

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-20T07:19:10.870
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3415631535954148864
 2Mass ID (if available) : 05165359+2309430

ICRS Star Coord at Epoch: 05h 16m 53.57450s +23:09:42.83516s

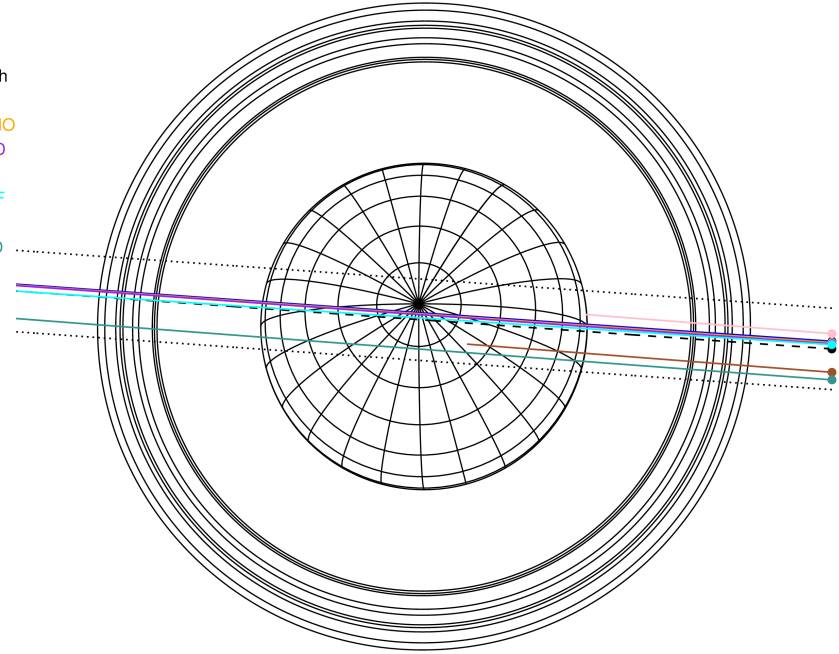
RUWE (>1.4 is poor) : 1.03
 K magnitude : 13.427
 G magnitude : 16.814
 RP magnitude : 15.817
 BP magnitude : 17.823
 DUPflag : 0
 Distance (au) : 18.179
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.18
 Sun-Target sep (deg) : 172.10
 Sun-Moon sep (deg) : 126.74
 B (ring opening deg) : 81.81
 PA of pole (deg) : 13.07

#	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



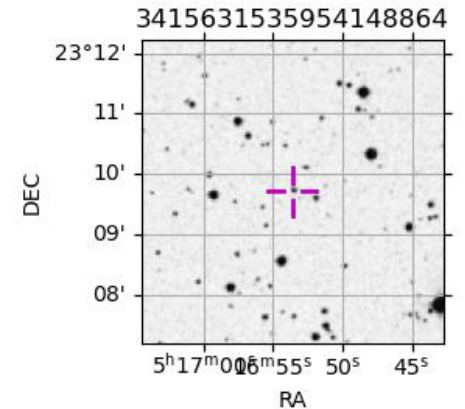
2030-12-20T07:19:10.8700 ex: 05 16 53.5745 s: +23 09 42.835 C/A 0.083° PA 175.92 deg v_sky -23.18 km/s D 18.18 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO

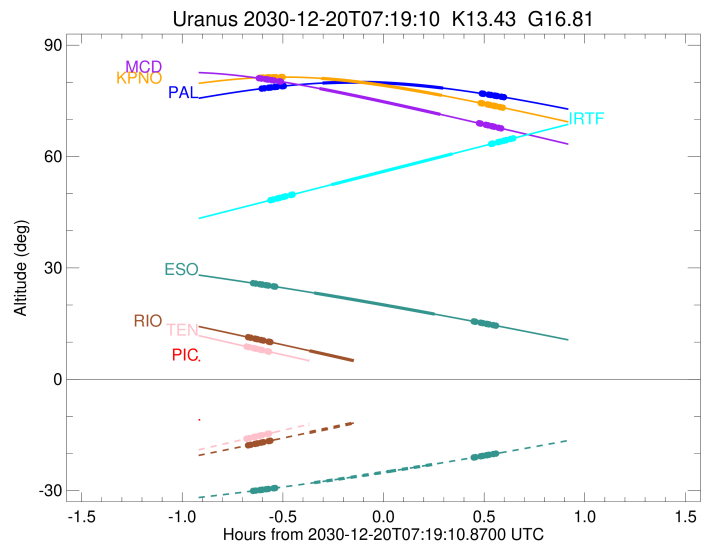
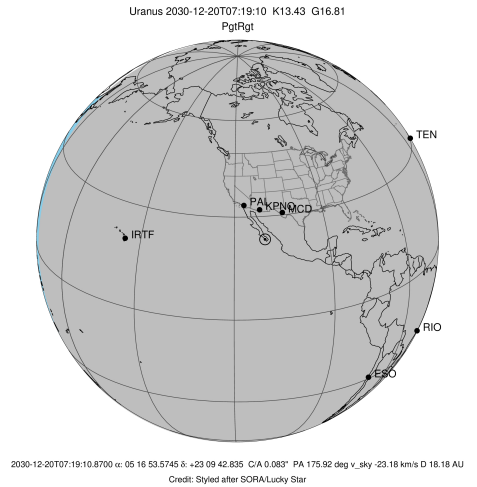


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1	+++++	+ +	+++++	DEC 20 06:43 - DEC 20 07:55	PieRie
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	DEC 20 06:42 - DEC 20 07:55	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	DEC 20 06:42 - DEC 20 07:54	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5	+++++	+		DEC 20 06:38 - DEC 20 06:56	PinRin
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	DEC 20 06:45 - DEC 20 07:58	PieRie
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++++	+		DEC 20 06:39 - DEC 20 06:57	PinRin
ESO	European Southern Obs	-29.3	289.3	+++++	+ +	+++++	DEC 20 06:40 - DEC 20 07:53	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



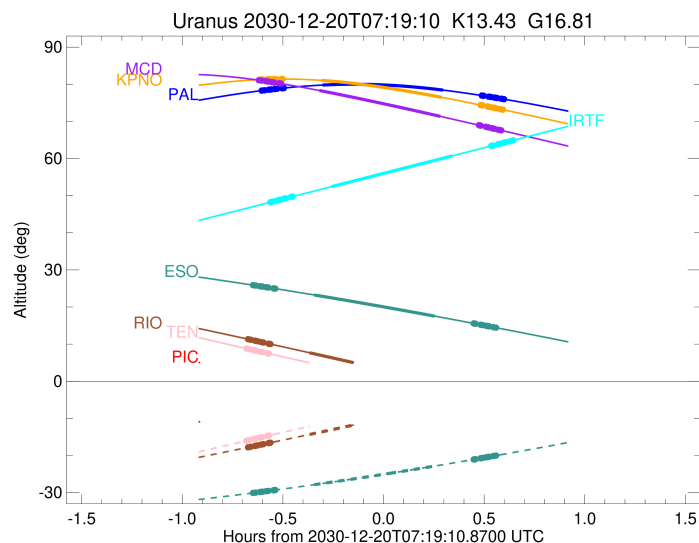
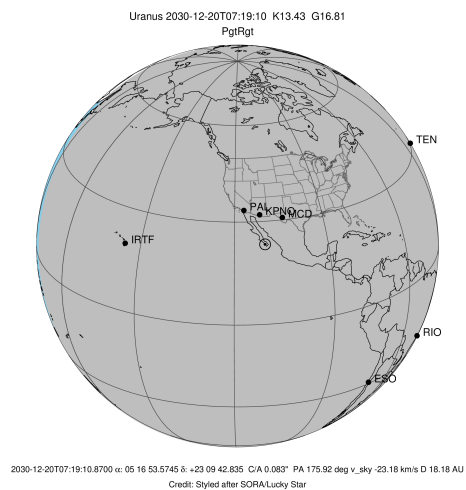
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-20T07:18:59.240
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3415631535954148864
 2Mass ID (if available) : 05165359+2309430
 ICRS Star Coord at Epoch: 05h 16m 53.57450s +23:09:42.83516s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 13.427
 G magnitude : 16.814
 RP magnitude : 15.817
 BP magnitude : 17.823
 DUPflag : 0
 Distance (au) : 18.179
