

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-12-26T15:39:07.380
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3427814773328333696
 2Mass ID (if available) : 05551611+2338537

Uranus 2032-12-26T15:39:07 K14.59 G17.34 PgtRgt

ICRS Star Coord at Epoch: 05h 55m 16.12149s +23:38:53.66157s

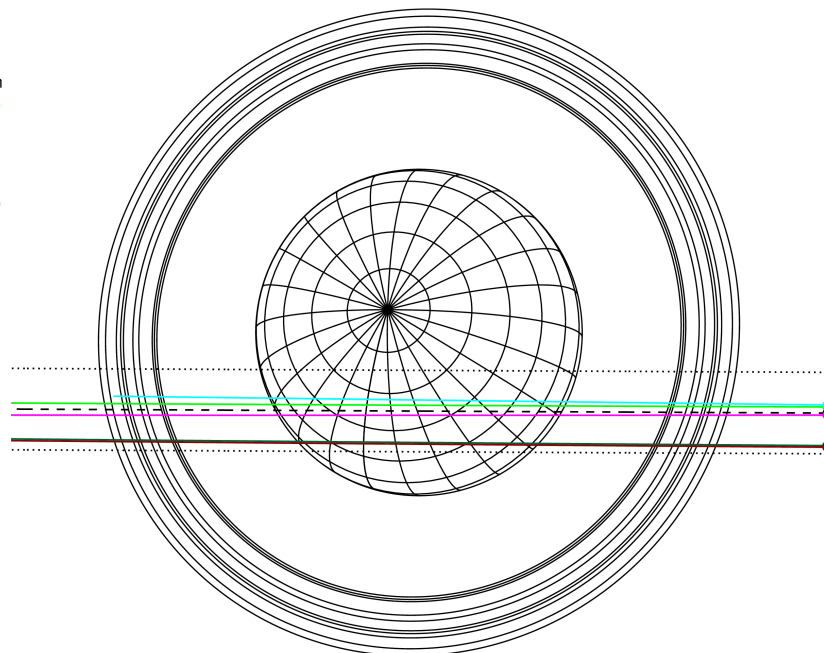
RUWE (>1.4 is poor) : 0.95
 K magnitude : 14.588
 G magnitude : 17.339
 RP magnitude : 16.479
 BP magnitude : 18.124
 DUPflag : 0
 Distance (au) : 18.040
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.26
 Sun-Target sep (deg) : 173.95
 Sun-Moon sep (deg) : 115.69
 B (ring opening deg) : 76.24
 PA of pole (deg) : 54.06

Uranus 2032-12-26T15:39:07 K14.59 G17.34
 PgtRgt



2032-12-26T15:39:07.3800 ra: 05 55 16.1215 s: +23 38 53.662 C/A 0.934 PA 359.72 deg v_sky -23.26 km/s D 18.04 AU
 Credit: Styled after SORA/Lucky Star

