

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-10-27T03:18:42.740
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3427645104939508352
 2Mass ID (if available) : 05450080+2332077

ICRS Star Coord at Epoch: 05h 45m 00.81207s +23:32:07.70421s

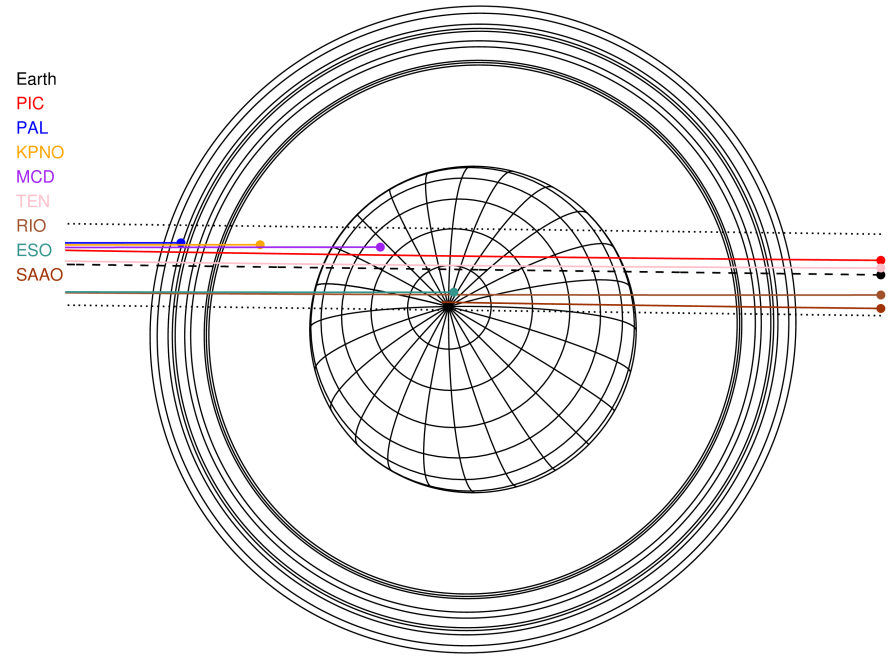
RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.980
 G magnitude : 18.400
 RP magnitude : 17.421
 BP magnitude : 19.384
 DUPflag : 0
 Distance (au) : 18.488
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.37
 Sun-Target sep (deg) : 126.50
 Sun-Moon sep (deg) : 93.41
 B (ring opening deg) : 78.13
 PA of pole (deg) : 46.83

#	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



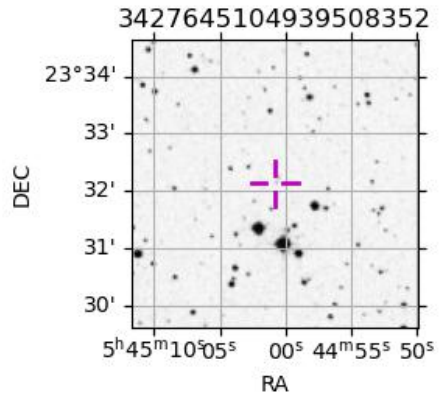
2031-10-27T03:18:42.7400 cc: 05 45 00.8121 s: +23 32 07.704 C/A 0.7077 PA 179.26 deg v_sky -11.37 km/s D 18.49 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2031-10-27T03:18:42 K14.98 G18.40 PgtRgt

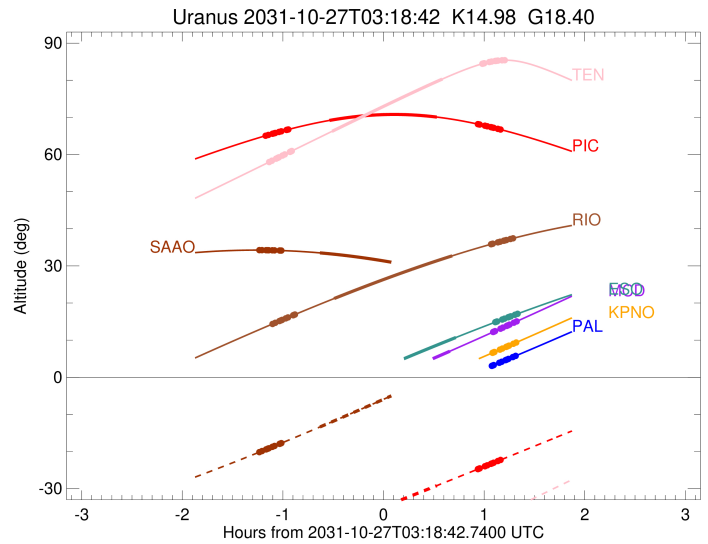
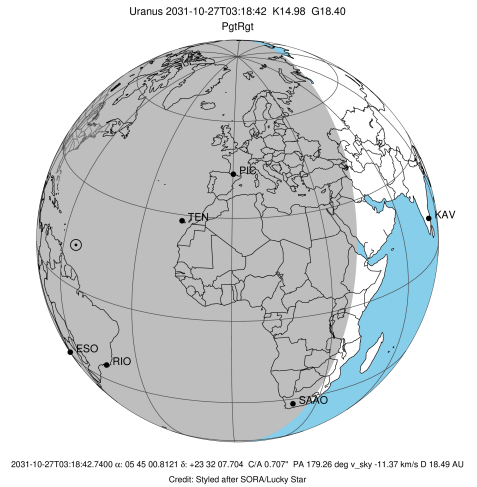


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+ +	+++++	OCT 27 02:08 - OCT 27 04:28	PieRie
PAL	Palomar Mt (200")	33.4	243.1			++	OCT 27 04:35 - OCT 27 04:37	PnnRne
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4			+++++	OCT 27 04:23 - OCT 27 04:37	PnnRne
MCD	McDonald Obs. 2.7m	30.7	256.0		+	+++++	OCT 27 03:58 - OCT 27 04:38	PneRne
TEN	Teide Obs./Tenerife	28.3	343.5	+++++	+ +	+++++	OCT 27 02:10 - OCT 27 04:31	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	+++++	+ +	+++++	OCT 27 02:12 - OCT 27 04:36	PieRie
ESO	European Southern Obs	-29.3	289.3		+	+++++	OCT 27 04:01 - OCT 27 04:38	PneRne
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	+++++	+		OCT 27 02:05 - OCT 27 02:40	PinRin
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



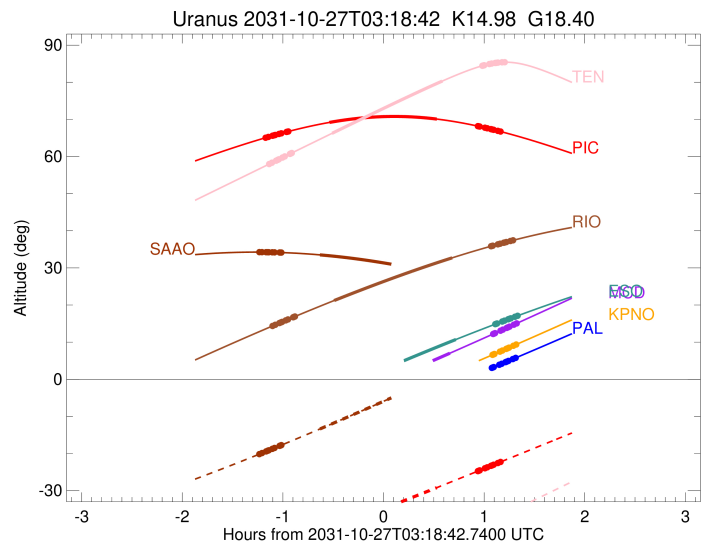
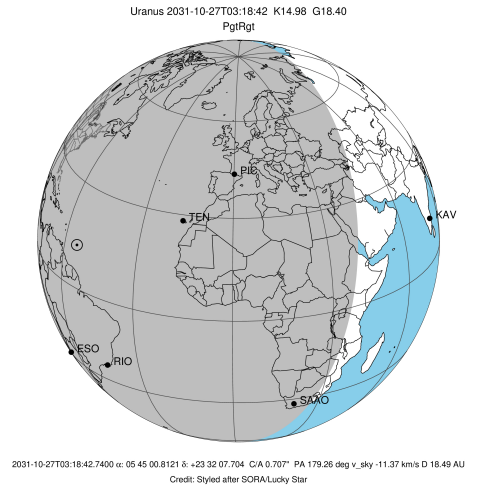
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-10-27T03:18:52.900
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 3427645104939508352
 2Mass ID (if available) : 05450080+2332077
 ICRS Star Coord at Epoch: 05h 45m 00.81207s +23:32:07.70421s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.980
 G magnitude : 18.400
 RP magnitude : 17.421
 BP magnitude : 19.384
 DUPflag : 0
 Distance (au) : 18.488
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.37
 Sun-Target sep (deg) : 126.50
 Sun-Moon sep (deg) : 94.33
 B (ring opening deg) : 78.13
 PA of pole (deg) : 46.83
