

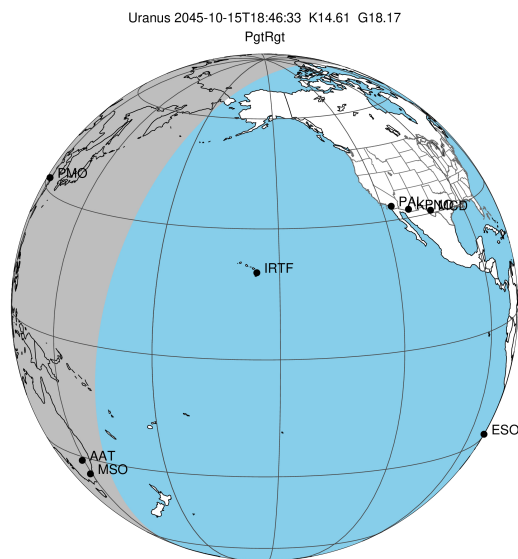
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2045-10-15T18:46:33.460
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3880798445686135552
 2Mass ID (if available) : 10083792+1212458

Uranus 2045-10-15T18:46:33 K14.61 G18.17 PgtRgt

ICRS Star Coord at Epoch: 10h 08m 38.03044s +12:12:44.44679s

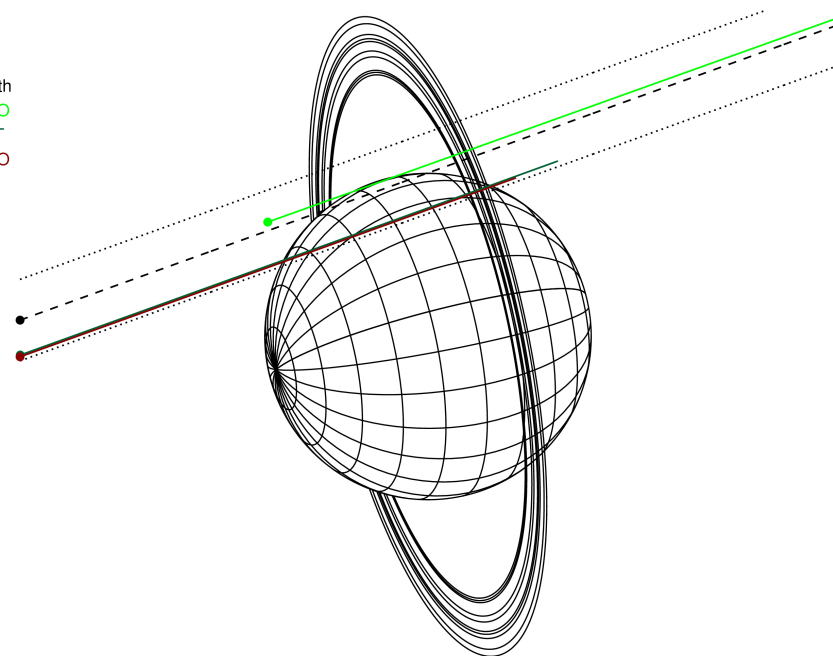
RUWE (>1.4 is poor) : 1.16
 K magnitude : 14.607
 G magnitude : 18.167
 RP magnitude : 17.006
 BP magnitude : 19.548
 DUPflag : 0
 Distance (au) : 18.937
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 24.93
 Sun-Target sep (deg) : 52.39
 Sun-Moon sep (deg) : 119.80
 B (ring opening deg) : 17.57
 PA of pole (deg) : 102.26

#	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



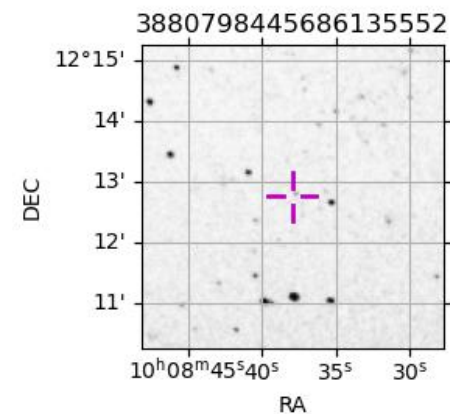
2045-10-15T18:46:33.4600 ex: 10 08 38.0304 s: +12 12 44.447 C/A 1.755° PA 199.85 deg v_sky +24.93 km/s D 18.94 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PMO
 AAT
 MSO

