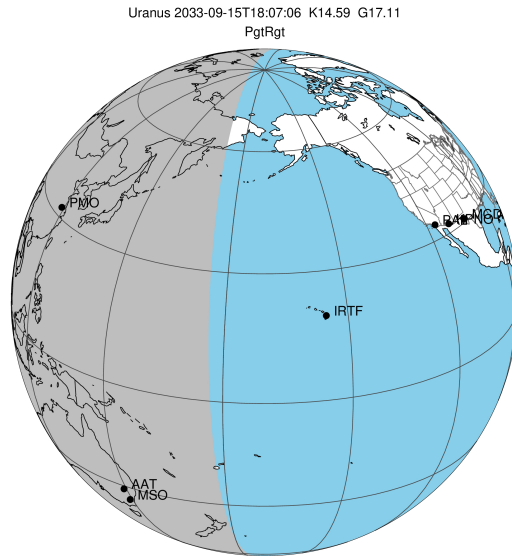


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-09-15T18:07:06.030
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3377568711144234880
 2Mass ID (if available) : 06231815+2334192

ICRS Star Coord at Epoch: 06h 23m 18.17444s +23:34:18.98597s

RUWE (>1.4 is poor) : 1.07
 K magnitude : 14.590
 G magnitude : 17.109
 RP magnitude : 16.343
 BP magnitude : 17.734
 DUPflag : 0
 Distance (au) : 19.165
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 12.89
 Sun-Target sep (deg) : 77.41
 Sun-Moon sep (deg) : 13.36
 B (ring opening deg) : 70.65
 PA of pole (deg) : 67.64

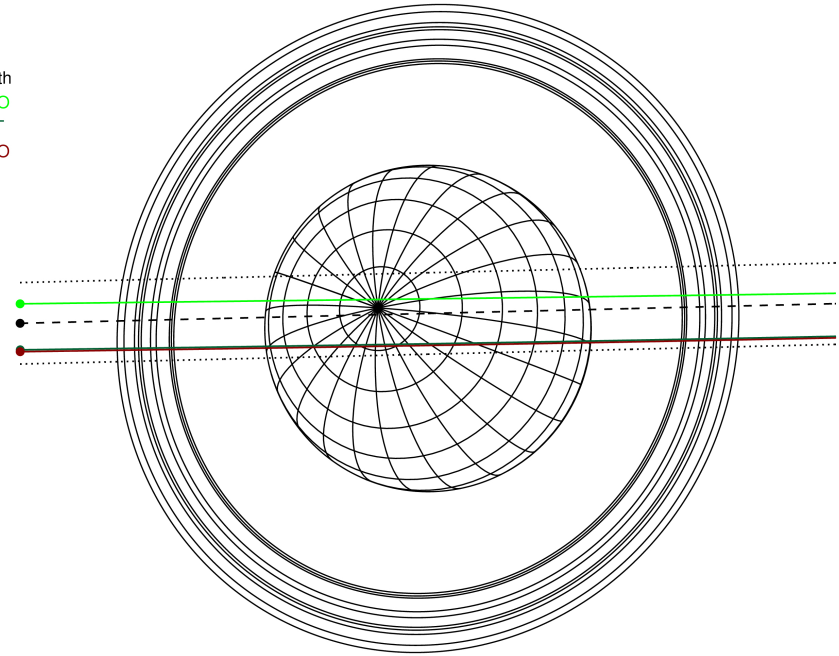
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2033-09-15T18:07:06.0300 ex: 06 23 18.1744 s: +23 34 18.986 C/A 0.173° PA 181.37 deg v_sky +12.89 km/s D 19.17 AU
 Credit: Styled after SORA/Lucky Star