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.855
 C/A sky separation (km) : 11468.4
 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	2031-10-27T02:08:48.339		65.12	-46.54	50885.26	-11.49		
lambda	I	2031-10-27T02:10:03.000		65.28	-46.34	50026.71	-11.49		
delta	I	2031-10-27T02:12:33.337		65.60	-45.96	48300.35	-11.47		
gamma	I	2031-10-27T02:13:31.696		65.73	-45.80	47631.11	-11.46		
eta	I	2031-10-27T02:14:11.400		65.81	-45.70	47176.12	-11.46		
beta	I	2031-10-27T02:16:24.766		66.09	-45.35	45649.69	-11.43		
alpha	I	2031-10-27T02:17:49.114		66.26	-45.13	44684.78	-11.42		
4	I	2031-10-27T02:20:52.976		66.63	-44.64	42590.52	-11.37		
5	I	2031-10-27T02:21:17.275		66.67	-44.58	42314.99	-11.37		
6	I	2031-10-27T02:21:58.223		66.75	-44.47	41844.08	-11.36		
Uranus	I	2031-10-27T02:46:29.503		69.19	-40.43	25486.53		-4.18	-4.38
Uranus	E	2031-10-27T03:50:31.289		70.09	-29.19	25035.23		11.45	11.98
6	E	2031-10-27T04:15:00.909		68.19	-24.74	41853.97	11.40		
5	E	2031-10-27T04:15:28.266		68.14	-24.66	42170.76	11.41		
4	E	2031-10-27T04:15:59.575		68.09	-24.56	42533.14	11.41		
alpha	E	2031-10-27T04:19:13.409		67.76	-23.97	44745.93	11.46		
beta	E	2031-10-27T04:20:33.178		67.62	-23.73	45662.88	11.47		
eta	E	2031-10-27T04:22:44.923		67.38	-23.33	47176.12	11.50		
gamma	E	2031-10-27T04:23:23.594		67.31	-23.21	47620.97	11.51		
delta	E	2031-10-27T04:24:22.608		67.20	-23.03	48300.35	11.52		
lambda	E	2031-10-27T04:26:52.345		66.92	-22.57	50026.71	11.54		
epsilon	E	2031-10-27T04:28:37.615		66.72	-22.25	51242.45	11.54		

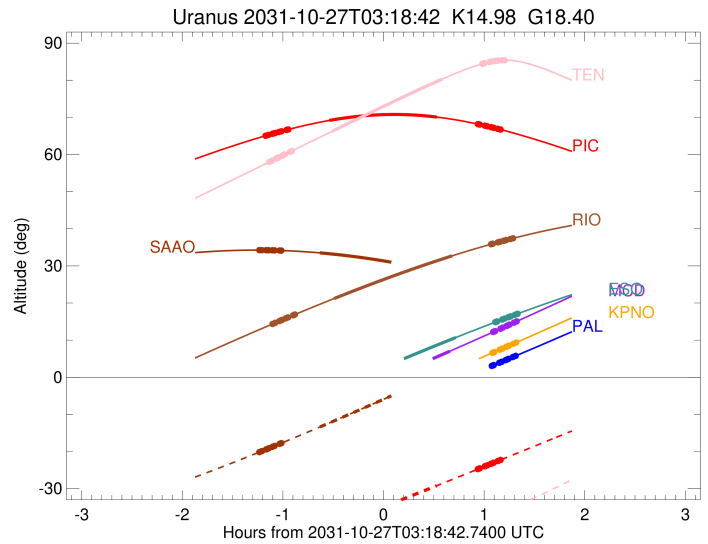
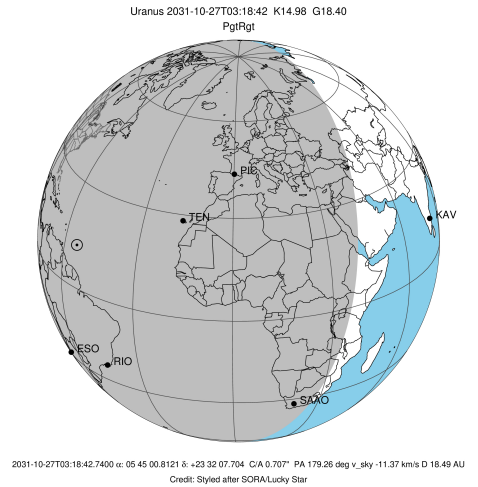
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2031-10-27T03:25:52.390
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      : 3427645104939508352
2Mass ID (if available) : 05450080+2332077
ICRS Star Coord at Epoch: 05h 45m 00.81207s +23:32:07.70421s
RUWE (>1.4 is poor) : 1.03
K magnitude          : 14.980
G magnitude          : 18.400
RP magnitude         : 17.421
BP magnitude         : 19.384
DUPflag             : 0
Distance (au)       : 18.488
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -11.37
Sun-Target sep (deg) : 126.50
Sun-Moon sep (deg)  : 93.30
B (ring opening deg) : 78.13
PA of pole (deg)    : 46.83
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.012
C/A sky separation (km) : 13576.5
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	2031-10-27T02:12:58.034	-18.96x	-15.51	50869.69	-10.77			
