

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-28T00:50:36.090
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3415552126301821696
 2Mass ID (if available) : 05153014+2308188

Uranus 2030-12-28T00:50:36 K14.82 G16.64 PgtRgt

ICRS Star Coord at Epoch: 05h 15m 30.15465s +23:08:18.87393s

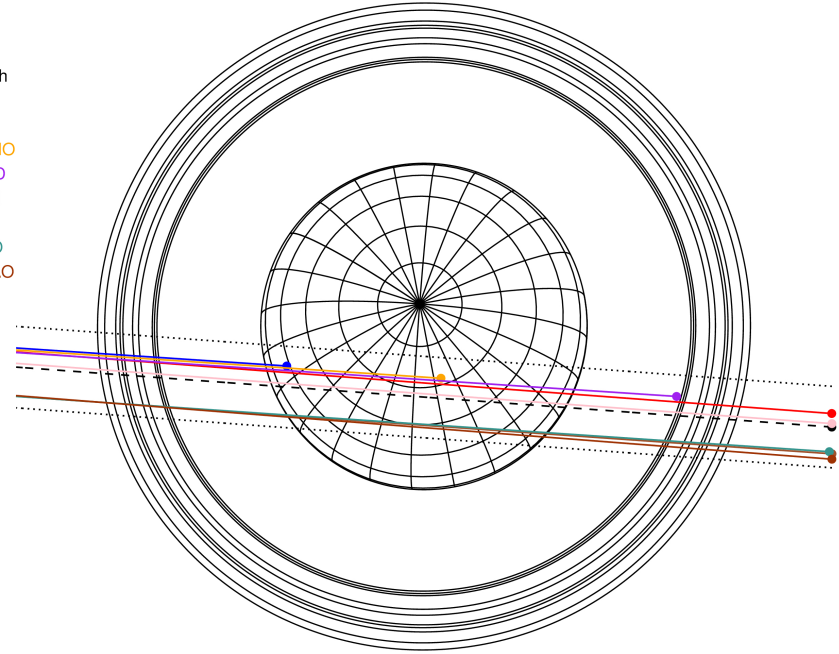
RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.820
 G magnitude : 16.638
 RP magnitude : 16.036
 BP magnitude : 17.055
 DUPflag : 0
 Distance (au) : 18.206
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.29
 Sun-Target sep (deg) : 163.90
 Sun-Moon sep (deg) : 117.86
 B (ring opening deg) : 81.90
 PA of pole (deg) : 10.78

#	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



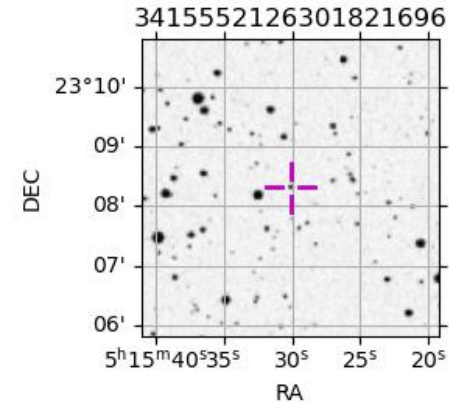
2030-12-28T00:50:36.0900 α: 05 15 30.1547 δ: +23 08 18.874 C/A 0.829° PA 355.80 deg v_sky -22.29 km/s D 18.21 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 RIO
 ESO
 SAAO

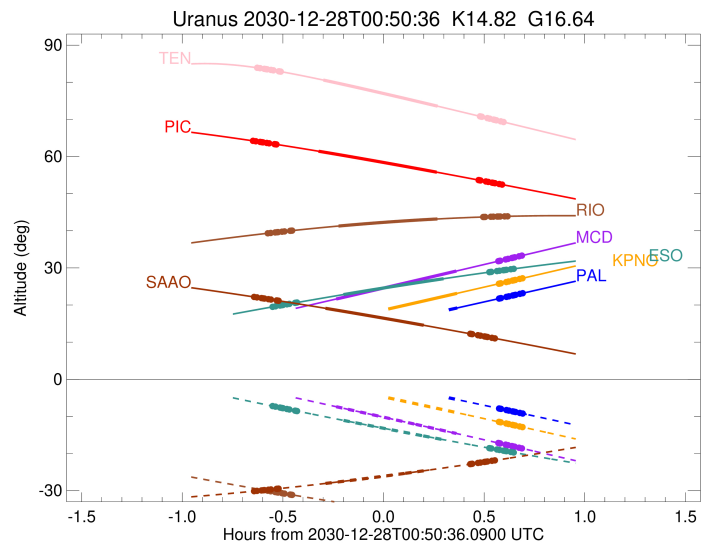
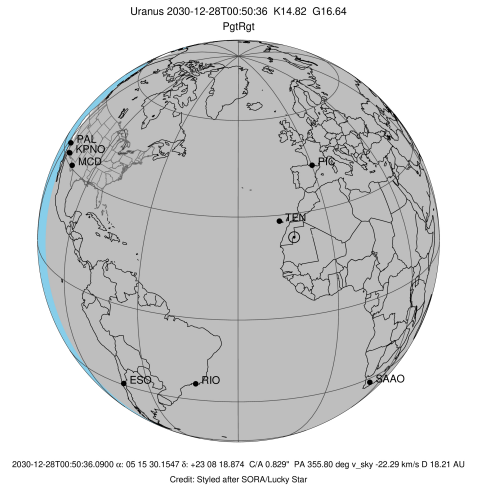


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+ +	+++++	DEC 28 00:11 - DEC 28 01:26	PieRie
PAL	Palomar Mt (200")	33.4	243.1		+	+++++	DEC 28 01:12 - DEC 28 01:32	PneRne
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4		+	+++++	DEC 28 01:12 - DEC 28 01:32	PneRne
MCD	McDonald Obs. 2.7m	30.7	256.0		+ +	+++++	DEC 28 00:36 - DEC 28 01:32	PieRne
TEN	Teide Obs./Tenerife	28.3	343.5	+++++	+ +	+++++	DEC 28 00:13 - DEC 28 01:26	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 28 00:16 - DEC 28 01:27	PieRie
ESO	European Southern Obs	-29.3	289.3	+++++	+ +	+++++	DEC 28 00:17 - DEC 28 01:29	PieRie
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	+++++	+ +	+++++	DEC 28 00:12 - DEC 28 01:24	PieRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

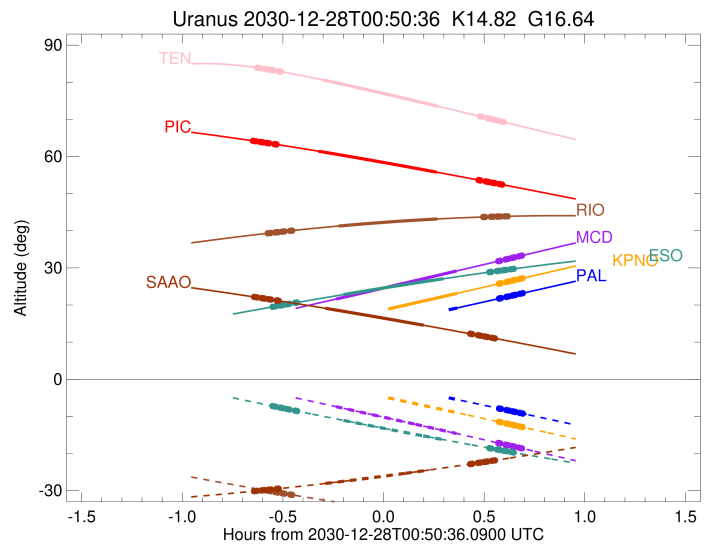
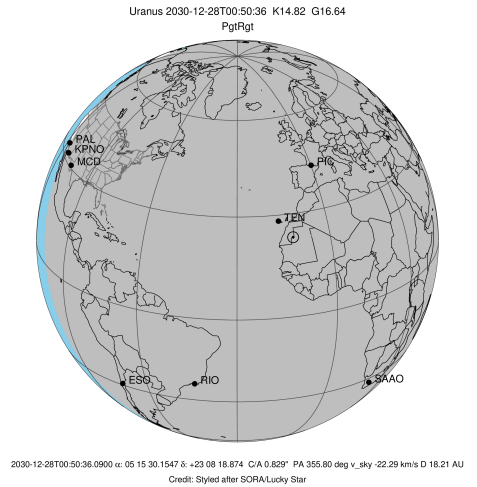


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-28T00:48:46.200
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 3415552126301821696
 2Mass ID (if available) : 05153014+2308188
 ICRS Star Coord at Epoch: 05h 15m 30.15465s +23:08:18.87393s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.820
 G magnitude : 16.638
 RP magnitude : 16.036
 BP magnitude : 17.055
 DUPflag : 0
 Distance (au) : 18.206
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.29
 Sun-Target sep (deg) : 163.90
 Sun-Moon sep (deg) : 118.43
 B (ring opening deg) : 81.90
