

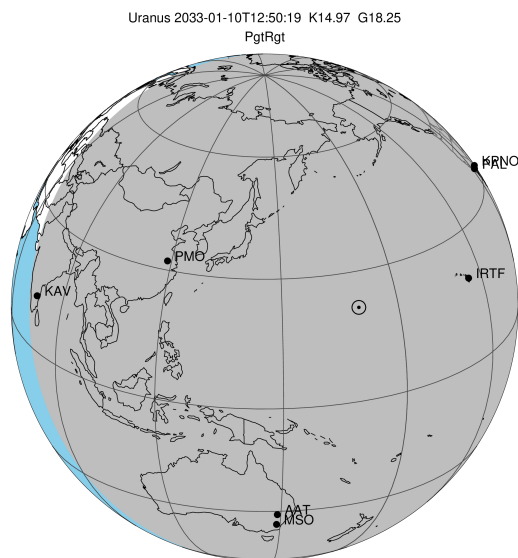
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-10T12:50:19.250
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3427497873461998976
 2Mass ID (if available) : 05523568+2338379

ICRS Star Coord at Epoch: 05h 52m 35.67624s +23:38:37.81628s

RUWE (>1.4 is poor) : 1.06
 K magnitude : 14.966
 G magnitude : 18.253
 RP magnitude : 17.326
 BP magnitude : 19.162
 DUPflag : 0
 Distance (au) : 18.099
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.28
 Sun-Target sep (deg) : 158.17
 Sun-Moon sep (deg) : 38.08
 B (ring opening deg) : 76.74
 PA of pole (deg) : 52.28

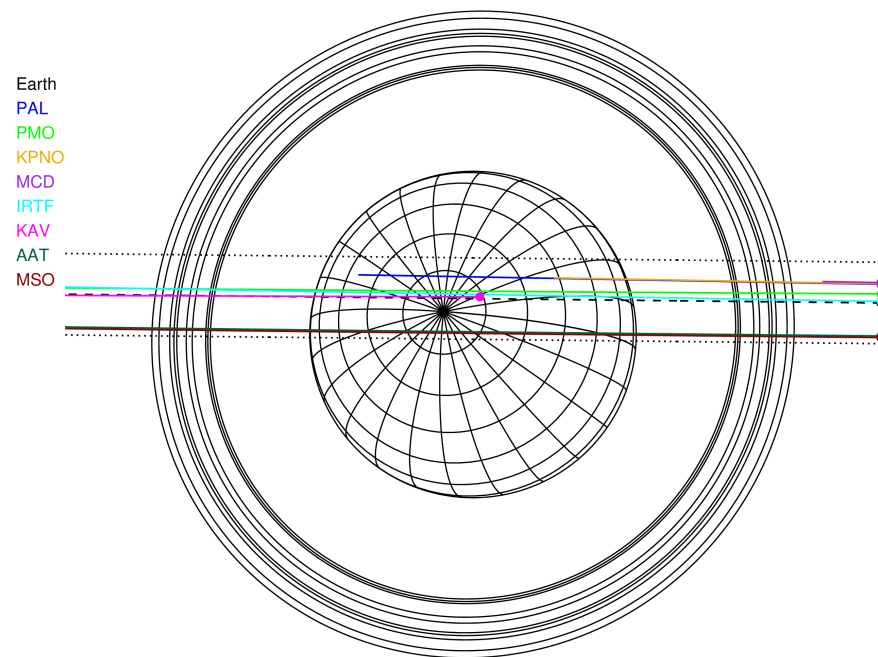
a(km) ring

- 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



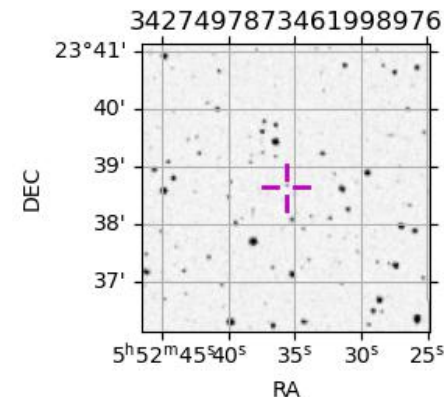
2033-01-10T12:50:19.2500 ra: 05 52 35.6762 s: +23 38 37.816 C/A 0.435° PA 179.39 deg v_sky -21.28 km/s D 18.10 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2033-01-10T12:50:19 K14.97 G18.25 PgtRgt