lambda	I	2031-10-27T02:14:16.239	-18.77x	-15.79	50026.71	-10.77			
delta	I	2031-10-27T02:16:56.698	-18.39x	-16.34	48300.35	-10.74			
gamma	I	2031-10-27T02:17:59.030	-18.23x	-16.56	47630.99	-10.73			
eta	I	2031-10-27T02:18:41.428	-18.13x	-16.71	47176.12	-10.72			
beta	I	2031-10-27T02:21:04.038	-17.78x	-17.20	45648.76	-10.69			
alpha	I	2031-10-27T02:22:34.178	-17.56x	-17.52	44684.64	-10.67			
4	I	2031-10-27T02:25:51.185	-17.07x	-18.20	42587.97	-10.62			
5	I	2031-10-27T02:26:16.980	-17.01x	-18.29	42315.24	-10.61			
6	I	2031-10-27T02:27:00.670	-16.90x	-18.45	41846.69	-10.60			
Uranus	I	2031-10-27T02:53:37.092	-12.74x	-24.01	25521.45			-3.00	-3.15
Uranus	E	2031-10-27T03:57:04.267	-1.79x	-37.24	25015.37			11.68	12.21
6	E	2031-10-27T04:23:20.204	3.07x	-42.62	41855.52	10.80			
5	E	2031-10-27T04:23:49.137	3.16x	-42.72	42172.71	10.82			
4	E	2031-10-27T04:24:21.847	3.27x	-42.83	42532.21	10.82			
alpha	E	2031-10-27T04:27:46.060	3.91x	-43.52	44745.20	10.89			
beta	E	2031-10-27T04:29:09.953	4.17x	-43.80	45662.18	10.91			
eta	E	2031-10-27T04:31:28.419	4.61x	-44.27	47176.12	10.95			
gamma	E	2031-10-27T04:32:09.009	4.74x	-44.40	47620.99	10.97			
delta	E	2031-10-27T04:33:10.919	4.93x	-44.61	48300.35	10.98			
lambda	E	2031-10-27T04:35:47.852	5.43	-45.14	50026.71	11.02			
epsilon	E	2031-10-27T04:37:37.011	5.78	-45.50	51230.91	11.02			

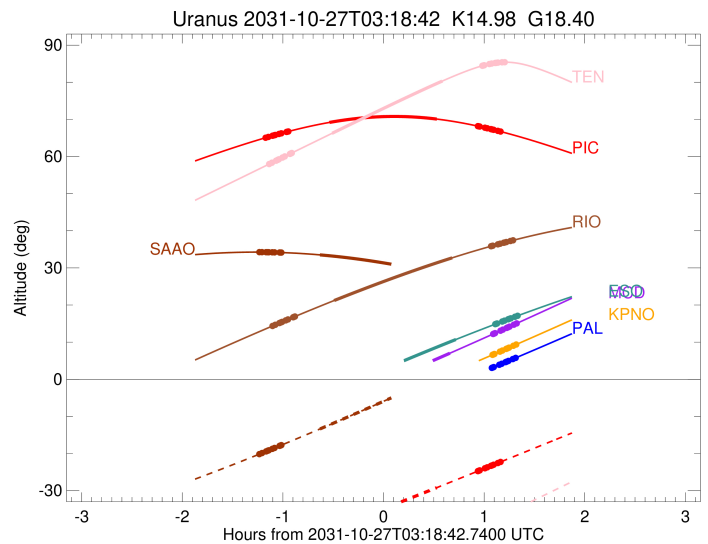
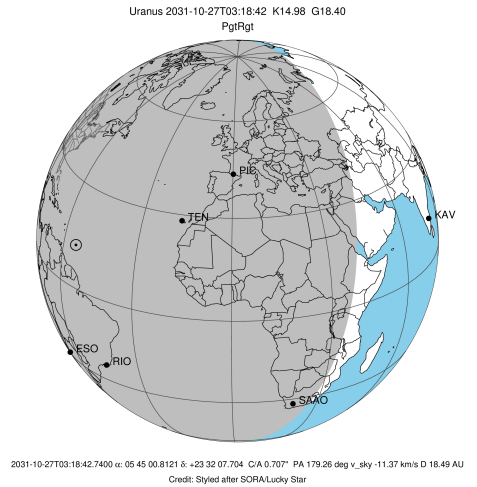
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-10-27T03:26:18.000
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 3427645104939508352
 2Mass ID (if available) : 05450080+2332077
 ICRS Star Coord at Epoch: 05h 45m 00.81207s +23:32:07.70421s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.980
 G magnitude : 18.400
 RP magnitude : 17.421
 BP magnitude : 19.384
 DUPflag : 0
 Distance (au) : 18.488
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.37
 Sun-Target sep (deg) : 126.50
 Sun-Moon sep (deg) : 93.36
 B (ring opening deg) : 78.13
 PA of pole (deg) : 46.83
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.991
 C/A sky separation (km) : 13290.2
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.bsp
 earthstns_itr93_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	2031-10-27T02:13:27.880	-16.71x	-19.95	50871.16	-10.81			
lambda	I	2031-10-27T02:14:45.924	-16.50x	-20.23	50026.71	-10.81			
delta	I	2031-10-27T02:17:25.756	-16.08x	-20.79	48300.35	-10.79			
