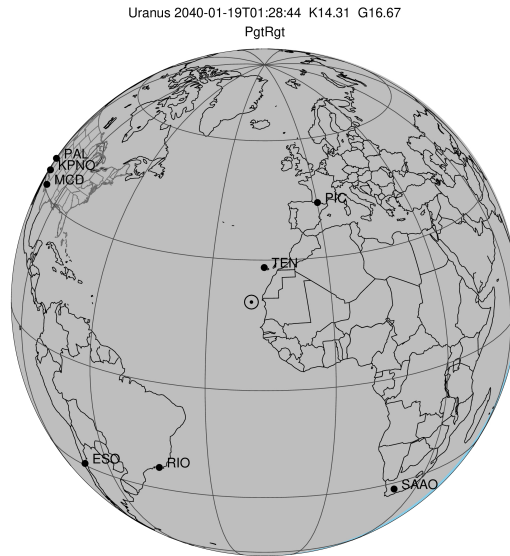


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-01-19T01:28:44.320
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 675861280675522944
 2Mass ID (if available) : 08130981+2031483

ICRS Star Coord at Epoch: 08h 13m 09.80177s +20:31:48.17520s

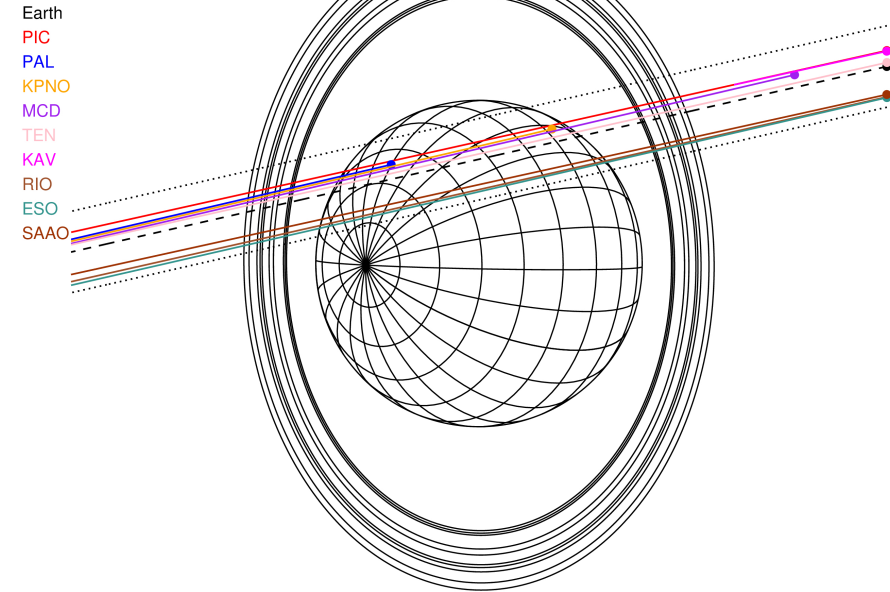
RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.314
 G magnitude : 16.672
 RP magnitude : 15.935
 BP magnitude : 17.269
 DUPflag : 0
 Distance (au) : 17.606
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.20
 Sun-Target sep (deg) : 177.02
 Sun-Moon sep (deg) : 117.01
 B (ring opening deg) : 46.05
 PA of pole (deg) : 90.82

#	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



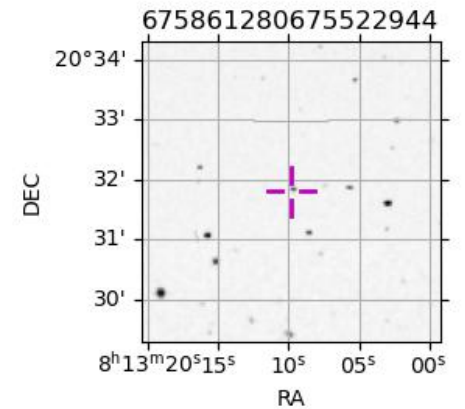
2040-01-19T01:28:44.3200 ex: 08 13 09.8018 s: +20 31 48.175 C/A 1.255° PA 192.81 deg v_sky -23.20 km/s D 17.61 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2040-01-19T01:28:44 K14.31 G16.67 PgtRgt

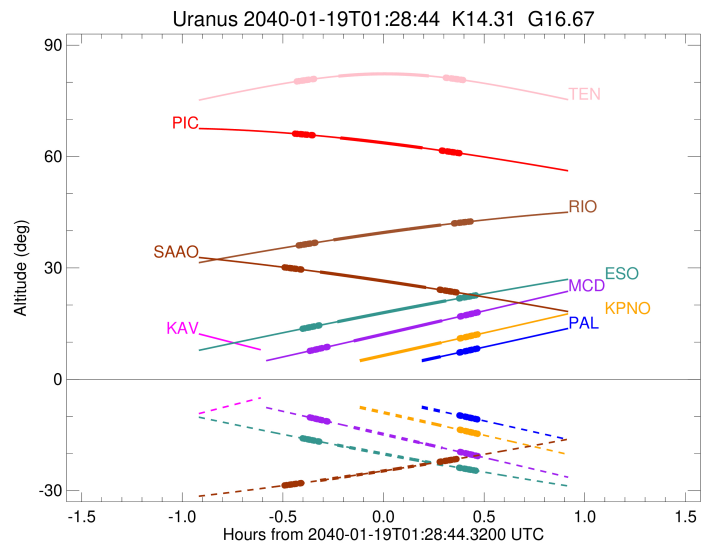
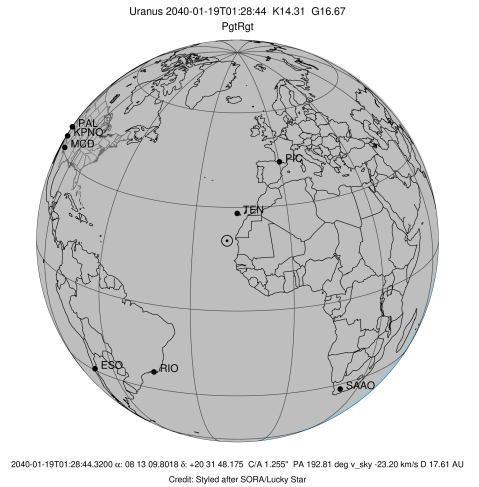


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+ +	+++++	JAN 19 01:02 - JAN 19 01:51	PieRie
PAL	Palomar Mt (200")	33.4	243.1		+	+++++	JAN 19 01:45 - JAN 19 01:56	PneRne
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4		+	+++++	JAN 19 01:46 - JAN 19 01:56	PneRne
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	JAN 19 01:06 - JAN 19 01:56	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5	+++++	+ +	+++++	JAN 19 01:02 - JAN 19 01:52	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	+++++	+ +	+++++	JAN 19 01:03 - JAN 19 01:54	PieRie
ESO	European Southern Obs	-29.3	289.3	+++++	+ +	+++++	JAN 19 01:04 - JAN 19 01:56	PieRie
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	+++++	+ +	+++++	JAN 19 00:59 - JAN 19 01:50	PieRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

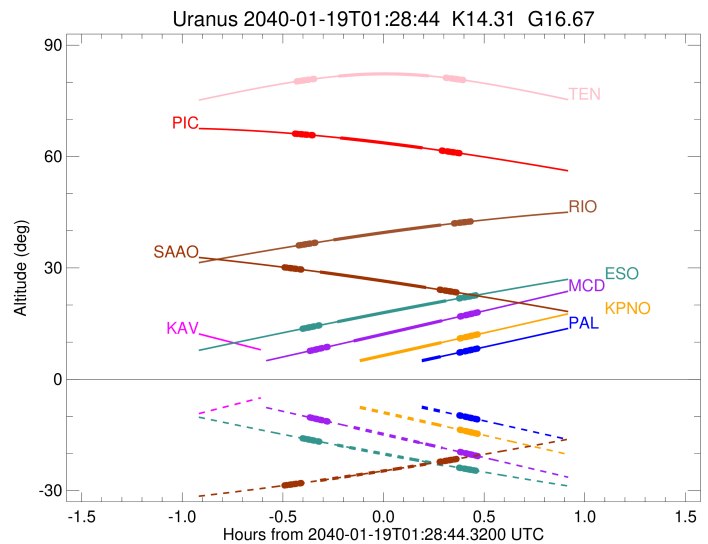
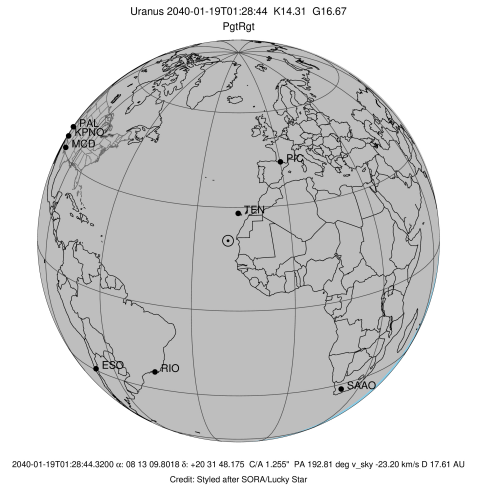


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-01-19T01:28:09.340
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 675861280675522944
 2Mass ID (if available) : 08130981+2031483
 ICRS Star Coord at Epoch: 08h 13m 09.80177s +20:31:48.17520s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.314
 G magnitude : 16.672
 RP magnitude : 15.935
 BP magnitude : 17.269
 DUPflag : 0
 Distance (au) : 17.606
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.20
 Sun-Target sep (deg) : 177.02
 Sun-Moon sep (deg) : 117.69
 B (ring opening deg) : 46.05