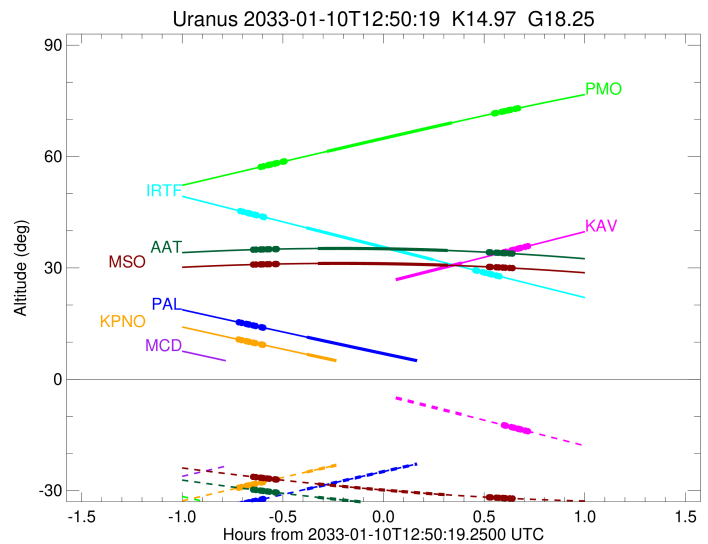
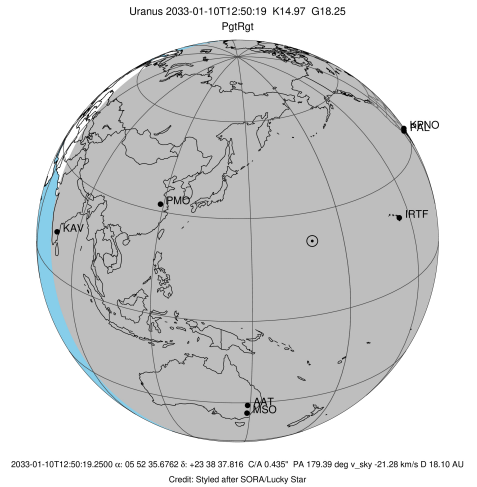


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEncode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1	+++++	+		JAN 10 12:07 - JAN 10 12:27	PinRin
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+	+++++	JAN 10 12:13 - JAN 10 13:30	PieRie
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+		JAN 10 12:07 - JAN 10 12:27	PinRin
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	+++++	+	+++++	JAN 10 12:07 - JAN 10 13:25	PieRie
KAV	Kavalur Observatory	12.6	78.8		+	+++++	JAN 10 13:13 - JAN 10 13:33	PneRne
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	+++++	+	+++++	JAN 10 12:11 - JAN 10 13:28	PieRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++	+	+++++	JAN 10 12:11 - JAN 10 13:28	PieRie

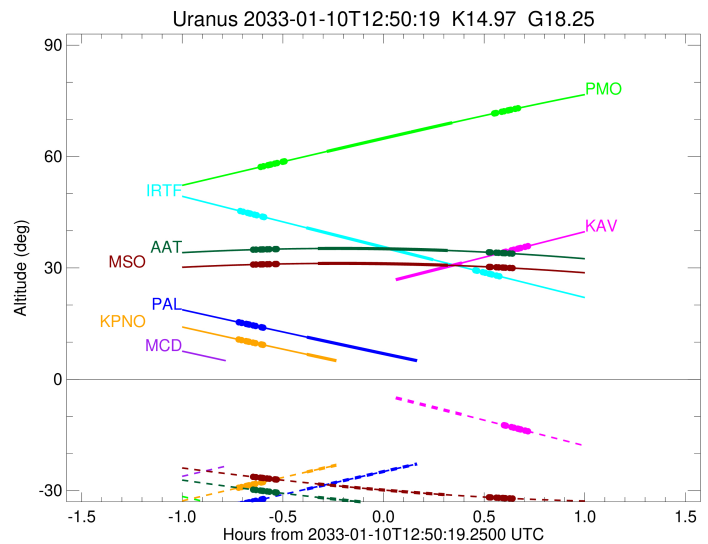
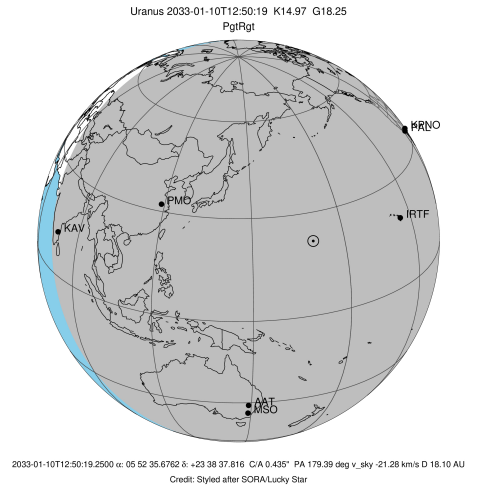