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.18
 Sun-Target sep (deg) : 172.10
 Sun-Moon sep (deg) : 127.52
 B (ring opening deg) : 81.81
 PA of pole (deg) : 13.07
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.160
 C/A sky separation (km) : 2107.7
 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	2030-12-20T06:43:09.785		78.33	-73.30	50743.95	-23.56		
lambda	I	2030-12-20T06:43:40.233		78.39	-73.39	50026.71	-23.56		
delta	I	2030-12-20T06:44:53.521		78.52	-73.61	48300.35	-23.55		
gamma	I	2030-12-20T06:45:22.356		78.58	-73.69	47621.17	-23.55		
eta	I	2030-12-20T06:45:41.251		78.61	-73.75	47176.12	-23.55		
beta	I	2030-12-20T06:46:44.786		78.72	-73.93	45679.59	-23.55		
alpha	I	2030-12-20T06:47:26.321		78.79	-74.05	44701.19	-23.55		
4	I	2030-12-20T06:48:58.270		78.94	-74.32	42537.13	-23.55		
5	I	2030-12-20T06:49:11.146		78.96	-74.35	42231.80	-23.54		
6	I	2030-12-20T06:49:26.713		78.98	-74.40	41867.78	-23.55		
Uranus	I	2030-12-20T07:00:59.508		79.79	-76.28	25531.98		-1.74	-1.82
Uranus	E	2030-12-20T07:36:56.690		78.44	-80.09	25477.24		3.04	3.18
6	E	2030-12-20T07:48:28.117		76.97	-80.22	41803.76	23.54		
5	E	2030-12-20T07:48:46.360		76.93	-80.21	42229.66	23.54		
4	E	2030-12-20T07:49:02.056		76.89	-80.20	42602.08	23.54		
alpha	E	2030-12-20T07:50:32.628		76.68	-80.17	44732.89	23.55		
beta	E	2030-12-20T07:51:11.223		76.58	-80.15	45642.02	23.55		
eta	E	2030-12-20T07:52:16.362		76.42	-80.11	47176.12	23.55		
gamma	E	2030-12-20T07:52:35.698		76.37	-80.10	47631.48	23.55		
delta	E	2030-12-20T07:53:04.101		76.30	-80.08	48300.35	23.55		
lambda	E	2030-12-20T07:54:17.403		76.12	-80.03	50026.71	23.55		
epsilon	E	2030-12-20T07:55:22.291		75.95	-79.98	51554.99	23.55		

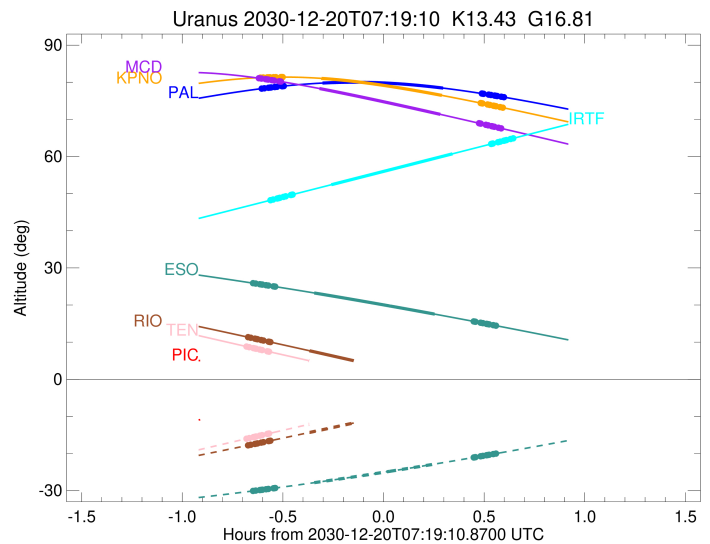
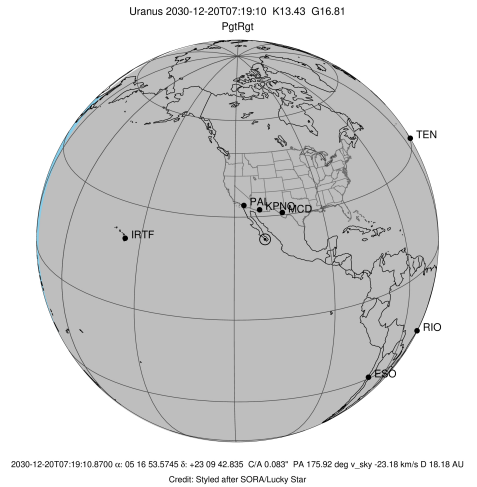
```

target                : Uranus
target radius (km)    : 25559.00
C/A epoch             : 2030-12-20T07:18:38.450
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        : 3415631535954148864
2Mass ID (if available) : 05165359+2309430
ICRS Star Coord at Epoch: 05h 16m 53.57450s +23:09:42.83516s
RUWE (>1.4 is poor)  : 1.03
K magnitude           : 13.427
G magnitude           : 16.814