 PA of pole (deg) : 90.82
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.460
 C/A sky separation (km) : 18638.3
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.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	2040-01-19T01:02:08.696		66.17	-65.14	51555.20	-30.11		
lambda	I	2040-01-19T01:02:59.585		66.11	-65.07	50026.71	-29.96		
delta	I	2040-01-19T01:03:57.374		66.03	-64.97	48300.35	-29.78		
gamma	I	2040-01-19T01:04:20.212		66.01	-64.94	47621.08	-29.70		
eta	I	2040-01-19T01:04:35.205		65.99	-64.91	47176.12	-29.65		
beta	I	2040-01-19T01:05:27.052		65.92	-64.83	45643.99	-29.46		
alpha	I	2040-01-19T01:05:58.606		65.88	-64.78	44716.09	-29.32		
4	I	2040-01-19T01:07:14.293		65.78	-64.65	42526.06	-29.00		
5	I	2040-01-19T01:07:25.542		65.76	-64.64	42212.88	-28.99		
6	I	2040-01-19T01:07:36.520		65.75	-64.62	41834.44	-28.86		
Uranus	I	2040-01-19T01:15:50.850		65.02	-63.75	25476.70		-21.10	-22.01
Uranus	E	2040-01-19T01:40:20.608		62.33	-60.72	25358.05		34.37	35.61
6	E	2040-01-19T01:46:08.830		61.60	-59.92	41873.01	28.83		
5	E	2040-01-19T01:46:21.552		61.57	-59.89	42309.89	28.97		
4	E	2040-01-19T01:46:32.544		61.54	-59.86	42601.32	28.98		
alpha	E	2040-01-19T01:47:44.851		61.39	-59.69	44694.18	29.29		
beta	E	2040-01-19T01:48:17.500		61.32	-59.61	45664.55	29.43		
eta	E	2040-01-19T01:49:08.791		61.20	-59.49	47176.12	29.62		
gamma	E	2040-01-19T01:49:24.066		61.17	-59.46	47628.99	29.67		
delta	E	2040-01-19T01:49:46.661		61.12	-59.40	48300.35	29.75		
lambda	E	2040-01-19T01:50:44.511		60.99	-59.26	50026.71	29.93		
epsilon	E	2040-01-19T01:51:12.245		60.93	-59.20	50857.93	30.08		

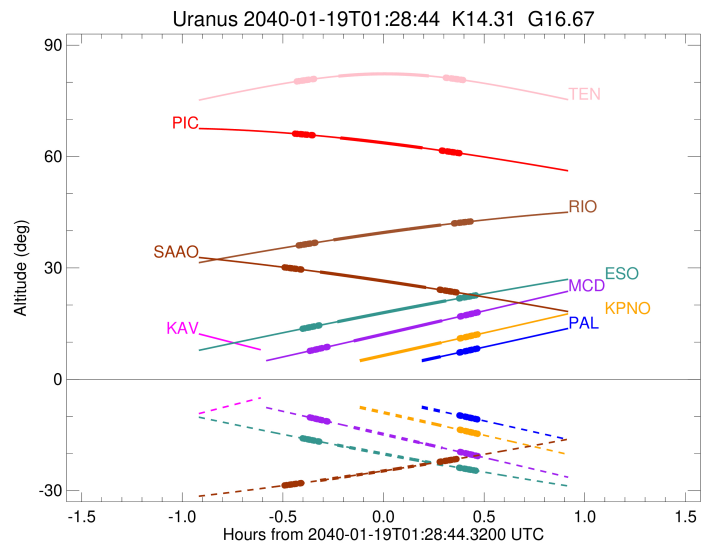
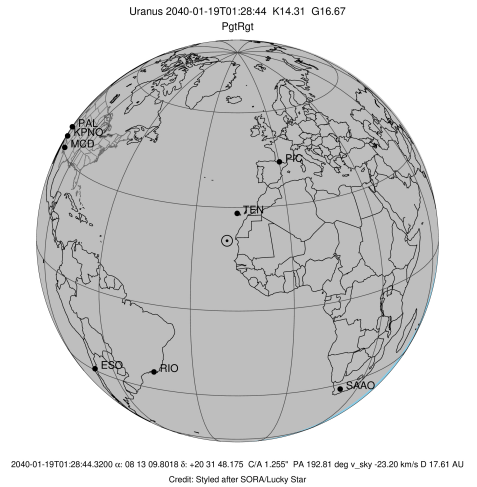
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-01-19T01:33:04.890
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 675861280675522944
 2Mass ID (if available) : 08130981+2031483
 ICRS Star Coord at Epoch: 08h 13m 09.80177s +20:31:48.17520s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.314
 G magnitude : 16.672
 RP magnitude : 15.935
 BP magnitude : 17.269
 DUPflag : 0
 Distance (au) : 17.606
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.20
 Sun-Target sep (deg) : 177.02
 Sun-Moon sep (deg) : 117.44
 B (ring opening deg) : 46.05
 PA of pole (deg) : 90.82
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.426
 C/A sky separation (km) : 18212.5
 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	2040-01-19T01:06:30.432	-1.48x	-0.98x	51555.20	-29.67			
lambda	I	2040-01-19T01:07:22.073	-1.31x	-1.14x	50026.71	-29.53			