gamma	I	2031-10-27T02:18:27.837	-15.92x	-21.01	47631.00	-10.78			
eta	I	2031-10-27T02:19:10.063	-15.80x	-21.16	47176.12	-10.77			
beta	I	2031-10-27T02:21:32.068	-15.42x	-21.67	45648.85	-10.74			
alpha	I	2031-10-27T02:23:01.824	-15.18x	-21.98	44684.65	-10.72			
4	I	2031-10-27T02:26:17.919	-14.66x	-22.68	42588.23	-10.67			
5	I	2031-10-27T02:26:43.618	-14.59x	-22.77	42315.23	-10.66			
6	I	2031-10-27T02:27:27.120	-14.47x	-22.92	41846.42	-10.65			
Uranus	I	2031-10-27T02:53:52.442	-10.04x	-28.54	25517.87			-3.14	-3.29
Uranus	E	2031-10-27T03:57:40.818	1.57x	-41.99	25018.20			11.64	12.18
6	E	2031-10-27T04:23:44.641	6.59	-47.35	41855.22	10.86			
5	E	2031-10-27T04:24:13.397	6.68	-47.45	42172.32	10.88			
4	E	2031-10-27T04:24:45.987	6.79	-47.56	42532.39	10.88			
alpha	E	2031-10-27T04:28:09.083	7.45	-48.25	44745.35	10.95			
beta	E	2031-10-27T04:29:32.533	7.72	-48.53	45662.32	10.97			
eta	E	2031-10-27T04:31:50.270	8.18	-48.99	47176.12	11.01			
gamma	E	2031-10-27T04:32:30.654	8.31	-49.13	47620.98	11.02			
delta	E	2031-10-27T04:33:32.252	8.51	-49.33	48300.35	11.04			
lambda	E	2031-10-27T04:36:08.411	9.02	-49.86	50026.71	11.07			
epsilon	E	2031-10-27T04:37:57.271	9.38	-50.22	51233.46	11.07			

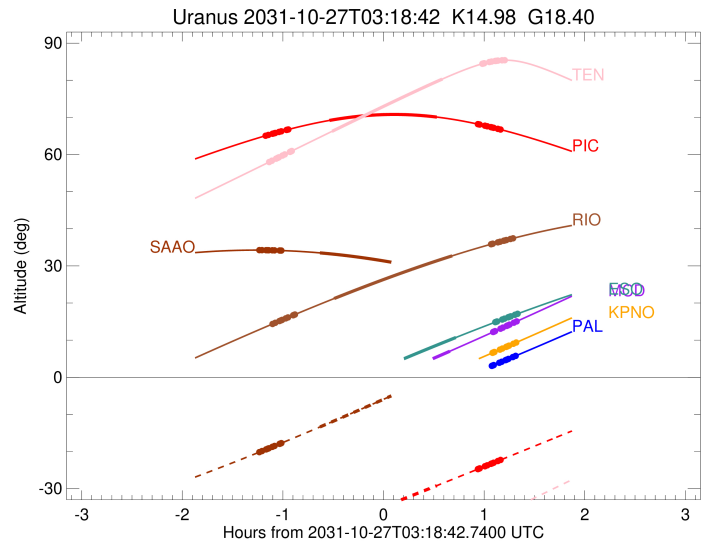
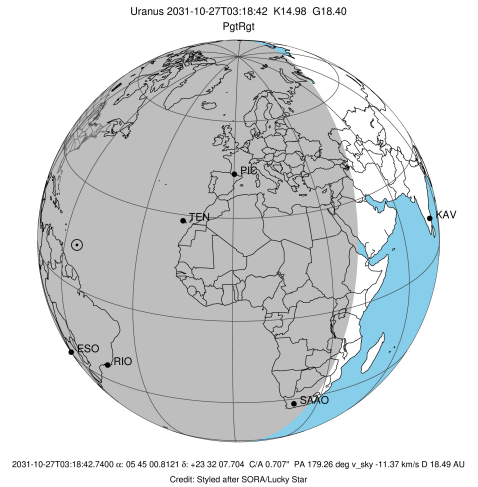
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-10-27T03:26:44.400
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 3427645104939508352
 2Mass ID (if available) : 05450080+2332077
 ICRS Star Coord at Epoch: 05h 45m 00.81207s +23:32:07.70421s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.980
 G magnitude : 18.400
 RP magnitude : 17.421
 BP magnitude : 19.384
 DUPflag : 0
 Distance (au) : 18.488
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.37
 Sun-Target sep (deg) : 126.50
 Sun-Moon sep (deg) : 93.44
 B (ring opening deg) : 78.13
 PA of pole (deg) : 46.83
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.963
 C/A sky separation (km) : 12911.3
 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	2031-10-27T02:14:03.664	-12.45x	-26.54	50873.17	-10.87			
lambda	I	2031-10-27T02:15:21.438	-12.23x	-26.82	50026.71	-10.88			
delta	I	2031-10-27T02:18:00.316	-11.77x	-27.39	48300.35	-10.85			
gamma	I	2031-10-27T02:19:02.015	-11.59x	-27.61	47631.02	-10.84			
eta	I	2031-10-27T02:19:43.983	-11.47x	-27.76	47176.12	-10.84			
beta	I	2031-10-27T02:22:05.079	-11.06x	-28.27	45648.98	-10.81			
alpha	I	2031-10-27T02:23:34.260	-10.80x	-28.59	44684.66	-10.79			