RP magnitude          : 15.817
BP magnitude          : 17.823
DUPflag              : 0
Distance (au)         : 18.179
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s)  : -23.18
Sun-Target sep (deg)  : 172.10
Sun-Moon sep (deg)    : 127.57
B (ring opening deg)  : 81.81
PA of pole (deg)      : 13.07
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.147
C/A sky separation (km) : 1938.3
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
    
```



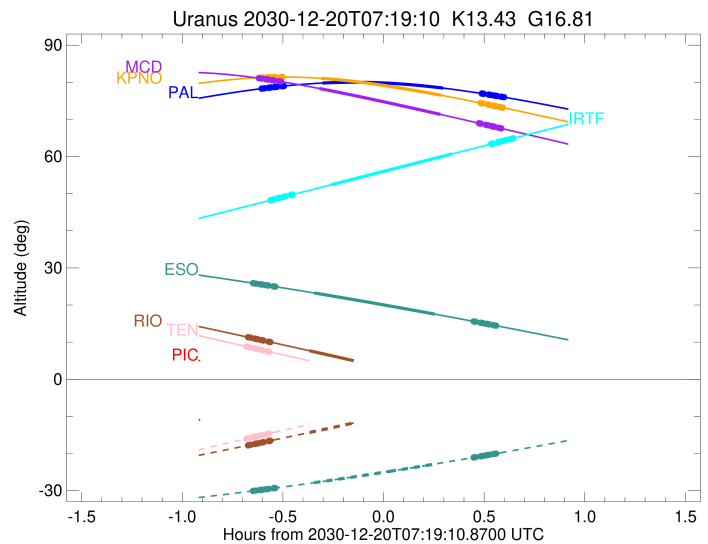
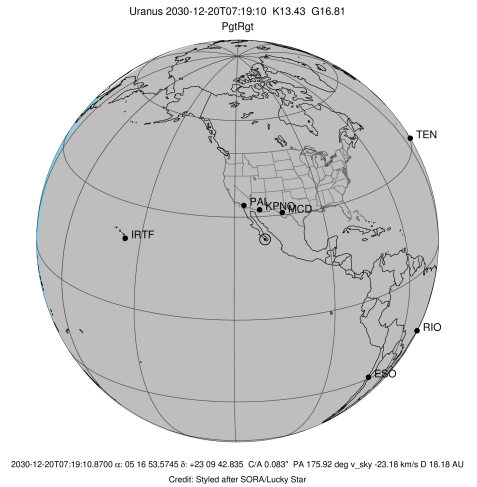
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-12-20T06:42:49.382		81.27	-77.66	50743.88	-23.57		
lambda	I	2030-12-20T06:43:19.810		81.29	-77.74	50026.71	-23.57		
delta	I	2030-12-20T06:44:33.059		81.33	-77.94	48300.35	-23.57		
gamma	I	2030-12-20T06:45:01.878		81.34	-78.01	47621.17	-23.57		
eta	I	2030-12-20T06:45:20.762		81.35	-78.06	47176.12	-23.57		
beta	I	2030-12-20T06:46:24.260		81.37	-78.23	45679.62	-23.56		
alpha	I	2030-12-20T06:47:05.768		81.38	-78.34	44701.32	-23.56		
4	I	2030-12-20T06:48:37.666		81.40	-78.57	42537.26	-23.56		
5	I	2030-12-20T06:48:50.523		81.40	-78.60	42232.17	-23.56		
6	I	2030-12-20T06:49:06.093		81.40	-78.64	41867.92	-23.56		
Uranus	I	2030-12-20T07:00:38.478		81.06	-80.18	25530.17		-1.80	-1.89
Uranus	E	2030-12-20T07:36:36.455		76.47	-81.17	25479.69		2.99	3.13
6	E	2030-12-20T07:48:07.589		74.41	-80.06	41803.85	23.55		
5	E	2030-12-20T07:48:25.835		74.36	-80.03	42229.94	23.54		
4	E	2030-12-20T07:48:41.522		74.31	-80.00	42602.20	23.55		
alpha	E	2030-12-20T07:50:12.079		74.03	-79.81	44732.99	23.55		
beta	E	2030-12-20T07:50:50.666		73.91	-79.73	45642.04	23.55		
eta	E	2030-12-20T07:51:55.796		73.70	-79.59	47176.12	23.55		
gamma	E	2030-12-20T07:52:15.130		73.64	-79.54	47631.47	23.55		
delta	E	2030-12-20T07:52:43.529		73.55	-79.48	48300.35	23.55		
lambda	E	2030-12-20T07:53:56.825		73.32	-79.31	50026.71	23.55		
epsilon	E	2030-12-20T07:55:01.709		73.12	-79.16	51555.03	23.55		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-20T07:18:08.070
 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 : 3415631535954148864
 2Mass ID (if available) : 05165359+2309430