delta	I	2040-01-19T01:08:20.697	-1.13x	-1.33x	48300.35	-29.36			
gamma	I	2040-01-19T01:08:43.859	-1.06x	-1.40x	47621.08	-29.29			
eta	I	2040-01-19T01:08:59.062	-1.01x	-1.45x	47176.12	-29.24			
beta	I	2040-01-19T01:09:51.622	-0.84x	-1.62x	45644.01	-29.06			
alpha	I	2040-01-19T01:10:23.597	-0.74x	-1.72x	44716.17	-28.93			
4	I	2040-01-19T01:11:40.266	-0.50x	-1.97x	42526.05	-28.64			
5	I	2040-01-19T01:11:51.667	-0.46x	-2.00x	42212.64	-28.64			
6	I	2040-01-19T01:12:02.769	-0.43x	-2.04x	41834.30	-28.51			
Uranus	I	2040-01-19T01:20:15.986	1.14x	-3.62x	25473.08			-21.58	-22.51
Uranus	E	2040-01-19T01:45:45.370	6.10	-8.62	25348.29			35.33	36.58
6	E	2040-01-19T01:51:24.888	7.22	-9.74	41872.57	28.59			
5	E	2040-01-19T01:51:37.679	7.26	-9.78	42309.34	28.72			
4	E	2040-01-19T01:51:48.812	7.29	-9.82	42601.94	28.73			
alpha	E	2040-01-19T01:53:01.779	7.53	-10.06	44694.61	29.02			
beta	E	2040-01-19T01:53:34.735	7.64	-10.17	45664.90	29.15			
eta	E	2040-01-19T01:54:26.505	7.81	-10.34	47176.12	29.34			
gamma	E	2040-01-19T01:54:41.931	7.86	-10.39	47629.07	29.39			
delta	E	2040-01-19T01:55:04.745	7.94	-10.47	48300.35	29.46			
lambda	E	2040-01-19T01:56:03.172	8.13	-10.66	50026.71	29.63			
epsilon	E	2040-01-19T01:56:31.031	8.23	-10.76	50853.34	29.77			

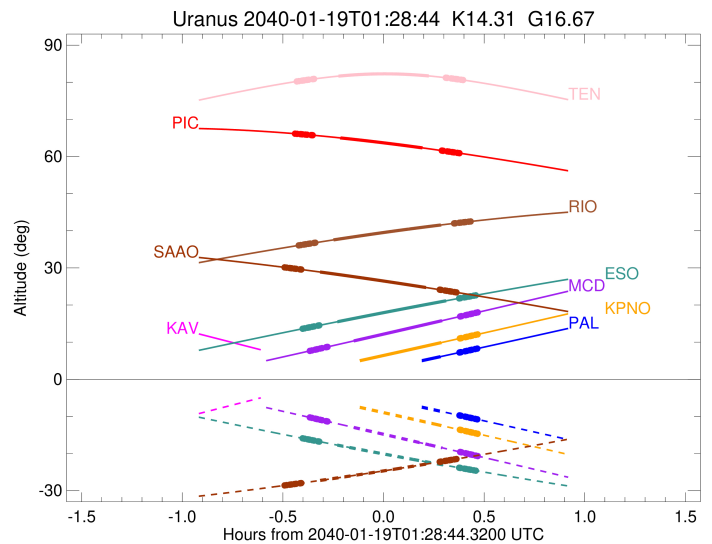
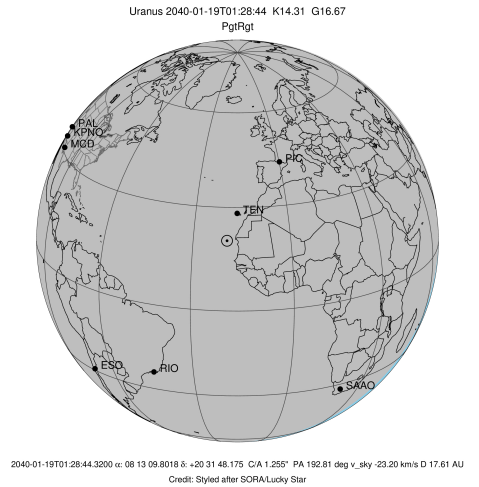
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch             : 2040-01-19T01:33:07.770
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        : 675861280675522944
2Mass ID (if available) : 08130981+2031483
ICRS Star Coord at Epoch: 08h 13m 09.80177s +20:31:48.17520s
RUWE (>1.4 is poor)  : 1.01
K magnitude           : 14.314
G magnitude           : 16.672
RP magnitude          : 15.935
BP magnitude          : 17.269
DUPflag               : 0
Distance (au)         : 17.606
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s)  : -23.20
Sun-Target sep (deg)  : 177.02
Sun-Moon sep (deg)    : 117.50
B (ring opening deg)  : 46.05
PA of pole (deg)      : 90.82
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.402
C/A sky separation (km) : 17898.5
NAIF SPICE kernels    : RAJobs_U111+rgf15.spk
URKALLvl1.spk
ura111.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.ura111.bsp
ura161.bsp
vgr2.ura161.bsp
peph.ura160.bsp
earthstns_itrf93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
    
```



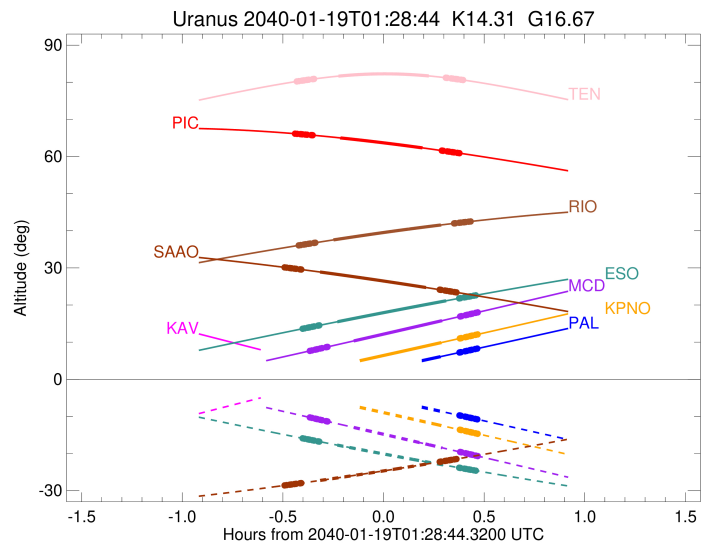
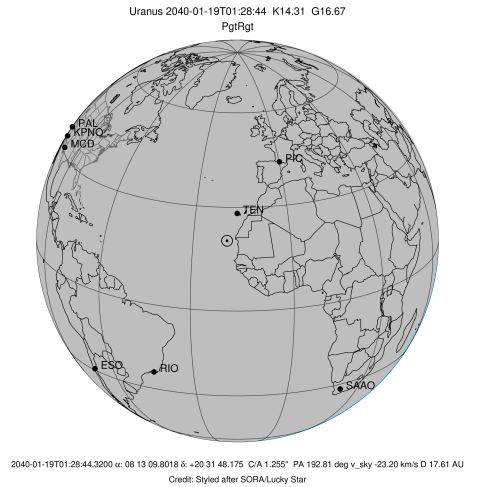
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-01-19T01:06:33.410		2.01x	-4.55x	51555.13	-29.78		