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-10T12:46:05.900
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3427497873461998976
 2Mass ID (if available) : 05523568+2338379
 ICRS Star Coord at Epoch: 05h 52m 35.67624s +23:38:37.81628s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 14.966
 G magnitude : 18.253
 RP magnitude : 17.326
 BP magnitude : 19.162
 DUPflag : 0
 Distance (au) : 18.099
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.28
 Sun-Target sep (deg) : 158.17
 Sun-Moon sep (deg) : 38.80
 B (ring opening deg) : 76.74
 PA of pole (deg) : 52.28
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.687
 C/A sky separation (km) : 9017.8
 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	2033-01-10T12:07:19.537		15.32	-33.76	50971.08	-21.36		
lambda	I	2033-01-10T12:08:03.817		15.18	-33.60	50026.71	-21.32		
delta	I	2033-01-10T12:09:24.847		14.91	-33.32	48300.35	-21.29		
gamma	I	2033-01-10T12:09:56.308		14.81	-33.21	47630.71	-21.28		
eta	I	2033-01-10T12:10:17.677		14.73	-33.14	47176.12	-21.27		
beta	I	2033-01-10T12:11:28.430		14.50	-32.89	45672.35	-21.24		
alpha	I	2033-01-10T12:12:12.981		14.35	-32.74	44727.43	-21.22		
4	I	2033-01-10T12:13:52.394		14.03	-32.39	42616.26	-21.17		
5	I	2033-01-10T12:14:12.070		13.96	-32.33	42209.46	-21.17		
6	I	2033-01-10T12:14:31.069		13.90	-32.26	41806.94	-21.15		
Uranus	I	2033-01-10T12:27:29.136		11.34	-29.57	25394.94		-7.08	-7.42
Uranus	E	2033-01-10T13:04:26.691		4.22x	-21.96	25043.03		12.77	13.35
6	E	2033-01-10T13:17:26.193		1.78x	-19.32	41851.86	21.03		
5	E	2033-01-10T13:17:46.840		1.72x	-19.25	42290.17	21.05		
4	E	2033-01-10T13:17:58.920		1.68x	-19.21	42532.60	21.05		
alpha	E	2033-01-10T13:19:42.635		1.36x	-18.86	44723.40	21.10		
beta	E	2033-01-10T13:20:27.001		1.22x	-18.71	45657.37	21.11		
eta	E	2033-01-10T13:21:38.878		1.00x	-18.46	47176.12	21.14		
gamma	E	2033-01-10T13:22:00.027		0.93x	-18.39	47623.25	21.15		
delta	E	2033-01-10T13:22:32.039		0.83x	-18.28	48300.35	21.16		
lambda	E	2033-01-10T13:23:53.592		0.58x	-18.01	50026.71	21.18		
epsilon	E	2033-01-10T13:25:00.329		0.38x	-17.78	51440.86	21.22		

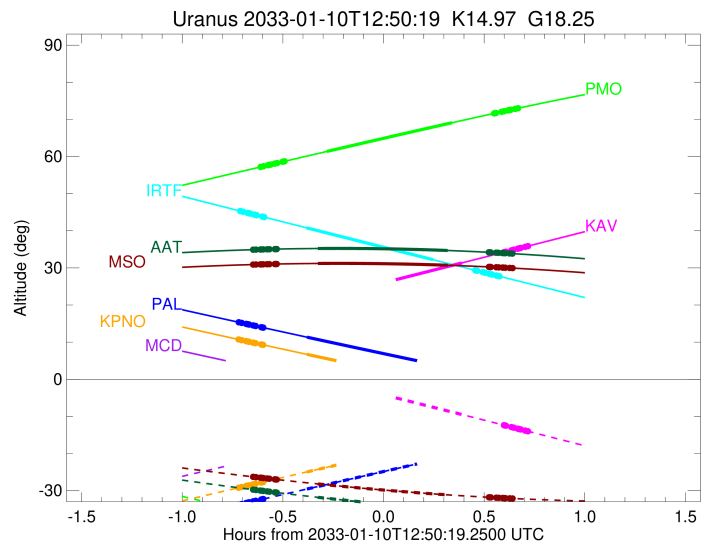
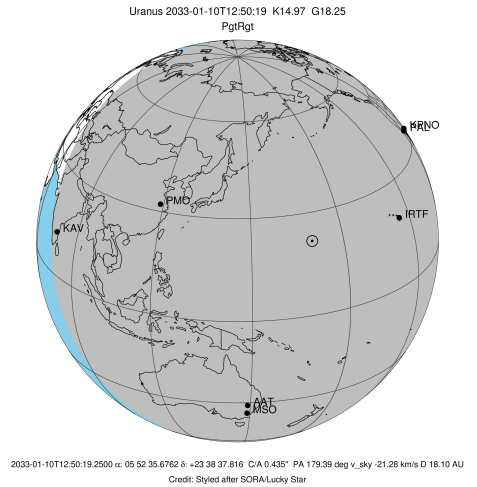
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-10T12:52:13.020
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3427497873461998976
 2Mass ID (if available) : 05523568+2338379
 ICRS Star Coord at Epoch: 05h 52m 35.67624s +23:38:37.81628s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 14.966
 G magnitude : 18.253
 RP magnitude : 17.326
 BP magnitude : 19.162
 DUPflag : 0
 Distance (au) : 18.099
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.28
 Sun-Target sep (deg) : 158.17
 Sun-Moon sep (deg) : 38.34
 B (ring opening deg) : 76.74
 PA of pole (deg) : 52.28
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.517
 C/A sky separation (km) : 6781.2
 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	2033-01-10T12:13:50.115		57.23	-36.53	50958.91	-21.80		
lambda	I	2033-01-10T12:14:32.928		57.38	-36.68	50026.71	-21.77		
delta	I	2033-01-10T12:15:52.253		57.66	-36.96	48300.35	-21.76		
gamma	I	2033-01-10T12:16:23.042		57.77	-37.07	47630.60	-21.75		
eta	I	2033-01-10T12:16:43.940		57.85	-37.14	47176.12	-21.75		
beta	I	2033-01-10T12:17:53.148		58.09	-37.38	45671.68	-21.73		
alpha	I	2033-01-10T12:18:36.719		58.24	-37.54	44726.11	-21.72		
4	I	2033-01-10T12:20:13.724		58.59	-37.88	42615.99	-21.69		
5	I	2033-01-10T12:20:33.080		58.65	-37.95	42206.17	-21.70		
6	I	2033-01-10T12:20:51.385		58.72	-38.01	41808.29	-21.68		
Uranus	I	2033-01-10T12:33:23.621		61.36	-40.67	25352.22		-7.97	-8.34
Uranus	E	2033-01-10T13:10:48.606		69.12	-48.60	25077.24		12.32	12.88
6	E	2033-01-10T13:23:18.820		71.62	-51.25	41854.42	21.72		
5	E	2033-01-10T13:23:38.542		71.68	-51.32	42286.31	21.74		
4	E	2033-01-10T13:23:50.352		71.72	-51.36	42531.17	21.73		
alpha	E	2033-01-10T13:25:30.814		72.05	-51.72	44721.34	21.77		
beta	E	2033-01-10T13:26:13.855		72.19	-51.87	45656.19	21.78		
eta	E	2033-01-10T13:27:23.620		72.42	-52.11	47176.12	21.79		
gamma	E	2033-01-10T13:27:44.125		72.49	-52.19	47623.00	21.80		
delta	E	2033-01-10T13:28:15.197		72.59	-52.29	48300.35	21.80		
lambda	E	2033-01-10T13:29:34.348		72.84	-52.57	50026.71	21.82		
epsilon	E	2033-01-10T13:30:38.417		73.05	-52.80	51425.02	21.85		