 ICRS Star Coord at Epoch: 05h 16m 53.57450s +23:09:42.83516s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 13.427
 G magnitude : 16.814
 RP magnitude : 15.817
 BP magnitude : 17.823
 DUPflag : 0
 Distance (au) : 18.179
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.18
 Sun-Target sep (deg) : 172.10
 Sun-Moon sep (deg) : 127.62
 B (ring opening deg) : 81.81
 PA of pole (deg) : 13.07
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.137
 C/A sky separation (km) : 1802.8
 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_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	2030-12-20T06:42:18.910		81.06	-82.49	50743.82	-23.58		
lambda	I	2030-12-20T06:42:49.325		81.00	-82.53	50026.71	-23.58		
delta	I	2030-12-20T06:44:02.551		80.84	-82.61	48300.35	-23.57		
gamma	I	2030-12-20T06:44:31.362		80.77	-82.64	47621.16	-23.57		
eta	I	2030-12-20T06:44:50.240		80.73	-82.66	47176.12	-23.57		
beta	I	2030-12-20T06:45:53.717		80.58	-82.72	45679.66	-23.57		
alpha	I	2030-12-20T06:46:35.208		80.48	-82.75	44701.43	-23.57		
4	I	2030-12-20T06:48:07.079		80.26	-82.82	42537.39	-23.57		
5	I	2030-12-20T06:48:19.922		80.23	-82.83	42232.50	-23.56		
6	I	2030-12-20T06:48:35.499		80.19	-82.84	41868.04	-23.57		
Uranus	I	2030-12-20T07:00:07.689		78.31	-82.77	25528.57		-1.85	-1.94
Uranus	E	2030-12-20T07:36:06.811		71.36	-78.18	25481.47		2.96	3.10
6	E	2030-12-20T07:47:37.984		68.98	-76.04	41803.91	23.54		
5	E	2030-12-20T07:47:56.240		68.92	-75.99	42230.13	23.54		
4	E	2030-12-20T07:48:11.927		68.86	-75.94	42602.27	23.54		
alpha	E	2030-12-20T07:49:42.509		68.55	-75.65	44733.05	23.54		
beta	E	2030-12-20T07:50:21.105		68.41	-75.52	45642.05	23.54		
eta	E	2030-12-20T07:51:26.256		68.18	-75.31	47176.12	23.54		
gamma	E	2030-12-20T07:51:45.596		68.12	-75.25	47631.47	23.54		
delta	E	2030-12-20T07:52:14.005		68.02	-75.15	48300.35	23.54		
lambda	E	2030-12-20T07:53:27.327		67.76	-74.92	50026.71	23.55		
epsilon	E	2030-12-20T07:54:32.237		67.53	-74.70	51555.06	23.55		

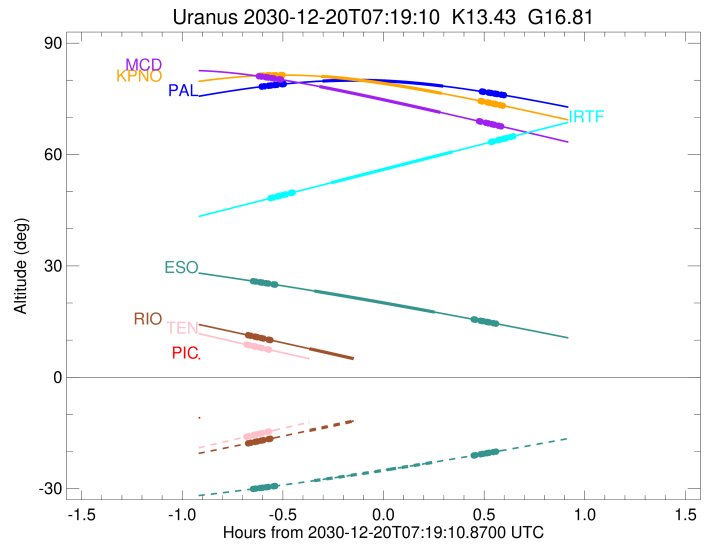
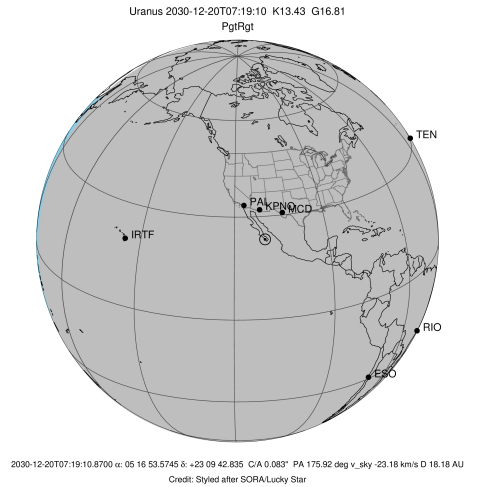
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-20T07:15:03.190
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 3415631535954148864