lambda	I	2040-01-19T01:07:24.839		2.18x	-4.72x	50026.71	-29.65		
delta	I	2040-01-19T01:08:23.213		2.37x	-4.91x	48300.35	-29.49		
gamma	I	2040-01-19T01:08:46.272		2.44x	-4.99x	47621.09	-29.42		
eta	I	2040-01-19T01:09:01.407		2.49x	-5.04	47176.12	-29.38		
beta	I	2040-01-19T01:09:53.719		2.67x	-5.21	45644.10	-29.20		
alpha	I	2040-01-19T01:10:25.528		2.77x	-5.32	44716.44	-29.08		
4	I	2040-01-19T01:11:41.814		3.02x	-5.57	42526.02	-28.80		
5	I	2040-01-19T01:11:53.182		3.06x	-5.61	42211.98	-28.79		
6	I	2040-01-19T01:12:04.192		3.09x	-5.65	41833.94	-28.67		
Uranus	I	2040-01-19T01:20:06.709		4.69x	-7.25	25468.26		-22.22	-23.16
Uranus	E	2040-01-19T01:46:00.513		9.89	-12.48	25343.56		35.79	37.05
6	E	2040-01-19T01:51:32.343		11.01	-13.61	41872.37	28.75		
5	E	2040-01-19T01:51:45.044		11.05	-13.65	42309.09	28.87		
4	E	2040-01-19T01:51:56.135		11.09	-13.69	42602.21	28.88		
alpha	E	2040-01-19T01:53:08.722		11.34	-13.94	44694.79	29.17		
beta	E	2040-01-19T01:53:41.515		11.45	-14.05	45665.05	29.29		
eta	E	2040-01-19T01:54:33.034		11.62	-14.22	47176.12	29.47		
gamma	E	2040-01-19T01:54:48.390		11.68	-14.28	47629.10	29.52		
delta	E	2040-01-19T01:55:11.100		11.75	-14.35	48300.35	29.59		
lambda	E	2040-01-19T01:56:09.273		11.95	-14.55	50026.71	29.76		
epsilon	E	2040-01-19T01:56:36.956		12.05	-14.65	50851.55	29.89		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-01-19T01:33:07.070
 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 : 675861280675522944
 2Mass ID (if available) : 08130981+2031483
 ICRS Star Coord at Epoch: 08h 13m 09.80177s +20:31:48.17520s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.314
 G magnitude : 16.672
 RP magnitude : 15.935
 BP magnitude : 17.269
 DUPflag : 0
 Distance (au) : 17.606
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.20
 Sun-Target sep (deg) : 177.02
 Sun-Moon sep (deg) : 117.59
 B (ring opening deg) : 46.05
 PA of pole (deg) : 90.82
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.372
 C/A sky separation (km) : 17524.3
 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_itrfr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



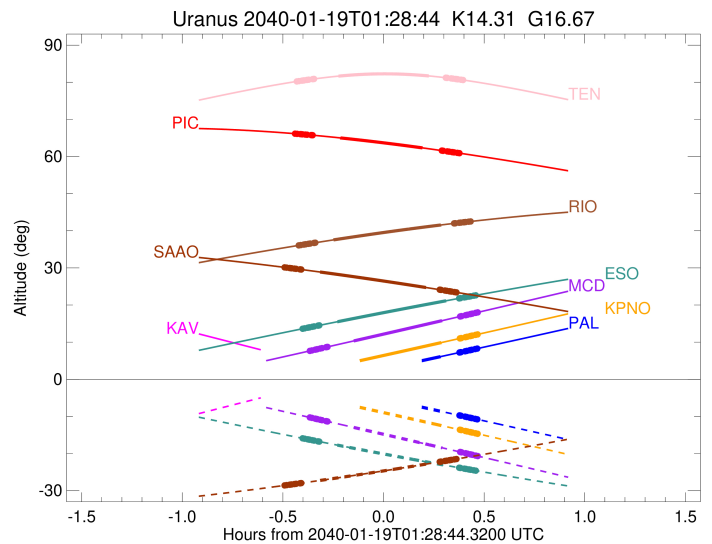
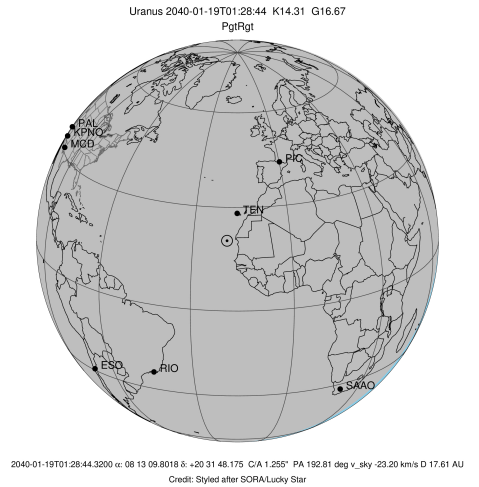
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-01-19T01:06:33.732		7.60	-10.24	51555.02	-29.94		
lambda	I	2040-01-19T01:07:24.888		7.78	-10.41	50026.71	-29.81		
delta	I	2040-01-19T01:08:22.942		7.97	-10.61	48300.35	-29.66		
gamma	I	2040-01-19T01:08:45.870		8.05	-10.69	47621.10	-29.59		