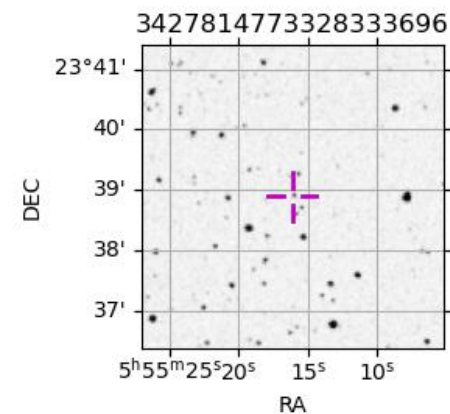
Earth
 PMO
 IRTF
 KAV
 AAT
 MSO



#	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

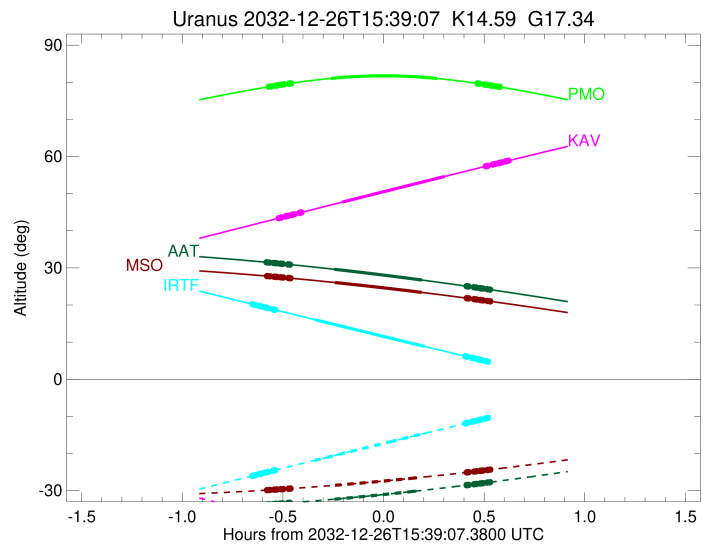
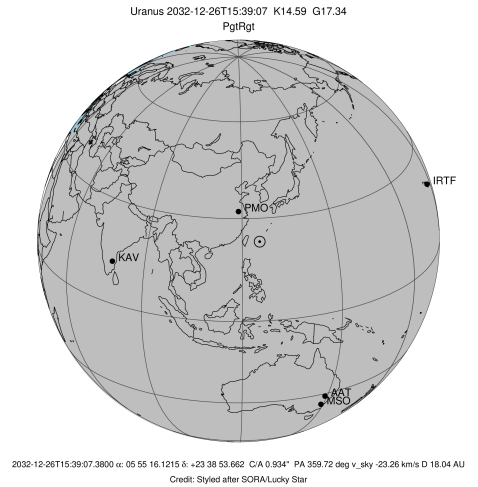
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+ +	+++++	DEC 26 15:05 - DEC 26 16:13	PieRie
KPNO	Kitt Peak Natl Obs	32.0	248.4					PnnRnn
MCD	McDonald Obs. 2.7m	30.7	256.0					PnnRnn
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	DEC 26 15:00 - DEC 26 16:08	PieRie
KAV	Kavalur Observatory	12.6	78.8	+++++	+ +	+++++	DEC 26 15:08 - DEC 26 16:16	PieRie
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European Southern Obs	-29.3	289.3					PnnRnn
AAT	Siding Spring (AAT)	-31.3	149.1	+++++	+ +	+++++	DEC 26 15:04 - DEC 26 16:10	PieRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++	+ +	+++++	DEC 26 15:04 - DEC 26 16:10	PieRie



```

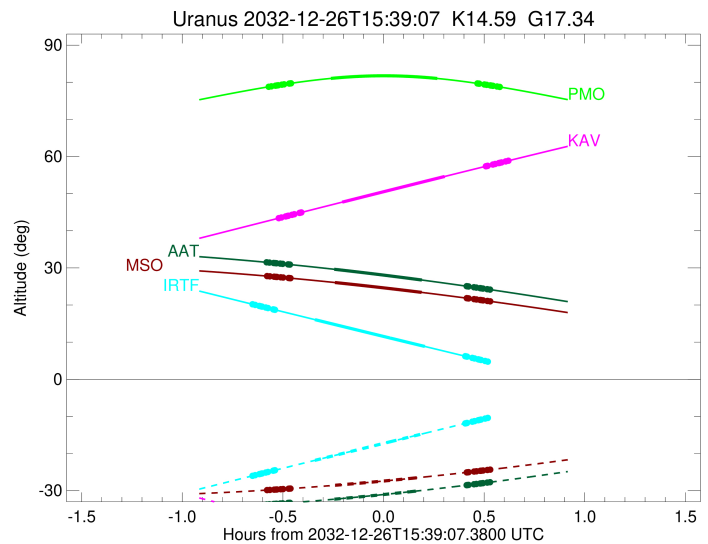
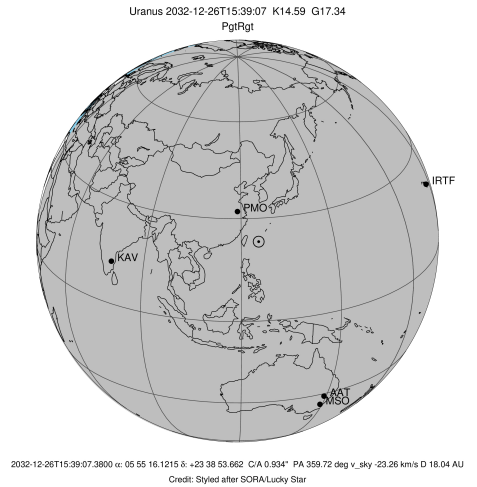
target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2032-12-26T15:39:07.410
Event type           : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : PMO
Location              : Purple Mtn Obs. Nanking
Latitude (deg)       : 32.06667
E. Longitude (deg)   : 118.82089
Altitude (km)        : 0.364
Gaia source ID       : 3427814773328333696
2Mass ID (if available) : 05551611+2338537
ICRS Star Coord at Epoch: 05h 55m 16.12149s +23:38:53.66157s
RUWE (>1.4 is poor) : 0.95
K magnitude          : 14.588
G magnitude          : 17.339
RP magnitude         : 16.479
BP magnitude         : 18.124
DUPflag             : 0
Distance (au)        : 18.040
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -23.26
Sun-Target sep (deg) : 173.95
Sun-Moon sep (deg)   : 116.51
B (ring opening deg) : 76.24
PA of pole (deg)     : 54.06
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.871
C/A sky separation (km) : 11393.9
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall1.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall1.bsp
ural61.bsp
vgr2.ural61.bsp
peph.ural60.bsp
earthstns_itrff93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
  