 2Mass ID (if available) : 05165359+2309430
 ICRS Star Coord at Epoch: 05h 16m 53.57450s +23:09:42.83516s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 13.427
 G magnitude : 16.814
 RP magnitude : 15.817
 BP magnitude : 17.823
 DUPflag : 0
 Distance (au) : 18.179
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.18
 Sun-Target sep (deg) : 172.10
 Sun-Moon sep (deg) : 127.25
 B (ring opening deg) : 81.81
 PA of pole (deg) : 13.07
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.291
 C/A sky separation (km) : 3842.4
 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	2030-12-20T06:38:38.365		8.75	-15.95	50744.58	-23.12		
lambda	I	2030-12-20T06:39:09.415		8.64	-15.85	50026.71	-23.12		
delta	I	2030-12-20T06:40:24.103		8.39	-15.59	48300.35	-23.11		
gamma	I	2030-12-20T06:40:53.492		8.29	-15.48	47621.22	-23.11		
eta	I	2030-12-20T06:41:12.755		8.22	-15.42	47176.12	-23.10		
beta	I	2030-12-20T06:42:17.542		8.00	-15.19	45679.34	-23.10		
alpha	I	2030-12-20T06:42:59.927		7.86	-15.04	44700.29	-23.09		
4	I	2030-12-20T06:44:33.717		7.54	-14.72	42536.16	-23.08		
5	I	2030-12-20T06:44:46.939		7.49	-14.67	42229.13	-23.07		
6	I	2030-12-20T06:45:02.736		7.44	-14.62	41866.77	-23.07		
Uranus	I	2030-12-20T06:56:51.042		5.04	-12.17	25544.86		-1.26	-1.32
Uranus	E	2030-12-20T07:33:12.470		-2.20x	-4.75x	25443.89		3.61	3.78
6	E	2030-12-20T07:45:03.074		-4.50x	-2.38x	41802.50	22.97		
5	E	2030-12-20T07:45:21.679		-4.56x	-2.31x	42225.75	22.96		
4	E	2030-12-20T07:45:37.853		-4.62x	-2.26x	42600.43	22.97		
alpha	E	2030-12-20T07:47:10.698		-4.91x	-1.95x	44731.44	22.97		
beta	E	2030-12-20T07:47:50.299		-5.04x	-1.82x	45641.76	22.98		
eta	E	2030-12-20T07:48:57.056		-5.25x	-1.60x	47176.12	22.98		
gamma	E	2030-12-20T07:49:16.871		-5.32x	-1.54x	47631.52	22.98		
delta	E	2030-12-20T07:49:45.970		-5.41x	-1.44x	48300.35	22.99		
lambda	E	2030-12-20T07:51:01.072		-5.65x	-1.19x	50026.71	22.99		
epsilon	E	2030-12-20T07:52:07.504		-5.86x	-0.97x	51553.98	22.99		

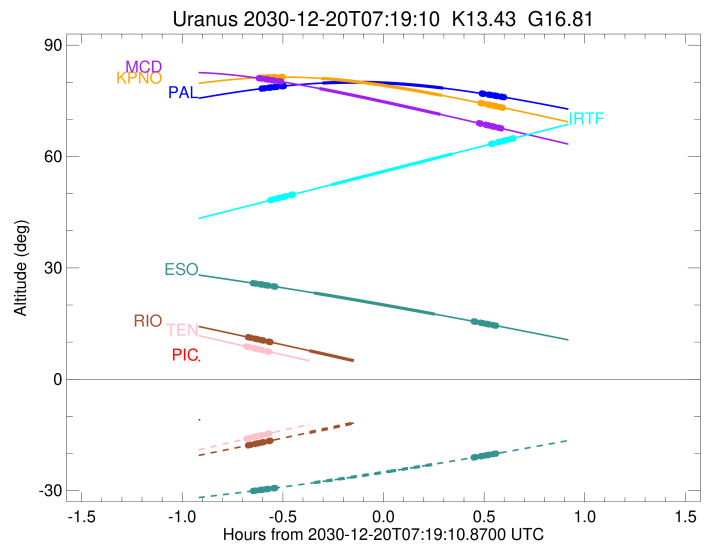
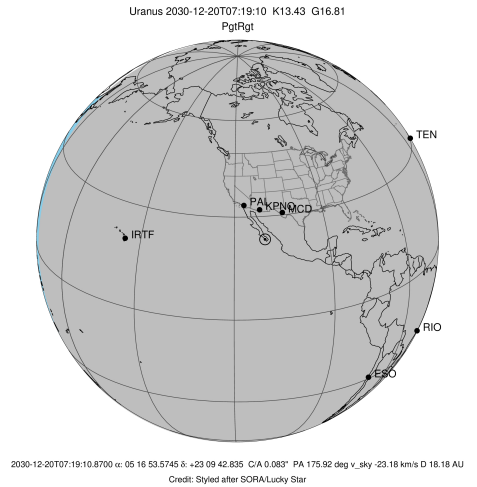

```

target                : Uranus
target radius (km)    : 25559.00