 PA of pole (deg) : 10.78
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.668
 C/A sky separation (km) : 8818.4
 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_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	2030-12-28T00:11:59.140		64.19	-70.40	50768.91	-22.29		
lambda	I	2030-12-28T00:12:32.468		64.11	-70.39	50026.71	-22.26		
delta	I	2030-12-28T00:13:50.056		63.93	-70.35	48300.35	-22.24		
gamma	I	2030-12-28T00:14:20.614		63.86	-70.34	47621.05	-22.22		
eta	I	2030-12-28T00:14:40.637		63.82	-70.33	47176.12	-22.22		
beta	I	2030-12-28T00:15:47.961		63.66	-70.29	45681.10	-22.19		
alpha	I	2030-12-28T00:16:31.332		63.56	-70.27	44718.83	-22.17		
4	I	2030-12-28T00:18:08.896		63.34	-70.21	42560.54	-22.12		
5	I	2030-12-28T00:18:21.425		63.31	-70.20	42279.40	-22.12		
6	I	2030-12-28T00:18:39.724		63.26	-70.19	41879.40	-22.10		
Uranus	I	2030-12-28T00:31:13.925		61.43	-69.54	25361.61		-4.69	-4.91
Uranus	E	2030-12-28T01:06:28.237		55.79	-66.25	25554.35		-0.71	-0.75
6	E	2030-12-28T01:18:55.117		53.67	-64.69	41801.09	22.06		
5	E	2030-12-28T01:19:14.202		53.61	-64.65	42221.66	22.07		
4	E	2030-12-28T01:19:31.274		53.56	-64.61	42598.86	22.08		
alpha	E	2030-12-28T01:21:07.796		53.28	-64.40	44731.34	22.12		
beta	E	2030-12-28T01:21:48.942		53.16	-64.30	45641.82	22.14		
eta	E	2030-12-28T01:22:58.210		52.96	-64.15	47176.12	22.16		
gamma	E	2030-12-28T01:23:18.752		52.91	-64.10	47631.48	22.17		
delta	E	2030-12-28T01:23:48.913		52.82	-64.03	48300.35	22.18		
lambda	E	2030-12-28T01:25:06.696		52.59	-63.86	50026.71	22.21		
epsilon	E	2030-12-28T01:26:15.496		52.39	-63.70	51555.27	22.23		

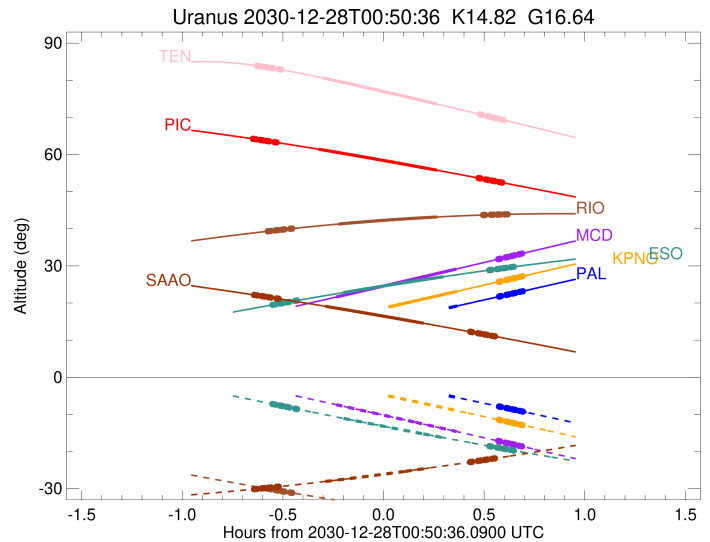
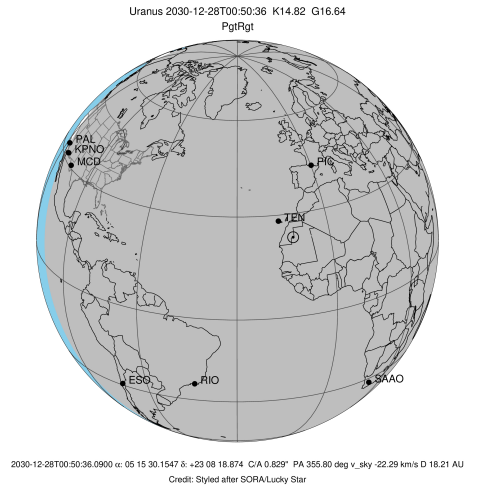
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-28T00:54:22.250
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3415552126301821696
 2Mass ID (if available) : 05153014+2308188
 ICRS Star Coord at Epoch: 05h 15m 30.15465s +23:08:18.87393s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.820
 G magnitude : 16.638
 RP magnitude : 16.036
 BP magnitude : 17.055
 DUPflag : 0
 Distance (au) : 18.206
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.29
 Sun-Target sep (deg) : 163.90
 Sun-Moon sep (deg) : 118.48
 B (ring opening deg) : 81.90
 PA of pole (deg) : 10.78
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.575
 C/A sky separation (km) : 7597.2
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-12-28T00:16:53.519		8.17	4.80x	50764.49	-22.01		