4	I	2031-10-27T02:26:49.005	-10.23x	-29.29	42588.59	-10.74			
5	I	2031-10-27T02:27:14.556	-10.16x	-29.38	42315.21	-10.74			
6	I	2031-10-27T02:27:57.781	-10.03x	-29.53	41846.06	-10.73			
Uranus	I	2031-10-27T02:54:07.578	-5.30x	-35.16	25512.90			-3.33	-3.49
Uranus	E	2031-10-27T03:58:19.603	7.02	-48.72	25022.18			11.60	12.13
6	E	2031-10-27T04:24:06.969	12.20	-53.97	41854.82	10.95			
5	E	2031-10-27T04:24:35.481	12.29	-54.06	42171.82	10.96			
4	E	2031-10-27T04:25:07.895	12.40	-54.17	42532.63	10.97			
alpha	E	2031-10-27T04:28:29.432	13.09	-54.84	44745.54	11.03			
beta	E	2031-10-27T04:29:52.262	13.37	-55.11	45662.51	11.05			
eta	E	2031-10-27T04:32:08.980	13.83	-55.56	47176.12	11.09			
gamma	E	2031-10-27T04:32:49.074	13.97	-55.69	47620.98	11.10			
delta	E	2031-10-27T04:33:50.236	14.17	-55.89	48300.35	11.12			
lambda	E	2031-10-27T04:36:25.304	14.70	-56.40	50026.71	11.15			
epsilon	E	2031-10-27T04:38:13.711	15.07	-56.75	51236.71	11.15			

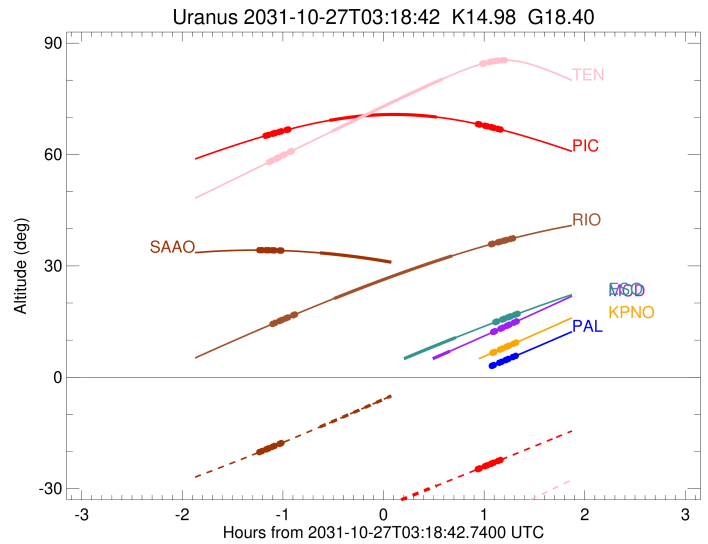
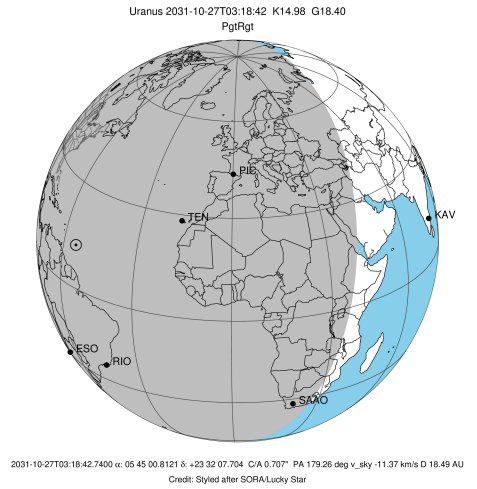
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2031-10-27T03:21:15.820
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       : 3427645104939508352
2Mass ID (if available) : 05450080+2332077
ICRS Star Coord at Epoch: 05h 45m 00.81207s +23:32:07.70421s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 14.980
G magnitude           : 18.400
RP magnitude          : 17.421
BP magnitude          : 19.384
DUPflag              : 0
Distance (au)         : 18.488
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -11.37
Sun-Target sep (deg) : 126.50
Sun-Moon sep (deg)   : 94.36
B (ring opening deg) : 78.13
PA of pole (deg)     : 46.83
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.746
C/A sky separation (km) : 10002.7
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
  
```



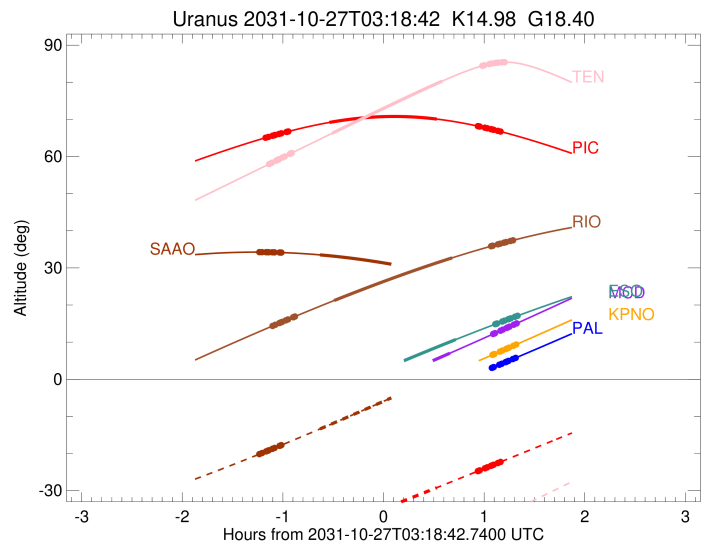
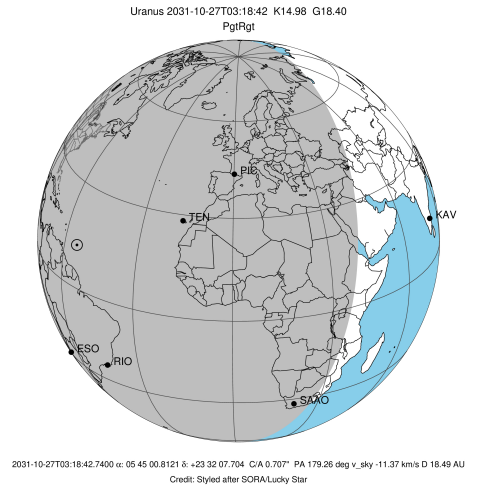
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2031-10-27T02:10:57.129		58.06	-65.58	50893.22	-11.58		
lambda	I	2031-10-27T02:12:11.911		58.34	-65.36	50026.71	-11.58		
delta	I	2031-10-27T02:14:41.037		58.89	-64.90	48300.35	-11.57		
gamma	I	2031-10-27T02:15:38.896		59.10	-64.73	47631.17	-11.56		
eta	I	2031-10-27T02:16:18.260		59.25	-64.61	47176.12	-11.56		
beta	I	2031-10-27T02:18:30.367		59.73	-64.20	45650.18	-11.54		
alpha	I	2031-10-27T02:19:53.926		60.04	-63.94	44684.89	-11.53		
4	I	2031-10-27T02:22:55.786		60.71	-63.37	42591.82	-11.50		