```



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-12-26T15:05:03.025		78.81	-74.12	50955.09	-23.45		
lambda	I	2032-12-26T15:05:42.574		78.91	-74.24	50026.71	-23.46		
delta	I	2032-12-26T15:06:56.228		79.09	-74.47	48300.35	-23.41		
gamma	I	2032-12-26T15:07:24.837		79.16	-74.55	47630.79	-23.39		
eta	I	2032-12-26T15:07:44.278		79.20	-74.61	47176.12	-23.38		
beta	I	2032-12-26T15:08:48.577		79.36	-74.81	45673.65	-23.33		
alpha	I	2032-12-26T15:09:29.162		79.45	-74.93	44731.00	-23.29		
4	I	2032-12-26T15:10:59.982		79.66	-75.21	42616.43	-23.21		
5	I	2032-12-26T15:11:17.033		79.69	-75.26	42225.79	-23.19		
6	I	2032-12-26T15:11:35.014		79.73	-75.31	41801.01	-23.18		
Uranus	I	2032-12-26T15:23:25.856		81.05	-77.34	25018.42		-13.60	-14.22
Uranus	E	2032-12-26T15:55:08.776		81.03	-81.12	25436.21		6.35	6.65
6	E	2032-12-26T16:07:09.361		79.69	-81.42	41879.74	23.18		
5	E	2032-12-26T16:07:23.057		79.66	-81.42	42201.04	23.18		
4	E	2032-12-26T16:07:37.752		79.63	-81.42	42534.42	23.21		
alpha	E	2032-12-26T16:09:10.400		79.42	-81.39	44692.04	23.29		
beta	E	2032-12-26T16:09:51.255		79.32	-81.38	45642.57	23.33		
eta	E	2032-12-26T16:10:56.909		79.17	-81.35	47176.12	23.38		
gamma	E	2032-12-26T16:11:15.931		79.12	-81.34	47620.97	23.39		
delta	E	2032-12-26T16:11:44.960		79.05	-81.32	48300.35	23.41		
lambda	E	2032-12-26T16:12:58.617		78.87	-81.27	50026.71	23.46		
epsilon	E	2032-12-26T16:13:46.989		78.75	-81.24	51162.29	23.45		

