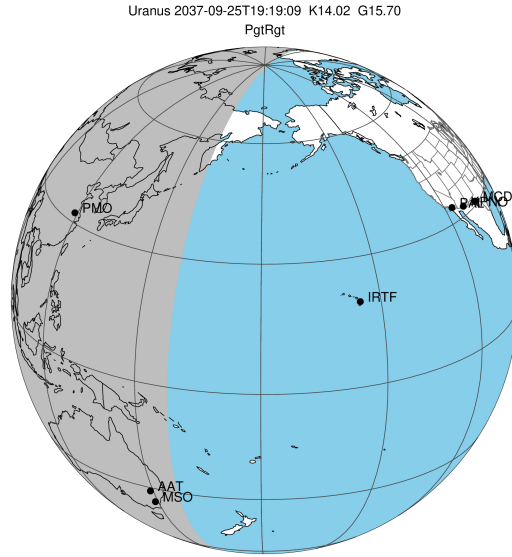


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-09-25T19:19:09.790
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 865433990294814208
 2Mass ID (if available) : 07401575+2153464

ICRS Star Coord at Epoch: 07h 40m 15.74181s +21:53:46.43405s

RUWE (>1.4 is poor) : 0.00
 K magnitude : 14.016
 G magnitude : 15.695
 RP magnitude : 14.876
 BP magnitude : 15.618
 DUPflag : 1
 Distance (au) : 19.050
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 16.98
 Sun-Target sep (deg) : 69.40
 Sun-Moon sep (deg) : 96.17
 B (ring opening deg) : 53.67
 PA of pole (deg) : 85.96

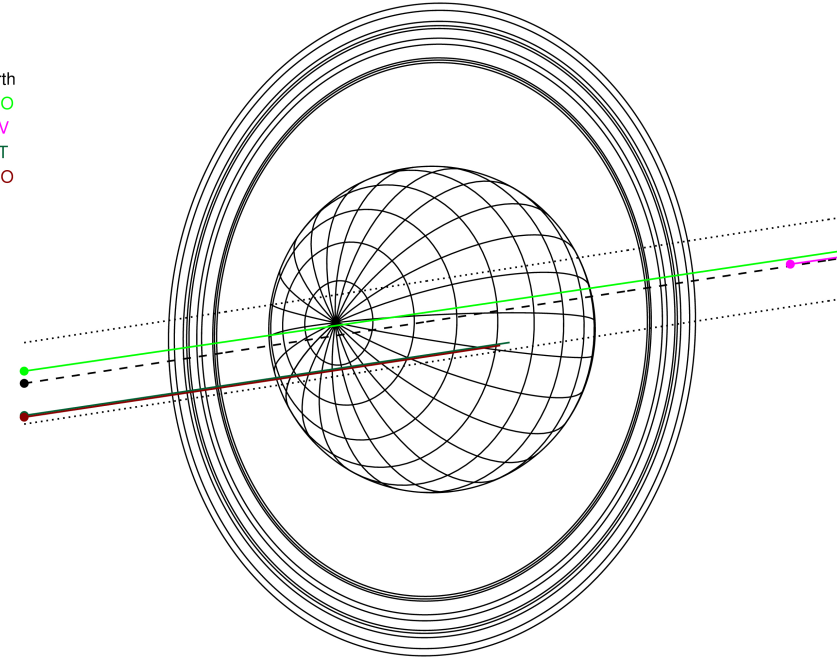
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2037-09-25T19:19:09.7900 ex: 07 40 15.7418 s: +21 53 46.434 C/A 0.100° PA 188.70 deg v_sky +16.98 km/s D 19.05 AU
 Credit: Styled after SORA/Lucky Star

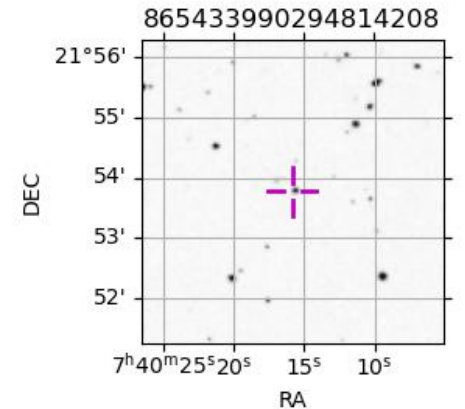
Uranus 2037-09-25T19:19:09 K14.02 G15.70 PgtRgt