5	I	2031-10-27T02:23:19.934		60.80	-63.29	42314.74	-11.50		
6	I	2031-10-27T02:24:00.506		60.95	-63.16	41842.71	-11.49		
Uranus	I	2031-10-27T02:48:03.518		66.26	-58.43	25462.65		-4.82	-5.05
Uranus	E	2031-10-27T03:53:45.904		80.33	-44.55	25056.40		11.21	11.72
6	E	2031-10-27T04:17:41.779		84.45	-39.34	41852.38	11.59		
5	E	2031-10-27T04:18:08.648		84.51	-39.24	42168.90	11.59		
4	E	2031-10-27T04:18:39.751		84.57	-39.13	42534.14	11.60		
alpha	E	2031-10-27T04:21:50.560		84.92	-38.43	44746.67	11.63		
beta	E	2031-10-27T04:23:09.149		85.04	-38.14	45663.62	11.64		
eta	E	2031-10-27T04:25:18.923		85.20	-37.67	47176.12	11.67		
gamma	E	2031-10-27T04:25:57.046		85.24	-37.53	47620.96	11.67		
delta	E	2031-10-27T04:26:55.234		85.30	-37.32	48300.35	11.68		
lambda	E	2031-10-27T04:29:22.918		85.39	-36.77	50026.71	11.70		
epsilon	E	2031-10-27T04:31:07.898		85.41	-36.39	51255.52	11.69		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-10-27T03:24:46.520
 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 : 3427645104939508352
 2Mass ID (if available) : 05450080+2332077
 ICRS Star Coord at Epoch: 05h 45m 00.81207s +23:32:07.70421s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.980
 G magnitude : 18.400
 RP magnitude : 17.421
 BP magnitude : 19.384
 DUPflag : 0
 Distance (au) : 18.488
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.37
 Sun-Target sep (deg) : 126.50
 Sun-Moon sep (deg) : 93.88
 B (ring opening deg) : 78.13
 PA of pole (deg) : 46.83
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.406
 C/A sky separation (km) : 5444.9
 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



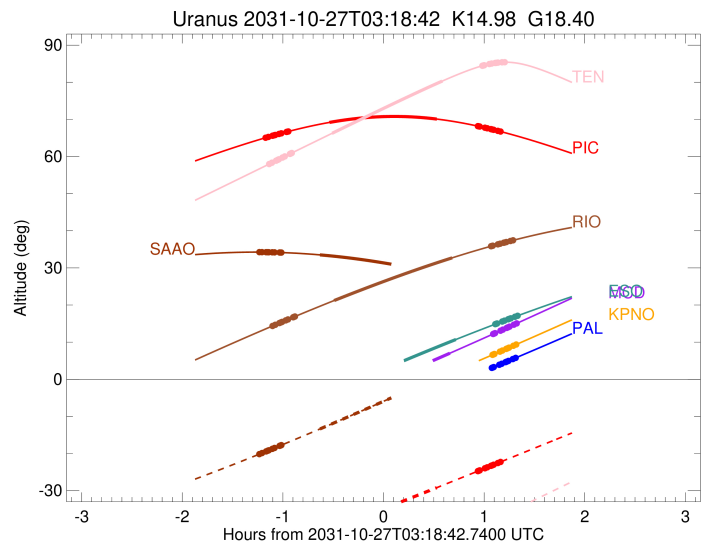
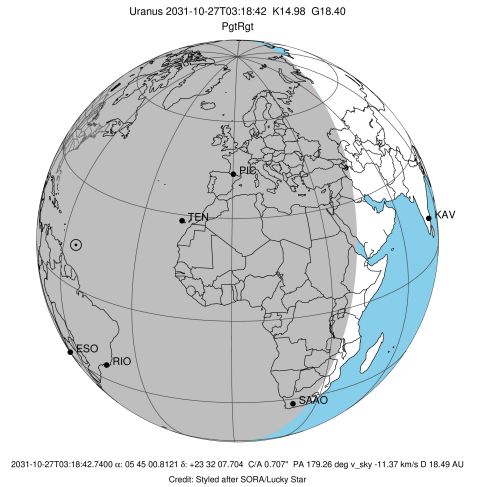
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2031-10-27T02:12:53.449		14.42	-54.10	50921.19	-11.61		
lambda	I	2031-10-27T02:14:10.409		14.67	-54.14	50026.71	-11.62		
delta	I	2031-10-27T02:16:38.947		15.14	-54.23	48300.35	-11.62		
gamma	I	2031-10-27T02:17:36.513		15.33	-54.26	47631.34	-11.62		
eta	I	2031-10-27T02:18:15.684		15.45	-54.28	47176.12	-11.62		
beta	I	2031-10-27T02:20:26.848		15.87	-54.35	45651.86	-11.62		
alpha	I	2031-10-27T02:21:49.882		16.13	-54.38	44685.49	-11.62		
4	I	2031-10-27T02:24:49.916		16.70	-54.45	42595.93	-11.61		
5	I	2031-10-27T02:25:14.231		16.78	-54.46	42313.35	-11.61		
6	I	2031-10-27T02:25:54.625		16.90	-54.47	41838.19	-11.61		
Uranus	I	2031-10-27T02:49:20.577		21.22	-54.43	25374.55		-6.70	-7.01