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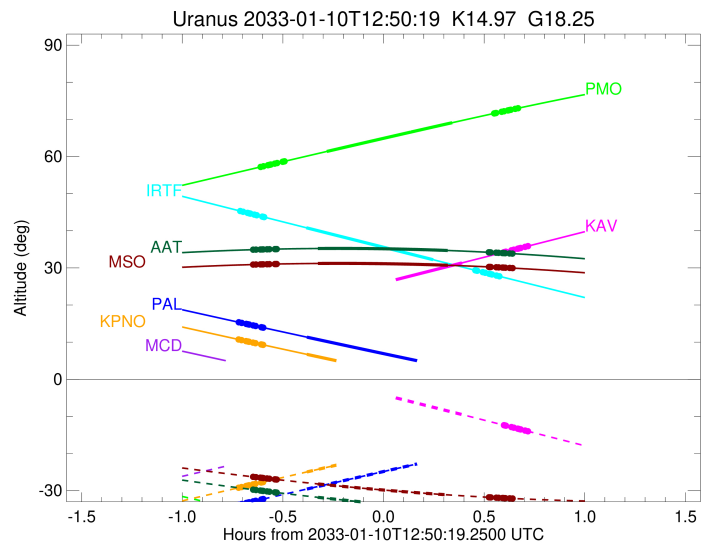
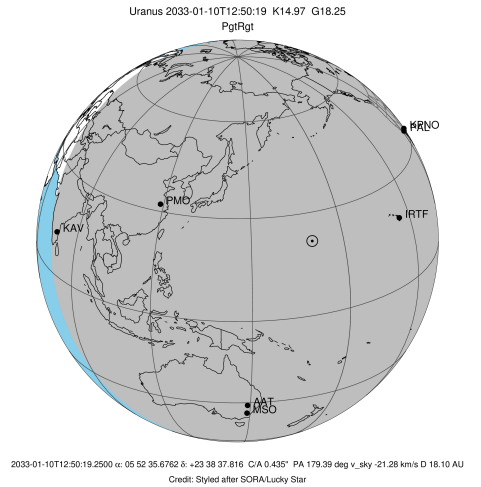
target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-01-10T12:46:05.580
Event type           : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : KPNO
Location             : Kitt Peak Natl Obs
Latitude (deg)       : 31.96333
E. Longitude (deg)   : 248.40000
Altitude (km)        : 2.120
Gaia source ID       : 3427497873461998976
2Mass ID (if available) : 05523568+2338379
ICRS Star Coord at Epoch: 05h 52m 35.67624s +23:38:37.81628s
RUWE (>1.4 is poor) : 1.06
K magnitude           : 14.966
G magnitude           : 18.253
RP magnitude          : 17.326
BP magnitude          : 19.162
DUPflag              : 0
Distance (au)        : 18.099
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -21.28
Sun-Target sep (deg) : 158.17
Sun-Moon sep (deg)   : 38.76
B (ring opening deg) : 76.74
PA of pole (deg)     : 52.28
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.693
C/A sky separation (km) : 9099.6
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	2033-01-10T12:07:15.800		10.69	-29.19	50971.64	-21.32		
lambda	I	2033-01-10T12:08:00.195		10.54	-29.03	50026.71	-21.28		
delta	I	2033-01-10T12:09:21.388		10.27	-28.75	48300.35	-21.25		
gamma	I	2033-01-10T12:09:52.913		10.17	-28.64	47630.72	-21.23		
eta	I	2033-01-10T12:10:14.326		10.10	-28.57	47176.12	-21.23		
beta	I	2033-01-10T12:11:25.223		9.87	-28.32	45672.38	-21.20		
alpha	I	2033-01-10T12:12:09.866		9.72	-28.16	44727.49	-21.18		
4	I	2033-01-10T12:13:49.491		9.39	-27.81	42616.27	-21.12		
5	I	2033-01-10T12:14:09.202		9.33	-27.75	42209.61	-21.12		
6	I	2033-01-10T12:14:28.252		9.26	-27.68	41806.89	-21.10		
Uranus	I	2033-01-10T12:27:28.270		6.71	-24.96	25396.65		-7.05	-7.38
Uranus	E	2033-01-10T13:04:26.729		-0.37x	-17.32	25042.05		12.78	13.36
6	E	2033-01-10T13:17:28.168		-2.79x	-14.66	41851.78	20.99		
5	E	2033-01-10T13:17:48.869		-2.85x	-14.59	42290.29	21.01		
4	E	2033-01-10T13:18:00.972		-2.89x	-14.55	42532.64	21.00		
alpha	E	2033-01-10T13:19:44.910		-3.21x	-14.20	44723.47	21.05		
beta	E	2033-01-10T13:20:29.369		-3.34x	-14.05	45657.40	21.07		
eta	E	2033-01-10T13:21:41.395		-3.56x	-13.80	47176.12	21.09		
gamma	E	2033-01-10T13:22:02.587		-3.63x	-13.73	47623.25	21.10		
delta	E	2033-01-10T13:22:34.666		-3.72x	-13.62	48300.35	21.11		
lambda	E	2033-01-10T13:23:56.386		-3.97x	-13.35	50026.71	21.14		
epsilon	E	2033-01-10T13:25:03.280		-4.18x	-13.12	51441.31	21.18		