lambda	I	2030-12-28T00:17:27.058		8.28	4.70x	50026.71	-21.99		
delta	I	2030-12-28T00:18:45.580		8.53	4.46x	48300.35	-21.98		
gamma	I	2030-12-28T00:19:16.497		8.63	4.37x	47621.02	-21.97		
eta	I	2030-12-28T00:19:36.750		8.70	4.31x	47176.12	-21.96		
beta	I	2030-12-28T00:20:44.831		8.92	4.11x	45681.17	-21.95		
alpha	I	2030-12-28T00:21:28.737		9.06	3.98x	44717.60	-21.94		
4	I	2030-12-28T00:23:07.326		9.38	3.68x	42558.88	-21.90		
5	I	2030-12-28T00:23:20.034		9.42	3.65x	42276.82	-21.90		
6	I	2030-12-28T00:23:38.389		9.48	3.59x	41879.16	-21.89		
Uranus	I	2030-12-28T00:36:15.369		11.96	1.31x	25393.79		-4.28	-4.48
Uranus	E	2030-12-28T01:12:35.427		19.21	-5.48	25557.68		-0.38	-0.40
6	E	2030-12-28T01:25:01.959		21.74	-7.86	41800.63	21.98		
5	E	2030-12-28T01:25:21.061		21.80	-7.93	42220.04	22.00		
4	E	2030-12-28T01:25:38.222		21.86	-7.98	42598.13	22.00		
alpha	E	2030-12-28T01:27:15.100		22.19	-8.29	44730.75	22.04		
beta	E	2030-12-28T01:27:56.427		22.33	-8.43	45641.73	22.05		
eta	E	2030-12-28T01:29:05.976		22.57	-8.65	47176.12	22.07		
gamma	E	2030-12-28T01:29:26.605		22.64	-8.72	47631.50	22.08		
delta	E	2030-12-28T01:29:56.892		22.74	-8.82	48300.35	22.09		
lambda	E	2030-12-28T01:31:15.012		23.00	-9.07	50026.71	22.11		
epsilon	E	2030-12-28T01:32:24.114		23.24	-9.29	51555.16	22.13		

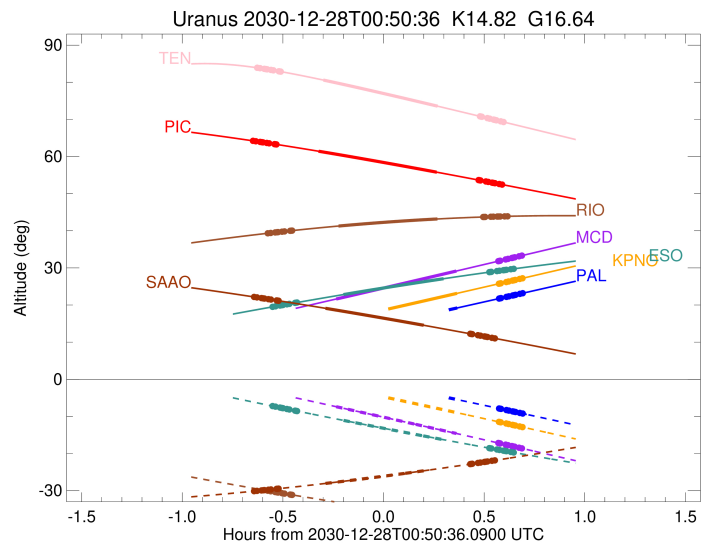
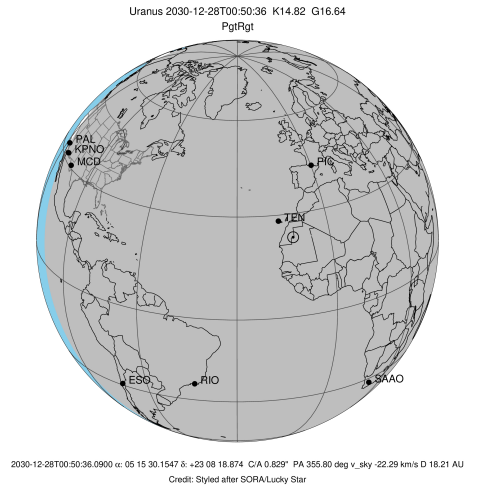
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch             : 2030-12-28T00:54:24.290
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        : 3415552126301821696
2Mass ID (if available) : 05153014+2308188
ICRS Star Coord at Epoch: 05h 15m 30.15465s +23:08:18.87393s
RUWE (>1.4 is poor) : 1.05
K magnitude           : 14.820
G magnitude           : 16.638
RP magnitude          : 16.036
BP magnitude          : 17.055
DUPflag              : 0
Distance (au)         : 18.206
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -22.29
Sun-Target sep (deg) : 163.90
Sun-Moon sep (deg)   : 118.54
B (ring opening deg) : 81.90
PA of pole (deg)     : 10.78
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.599
C/A sky separation (km) : 7911.1
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
    
```



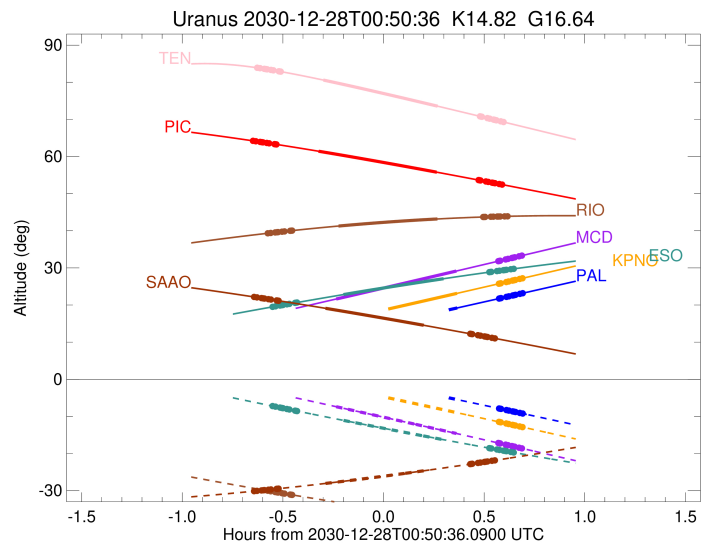
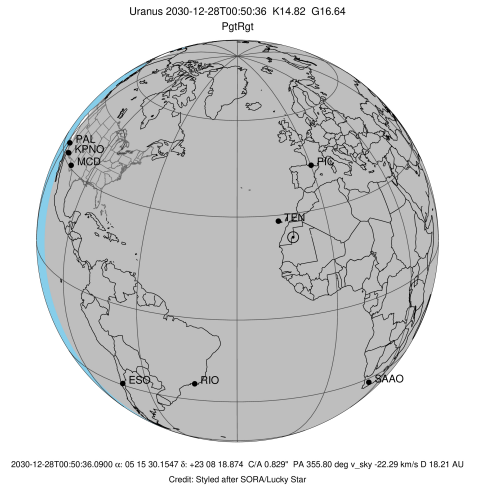
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-12-28T00:17:01.418		11.83	1.64x	50765.28	-22.02		
lambda	I	2030-12-28T00:17:34.973		11.94	1.54x	50026.71	-22.01		