C/A epoch             : 2030-12-20T07:21:42.270
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        : 3415631535954148864
2Mass ID (if available) : 05165359+2309430
ICRS Star Coord at Epoch: 05h 16m 53.57450s +23:09:42.83516s
RUWE (>1.4 is poor)  : 1.03
K magnitude           : 13.427
G magnitude           : 16.814
RP magnitude          : 15.817
BP magnitude          : 17.823
DUPflag               : 0
Distance (au)         : 18.179
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s)  : -23.18
Sun-Target sep (deg)  : 172.10
Sun-Moon sep (deg)    : 127.06
B (ring opening deg)  : 81.81
PA of pole (deg)      : 13.07
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.100
C/A sky separation (km) : 1312.6
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
    
```



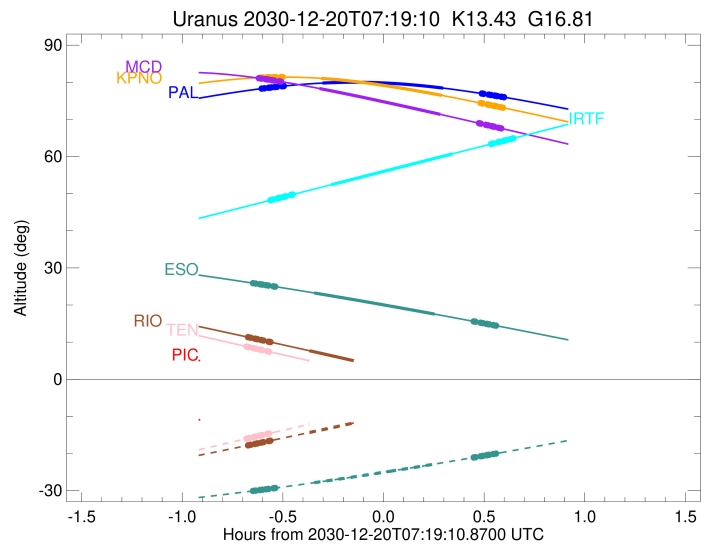
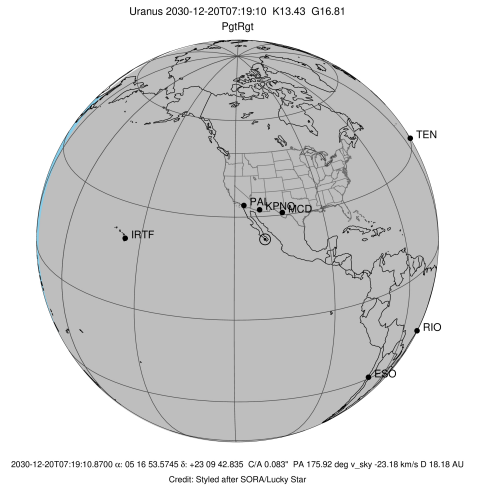
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-12-20T06:45:46.181		48.30	-40.48	50743.76	-23.49		
lambda	I	2030-12-20T06:46:16.710		48.42	-40.60	50026.71	-23.49		
delta	I	2030-12-20T06:47:30.212		48.70	-40.88	48300.35	-23.49		
gamma	I	2030-12-20T06:47:59.128		48.81	-40.99	47621.15	-23.49		
eta	I	2030-12-20T06:48:18.076		48.88	-41.06	47176.12	-23.49		
beta	I	2030-12-20T06:49:21.779		49.13	-41.30	45679.69	-23.49		
alpha	I	2030-12-20T06:50:03.411		49.29	-41.46	44701.59	-23.49		
4	I	2030-12-20T06:51:35.596		49.64	-41.81	42537.57	-23.49		
5	I	2030-12-20T06:51:48.467		49.69	-41.86	42232.98	-23.49		
6	I	2030-12-20T06:52:04.111		49.75	-41.92	41868.22	-23.49		
Uranus	I	2030-12-20T07:03:38.219		52.41	-44.56	25524.98		-1.96	-2.05
Uranus	E	2030-12-20T07:39:43.971		60.73	-52.82	25491.22		2.76	2.89
6	E	2030-12-20T07:51:14.589		63.38	-55.45	41804.38	23.55		
5	E	2030-12-20T07:51:32.865		63.45	-55.52	42231.54	23.55		
4	E	2030-12-20T07:51:48.512		63.51	-55.58	42602.85	23.56		
alpha	E	2030-12-20T07:53:19.029		63.86	-55.93	44733.57	23.56		
beta	E	2030-12-20T07:53:57.582		64.01	-56.08	45642.16	23.56		
eta	E	2030-12-20T07:55:02.680		64.25	-56.33	47176.12	23.56		
gamma	E	2030-12-20T07:55:22.005		64.33	-56.40	47631.45	23.56		
delta	E	2030-12-20T07:55:50.392		64.44	-56.51	48300.35	23.56		