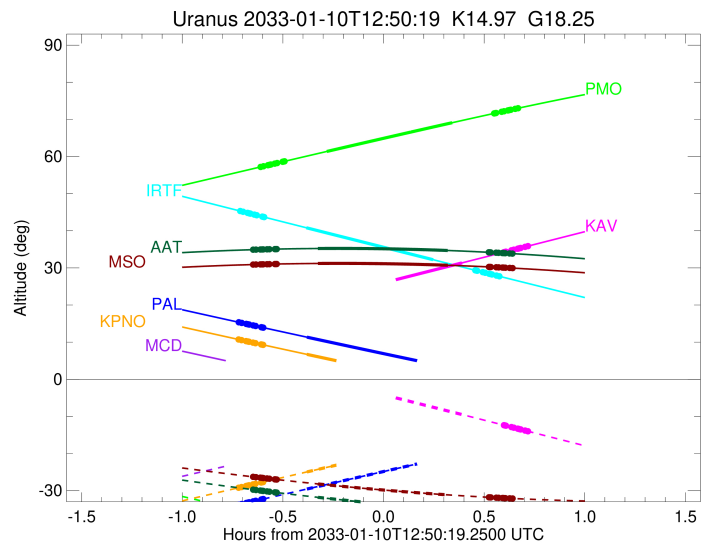
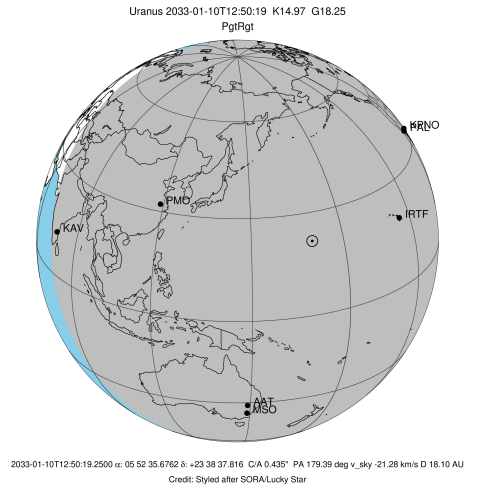
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target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-01-10T12:46:18.160
Event type          : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code       : IRTF
Location            : Mauna Kea/IRTF
Latitude (deg)      : 19.82622
E. Longitude (deg)  : 204.52800
Altitude (km)       : 4.168
Gaia source ID      : 3427497873461998976
2Mass ID (if available) : 05523568+2338379
ICRS Star Coord at Epoch: 05h 52m 35.67624s +23:38:37.81628s
RUWE (>1.4 is poor) : 1.06
K magnitude         : 14.966
G magnitude         : 18.253
RP magnitude        : 17.326
BP magnitude        : 19.162
DUPflag            : 0
Distance (au)       : 18.099
f0 (km)            : 0.000
g0 (km)            : 0.000
skyplane vel. (km/s) : -21.28
Sun-Target sep (deg) : 158.17
Sun-Moon sep (deg)  : 39.04
B (ring opening deg) : 76.74
PA of pole (deg)    : 52.28
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.478
C/A sky separation (km) : 6274.0
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_itrfr93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
    