delta	I	2030-12-28T00:18:53.452		12.21	1.30x	48300.35	-21.99		
gamma	I	2030-12-28T00:19:24.354		12.31	1.20x	47621.02	-21.98		
eta	I	2030-12-28T00:19:44.598		12.38	1.14x	47176.12	-21.97		
beta	I	2030-12-28T00:20:52.652		12.60	0.93x	45681.16	-21.95		
alpha	I	2030-12-28T00:21:36.530		12.75	0.79x	44717.84	-21.94		
4	I	2030-12-28T00:23:15.093		13.08	0.48x	42559.21	-21.91		
5	I	2030-12-28T00:23:27.788		13.12	0.44x	42277.33	-21.90		
6	I	2030-12-28T00:23:46.164		13.19	0.38x	41879.21	-21.89		
Uranus	I	2030-12-28T00:36:23.991		15.74	-2.00x	25386.99		-4.37	-4.58
Uranus	E	2030-12-28T01:12:31.182		23.14	-9.01	25556.85		-0.49	-0.51
6	E	2030-12-28T01:24:58.393		25.73	-11.47	41800.80	21.99		
5	E	2030-12-28T01:25:17.509		25.79	-11.54	42220.65	22.00		
4	E	2030-12-28T01:25:34.655		25.85	-11.59	42598.41	22.01		
alpha	E	2030-12-28T01:27:11.503		26.19	-11.91	44730.98	22.05		
beta	E	2030-12-28T01:27:52.807		26.33	-12.05	45641.76	22.06		
eta	E	2030-12-28T01:29:02.325		26.57	-12.28	47176.12	22.08		
gamma	E	2030-12-28T01:29:22.943		26.65	-12.35	47631.49	22.09		
delta	E	2030-12-28T01:29:53.216		26.75	-12.45	48300.35	22.10		
lambda	E	2030-12-28T01:31:11.292		27.02	-12.71	50026.71	22.12		
epsilon	E	2030-12-28T01:32:20.354		27.26	-12.94	51555.22	22.14		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-28T00:54:21.390
 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 : 3415552126301821696
 2Mass ID (if available) : 05153014+2308188
 ICRS Star Coord at Epoch: 05h 15m 30.15465s +23:08:18.87393s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.820
 G magnitude : 16.638
 RP magnitude : 16.036
 BP magnitude : 17.055
 DUPflag : 0
 Distance (au) : 18.206
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.29
 Sun-Target sep (deg) : 163.90
 Sun-Moon sep (deg) : 118.62
 B (ring opening deg) : 81.90
 PA of pole (deg) : 10.78
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.629
 C/A sky separation (km) : 8311.5
 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



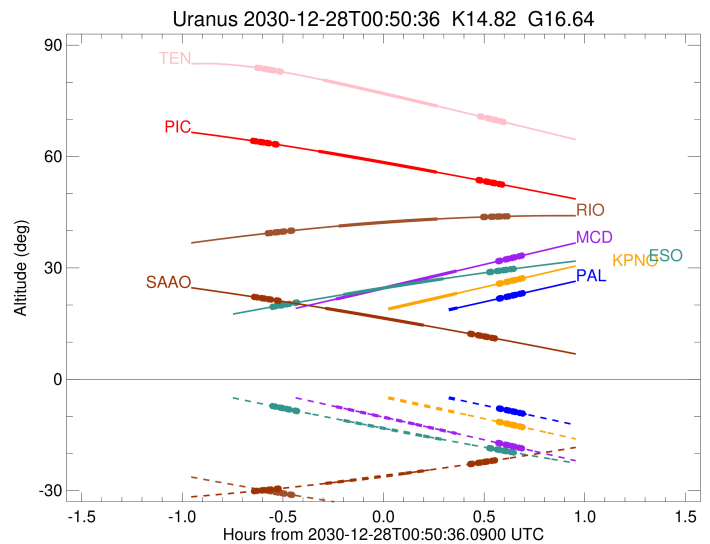
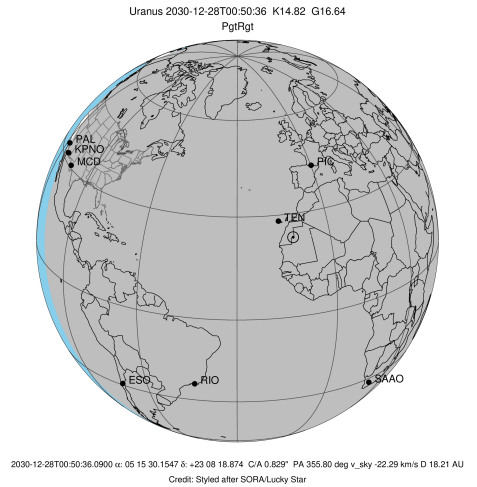
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-12-28T00:17:06.769		17.59	-3.57x	50766.33	-22.05		
lambda	I	2030-12-28T00:17:40.337		17.71	-3.68x	50026.71	-22.03		
delta	I	2030-12-28T00:18:58.743		17.98	-3.94x	48300.35	-22.01		
gamma	I	2030-12-28T00:19:29.617		18.08	-4.04x	47621.03	-22.00		
eta	I	2030-12-28T00:19:49.845		18.15	-4.10x	47176.12	-21.99		