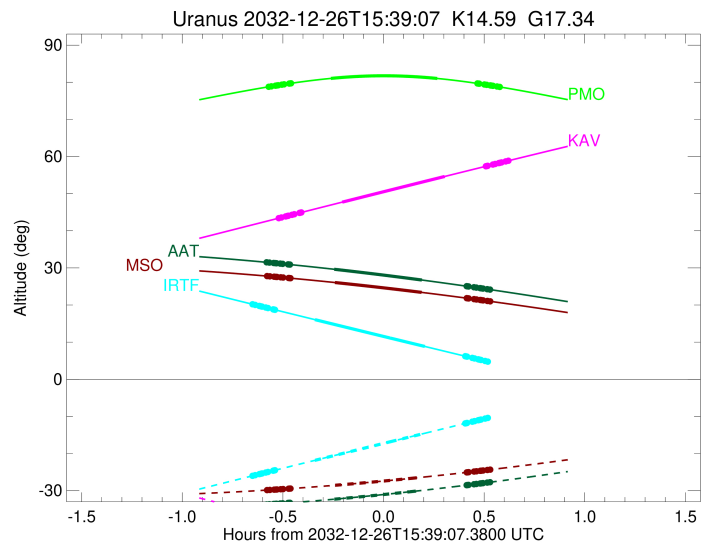
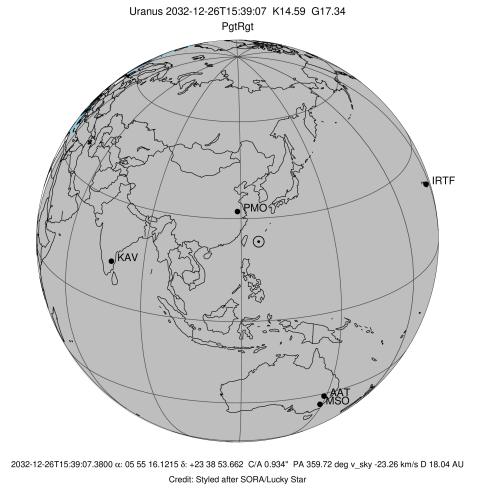
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2032-12-26T15:34:53.650
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      : 3427814773328333696
2Mass ID (if available) : 05551611+2338537
ICRS Star Coord at Epoch: 05h 55m 16.12149s +23:38:53.66157s
RUWE (>1.4 is poor) : 0.95
K magnitude          : 14.588
G magnitude          : 17.339
RP magnitude         : 16.479
BP magnitude         : 18.124
DUPflag             : 0
Distance (au)       : 18.040
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -23.26
Sun-Target sep (deg) : 173.95
Sun-Moon sep (deg)  : 116.24
B (ring opening deg) : 76.24
PA of pole (deg)    : 54.06
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.808
C/A sky separation (km) : 10571.4
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
    