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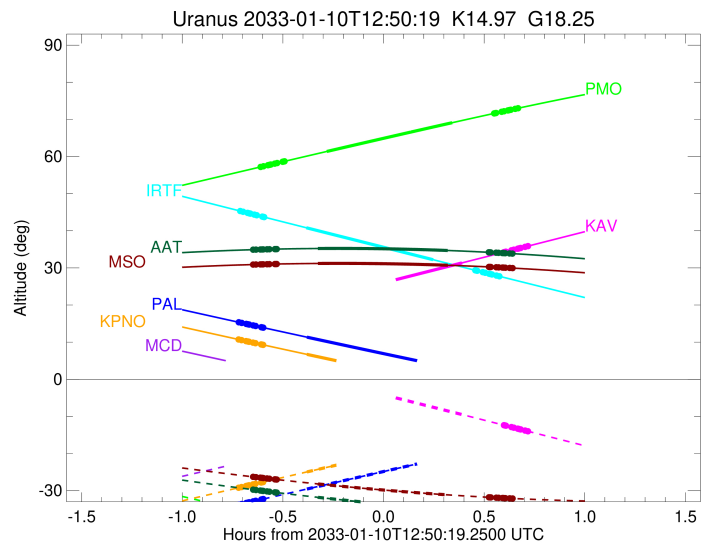
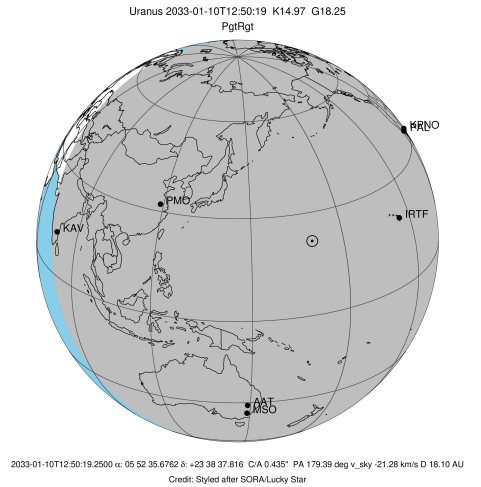
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-01-10T12:07:46.174		45.28	-66.96	50951.71	-21.81		
lambda	I	2033-01-10T12:08:28.637		45.12	-66.79	50026.71	-21.78		
delta	I	2033-01-10T12:09:47.930		44.82	-66.49	48300.35	-21.76		
gamma	I	2033-01-10T12:10:18.710		44.70	-66.37	47630.53	-21.76		
eta	I	2033-01-10T12:10:39.598		44.62	-66.29	47176.12	-21.75		
beta	I	2033-01-10T12:11:48.798		44.36	-66.02	45671.31	-21.74		
alpha	I	2033-01-10T12:12:32.375		44.19	-65.85	44725.38	-21.73		
4	I	2033-01-10T12:14:09.319		43.82	-65.48	42615.82	-21.70		
5	I	2033-01-10T12:14:28.747		43.75	-65.40	42204.51	-21.71		
6	I	2033-01-10T12:14:46.930		43.68	-65.33	41809.00	-21.69		
Uranus	I	2033-01-10T12:27:18.299		40.81	-62.43	25335.51		-8.29	-8.68
Uranus	E	2033-01-10T13:05:07.570		32.21	-53.66	25081.32		12.26	12.82
6	E	2033-01-10T13:17:41.327		29.36	-50.76	41854.52	21.58		
5	E	2033-01-10T13:18:01.170		29.29	-50.68	42286.16	21.59		
4	E	2033-01-10T13:18:13.065		29.24	-50.63	42531.11	21.59		
alpha	E	2033-01-10T13:19:54.227		28.86	-50.24	44721.28	21.61		
beta	E	2033-01-10T13:20:37.581		28.70	-50.08	45656.16	21.62		
eta	E	2033-01-10T13:21:47.865		28.43	-49.81	47176.12	21.63		
gamma	E	2033-01-10T13:22:08.525		28.36	-49.73	47622.99	21.63		
delta	E	2033-01-10T13:22:39.835		28.24	-49.61	48300.35	21.64		
lambda	E	2033-01-10T13:23:59.606		27.94	-49.30	50026.71	21.65		
epsilon	E	2033-01-10T13:25:04.188		27.70	-49.05	51424.95	21.67		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-10T12:54:48.110
 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 : 3427497873461998976
 2Mass ID (if available) : 05523568+2338379
 ICRS Star Coord at Epoch: 05h 52m 35.67624s +23:38:37.81628s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 14.966
 G magnitude : 18.253
 RP magnitude : 17.326
 BP magnitude : 19.162
 DUPflag : 0
 Distance (au) : 18.099
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.28
 Sun-Target sep (deg) : 158.17
 Sun-Moon sep (deg) : 37.66
 B (ring opening deg) : 76.74
 PA of pole (deg) : 52.28
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.450
 C/A sky separation (km) : 5902.5
 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