beta	I	2030-12-28T00:20:57.847		18.39	-4.33x	45681.15	-21.97		
alpha	I	2030-12-28T00:21:41.680		18.54	-4.47x	44718.15	-21.96		
4	I	2030-12-28T00:23:20.185		18.88	-4.79x	42559.63	-21.92		
5	I	2030-12-28T00:23:32.861		18.92	-4.83x	42277.99	-21.91		
6	I	2030-12-28T00:23:51.261		18.99	-4.89x	41879.28	-21.90		
Uranus	I	2030-12-28T00:36:30.074		21.62	-7.39	25378.09		-4.48	-4.69
Uranus	E	2030-12-28T01:12:19.728		29.16	-14.61	25555.50		-0.62	-0.65
6	E	2030-12-28T01:24:47.775		31.80	-17.16	41801.02	21.99		
5	E	2030-12-28T01:25:06.906		31.87	-17.22	42221.42	22.01		
4	E	2030-12-28T01:25:24.031		31.93	-17.28	42598.75	22.01		
alpha	E	2030-12-28T01:27:00.830		32.28	-17.61	44731.27	22.06		
beta	E	2030-12-28T01:27:42.099		32.42	-17.76	45641.81	22.07		
eta	E	2030-12-28T01:28:51.569		32.67	-17.99	47176.12	22.10		
gamma	E	2030-12-28T01:29:12.172		32.74	-18.07	47631.49	22.11		
delta	E	2030-12-28T01:29:42.421		32.85	-18.17	48300.35	22.12		
lambda	E	2030-12-28T01:31:00.432		33.13	-18.44	50026.71	22.14		
epsilon	E	2030-12-28T01:32:09.432		33.37	-18.67	51555.27	22.16		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-28T00:49:37.280
 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 : 3415552126301821696
 2Mass ID (if available) : 05153014+2308188
 ICRS Star Coord at Epoch: 05h 15m 30.15465s +23:08:18.87393s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.820
 G magnitude : 16.638
 RP magnitude : 16.036
 BP magnitude : 17.055
 DUPflag : 0
 Distance (au) : 18.206
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.29
 Sun-Target sep (deg) : 163.90
 Sun-Moon sep (deg) : 118.61
 B (ring opening deg) : 81.90
 PA of pole (deg) : 10.78
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.796
 C/A sky separation (km) : 10506.6
 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



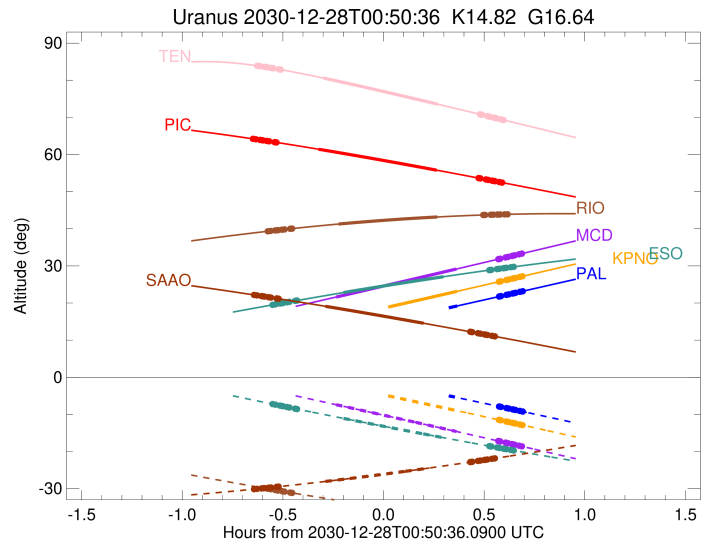
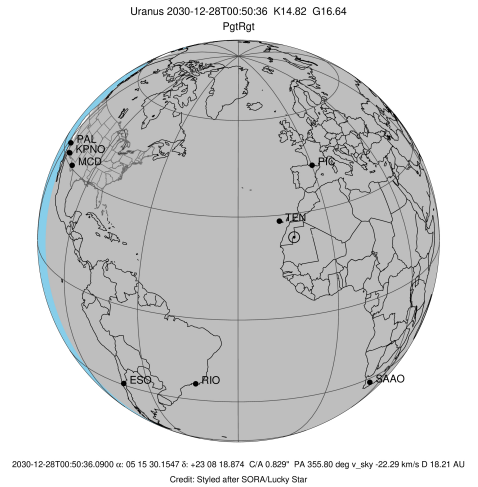
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-12-28T00:13:14.074		83.87	-76.91	50773.66	-22.22		
lambda	I	2030-12-28T00:13:47.717		83.80	-77.02	50026.71	-22.19		
delta	I	2030-12-28T00:15:05.568		83.62	-77.29	48300.35	-22.16		
gamma	I	2030-12-28T00:15:36.239		83.55	-77.40	47621.09	-22.14		
eta	I	2030-12-28T00:15:56.343		83.50	-77.47	47176.12	-22.13		
beta	I	2030-12-28T00:17:03.958		83.33	-77.70	45681.01	-22.09		
alpha	I	2030-12-28T00:17:47.469		83.22	-77.85	44720.10	-22.06		
4	I	2030-12-28T00:19:25.543		82.96	-78.19	42562.29	-22.00		
5	I	2030-12-28T00:19:38.094		82.93	-78.23	42282.02	-21.99		