Uranus	E	2031-10-27T03:59:41.753		32.71	-49.15	25138.71		10.21	10.69
6	E	2031-10-27T04:22:51.377		35.84	-46.05	41847.61	11.80		
5	E	2031-10-27T04:23:17.705		35.90	-45.99	42164.06	11.80		
4	E	2031-10-27T04:23:49.079		35.97	-45.91	42537.40	11.80		
alpha	E	2031-10-27T04:26:56.580		36.35	-45.45	44748.58	11.82		
beta	E	2031-10-27T04:28:14.001		36.51	-45.26	45665.76	11.82		
eta	E	2031-10-27T04:30:21.718		36.77	-44.94	47176.12	11.83		
gamma	E	2031-10-27T04:30:59.315		36.84	-44.84	47620.97	11.83		
delta	E	2031-10-27T04:31:56.721		36.96	-44.70	48300.35	11.84		
lambda	E	2031-10-27T04:34:22.520		37.25	-44.32	50026.71	11.84		
epsilon	E	2031-10-27T04:36:09.405		37.45	-44.05	51293.05	11.84		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-10-27T03:26:34.360
 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 : 3427645104939508352
 2Mass ID (if available) : 05450080+2332077
 ICRS Star Coord at Epoch: 05h 45m 00.81207s +23:32:07.70421s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.980
 G magnitude : 18.400
 RP magnitude : 17.421
 BP magnitude : 19.384
 DUPflag : 0
 Distance (au) : 18.488
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.37
 Sun-Target sep (deg) : 126.50
 Sun-Moon sep (deg) : 93.50
 B (ring opening deg) : 78.13
 PA of pole (deg) : 46.83
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.435
 C/A sky separation (km) : 5837.4
 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	2031-10-27T02:13:33.493	-10.24x	-37.28	50917.87	-11.41			
lambda	I	2031-10-27T02:14:51.571	-9.98x	-37.48	50026.71	-11.41			
delta	I	2031-10-27T02:17:22.829	-9.46x	-37.84	48300.35	-11.41			
gamma	I	2031-10-27T02:18:21.451	-9.26x	-37.98	47631.32	-11.41			
eta	I	2031-10-27T02:19:01.339	-9.13x	-38.08	47176.12	-11.41			
beta	I	2031-10-27T02:21:14.928	-8.68x	-38.39	45651.67	-11.41			
alpha	I	2031-10-27T02:22:39.480	-8.39x	-38.59	44685.41	-11.41			
4	I	2031-10-27T02:25:42.858	-7.77x	-39.02	42595.49	-11.40			
5	I	2031-10-27T02:26:07.573	-7.69x	-39.07	42313.55	-11.40			
6	I	2031-10-27T02:26:48.689	-7.55x	-39.17	41838.69	-11.40			
Uranus	I	2031-10-27T02:50:41.483	-2.78x	-42.21	25384.23	-6.52		-6.82	
Uranus	E	2031-10-27T04:01:51.778	10.71	-47.78	25132.68	10.29		10.76	
6	E	2031-10-27T04:25:23.052	14.85	-48.20	41847.85	11.63			
5	E	2031-10-27T04:25:49.751	14.93	-48.20	42164.28	11.64			
4	E	2031-10-27T04:26:21.524	15.02	-48.20	42537.23	11.64			
alpha	E	2031-10-27T04:29:31.630	15.56	-48.20	44748.50	11.66			