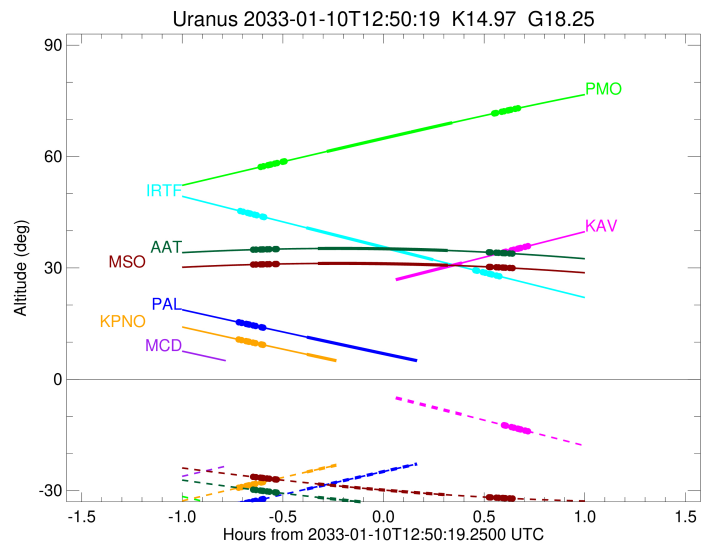
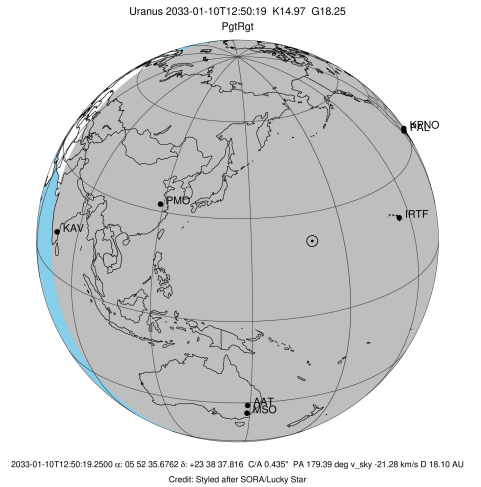
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-01-10T12:16:00.887		18.12	3.57x	50954.13	-21.63		
lambda	I	2033-01-10T12:16:43.798		18.29	3.41x	50026.71	-21.61		
delta	I	2033-01-10T12:18:03.700		18.59	3.11x	48300.35	-21.60		
gamma	I	2033-01-10T12:18:34.711		18.71	2.99x	47630.56	-21.60		
eta	I	2033-01-10T12:18:55.753		18.79	2.92x	47176.12	-21.59		
beta	I	2033-01-10T12:20:05.450		19.06	2.65x	45671.42	-21.59		
alpha	I	2033-01-10T12:20:49.327		19.22	2.49x	44725.58	-21.58		
4	I	2033-01-10T12:22:26.934		19.59	2.13x	42615.86	-21.56		
5	I	2033-01-10T12:22:46.471		19.67	2.05x	42204.90	-21.56		
6	I	2033-01-10T12:23:04.799		19.74	1.98x	41808.84	-21.55		
Uranus	I	2033-01-10T12:35:39.559		22.62	-0.85x	25335.21		-8.30	-8.68
Uranus	E	2033-01-10T13:13:43.354		31.35	-9.50	25093.06		12.10	12.66
6	E	2033-01-10T13:26:14.625		34.23	-12.37	41855.42	21.66		
5	E	2033-01-10T13:26:34.296		34.30	-12.45	42284.71	21.67		
4	E	2033-01-10T13:26:46.190		34.35	-12.49	42530.64	21.67		
alpha	E	2033-01-10T13:28:26.961		34.73	-12.88	44720.51	21.69		
beta	E	2033-01-10T13:29:10.159		34.90	-13.04	45655.72	21.70		
eta	E	2033-01-10T13:30:20.188		35.17	-13.31	47176.12	21.72		
gamma	E	2033-01-10T13:30:40.761		35.24	-13.39	47622.90	21.72		
delta	E	2033-01-10T13:31:11.948		35.36	-13.51	48300.35	21.72		
lambda	E	2033-01-10T13:32:31.387		35.67	-13.81	50026.71	21.74		
epsilon	E	2033-01-10T13:33:35.389		35.91	-14.06	51418.38	21.76		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-10T12:50:06.220
 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 : 3427497873461998976
 2Mass ID (if available) : 05523568+2338379
 ICRS Star Coord at Epoch: 05h 52m 35.67624s +23:38:37.81628s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 14.966
 G magnitude : 18.253
 RP magnitude : 17.326
 BP magnitude : 19.162
 DUPflag : 0
 Distance (au) : 18.099
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.28
 Sun-Target sep (deg) : 158.17
 Sun-Moon sep (deg) : 38.42
 B (ring opening deg) : 76.74
 PA of pole (deg) : 52.28
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.032
 C/A sky separation (km) : 420.2
 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	2033-01-10T12:11:38.604		34.91	-29.76	50914.23	-22.06		
lambda	I	2033-01-10T12:12:18.845		34.93	-29.84	50026.71	-22.05		
delta	I	2033-01-10T12:13:37.123		34.96	-29.98	48300.35	-22.05		
gamma	I	2033-01-10T12:14:07.512		34.97	-30.04	47630.13	-22.05		
eta	I	2033-01-10T12:14:28.099		34.98	-30.08	47176.12	-22.05		
beta	I	2033-01-10T12:15:36.428		35.01	-30.21	45669.11	-22.05		
alpha	I	2033-01-10T12:16:19.482		35.02	-30.29	44721.15	-22.05		
4	I	2033-01-10T12:17:54.793		35.06	-30.46	42614.33	-22.05		
5	I	2033-01-10T12:18:14.324		35.06	-30.50	42194.87	-22.06		
6	I	2033-01-10T12:18:31.524		35.07	-30.53	41813.54	-22.05		
Uranus	I	2033-01-10T12:30:43.573		35.23	-31.80	25210.79		-10.41	-10.89