eta	I	2040-01-19T01:09:00.918		8.10	-10.74	47176.12	-29.55		
beta	I	2040-01-19T01:09:52.918		8.28	-10.92	45644.19	-29.38		
alpha	I	2040-01-19T01:10:24.518		8.39	-11.03	44716.76	-29.26		
4	I	2040-01-19T01:11:40.322		8.65	-11.29	42525.99	-29.00		
5	I	2040-01-19T01:11:51.649		8.68	-11.32	42211.20	-28.99		
6	I	2040-01-19T01:12:02.546		8.72	-11.36	41833.50	-28.87		
Uranus	I	2040-01-19T01:19:52.516		10.33	-12.98	25462.48		-22.96	-23.92
Uranus	E	2040-01-19T01:46:13.470		15.79	-18.46	25338.17		36.31	37.57
6	E	2040-01-19T01:51:36.538		16.92	-19.59	41872.14	28.95		
5	E	2040-01-19T01:51:49.131		16.97	-19.63	42308.79	29.07		
4	E	2040-01-19T01:52:00.169		17.00	-19.67	42602.52	29.08		
alpha	E	2040-01-19T01:53:12.283		17.26	-19.92	44695.01	29.35		
beta	E	2040-01-19T01:53:44.873		17.37	-20.04	45665.22	29.47		
eta	E	2040-01-19T01:54:36.078		17.55	-20.22	47176.12	29.65		
gamma	E	2040-01-19T01:54:51.347		17.60	-20.27	47629.14	29.69		
delta	E	2040-01-19T01:55:13.927		17.68	-20.35	48300.35	29.76		
lambda	E	2040-01-19T01:56:11.779		17.88	-20.55	50026.71	29.92		
epsilon	E	2040-01-19T01:56:39.246		17.98	-20.65	50849.47	30.05		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-01-19T01:28:50.090
 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 : 675861280675522944
 2Mass ID (if available) : 08130981+2031483
 ICRS Star Coord at Epoch: 08h 13m 09.80177s +20:31:48.17520s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.314
 G magnitude : 16.672
 RP magnitude : 15.935
 BP magnitude : 17.269
 DUPflag : 0
 Distance (au) : 17.606
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.20
 Sun-Target sep (deg) : 177.02
 Sun-Moon sep (deg) : 117.85
 B (ring opening deg) : 46.05
 PA of pole (deg) : 90.82
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.312
 C/A sky separation (km) : 16750.3
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.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



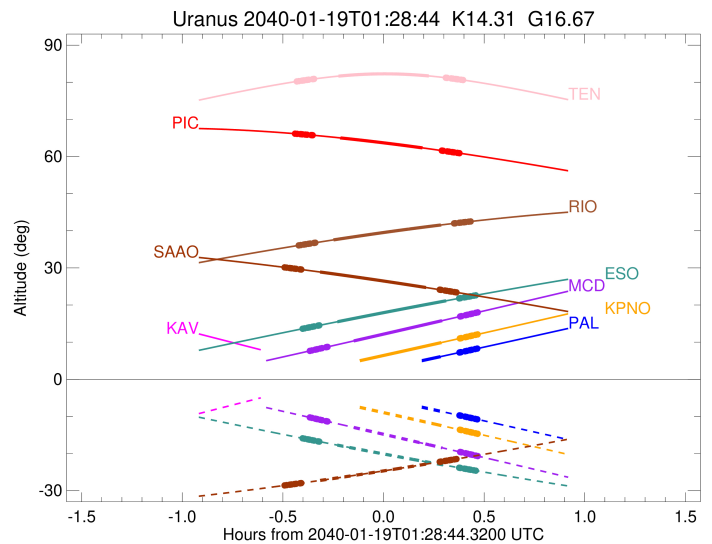
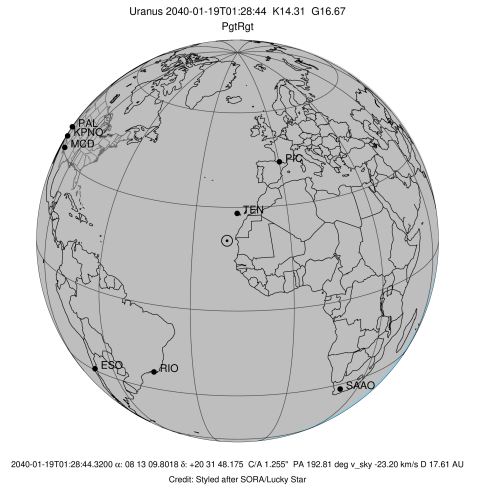
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-01-19T01:02:40.865		80.20	-81.71	51554.56	-30.65		
lambda	I	2040-01-19T01:03:30.810		80.32	-81.78	50026.71	-30.53		
delta	I	2040-01-19T01:04:27.484		80.45	-81.85	48300.35	-30.39		
gamma	I	2040-01-19T01:04:49.857		80.50	-81.88	47621.14	-30.33		
eta	I	2040-01-19T01:05:04.542		80.53	-81.90	47176.12	-30.28		
beta	I	2040-01-19T01:05:55.256		80.64	-81.96	45644.48	-30.13		
alpha	I	2040-01-19T01:06:26.034		80.70	-81.99	44717.65	-30.02		