```



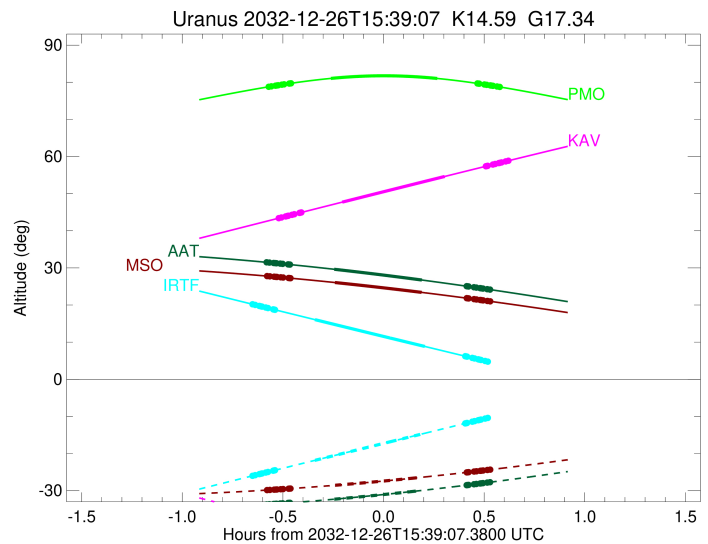
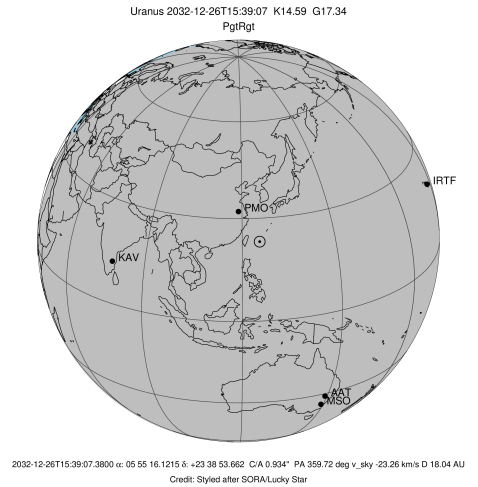
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-12-26T15:00:13.075		20.17	-25.98	50958.29	-23.26		
lambda	I	2032-12-26T15:00:53.076		20.02	-25.83	50026.71	-23.28		
delta	I	2032-12-26T15:02:07.306		19.75	-25.55	48300.35	-23.23		
gamma	I	2032-12-26T15:02:36.134		19.64	-25.44	47630.82	-23.22		
eta	I	2032-12-26T15:02:55.724		19.57	-25.37	47176.12	-23.20		
beta	I	2032-12-26T15:04:00.497		19.33	-25.13	45673.83	-23.16		
alpha	I	2032-12-26T15:04:41.368		19.18	-24.97	44731.36	-23.13		
4	I	2032-12-26T15:06:12.841		18.84	-24.63	42616.38	-23.05		
5	I	2032-12-26T15:06:29.967		18.77	-24.57	42226.81	-23.03		
6	I	2032-12-26T15:06:48.128		18.70	-24.50	41800.72	-23.03		
Uranus	I	2032-12-26T15:18:41.129		16.06	-21.84	25023.43		-13.53	-14.15
Uranus	E	2032-12-26T15:51:26.047		8.84	-14.55	25415.82		6.87	7.19
6	E	2032-12-26T16:03:31.069		6.21	-11.89	41879.73	22.92		
5	E	2032-12-26T16:03:44.999		6.16	-11.83	42203.04	22.92		
4	E	2032-12-26T16:03:59.748		6.10	-11.78	42533.72	22.94		
alpha	E	2032-12-26T16:05:33.553		5.76	-11.44	44692.60	23.01		
beta	E	2032-12-26T16:06:14.902		5.61	-11.28	45642.77	23.04		
eta	E	2032-12-26T16:07:21.382		5.37	-11.04	47176.12	23.08		
gamma	E	2032-12-26T16:07:40.651		5.30	-10.97	47620.98	23.09		
delta	E	2032-12-26T16:08:10.060		5.20	-10.86	48300.35	23.11		
lambda	E	2032-12-26T16:09:24.704		4.93x	-10.59	50026.71	23.15		
epsilon	E	2032-12-26T16:10:14.153		4.75x	-10.41	51171.88	23.13		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-12-26T15:41:54.260
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 3427814773328333696
 2Mass ID (if available) : 05551611+2338537
 ICRS Star Coord at Epoch: 05h 55m 16.12149s +23:38:53.66157s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 14.588
 G magnitude : 17.339
 RP magnitude : 16.479
 BP magnitude : 18.124
 DUPflag : 0
 Distance (au) : 18.040
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.26
 Sun-Target sep (deg) : 173.95
 Sun-Moon sep (deg) : 116.08
 B (ring opening deg) : 76.24
 PA of pole (deg) : 54.06
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.991
 C/A sky separation (km) : 12971.1
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.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



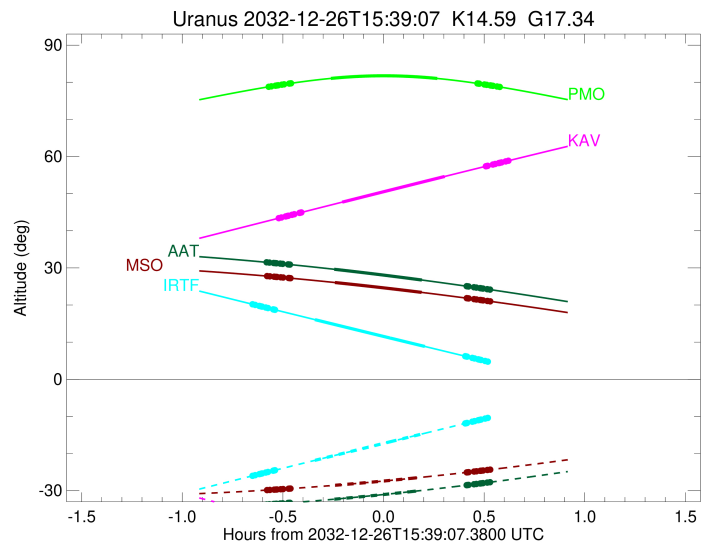
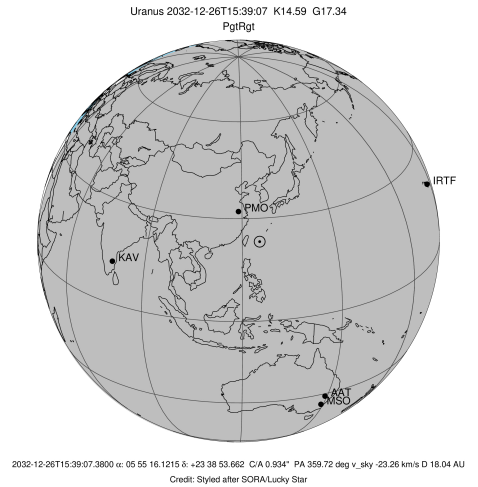
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-12-26T15:08:02.846		43.43	-37.45	50945.37	-23.17		
lambda	I	2032-12-26T15:08:42.450		43.58	-37.60	50026.71	-23.18		
delta	I	2032-12-26T15:09:57.018		43.87	-37.88	48300.35	-23.12		
gamma	I	2032-12-26T15:10:25.997		43.98	-37.99	47630.70	-23.09		
eta	I	2032-12-26T15:10:45.688		44.05	-38.07	47176.12	-23.08		