lambda	E	2030-12-20T07:57:03.653		64.72	-56.79	50026.71	23.57		
epsilon	E	2030-12-20T07:58:08.513		64.97	-57.04	51555.22	23.57		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-20T07:15:15.630
 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 : 3415631535954148864
 2Mass ID (if available) : 05165359+2309430
 ICRS Star Coord at Epoch: 05h 16m 53.57450s +23:09:42.83516s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 13.427
 G magnitude : 16.814
 RP magnitude : 15.817
 BP magnitude : 17.823
 DUPflag : 0
 Distance (au) : 18.179
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.18
 Sun-Target sep (deg) : 172.10
 Sun-Moon sep (deg) : 127.31
 B (ring opening deg) : 81.81
 PA of pole (deg) : 13.07
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.169
 C/A sky separation (km) : 2232.4
 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	2030-12-20T06:39:06.205		11.28	-17.74	50743.96	-23.36		
lambda	I	2030-12-20T06:39:36.914		11.18	-17.65	50026.71	-23.36		
delta	I	2030-12-20T06:40:50.837		10.94	-17.42	48300.35	-23.35		
gamma	I	2030-12-20T06:41:19.928		10.84	-17.33	47621.05	-23.35		
eta	I	2030-12-20T06:41:38.984		10.78	-17.27	47176.12	-23.35		
beta	I	2030-12-20T06:42:43.045		10.57	-17.07	45680.31	-23.34		
alpha	I	2030-12-20T06:43:24.840		10.43	-16.94	44704.36	-23.34		
4	I	2030-12-20T06:44:57.626		10.12	-16.65	42540.63	-23.34		
5	I	2030-12-20T06:45:10.351		10.08	-16.61	42240.74	-23.34		
6	I	2030-12-20T06:45:26.359		10.02	-16.55	41870.91	-23.33		
Uranus	I	2030-12-20T06:57:07.401		7.68	-14.33	25472.28		-3.13	-3.28
Uranus	E	2030-12-20T07:33:27.969		0.21x	-7.17	25531.24		1.77	1.85
6	E	2030-12-20T07:45:07.513		-2.23x	-4.81x	41806.47	23.22		
5	E	2030-12-20T07:45:26.180		-2.30x	-4.75x	42237.40	23.23		
4	E	2030-12-20T07:45:41.919		-2.36x	-4.70x	42605.11	23.23		
alpha	E	2030-12-20T07:47:13.707		-2.68x	-4.38x	44735.61	23.23		
beta	E	2030-12-20T07:47:52.752		-2.82x	-4.25x	45642.64	23.23		
eta	E	2030-12-20T07:48:58.772		-3.05x	-4.03x	47176.12	23.23		
gamma	E	2030-12-20T07:49:18.374		-3.12x	-3.96x	47631.37	23.23		
delta	E	2030-12-20T07:49:47.177		-3.22x	-3.86x	48300.35	23.23		
lambda	E	2030-12-20T07:51:01.509		-3.48x	-3.61x	50026.71	23.23		