4	I	2040-01-19T01:07:39.940		80.86	-82.06	42525.94	-29.77		
5	I	2040-01-19T01:07:51.066		80.88	-82.08	42209.11	-29.77		
6	I	2040-01-19T01:08:01.581		80.90	-82.08	41832.33	-29.65		
Uranus	I	2040-01-19T01:15:18.516		81.66	-82.31	25448.08		-24.73	-25.75
Uranus	E	2040-01-19T01:42:15.059		81.71	-80.31	25329.89		37.10	38.38
6	E	2040-01-19T01:47:20.820		81.22	-79.57	41871.79	29.64		
5	E	2040-01-19T01:47:33.091		81.20	-79.54	42308.34	29.76		
4	E	2040-01-19T01:47:43.906		81.18	-79.51	42602.97	29.77		
alpha	E	2040-01-19T01:48:54.404		81.05	-79.33	44695.32	30.01		
beta	E	2040-01-19T01:49:26.287		80.99	-79.24	45665.45	30.12		
eta	E	2040-01-19T01:50:16.400		80.89	-79.11	47176.12	30.28		
gamma	E	2040-01-19T01:50:31.353		80.86	-79.07	47629.19	30.32		
delta	E	2040-01-19T01:50:53.467		80.81	-79.01	48300.35	30.38		
lambda	E	2040-01-19T01:51:50.154		80.69	-78.85	50026.71	30.53		
epsilon	E	2040-01-19T01:52:16.993		80.64	-78.78	50846.84	30.65		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-01-19T01:29:53.910
 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 : 675861280675522944
 2Mass ID (if available) : 08130981+2031483
 ICRS Star Coord at Epoch: 08h 13m 09.80177s +20:31:48.17520s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.314
 G magnitude : 16.672
 RP magnitude : 15.935
 BP magnitude : 17.269
 DUPflag : 0
 Distance (au) : 17.606
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.20
 Sun-Target sep (deg) : 177.02
 Sun-Moon sep (deg) : 117.69
 B (ring opening deg) : 46.05
 PA of pole (deg) : 90.82
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.884
 C/A sky separation (km) : 11286.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.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



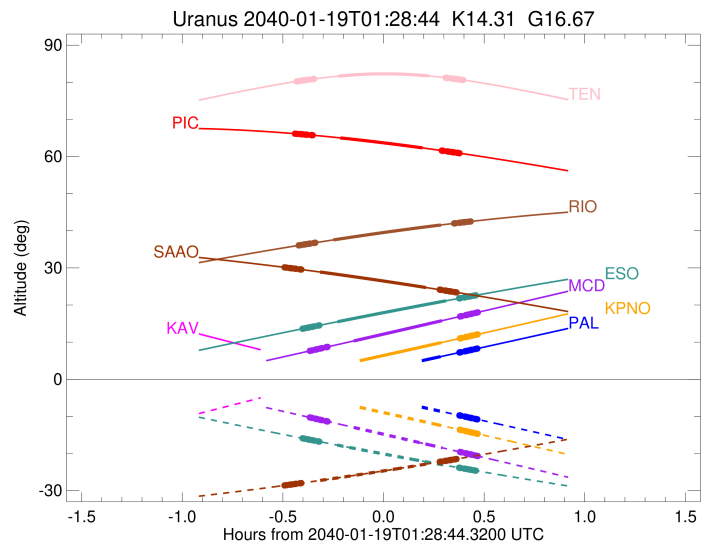
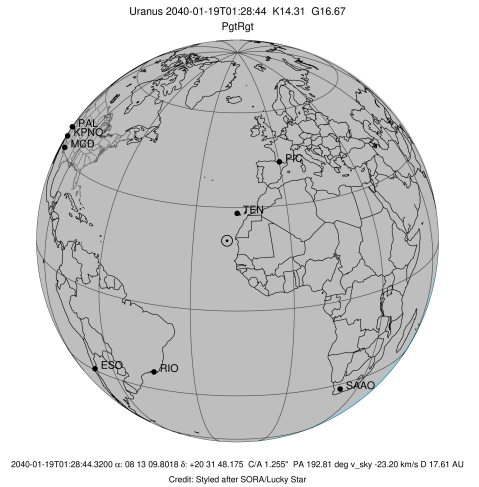
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-01-19T01:03:16.241		36.04	-37.82	51549.44	-31.60		
lambda	I	2040-01-19T01:04:04.488		36.15	-37.93	50026.71	-31.54		
delta	I	2040-01-19T01:04:59.284		36.29	-38.05	48300.35	-31.47		
gamma	I	2040-01-19T01:05:20.868		36.34	-38.10	47621.33	-31.45		
eta	I	2040-01-19T01:05:35.030		36.37	-38.13	47176.12	-31.43		
beta	I	2040-01-19T01:06:23.794		36.49	-38.24	45646.01	-31.36		
alpha	I	2040-01-19T01:06:53.186		36.56	-38.31	44721.98	-31.31		
4	I	2040-01-19T01:08:04.043		36.73	-38.47	42526.21	-31.21		
5	I	2040-01-19T01:08:15.103		36.76	-38.49	42199.01	-31.23		
6	I	2040-01-19T01:08:24.717		36.78	-38.51	41826.57	-31.14		
Uranus	I	2040-01-19T01:13:50.569		37.55	-39.22	25372.09		-32.97	-34.19