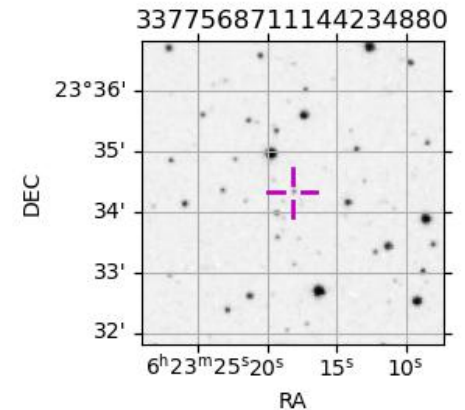
Uranus 2033-09-15T18:07:06 K14.59 G17.11 PgtRgt

Earth
 PMO
 AAT
 MSO

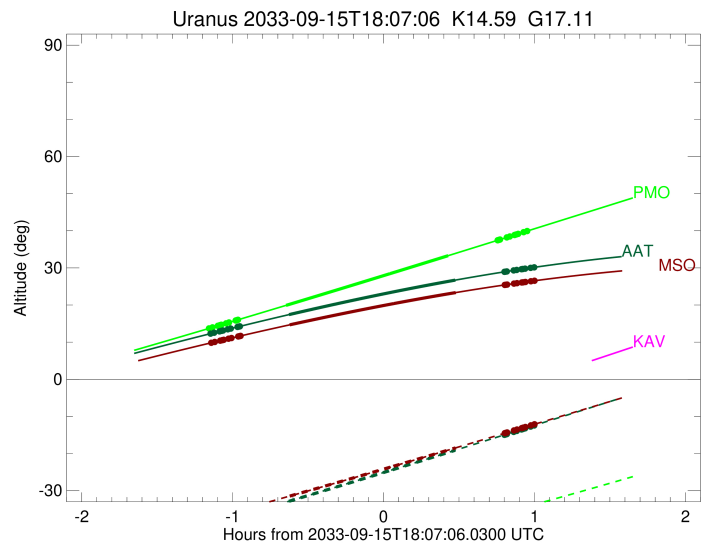
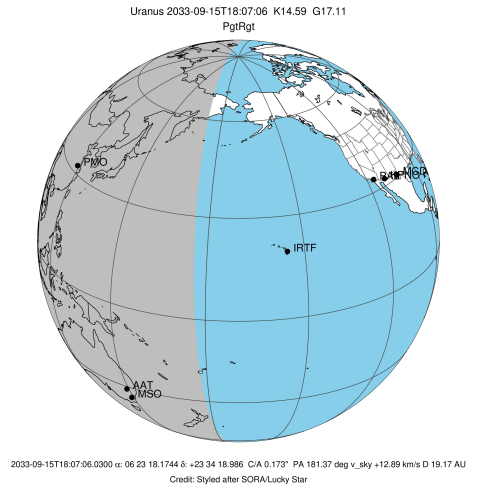


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++	+ +	+++++	SEP 15 16:57 - SEP 15 19:04	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	+++++	+ +	+++++	SEP 15 16:58 - SEP 15 19:06	PieRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++	+ +	+++++	SEP 15 16:58 - SEP 15 19:06	PieRie