6	I	2030-12-28T00:19:56.633		82.88	-78.29	41879.58	-21.97		
Uranus	I	2030-12-28T00:32:42.046		80.60	-80.83	25321.90		-5.14	-5.38
Uranus	E	2030-12-28T01:06:43.592		73.57	-85.15	25543.60		-1.30	-1.36
6	E	2030-12-28T01:19:20.372		70.84	-84.45	41802.09	21.94		
5	E	2030-12-28T01:19:39.649		70.77	-84.41	42225.07	21.96		
4	E	2030-12-28T01:19:56.736		70.71	-84.38	42600.37	21.97		
alpha	E	2030-12-28T01:21:33.662		70.36	-84.19	44732.60	22.04		
beta	E	2030-12-28T01:22:14.916		70.21	-84.10	45642.06	22.06		
eta	E	2030-12-28T01:23:24.398		69.95	-83.95	47176.12	22.10		
gamma	E	2030-12-28T01:23:44.998		69.88	-83.90	47631.44	22.11		
delta	E	2030-12-28T01:24:15.242		69.77	-83.83	48300.35	22.12		
lambda	E	2030-12-28T01:25:33.204		69.48	-83.65	50026.71	22.16		
epsilon	E	2030-12-28T01:26:42.124		69.23	-83.48	51555.17	22.19		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-28T00:51:47.730
 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 : 3415552126301821696
 2Mass ID (if available) : 05153014+2308188
 ICRS Star Coord at Epoch: 05h 15m 30.15465s +23:08:18.87393s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.820
 G magnitude : 16.638
 RP magnitude : 16.036
 BP magnitude : 17.055
 DUPflag : 0
 Distance (au) : 18.206
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.29
 Sun-Target sep (deg) : 163.90
 Sun-Moon sep (deg) : 118.53
 B (ring opening deg) : 81.90
 PA of pole (deg) : 10.78
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.169
 C/A sky separation (km) : 15441.0
 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



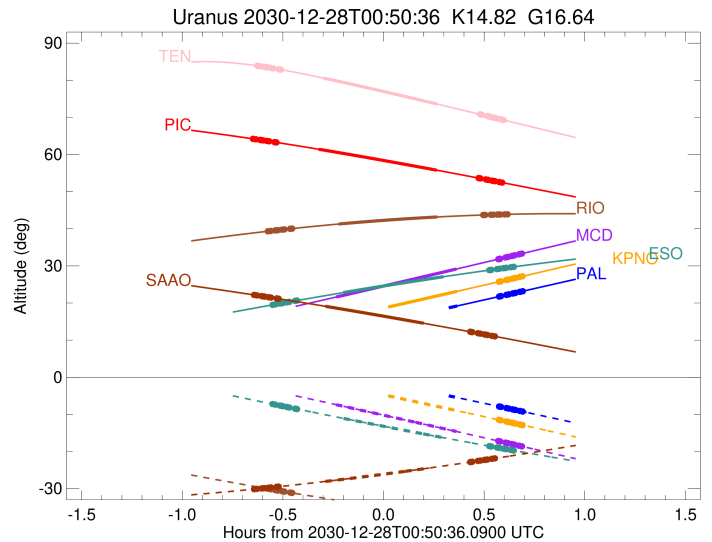
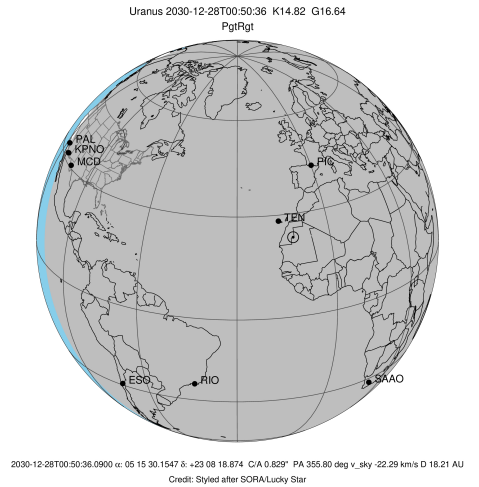
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-12-28T00:16:23.083		39.35	-30.08	50790.40	-21.62		
lambda	I	2030-12-28T00:16:58.471		39.42	-30.17	50026.71	-21.56		
delta	I	2030-12-28T00:18:18.687		39.55	-30.38	48300.35	-21.48		
gamma	I	2030-12-28T00:18:50.332		39.60	-30.46	47621.24	-21.44		
eta	I	2030-12-28T00:19:11.102		39.64	-30.51	47176.12	-21.42		
beta	I	2030-12-28T00:20:21.054		39.75	-30.69	45680.56	-21.33		
alpha	I	2030-12-28T00:21:05.937		39.83	-30.80	44723.92	-21.28		
4	I	2030-12-28T00:22:47.805		39.99	-31.06	42567.67	-21.13		
5	I	2030-12-28T00:23:00.746		40.01	-31.10	42289.53	-21.11		
6	I	2030-12-28T00:23:20.476		40.05	-31.15	41879.72	-21.06		
Uranus	I	2030-12-28T00:37:10.803		41.27	-33.18	25192.05		-6.43	-6.73
Uranus	E	2030-12-28T01:06:40.028		43.18	-37.06	25472.52		-3.09	-3.24