Uranus	E	2040-01-19T01:45:52.245		41.57	-42.86	25275.87		42.20	43.51
6	E	2040-01-19T01:49:48.315		41.99	-43.23	41867.93	31.18		
5	E	2040-01-19T01:49:59.743		42.01	-43.25	42303.05	31.27		
4	E	2040-01-19T01:50:10.347		42.03	-43.27	42607.17	31.25		
alpha	E	2040-01-19T01:51:17.720		42.15	-43.37	44698.78	31.35		
beta	E	2040-01-19T01:51:48.280		42.21	-43.42	45667.95	31.40		
eta	E	2040-01-19T01:52:36.332		42.29	-43.49	47176.12	31.47		
gamma	E	2040-01-19T01:52:50.740		42.32	-43.51	47629.71	31.49		
delta	E	2040-01-19T01:53:12.025		42.35	-43.55	48300.35	31.52		
lambda	E	2040-01-19T01:54:06.738		42.45	-43.63	50026.71	31.59		
epsilon	E	2040-01-19T01:54:31.778		42.49	-43.66	50817.95	31.65		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-01-19T01:31:14.650
 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 : 675861280675522944
 2Mass ID (if available) : 08130981+2031483
 ICRS Star Coord at Epoch: 08h 13m 09.80177s +20:31:48.17520s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.314
 G magnitude : 16.672
 RP magnitude : 15.935
 BP magnitude : 17.269
 DUPflag : 0
 Distance (au) : 17.606
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.20
 Sun-Target sep (deg) : 177.02
 Sun-Moon sep (deg) : 117.54
 B (ring opening deg) : 46.05
 PA of pole (deg) : 90.82
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.858
 C/A sky separation (km) : 10954.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.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	2040-01-19T01:04:25.513		13.57	-15.87	51549.15	-31.44		
lambda	I	2040-01-19T01:05:13.990		13.72	-16.01	50026.71	-31.38		
delta	I	2040-01-19T01:06:09.052		13.89	-16.18	48300.35	-31.32		
gamma	I	2040-01-19T01:06:30.737		13.96	-16.24	47621.35	-31.30		
eta	I	2040-01-19T01:06:44.966		14.00	-16.28	47176.12	-31.28		
beta	I	2040-01-19T01:07:33.953		14.15	-16.43	45646.08	-31.22		
alpha	I	2040-01-19T01:08:03.470		14.24	-16.52	44722.16	-31.17		
4	I	2040-01-19T01:09:14.638		14.46	-16.73	42526.24	-31.08		
5	I	2040-01-19T01:09:25.763		14.49	-16.76	42198.60	-31.10		
6	I	2040-01-19T01:09:35.402		14.52	-16.79	41826.32	-31.01		
Uranus	I	2040-01-19T01:14:59.043		15.50	-17.74	25368.82		-33.30	-34.52
Uranus	E	2040-01-19T01:47:24.852		21.15	-23.21	25273.36		42.43	43.74
6	E	2040-01-19T01:51:19.234		21.80	-23.84	41867.61	31.08		
5	E	2040-01-19T01:51:30.681		21.83	-23.87	42302.59	31.17		
4	E	2040-01-19T01:51:41.339		21.86	-23.89	42607.46	31.16		
alpha	E	2040-01-19T01:52:48.927		22.05	-24.07	44699.06	31.25		
beta	E	2040-01-19T01:53:19.587		22.13	-24.16	45668.14	31.30		