beta	E	2031-10-27T04:30:50.105	15.78	-48.19	45665.66	11.66			
eta	E	2031-10-27T04:32:59.553	16.15	-48.18	47176.12	11.67			
gamma	E	2031-10-27T04:33:37.653	16.25	-48.17	47620.97	11.68			
delta	E	2031-10-27T04:34:35.822	16.42	-48.16	48300.35	11.68			
lambda	E	2031-10-27T04:37:03.539	16.83	-48.13	50026.71	11.69			
epsilon	E	2031-10-27T04:38:51.684	17.13	-48.10	51291.54	11.69			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-10-27T03:16:15.600
 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 : 3427645104939508352
 2Mass ID (if available) : 05450080+2332077
 ICRS Star Coord at Epoch: 05h 45m 00.81207s +23:32:07.70421s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.980
 G magnitude : 18.400
 RP magnitude : 17.421
 BP magnitude : 19.384
 DUPflag : 0
 Distance (au) : 18.488
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.37
 Sun-Target sep (deg) : 126.50
 Sun-Moon sep (deg) : 93.89
 B (ring opening deg) : 78.13
 PA of pole (deg) : 46.83
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.313
 C/A sky separation (km) : 4197.4
 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	2031-10-27T02:05:00.580		34.25	-20.11	50934.21	-11.84		
lambda	I	2031-10-27T02:06:17.216		34.24	-19.87	50026.71	-11.84		
delta	I	2031-10-27T02:08:43.026		34.23	-19.43	48300.35	-11.84		
gamma	I	2031-10-27T02:09:39.536		34.22	-19.26	47631.40	-11.84		
eta	I	2031-10-27T02:10:17.999		34.22	-19.14	47176.12	-11.84		
beta	I	2031-10-27T02:12:26.726		34.20	-18.74	45652.61	-11.83		
alpha	I	2031-10-27T02:13:48.289		34.19	-18.49	44685.84	-11.83		
4	I	2031-10-27T02:16:45.009		34.15	-17.94	42597.56	-11.83		
5	I	2031-10-27T02:17:09.062		34.14	-17.87	42312.52	-11.83		
6	I	2031-10-27T02:17:48.817		34.13	-17.74	41836.32	-11.82		
Uranus	I	2031-10-27T02:40:48.825		33.51	-13.38	25340.02		-7.31	-7.65
Uranus	E	2031-10-27T03:51:28.124		28.46	0.70x	25156.57		9.99	10.45
6	E	2031-10-27T04:14:32.072		25.93	5.45x	41846.93	11.80		
5	E	2031-10-27T04:14:58.408		25.88	5.55x	42163.47	11.80		
4	E	2031-10-27T04:15:29.899		25.82	5.65x	42537.88	11.80		
alpha	E	2031-10-27T04:18:37.525		25.44	6.30x	44748.80	11.80		
beta	E	2031-10-27T04:19:55.060		25.29	6.57x	45666.02	11.80		
eta	E	2031-10-27T04:22:02.986		25.03	7.02x	47176.12	11.81		
gamma	E	2031-10-27T04:22:40.665		24.95	7.15x	47620.97	11.81		
delta	E	2031-10-27T04:23:38.205		24.83	7.35x	48300.35	11.81		
lambda	E	2031-10-27T04:26:04.405		24.53	7.85x	50026.71	11.81		
epsilon	E	2031-10-27T04:27:51.972		24.30	8.23x	51297.04	11.80		