beta	I	2032-12-26T15:11:50.873		44.30	-38.32	45673.15	-23.01		
alpha	I	2032-12-26T15:12:32.051		44.46	-38.48	44729.97	-22.97		
4	I	2032-12-26T15:14:04.169		44.81	-38.83	42616.52	-22.86		
5	I	2032-12-26T15:14:21.590		44.88	-38.89	42223.02	-22.83		
6	I	2032-12-26T15:14:39.691		44.94	-38.96	41801.81	-22.82		
Uranus	I	2032-12-26T15:26:48.311		47.71	-41.75	25010.11		-13.71	-14.33
Uranus	E	2032-12-26T15:57:22.156		54.63	-48.72	25469.05		5.43	5.69
6	E	2032-12-26T16:09:39.796		57.38	-51.51	41879.70	22.89		
5	E	2032-12-26T16:09:53.546		57.43	-51.56	42197.86	22.89		
4	E	2032-12-26T16:10:08.608		57.49	-51.62	42535.62	22.93		
alpha	E	2032-12-26T16:11:42.255		57.83	-51.97	44691.17	23.04		
beta	E	2032-12-26T16:12:23.570		57.99	-52.13	45642.27	23.08		
eta	E	2032-12-26T16:13:29.906		58.23	-52.38	47176.12	23.15		
gamma	E	2032-12-26T16:13:49.112		58.30	-52.45	47620.96	23.17		
delta	E	2032-12-26T16:14:18.415		58.41	-52.56	48300.35	23.20		
lambda	E	2032-12-26T16:15:32.729		58.69	-52.84	50026.71	23.26		
epsilon	E	2032-12-26T16:16:20.860		58.86	-53.02	51147.26	23.25		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-12-26T15:37:13.750
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 3427814773328333696
 2Mass ID (if available) : 05551611+2338537
 ICRS Star Coord at Epoch: 05h 55m 16.12149s +23:38:53.66157s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 14.588
 G magnitude : 17.339
 RP magnitude : 16.479
 BP magnitude : 18.124
 DUPflag : 0
 Distance (au) : 18.040
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.26
 Sun-Target sep (deg) : 173.95
 Sun-Moon sep (deg) : 116.25
 B (ring opening deg) : 76.24
 PA of pole (deg) : 54.06
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.317
 C/A sky separation (km) : 17228.3
 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_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	2032-12-26T15:04:27.556		31.49	-33.71	50912.57	-22.59		
lambda	I	2032-12-26T15:05:06.731		31.43	-33.67	50026.71	-22.59		
delta	I	2032-12-26T15:06:23.360		31.32	-33.59	48300.35	-22.47		
gamma	I	2032-12-26T15:06:53.207		31.28	-33.56	47630.38	-22.42		
eta	I	2032-12-26T15:07:13.482		31.25	-33.54	47176.12	-22.39		
beta	I	2032-12-26T15:08:20.833		31.15	-33.47	45671.35	-22.27		
alpha	I	2032-12-26T15:09:03.512		31.09	-33.42	44726.39	-22.18		
4	I	2032-12-26T15:10:38.956		30.95	-33.32	42616.45	-21.98		
5	I	2032-12-26T15:10:57.427		30.92	-33.30	42213.82	-21.93		
6	I	2032-12-26T15:11:15.700		30.89	-33.28	41804.83	-21.90		
Uranus	I	2032-12-26T15:24:25.516		29.63	-32.31	25016.98		-13.62	-14.24
Uranus	E	2032-12-26T15:50:32.294		26.74	-29.95	25533.93		2.86	2.99
6	E	2032-12-26T16:03:56.232		25.07	-28.53	41879.26	21.86		
5	E	2032-12-26T16:04:10.358		25.04	-28.50	42190.86	21.88		
4	E	2032-12-26T16:04:26.535		25.00	-28.47	42538.60	21.94		