eta	E	2040-01-19T01:54:07.794		22.26	-24.28	47176.12	31.37		
gamma	E	2040-01-19T01:54:22.251		22.30	-24.32	47629.75	31.38		
delta	E	2040-01-19T01:54:43.609		22.36	-24.38	48300.35	31.41		
lambda	E	2040-01-19T01:55:38.514		22.51	-24.52	50026.71	31.47		
epsilon	E	2040-01-19T01:56:03.577		22.58	-24.59	50815.84	31.53		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-01-19T01:25:40.870
 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 : 675861280675522944
 2Mass ID (if available) : 08130981+2031483
 ICRS Star Coord at Epoch: 08h 13m 09.80177s +20:31:48.17520s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.314
 G magnitude : 16.672
 RP magnitude : 15.935
 BP magnitude : 17.269
 DUPflag : 0
 Distance (au) : 17.606
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.20
 Sun-Target sep (deg) : 177.02
 Sun-Moon sep (deg) : 117.12
 B (ring opening deg) : 46.05
 PA of pole (deg) : 90.82
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.945
 C/A sky separation (km) : 12062.4
 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_itrfr93_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	2040-01-19T00:59:02.616		30.17	-28.62	51550.20	-31.43		
lambda	I	2040-01-19T00:59:51.147		30.07	-28.52	50026.71	-31.36		
delta	I	2040-01-19T01:00:46.256		29.97	-28.40	48300.35	-31.29		
gamma	I	2040-01-19T01:01:07.970		29.93	-28.36	47621.31	-31.26		
eta	I	2040-01-19T01:01:22.217		29.90	-28.33	47176.12	-31.24		
beta	I	2040-01-19T01:02:11.296		29.80	-28.23	45645.83	-31.16		
alpha	I	2040-01-19T01:02:40.900		29.75	-28.16	44721.51	-31.10		
4	I	2040-01-19T01:03:52.247		29.61	-28.01	42526.14	-30.98		
5	I	2040-01-19T01:04:03.340		29.58	-27.99	42200.10	-30.99		
6	I	2040-01-19T01:04:13.068		29.56	-27.97	41827.20	-30.90		
Uranus	I	2040-01-19T01:09:50.696		28.89	-27.25	25380.51		-32.12	-33.32
Uranus	E	2040-01-19T01:41:26.971		24.71	-22.85	25282.06		41.62	42.93
6	E	2040-01-19T01:45:31.572		24.13	-22.24	41868.60	30.84		
5	E	2040-01-19T01:45:43.161		24.10	-22.21	42304.00	30.93		
4	E	2040-01-19T01:45:53.830		24.07	-22.18	42606.53	30.92		
alpha	E	2040-01-19T01:47:01.905		23.91	-22.01	44698.18	31.03		
beta	E	2040-01-19T01:47:32.776		23.83	-21.93	45667.55	31.09		
eta	E	2040-01-19T01:48:21.324		23.72	-21.81	47176.12	31.17		
gamma	E	2040-01-19T01:48:35.870		23.68	-21.78	47629.63	31.19		
delta	E	2040-01-19T01:48:57.367		23.63	-21.72	48300.35	31.22		
lambda	E	2040-01-19T01:49:52.604		23.49	-21.58	50026.71	31.29		
epsilon	E	2040-01-19T01:50:18.027		23.43	-21.52	50822.55	31.36		