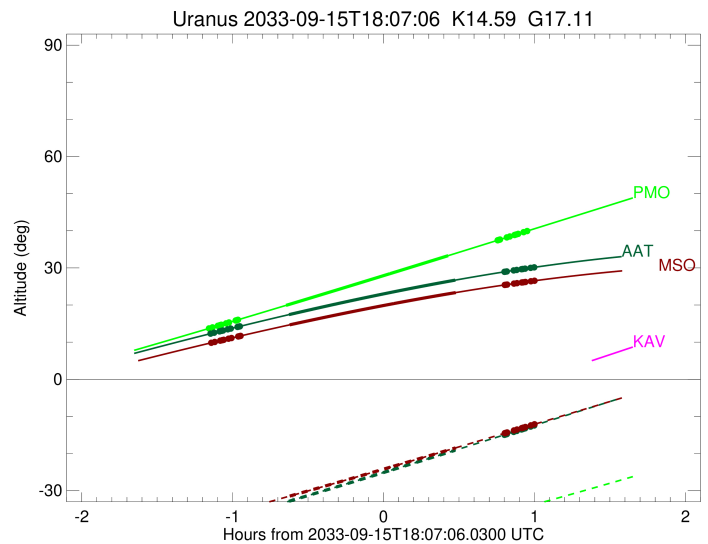
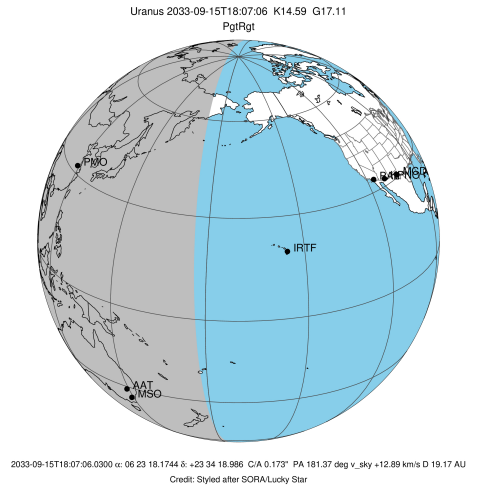
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-09-15T18:00:25.140
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3377568711144234880
 2Mass ID (if available) : 06231815+2334192
 ICRS Star Coord at Epoch: 06h 23m 18.17444s +23:34:18.98597s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 14.590
 G magnitude : 17.109
 RP magnitude : 16.343
 BP magnitude : 17.734
 DUPflag : 0
 Distance (au) : 19.165
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 12.89
 Sun-Target sep (deg) : 77.41
 Sun-Moon sep (deg) : 12.89
 B (ring opening deg) : 70.65
 PA of pole (deg) : 67.64
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.334
 C/A sky separation (km) : 4641.2
 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



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-09-15T16:57:34.589	13.67	-52.77	51291.17	-13.51		
lambda	I	2033-09-15T16:59:08.298	13.98	-52.64	50026.71	-13.49		
delta	I	2033-09-15T17:01:16.312	14.41	-52.44	48300.35	-13.48		
gamma	I	2033-09-15T17:02:06.091	14.58	-52.36	47629.37	-13.48		
eta	I	2033-09-15T17:02:39.725	14.69	-52.31	47176.12	-13.47		
beta	I	2033-09-15T17:04:31.110	15.06	-52.14	45676.80	-13.47		
alpha	I	2033-09-15T17:05:42.263	15.30	-52.02	44714.86	-13.46		
4	I	2033-09-15T17:08:24.373	15.85	-51.75	42541.21	-13.45		
5	I	2033-09-15T17:08:49.105	15.93	-51.71	42209.69	-13.45		
6	I	2033-09-15T17:09:13.651	16.01	-51.67	41873.90	-13.44		
Uranus	I	2033-09-15T17:28:21.829	19.91	-49.51	25061.33		18.88	19.71
Uranus	E	2033-09-15T18:32:48.743	33.30	-39.87	25195.11		-16.00	-16.72
6	E	2033-09-15T18:52:24.664	37.43	-36.43	41796.75	13.23		
5	E	2033-09-15T18:53:00.545	37.55	-36.32	42276.12	13.23		
4	E	2033-09-15T18:53:24.880	37.64	-36.25	42593.17	13.23		
alpha	E	2033-09-15T18:56:05.591	38.21	-35.76	44715.10	13.23		
beta	E	2033-09-15T18:57:15.511	38.45	-35.55	45643.26	13.23		
eta	E	2033-09-15T18:59:11.395	38.86	-35.20	47176.12	13.23		
gamma	E	2033-09-15T18:59:45.240	38.98	-35.09	47624.05	13.24		
delta	E	2033-09-15T19:00:36.337	39.16	-34.94	48300.35	13.24		
lambda	E	2033-09-15T19:02:46.768	39.62	-34.54	50026.71	13.24		
epsilon	E	2033-09-15T19:04:05.803	39.90	-34.29	51072.82	13.25		

