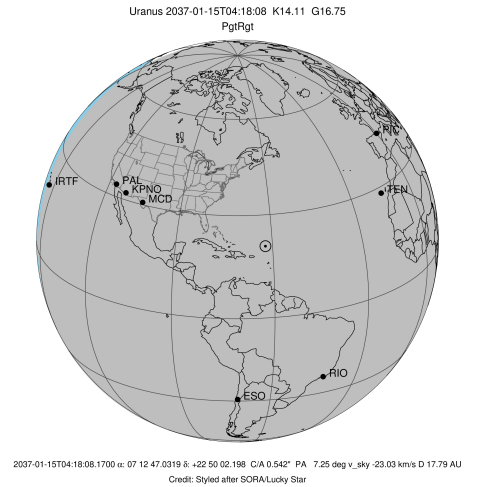
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2037-01-15T03:50:35.753		6.09	1.93x	51502.34	-26.17		
lambda	I	2037-01-15T03:51:32.176		6.29	1.73x	50026.71	-26.15		
delta	I	2037-01-15T03:52:38.215		6.53	1.49x	48300.35	-26.13		
gamma	I	2037-01-15T03:53:04.039		6.63	1.40x	47625.52	-26.13		
eta	I	2037-01-15T03:53:21.240		6.69	1.34x	47176.12	-26.12		
beta	I	2037-01-15T03:54:20.091		6.91	1.12x	45641.29	-26.11		
alpha	I	2037-01-15T03:54:54.909		7.03	1.00x	44737.08	-26.10		
4	I	2037-01-15T03:56:19.131		7.34	0.69x	42545.08	-26.09		
5	I	2037-01-15T03:56:30.693		7.38	0.65x	42242.62	-26.07		
6	I	2037-01-15T03:56:45.267		7.44	0.60x	41875.19	-26.08		
Uranus	I	2037-01-15T04:04:58.053		9.24	-1.19x	25122.79		-30.09	-31.25
Uranus	E	2037-01-15T04:40:11.440		17.06	-8.95	25235.35		25.49	26.53
6	E	2037-01-15T04:48:53.075		19.01	-10.88	41806.52	26.19		
5	E	2037-01-15T04:49:08.370		19.07	-10.94	42204.37	26.18		
4	E	2037-01-15T04:49:23.862		19.13	-10.99	42606.90	26.20		
alpha	E	2037-01-15T04:50:43.706		19.43	-11.29	44692.87	26.22		
beta	E	2037-01-15T04:51:21.483		19.57	-11.43	45679.45	26.23		
eta	E	2037-01-15T04:52:18.602		19.78	-11.64	47176.12	26.25		
gamma	E	2037-01-15T04:52:35.726		19.84	-11.71	47625.63	26.25		
delta	E	2037-01-15T04:53:01.422		19.94	-11.80	48300.35	26.26		
lambda	E	2037-01-15T04:54:07.137		20.19	-12.05	50026.71	26.28		
epsilon	E	2037-01-15T04:54:38.550		20.30	-12.16	50852.34	26.30		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-01-15T04:15:51.710
 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 : 3367537488605289600
 2Mass ID (if available) : 07124701+2250021
 ICRS Star Coord at Epoch: 07h 12m 47.03187s +22:50:02.19769s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.112
 G magnitude : 16.749
 RP magnitude : 15.959
 BP magnitude : 17.423
 DUPflag : 0
 Distance (au) : 17.789
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.03
 Sun-Target sep (deg) : 171.87
 Sun-Moon sep (deg) : 174.04
 B (ring opening deg) : 59.88
 PA of pole (deg) : 80.81
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.854
 C/A sky separation (km) : 11013.7
 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	2037-01-15T03:45:08.038		40.77	-44.95	51521.86	-26.20		
lambda	I	2037-01-15T03:46:05.193		40.68	-44.89	50026.71	-26.14		
delta	I	2037-01-15T03:47:11.302		40.57	-44.83	48300.35	-26.09		
gamma	I	2037-01-15T03:47:37.203		40.53	-44.80	47624.92	-26.07		
eta	I	2037-01-15T03:47:54.426		40.51	-44.79	47176.12	-26.05		
beta	I	2037-01-15T03:48:53.493		40.41	-44.73	45641.07	-26.00		
alpha	I	2037-01-15T03:49:28.612		40.35	-44.69	44733.48	-25.96		
4	I	2037-01-15T03:50:53.031		40.22	-44.60	42550.03	-25.88		
5	I	2037-01-15T03:51:05.203		40.20	-44.59	42232.27	-25.85		
6	I	2037-01-15T03:51:19.574		40.17	-44.58	41877.36	-25.85		