epsilon	E	2030-12-20T07:52:07.312		-3.71x	-3.38x	51554.98	23.22		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-20T07:16:26.990
 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 : 3415631535954148864
 2Mass ID (if available) : 05165359+2309430
 ICRS Star Coord at Epoch: 05h 16m 53.57450s +23:09:42.83516s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 13.427
 G magnitude : 16.814
 RP magnitude : 15.817
 BP magnitude : 17.823
 DUPflag : 0
 Distance (au) : 18.179
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.18
 Sun-Target sep (deg) : 172.10
 Sun-Moon sep (deg) : 127.39
 B (ring opening deg) : 81.81
 PA of pole (deg) : 13.07
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.272
 C/A sky separation (km) : 3579.8
 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	2030-12-20T06:40:34.803		25.85	-30.05	50744.54	-23.46		
lambda	I	2030-12-20T06:41:05.406		25.78	-29.99	50026.71	-23.45		
delta	I	2030-12-20T06:42:19.020		25.60	-29.85	48300.35	-23.45		
gamma	I	2030-12-20T06:42:47.993		25.54	-29.79	47621.02	-23.45		
eta	I	2030-12-20T06:43:06.970		25.49	-29.75	47176.12	-23.44		
beta	I	2030-12-20T06:44:10.766		25.34	-29.63	45680.47	-23.44		
alpha	I	2030-12-20T06:44:52.364		25.24	-29.54	44705.23	-23.43		
4	I	2030-12-20T06:46:24.795		25.02	-29.36	42541.63	-23.42		
5	I	2030-12-20T06:46:37.406		24.99	-29.33	42243.12	-23.42		
6	I	2030-12-20T06:46:53.435		24.95	-29.30	41871.67	-23.42		
Uranus	I	2030-12-20T06:58:33.379		23.24	-27.85	25450.10		-3.51	-3.67
Uranus	E	2030-12-20T07:34:25.714		17.55	-22.84	25543.43		1.32	1.38
6	E	2030-12-20T07:46:02.600		15.59	-21.07	41807.51	23.34		
5	E	2030-12-20T07:46:21.231		15.54	-21.02	42240.17	23.35		
4	E	2030-12-20T07:46:36.826		15.49	-20.98	42606.13	23.35		
alpha	E	2030-12-20T07:48:08.122		15.23	-20.75	44736.56	23.35		
beta	E	2030-12-20T07:48:46.927		15.12	-20.64	45642.90	23.35		
eta	E	2030-12-20T07:49:52.571		14.93	-20.47	47176.12	23.36		
gamma	E	2030-12-20T07:50:12.061		14.87	-20.42	47631.32	23.36		
delta	E	2030-12-20T07:50:40.703		14.79	-20.35	48300.35	23.36		
lambda	E	2030-12-20T07:51:54.605		14.58	-20.15	50026.71	23.36		
epsilon	E	2030-12-20T07:52:59.992		14.39	-19.98	51554.35	23.36		