6	E	2030-12-28T01:20:17.631		43.71	-38.61	41805.45	21.08		
5	E	2030-12-28T01:20:37.971		43.72	-38.65	42235.28	21.13		
4	E	2030-12-28T01:20:55.497		43.73	-38.68	42604.52	21.15		
alpha	E	2030-12-28T01:22:35.947		43.78	-38.86	44736.19	21.30		
beta	E	2030-12-28T01:23:18.474		43.80	-38.93	45642.92	21.35		
eta	E	2030-12-28T01:24:30.133		43.83	-39.06	47176.12	21.44		
gamma	E	2030-12-28T01:24:51.350		43.84	-39.10	47631.28	21.47		
delta	E	2030-12-28T01:25:22.492		43.85	-39.15	48300.35	21.52		
lambda	E	2030-12-28T01:26:42.620		43.88	-39.29	50026.71	21.59		
epsilon	E	2030-12-28T01:27:53.162		43.91	-39.41	51551.93	21.65		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-28T00:53:27.310
 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 : 3415552126301821696
 2Mass ID (if available) : 05153014+2308188
 ICRS Star Coord at Epoch: 05h 15m 30.15465s +23:08:18.87393s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.820
 G magnitude : 16.638
 RP magnitude : 16.036
 BP magnitude : 17.055
 DUPflag : 0
 Distance (au) : 18.206
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.29
 Sun-Target sep (deg) : 163.90
 Sun-Moon sep (deg) : 118.48
 B (ring opening deg) : 81.90
 PA of pole (deg) : 10.78
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.158
 C/A sky separation (km) : 15287.7
 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	2030-12-28T00:17:48.933		19.55	-7.27	50789.36	-21.52		
lambda	I	2030-12-28T00:18:24.446		19.65	-7.38	50026.71	-21.46		
delta	I	2030-12-28T00:19:45.047		19.86	-7.63	48300.35	-21.38		
gamma	I	2030-12-28T00:20:16.841		19.95	-7.73	47621.23	-21.34		
eta	I	2030-12-28T00:20:37.708		20.00	-7.79	47176.12	-21.32		
beta	I	2030-12-28T00:21:47.979		20.19	-8.01	45680.59	-21.23		
alpha	I	2030-12-28T00:22:33.076		20.31	-8.15	44723.72	-21.18		
4	I	2030-12-28T00:24:15.388		20.58	-8.46	42567.38	-21.04		
5	I	2030-12-28T00:24:28.389		20.62	-8.50	42289.15	-21.02		
6	I	2030-12-28T00:24:48.180		20.67	-8.56	41879.73	-20.98		
Uranus	I	2030-12-28T00:38:40.373		22.82	-11.08	25197.74		-6.38	-6.68
Uranus	E	2030-12-28T01:08:28.984		27.08	-16.28	25474.58		-3.05	-3.20
6	E	2030-12-28T01:22:07.435		28.85	-18.54	41805.42	21.03		
5	E	2030-12-28T01:22:27.821		28.90	-18.60	42235.17	21.08		
4	E	2030-12-28T01:22:45.391		28.93	-18.65	42604.48	21.10		
alpha	E	2030-12-28T01:24:26.088		29.14	-18.92	44736.16	21.24		
beta	E	2030-12-28T01:25:08.724		29.23	-19.04	45642.91	21.30		