Uranus	I	2037-01-15T03:59:46.592		39.30	-43.99	25134.34		-29.64	-30.78
Uranus	E	2037-01-15T04:32:06.020		35.37	-41.02	25314.16		21.93	22.86
6	E	2037-01-15T04:41:27.726		34.07	-39.96	41809.90	25.80		
5	E	2037-01-15T04:41:42.686		34.04	-39.93	42196.56	25.80		
4	E	2037-01-15T04:41:58.858		34.00	-39.90	42609.68	25.83		
alpha	E	2037-01-15T04:43:19.556		33.81	-39.74	44690.77	25.91		
beta	E	2037-01-15T04:43:57.800		33.72	-39.66	45678.55	25.94		
eta	E	2037-01-15T04:44:55.547		33.58	-39.54	47176.12	25.99		
gamma	E	2037-01-15T04:45:12.816		33.54	-39.51	47625.14	26.01		
delta	E	2037-01-15T04:45:38.768		33.48	-39.46	48300.35	26.03		
lambda	E	2037-01-15T04:46:45.031		33.32	-39.32	50026.71	26.08		
epsilon	E	2037-01-15T04:47:17.637		33.24	-39.26	50877.33	26.13		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-01-15T04:17:41.430
 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 : 3367537488605289600
 2Mass ID (if available) : 07124701+2250021
 ICRS Star Coord at Epoch: 07h 12m 47.03187s +22:50:02.19769s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.112
 G magnitude : 16.749
 RP magnitude : 15.959
 BP magnitude : 17.423
 DUPflag : 0
 Distance (au) : 17.789
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.03
 Sun-Target sep (deg) : 171.87
 Sun-Moon sep (deg) : 173.66
 B (ring opening deg) : 59.88
 PA of pole (deg) : 80.81
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.935
 C/A sky separation (km) : 12067.7
 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	2037-01-15T03:47:11.482		37.60	-37.44	51524.80	-26.07		
lambda	I	2037-01-15T03:48:09.037		37.64	-37.51	50026.71	-26.00		
delta	I	2037-01-15T03:49:15.500		37.67	-37.59	48300.35	-25.94		
gamma	I	2037-01-15T03:49:41.550		37.69	-37.62	47624.82	-25.92		
eta	I	2037-01-15T03:49:58.868		37.70	-37.64	47176.12	-25.90		
beta	I	2037-01-15T03:50:58.289		37.73	-37.71	45641.06	-25.84		
alpha	I	2037-01-15T03:51:33.656		37.74	-37.75	44732.80	-25.79		
4	I	2037-01-15T03:52:58.582		37.78	-37.84	42550.97	-25.70		
5	I	2037-01-15T03:53:10.939		37.79	-37.86	42230.38	-25.66		
6	I	2037-01-15T03:53:25.355		37.80	-37.87	41877.68	-25.66		
Uranus	I	2037-01-15T04:02:00.286		37.99	-38.40	25141.43		-29.36	-30.50
Uranus	E	2037-01-15T04:33:32.099		38.00	-39.64	25335.65		20.88	21.78
6	E	2037-01-15T04:43:06.865		37.78	-39.80	41810.86	25.66		
5	E	2037-01-15T04:43:21.759		37.78	-39.80	42194.54	25.66		
4	E	2037-01-15T04:43:38.134		37.77	-39.80	42610.36	25.70		
alpha	E	2037-01-15T04:44:59.179		37.73	-39.82	44690.24	25.79		
beta	E	2037-01-15T04:45:37.596		37.71	-39.82	45678.28	25.83		
eta	E	2037-01-15T04:46:35.580		37.68	-39.83	47176.12	25.90		
gamma	E	2037-01-15T04:46:52.907		37.67	-39.83	47625.01	25.91		
delta	E	2037-01-15T04:47:18.955		37.65	-39.83	48300.35	25.94		
lambda	E	2037-01-15T04:48:25.429		37.62	-39.84	50026.71	26.00		
epsilon	E	2037-01-15T04:48:58.409		37.60	-39.84	50884.63	26.07		