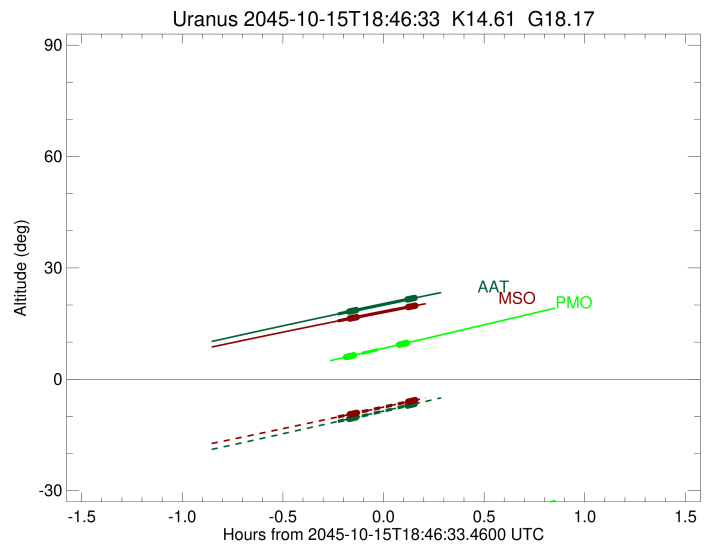
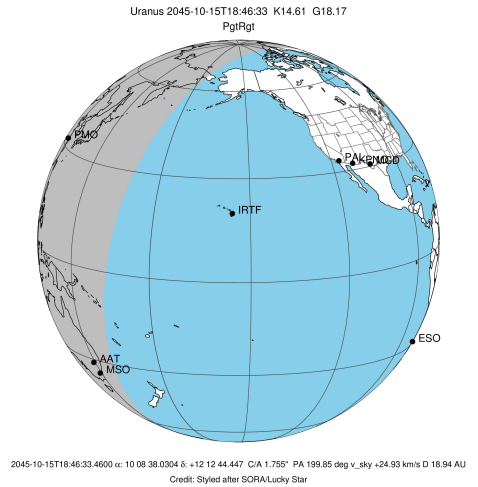


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++	+ +	+++++	OCT 15 18:35 - OCT 15 18:53	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					PnnRnn
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
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		+ +		OCT 15 18:32 - OCT 15 18:56	PieRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0		+ +		OCT 15 18:33 - OCT 15 18:56	PieRnn

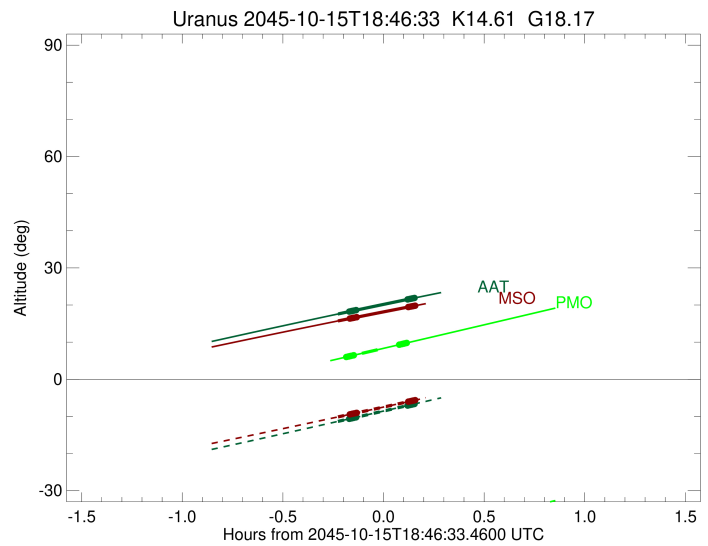
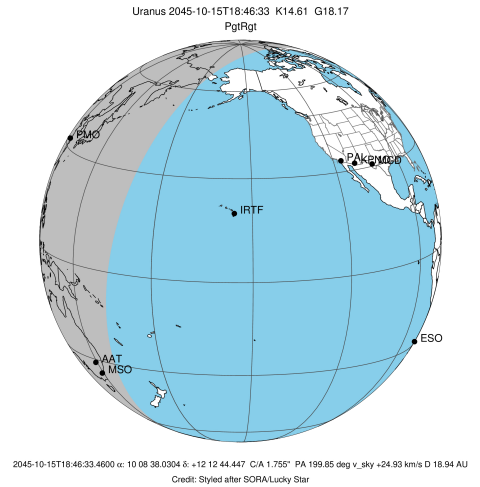