Uranus	E	2033-01-10T13:09:28.282		34.69	-35.00	25192.84		10.68	11.17
6	E	2033-01-10T13:21:42.621		34.20	-35.72	41860.06	22.04		
5	E	2033-01-10T13:22:01.421		34.19	-35.74	42276.58	22.04		
4	E	2033-01-10T13:22:13.367		34.18	-35.75	42528.49	22.04		
alpha	E	2033-01-10T13:23:52.427		34.10	-35.83	44716.58	22.04		
beta	E	2033-01-10T13:24:35.015		34.06	-35.87	45653.56	22.04		
eta	E	2033-01-10T13:25:44.097		34.01	-35.93	47176.12	22.04		
gamma	E	2033-01-10T13:26:04.350		33.99	-35.94	47622.48	22.04		
delta	E	2033-01-10T13:26:35.109		33.96	-35.97	48300.35	22.04		
lambda	E	2033-01-10T13:27:53.444		33.89	-36.03	50026.71	22.04		
epsilon	E	2033-01-10T13:28:55.151		33.84	-36.08	51386.61	22.04		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-10T12:50:07.200
 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 : 3427497873461998976
 2Mass ID (if available) : 05523568+2338379
 ICRS Star Coord at Epoch: 05h 52m 35.67624s +23:38:37.81628s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 14.966
 G magnitude : 18.253
 RP magnitude : 17.326
 BP magnitude : 19.162
 DUPflag : 0
 Distance (au) : 18.099
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.28
 Sun-Target sep (deg) : 158.17
 Sun-Moon sep (deg) : 38.38
 B (ring opening deg) : 76.74
 PA of pole (deg) : 52.28
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.013
 C/A sky separation (km) : 175.3
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.bsp
 earthstns_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-01-10T12:11:37.965		30.90	-26.30	50912.64	-22.04		
lambda	I	2033-01-10T12:12:18.166		30.92	-26.37	50026.71	-22.04		
delta	I	2033-01-10T12:13:36.506		30.95	-26.51	48300.35	-22.04		
gamma	I	2033-01-10T12:14:06.920		30.96	-26.56	47630.11	-22.04		
eta	I	2033-01-10T12:14:27.522		30.97	-26.60	47176.12	-22.04		
beta	I	2033-01-10T12:15:35.910		30.99	-26.72	45669.01	-22.04		
alpha	I	2033-01-10T12:16:19.004		31.01	-26.79	44720.97	-22.04		
4	I	2033-01-10T12:17:54.385		31.04	-26.95	42614.25	-22.03		
5	I	2033-01-10T12:18:13.947		31.04	-26.99	42194.47	-22.04		
6	I	2033-01-10T12:18:31.131		31.05	-27.01	41813.75	-22.04		
Uranus	I	2033-01-10T12:30:43.693		31.19	-28.19	25205.62		-10.49	-10.97
Uranus	E	2033-01-10T13:09:30.595		30.71	-31.14	25197.95		10.60	11.09
6	E	2033-01-10T13:21:45.550		30.27	-31.80	41860.27	22.02		
5	E	2033-01-10T13:22:04.339		30.25	-31.81	42276.17	22.03		
4	E	2033-01-10T13:22:16.307		30.24	-31.82	42528.40	22.02		
alpha	E	2033-01-10T13:23:55.439		30.17	-31.90	44716.39	22.02		
beta	E	2033-01-10T13:24:38.065		30.14	-31.93	45653.46	22.02		
eta	E	2033-01-10T13:25:47.205		30.09	-31.99	47176.12	22.02		
gamma	E	2033-01-10T13:26:07.473		30.07	-32.00	47622.46	22.02		
delta	E	2033-01-10T13:26:38.257		30.05	-32.02	48300.35	22.02		
lambda	E	2033-01-10T13:27:56.653		29.99	-32.08	50026.71	22.02		
epsilon	E	2033-01-10T13:28:58.335		29.94	-32.12	51385.01	22.02		