eta	E	2030-12-28T01:26:20.567		29.38	-19.23	47176.12	21.39		
gamma	E	2030-12-28T01:26:41.839		29.42	-19.29	47631.28	21.41		
delta	E	2030-12-28T01:27:13.063		29.48	-19.37	48300.35	21.45		
lambda	E	2030-12-28T01:28:33.403		29.64	-19.59	50026.71	21.53		
epsilon	E	2030-12-28T01:29:44.135		29.79	-19.77	51551.95	21.59		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-28T00:47:48.570
 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 : 3415552126301821696
 2Mass ID (if available) : 05153014+2308188
 ICRS Star Coord at Epoch: 05h 15m 30.15465s +23:08:18.87393s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.820
 G magnitude : 16.638
 RP magnitude : 16.036
 BP magnitude : 17.055
 DUPflag : 0
 Distance (au) : 18.206
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.29
 Sun-Target sep (deg) : 163.90
 Sun-Moon sep (deg) : 117.79
 B (ring opening deg) : 81.90
 PA of pole (deg) : 10.78
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.196
 C/A sky separation (km) : 15791.2
 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_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	2030-12-28T00:12:17.804		22.14	-30.12	50793.22	-21.49		
lambda	I	2030-12-28T00:12:53.548		22.05	-30.07	50026.71	-21.43		
delta	I	2030-12-28T00:14:14.291		21.87	-29.94	48300.35	-21.34		
gamma	I	2030-12-28T00:14:46.149		21.79	-29.89	47621.26	-21.30		
eta	I	2030-12-28T00:15:07.064		21.74	-29.86	47176.12	-21.27		
beta	I	2030-12-28T00:16:17.515		21.58	-29.75	45680.47	-21.18		
alpha	I	2030-12-28T00:17:02.699		21.47	-29.68	44724.45	-21.12		
4	I	2030-12-28T00:18:45.345		21.23	-29.52	42568.41	-20.96		
5	I	2030-12-28T00:18:58.375		21.20	-29.50	42290.49	-20.94		
6	I	2030-12-28T00:19:18.320		21.15	-29.47	41879.69	-20.89		
Uranus	I	2030-12-28T00:33:19.290		19.11	-28.06	25178.10		-6.55	-6.86
Uranus	E	2030-12-28T01:02:35.085		14.55	-24.65	25468.25		-3.17	-3.32
6	E	2030-12-28T01:16:25.584		12.26	-22.85	41805.51	20.82		
5	E	2030-12-28T01:16:46.184		12.20	-22.81	42235.42	20.86		
4	E	2030-12-28T01:17:03.925		12.15	-22.77	42604.57	20.88		
alpha	E	2030-12-28T01:18:45.616		11.87	-22.54	44736.23	21.04		
beta	E	2030-12-28T01:19:28.662		11.75	-22.44	45642.93	21.10		
eta	E	2030-12-28T01:20:41.186		11.54	-22.28	47176.12	21.19		
gamma	E	2030-12-28T01:21:02.657		11.48	-22.23	47631.28	21.21		
delta	E	2030-12-28T01:21:34.173		11.39	-22.15	48300.35	21.25		
lambda	E	2030-12-28T01:22:55.253		11.16	-21.97	50026.71	21.33		
epsilon	E	2030-12-28T01:24:06.627		10.96	-21.80	51551.93	21.40		