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2045-10-15T18:42:27.850
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3880798445686135552
 2Mass ID (if available) : 10083792+1212458
 ICRS Star Coord at Epoch: 10h 08m 38.03044s +12:12:44.44679s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 14.607
 G magnitude : 18.167
 RP magnitude : 17.006
 BP magnitude : 19.548
 DUPflag : 0
 Distance (au) : 18.937
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 24.93
 Sun-Target sep (deg) : 52.39
 Sun-Moon sep (deg) : 119.46
 B (ring opening deg) : 17.57
 PA of pole (deg) : 102.26
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.844
 C/A sky separation (km) : 25320.3
 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



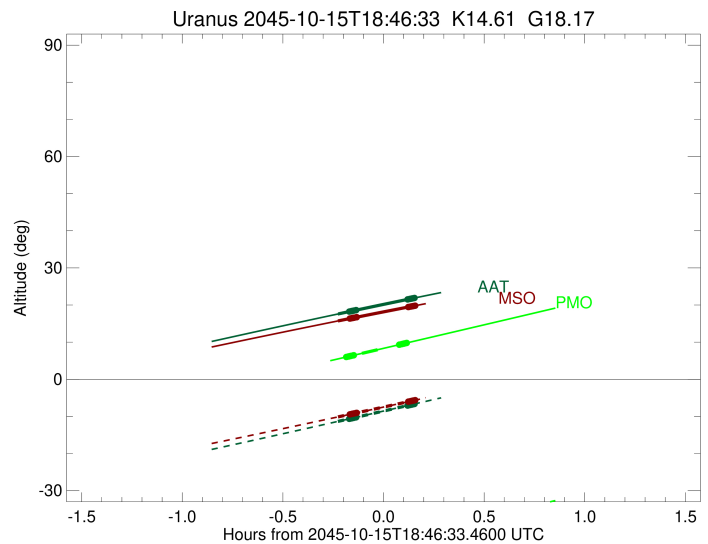
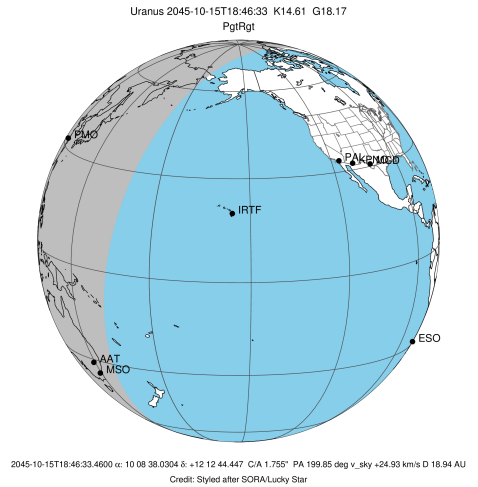
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2045-10-15T18:35:31.892		6.01	-45.36	50804.47	-70.99		
lambda	I	2045-10-15T18:35:42.904		6.05	-45.32	50026.71	-70.44		
delta	I	2045-10-15T18:36:07.567		6.14	-45.24	48300.35	-69.53		
gamma	I	2045-10-15T18:36:17.347		6.17	-45.21	47622.15	-69.14		
eta	I	2045-10-15T18:36:23.810		6.20	-45.19	47176.12	-68.88		
beta	I	2045-10-15T18:36:45.813		6.27	-45.12	45678.83	-67.93		
alpha	I	2045-10-15T18:36:59.460		6.32	-45.07	44741.14	-67.19		
4	I	2045-10-15T18:37:33.051		6.44	-44.96	42558.01	-65.59		
5	I	2045-10-15T18:37:37.190		6.45	-44.95	42156.52	-65.00		
6	I	2045-10-15T18:37:41.154		6.47	-44.93	41879.14	-64.71		
Uranus	I	2045-10-15T18:40:08.985		6.98	-44.45	25555.36		14.46	15.12
Uranus	E	2045-10-15T18:44:47.805		7.96	-43.52	25559.00		-0.40	-0.42
6	E	2045-10-15T18:51:13.279		9.31	-42.24	41819.56	64.64		
5	E	2045-10-15T18:51:20.446		9.33	-42.21	42271.79	64.92		
4	E	2045-10-15T18:51:22.544		9.34	-42.20	42533.30	65.51		
alpha	E	2045-10-15T18:51:56.272		9.46	-42.09	44686.98	67.11		
beta	E	2045-10-15T18:52:09.895		9.51	-42.05	45645.68	67.84		
eta	E	2045-10-15T18:52:32.437		9.59	-41.97	47176.11	68.78		
gamma	E	2045-10-15T18:52:38.950		9.61	-41.95	47624.98	69.05		
delta	E	2045-10-15T18:52:48.704		9.64	-41.92	48300.34	69.43		
lambda	E	2045-10-15T18:53:13.404		9.73	-41.83	50026.71	70.34		