Earth
 PMO
 KAV
 AAT
 MSO

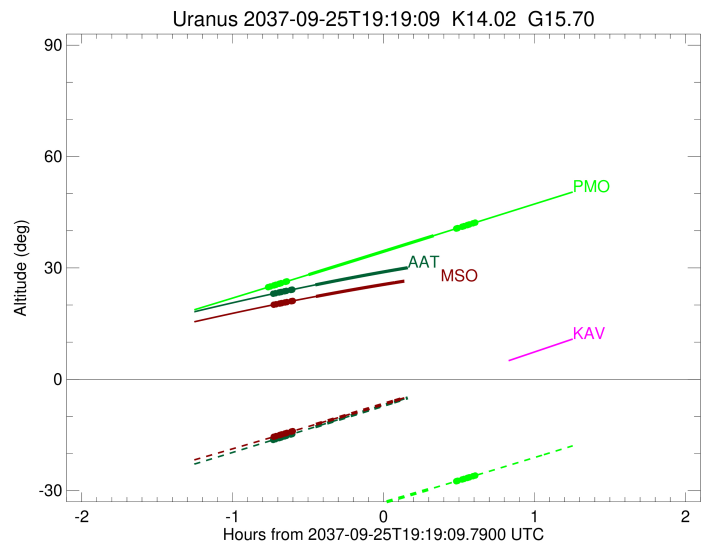
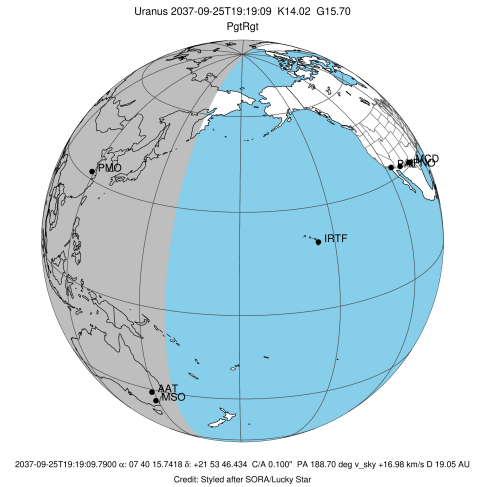


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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 25 18:33 - SEP 25 19:55	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 25 18:35 - SEP 25 18:52	PinRin
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++	+		SEP 25 18:35 - SEP 25 18:52	PinRin



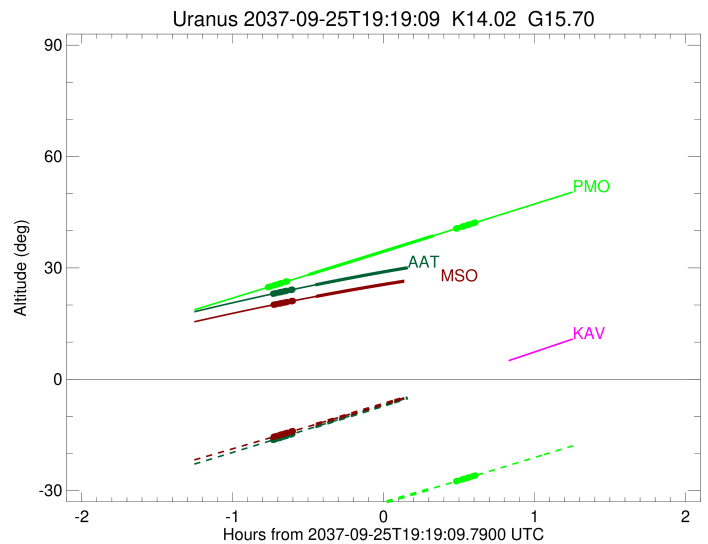
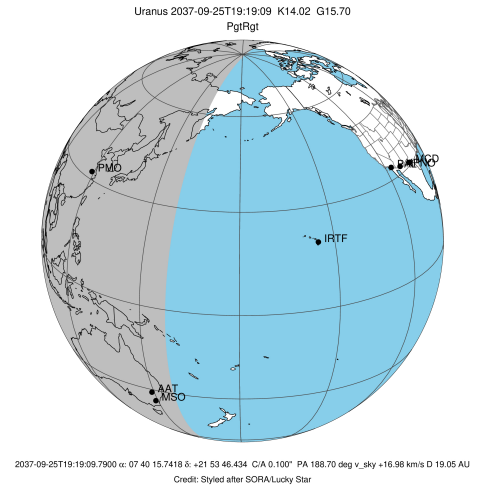
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-09-25T19:14:09.340
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 865433990294814208
 2Mass ID (if available) : 07401575+2153464
 ICRS Star Coord at Epoch: 07h 40m 15.74181s +21:53:46.43405s
 RUWE (>1.4 is poor) : 0.00
 K magnitude : 14.016
 G magnitude : 15.695
 RP magnitude : 14.876
 BP magnitude : 15.618
 DUPflag : 1
 Distance (au) : 19.051
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 16.98
 Sun-Target sep (deg) : 69.40
 Sun-Moon sep (deg) : 96.76
 B (ring opening deg) : 53.67
 PA of pole (deg) : 85.96
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.201
 C/A sky separation (km) : 2780.1
 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