alpha	E	2032-12-26T16:06:03.996		24.79	-28.29	44689.41	22.14		
beta	E	2032-12-26T16:06:46.995		24.70	-28.21	45641.72	22.22		
eta	E	2032-12-26T16:07:55.858		24.55	-28.08	47176.12	22.34		
gamma	E	2032-12-26T16:08:15.757		24.50	-28.04	47620.97	22.37		
delta	E	2032-12-26T16:08:46.093		24.44	-27.98	48300.35	22.42		
lambda	E	2032-12-26T16:10:02.902		24.27	-27.83	50026.71	22.53		
epsilon	E	2032-12-26T16:10:51.122		24.16	-27.74	51114.74	22.53		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-12-26T15:37:19.060
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MSO
 Location : Mt. Stromlo Observatory
 Latitude (deg) : -35.32000
 E. Longitude (deg) : 149.00833
 Altitude (km) : 0.770
 Gaia source ID : 3427814773328333696
 2Mass ID (if available) : 05551611+2338537
 ICRS Star Coord at Epoch: 05h 55m 16.12149s +23:38:53.66157s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 14.588
 G magnitude : 17.339
 RP magnitude : 16.479
 BP magnitude : 18.124
 DUPflag : 0
 Distance (au) : 18.040
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.26
 Sun-Target sep (deg) : 173.95
 Sun-Moon sep (deg) : 116.20
 B (ring opening deg) : 76.24
 PA of pole (deg) : 54.06
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.336
 C/A sky separation (km) : 17486.0
 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_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	2032-12-26T15:04:35.873		27.78	-29.85	50910.82	-22.52		
lambda	I	2032-12-26T15:05:15.079		27.73	-29.81	50026.71	-22.52		
delta	I	2032-12-26T15:06:31.928		27.63	-29.74	48300.35	-22.40		
gamma	I	2032-12-26T15:07:01.866		27.59	-29.71	47630.36	-22.35		
eta	I	2032-12-26T15:07:22.201		27.56	-29.69	47176.12	-22.32		
beta	I	2032-12-26T15:08:29.771		27.47	-29.62	45671.24	-22.19		
alpha	I	2032-12-26T15:09:12.597		27.41	-29.58	44726.18	-22.11		
4	I	2032-12-26T15:10:48.374		27.28	-29.48	42616.42	-21.90		
5	I	2032-12-26T15:11:06.933		27.25	-29.47	42213.31	-21.84		
6	I	2032-12-26T15:11:25.244		27.23	-29.45	41805.02	-21.82		
Uranus	I	2032-12-26T15:24:40.713		26.06	-28.55	25019.17		-13.59	-14.21
Uranus	E	2032-12-26T15:50:28.173		23.41	-26.41	25537.05		2.67	2.80
6	E	2032-12-26T16:03:57.869		21.85	-25.08	41879.21	21.78		
5	E	2032-12-26T16:04:12.030		21.82	-25.06	42190.39	21.80		
4	E	2032-12-26T16:04:28.296		21.78	-25.03	42538.82	21.86		
alpha	E	2032-12-26T16:06:06.081		21.59	-24.86	44689.30	22.06		
beta	E	2032-12-26T16:06:49.222		21.50	-24.79	45641.69	22.15		
eta	E	2032-12-26T16:07:58.299		21.36	-24.66	47176.12	22.27		
gamma	E	2032-12-26T16:08:18.257		21.32	-24.63	47620.97	22.31		
delta	E	2032-12-26T16:08:48.681		21.26	-24.58	48300.35	22.36		
lambda	E	2032-12-26T16:10:05.702		21.10	-24.44	50026.71	22.47		
epsilon	E	2032-12-26T16:10:53.948		21.00	-24.35	51112.47	22.47		