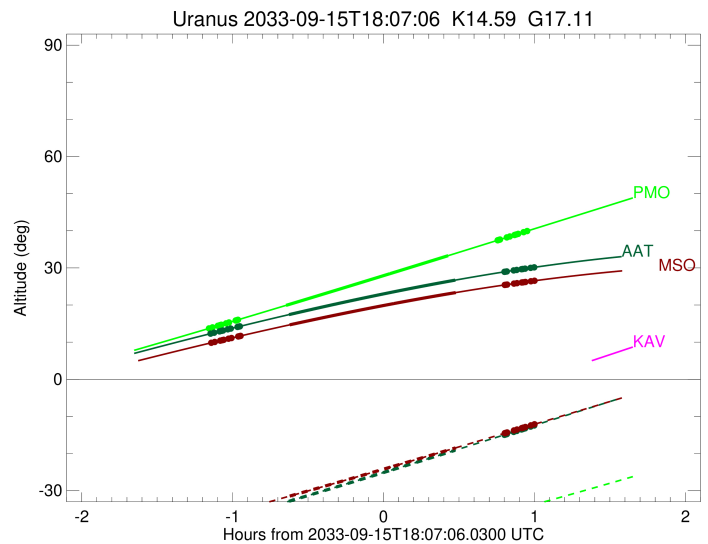
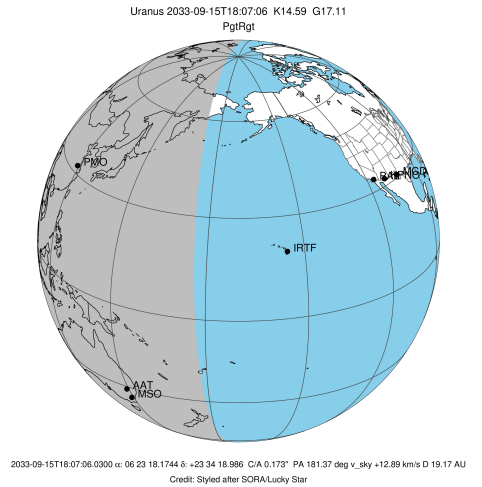
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-09-15T18:02:33.610
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 3377568711144234880
 2Mass ID (if available) : 06231815+2334192
 ICRS Star Coord at Epoch: 06h 23m 18.17444s +23:34:18.98597s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 14.590
 G magnitude : 17.109
 RP magnitude : 16.343
 BP magnitude : 17.734
 DUPflag : 0
 Distance (au) : 19.165
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 12.89
 Sun-Target sep (deg) : 77.41
 Sun-Moon sep (deg) : 12.72
 B (ring opening deg) : 70.65
 PA of pole (deg) : 67.64
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.172
 C/A sky separation (km) : 2395.5
 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