epsilon	E	2045-10-15T18:53:34.354		9.80	-41.76	51507.63	70.88		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2045-10-15T18:44:31.480
 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 : 3880798445686135552
 2Mass ID (if available) : 10083792+1212458
 ICRS Star Coord at Epoch: 10h 08m 38.03044s +12:12:44.44679s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 14.607
 G magnitude : 18.167
 RP magnitude : 17.006
 BP magnitude : 19.548
 DUPflag : 0
 Distance (au) : 18.937
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 24.93
 Sun-Target sep (deg) : 52.39
 Sun-Moon sep (deg) : 119.89
 B (ring opening deg) : 17.57
 PA of pole (deg) : 102.26
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.378
 C/A sky separation (km) : 18925.5
 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	2045-10-15T18:36:25.716	b	18.25	-10.64	50777.85	-75.39		
lambda	I	2045-10-15T18:36:35.705	b	18.28	-10.61	50026.71	-75.10		
delta	I	2045-10-15T18:36:58.761	b	18.35	-10.53	48300.35	-74.64		
gamma	I	2045-10-15T18:37:07.852	b	18.38	-10.50	47622.71	-74.44		
eta	I	2045-10-15T18:37:13.857	b	18.40	-10.48	47176.12	-74.30		
beta	I	2045-10-15T18:37:34.187	b	18.46	-10.41	45680.13	-73.83		
alpha	I	2045-10-15T18:37:46.566	b	18.50	-10.37	44745.04	-73.43		
4	I	2045-10-15T18:38:17.300	b	18.60	-10.26	42565.94	-72.71		
5	I	2045-10-15T18:38:20.724	b	18.61	-10.25	42154.85	-72.23		
6	I	2045-10-15T18:38:24.281	b	18.62	-10.24	41879.74	-72.10		
Uranus	I	2045-10-15T18:32:58.559		17.59	-11.35	25528.18		46.68	47.99
Uranus	E	2045-10-15T18:56:05.754		21.95	-6.59	25541.94		-32.76	-33.97
6	E	2045-10-15T18:53:42.968	b	21.51	-7.08	41812.88	72.01		
5	E	2045-10-15T18:53:49.625	b	21.53	-7.06	42283.91	72.14		
4	E	2045-10-15T18:53:50.967	b	21.53	-7.06	42538.27	72.62		
alpha	E	2045-10-15T18:54:21.701	b	21.63	-6.95	44685.36	73.33		
beta	E	2045-10-15T18:54:34.145	b	21.67	-6.91	45643.83	73.74		
eta	E	2045-10-15T18:54:55.009	b	21.73	-6.84	47176.11	74.21		
gamma	E	2045-10-15T18:55:01.063	b	21.75	-6.81	47625.78	74.34		
delta	E	2045-10-15T18:55:10.125	b	21.78	-6.78	48300.35	74.54		
lambda	E	2045-10-15T18:55:33.213	b	21.85	-6.70	50026.71	75.00		
epsilon	E	2045-10-15T18:55:53.217	b	21.91	-6.63	51530.63	75.28		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2045-10-15T18:44:43.990
 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 : 3880798445686135552
 2Mass ID (if available) : 10083792+1212458
 ICRS Star Coord at Epoch: 10h 08m 38.03044s +12:12:44.44679s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 14.607
 G magnitude : 18.167
 RP magnitude : 17.006
 BP magnitude : 19.548
 DUPflag : 0
 Distance (au) : 18.937
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 24.93
 Sun-Target sep (deg) : 52.39
 Sun-Moon sep (deg) : 119.88
 B (ring opening deg) : 17.57
 PA of pole (deg) : 102.26
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.360
 C/A sky separation (km) : 18678.0
 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	2045-10-15T18:36:35.990	b	16.37	-9.44	50776.99	-75.57		
lambda	I	2045-10-15T18:36:45.942	b	16.40	-9.40	50026.71	-75.30		
delta	I	2045-10-15T18:37:08.937	b	16.47	-9.33	48300.34	-74.84		
gamma	I	2045-10-15T18:37:18.003	b	16.50	-9.30	47622.74	-74.65		
eta	I	2045-10-15T18:37:23.990	b	16.51	-9.28	47176.12	-74.52		
beta	I	2045-10-15T18:37:44.259	b	16.57	-9.21	45680.18	-74.07		
alpha	I	2045-10-15T18:37:56.593	b	16.61	-9.17	44745.16	-73.67		
4	I	2045-10-15T18:38:27.229	b	16.70	-9.07	42566.23	-72.98		
5	I	2045-10-15T18:38:30.630	b	16.71	-9.06	42154.83	-72.50		
6	I	2045-10-15T18:38:34.175	b	16.72	-9.05	41879.73	-72.37		
Uranus	I	2045-10-15T18:33:00.488		15.72	-10.13	25527.43		47.41	48.72
Uranus	E	2045-10-15T18:56:28.834		19.90	-5.53	25541.23		-33.52	-34.75
6	E	2045-10-15T18:53:55.586	b	19.46	-6.04	41812.65	72.29		
5	E	2045-10-15T18:54:02.225	b	19.47	-6.02	42284.32	72.41		
4	E	2045-10-15T18:54:03.544	b	19.48	-6.01	42538.47	72.89		
alpha	E	2045-10-15T18:54:34.172	b	19.57	-5.91	44685.32	73.58		
beta	E	2045-10-15T18:54:46.575	b	19.60	-5.87	45643.77	73.97		
eta	E	2045-10-15T18:55:07.376	b	19.66	-5.80	47176.12	74.43		
gamma	E	2045-10-15T18:55:13.413	b	19.68	-5.78	47625.81	74.55		
delta	E	2045-10-15T18:55:22.449	b	19.71	-5.75	48300.35	74.75		
lambda	E	2045-10-15T18:55:45.474	b	19.78	-5.68	50026.71	75.20		
epsilon	E	2045-10-15T18:56:05.436	b	19.83	-5.61	51531.35	75.47		