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-09-15T16:58:15.416		12.28	-39.09	51236.03	-13.32		
lambda	I	2033-09-15T16:59:46.171		12.53	-38.79	50026.71	-13.32		
delta	I	2033-09-15T17:01:55.775		12.90	-38.37	48300.35	-13.32		
gamma	I	2033-09-15T17:02:46.214		13.04	-38.20	47628.69	-13.32		
eta	I	2033-09-15T17:03:20.205		13.14	-38.09	47176.12	-13.31		
beta	I	2033-09-15T17:05:12.771		13.45	-37.73	45678.59	-13.31		
alpha	I	2033-09-15T17:06:24.542		13.65	-37.49	44720.34	-13.31		
4	I	2033-09-15T17:09:08.292		14.11	-36.95	42547.38	-13.30		
5	I	2033-09-15T17:09:34.939		14.18	-36.86	42197.09	-13.30		
6	I	2033-09-15T17:09:58.633		14.25	-36.78	41877.06	-13.30		
Uranus	I	2033-09-15T17:29:29.187		17.41	-32.87	25155.50		16.89	17.65
Uranus	E	2033-09-15T18:35:40.222		26.71	-19.11	25085.66		-18.39	-19.19
6	E	2033-09-15T18:55:07.207		28.93	-14.98	41799.43	13.13		
5	E	2033-09-15T18:55:42.189		29.00	-14.86	42264.31	13.13		
4	E	2033-09-15T18:56:07.870		29.04	-14.76	42599.32	13.13		
alpha	E	2033-09-15T18:58:49.918		29.32	-14.19	44720.34	13.13		
beta	E	2033-09-15T19:00:00.056		29.45	-13.94	45644.85	13.13		
eta	E	2033-09-15T19:01:56.776		29.65	-13.52	47176.12	13.13		
gamma	E	2033-09-15T19:02:30.848		29.70	-13.40	47623.38	13.13		
delta	E	2033-09-15T19:03:22.419		29.79	-13.22	48300.35	13.13		
lambda	E	2033-09-15T19:05:33.941		30.01	-12.75	50026.71	13.13		
epsilon	E	2033-09-15T19:06:49.621		30.13	-12.48	51020.01	13.12		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-09-15T18:02:46.780
 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 : 3377568711144234880
 2Mass ID (if available) : 06231815+2334192
 ICRS Star Coord at Epoch: 06h 23m 18.17444s +23:34:18.98597s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 14.590
 G magnitude : 17.109
 RP magnitude : 16.343
 BP magnitude : 17.734
 DUPflag : 0
 Distance (au) : 19.165
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 12.89
 Sun-Target sep (deg) : 77.41
 Sun-Moon sep (deg) : 12.72
 B (ring opening deg) : 70.65
 PA of pole (deg) : 67.64
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.191
 C/A sky separation (km) : 2660.5
 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	2033-09-15T16:58:32.352		9.81	-37.30	51233.79	-13.33		
lambda	I	2033-09-15T17:00:02.898		10.06	-37.02	50026.71	-13.33		
delta	I	2033-09-15T17:02:12.442		10.40	-36.63	48300.35	-13.32		
gamma	I	2033-09-15T17:03:02.860		10.54	-36.47	47628.66	-13.32		
eta	I	2033-09-15T17:03:36.833		10.63	-36.37	47176.12	-13.32		
beta	I	2033-09-15T17:05:29.344		10.92	-36.03	45678.65	-13.32		
alpha	I	2033-09-15T17:06:41.076		11.11	-35.81	44720.56	-13.31		
4	I	2033-09-15T17:09:24.747		11.54	-35.30	42547.64	-13.31		
5	I	2033-09-15T17:09:51.446		11.61	-35.22	42196.62	-13.30		
6	I	2033-09-15T17:10:15.090		11.68	-35.15	41877.16	-13.30		
Uranus	I	2033-09-15T17:29:46.056		14.66	-31.48	25160.27		16.79	17.54
Uranus	E	2033-09-15T18:35:48.764		23.35	-18.47	25082.65		-18.45	-19.26
6	E	2033-09-15T18:55:14.639		25.41	-14.54	41799.55	13.14		
5	E	2033-09-15T18:55:49.545		25.47	-14.42	42263.85	13.14		
4	E	2033-09-15T18:56:15.246		25.51	-14.34	42599.53	13.14		
alpha	E	2033-09-15T18:58:57.151		25.77	-13.79	44720.53	13.14		
beta	E	2033-09-15T19:00:07.212		25.88	-13.55	45644.92	13.14		
eta	E	2033-09-15T19:02:03.816		26.07	-13.15	47176.12	13.14		
gamma	E	2033-09-15T19:02:37.852		26.12	-13.04	47623.36	13.14		
delta	E	2033-09-15T19:03:29.375		26.20	-12.86	48300.35	13.14		
lambda	E	2033-09-15T19:05:40.765		26.40	-12.42	50026.71	13.14		
epsilon	E	2033-09-15T19:06:56.222		26.52	-12.16	51018.10	13.13		