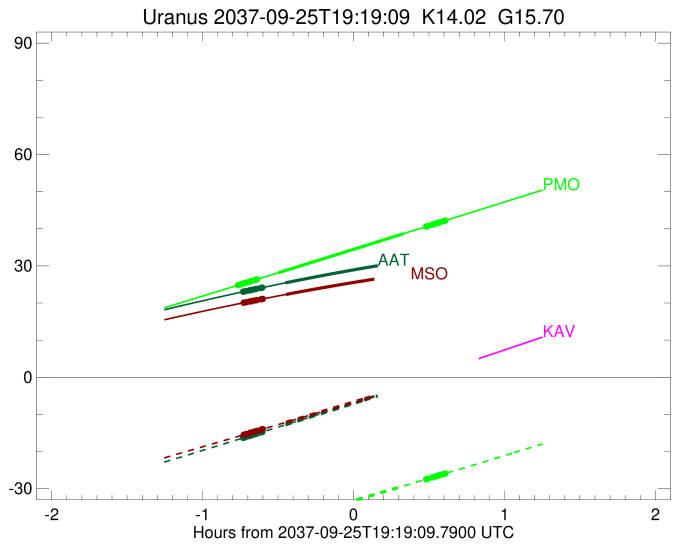
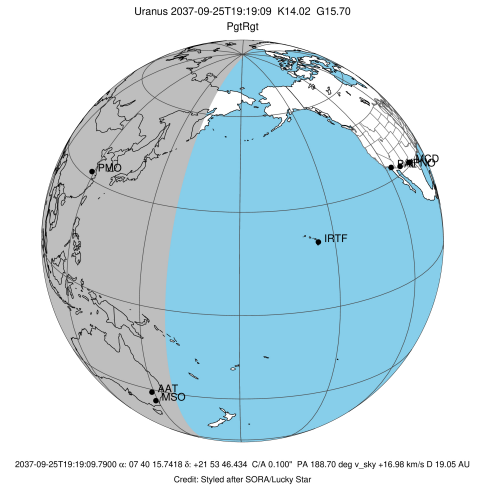
Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2037-09-25T18:33:31.549	24.86	-41.88	50864.54	-20.72		
lambda	I	2037-09-25T18:34:11.974	25.00	-41.76	50026.71	-20.72		
delta	I	2037-09-25T18:35:35.290	25.29	-41.51	48300.35	-20.72		
gamma	I	2037-09-25T18:36:07.572	25.40	-41.41	47631.58	-20.71		
eta	I	2037-09-25T18:36:29.560	25.48	-41.34	47176.12	-20.71		
beta	I	2037-09-25T18:37:43.381	25.73	-41.12	45644.96	-20.71		
alpha	I	2037-09-25T18:38:27.220	25.89	-40.99	44731.09	-20.70		
4	I	2037-09-25T18:40:09.891	26.24	-40.67	42615.96	-20.70		
5	I	2037-09-25T18:40:30.935	26.32	-40.61	42172.60	-20.69		
6	I	2037-09-25T18:40:50.365	26.39	-40.55	41809.54	-20.70		
Uranus	I	2037-09-25T18:49:20.613	28.17	-38.97	25184.30		36.09	37.36
Uranus	E	2037-09-25T19:39:04.118	38.68	-29.29	25218.55		-34.12	-35.36
6	E	2037-09-25T19:48:03.099	40.59	-27.48	41860.38	20.55		
5	E	2037-09-25T19:48:26.300	40.67	-27.40	42303.45	20.54		
4	E	2037-09-25T19:48:36.931	40.71	-27.36	42527.87	20.54		
alpha	E	2037-09-25T19:50:23.350	41.08	-27.00	44702.10	20.54		
beta	E	2037-09-25T19:51:10.484	41.25	-26.84	45675.75	20.54		
eta	E	2037-09-25T19:52:23.403	41.51	-26.60	47176.12	20.54		
gamma	E	2037-09-25T19:52:45.060	41.59	-26.52	47621.00	20.54		
delta	E	2037-09-25T19:53:18.131	41.70	-26.41	48300.35	20.54		
lambda	E	2037-09-25T19:54:42.171	42.00	-26.12	50026.71	20.54		
epsilon	E	2037-09-25T19:55:48.885	42.24	-25.90	51397.17	20.54		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-09-25T19:17:03.180
 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 : 865433990294814208
 2Mass ID (if available) : 07401575+2153464
 ICRS Star Coord at Epoch: 07h 40m 15.74181s +21:53:46.43405s
 RUWE (>1.4 is poor) : 0.00
 K magnitude : 14.016
 G magnitude : 15.695
 RP magnitude : 14.876
 BP magnitude : 15.618
 DUPflag : 1
 Distance (au) : 19.050
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 16.98
 Sun-Target sep (deg) : 69.40
 Sun-Moon sep (deg) : 96.65
 B (ring opening deg) : 53.67
 PA of pole (deg) : 85.96
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.277
 C/A sky separation (km) : 3832.0
 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	2037-09-25T18:35:32.047		23.08	-16.30	50905.70	-20.49		
lambda	I	2037-09-25T18:36:14.972		23.18	-16.15	50026.71	-20.48		
delta	I	2037-09-25T18:37:39.300		23.39	-15.85	48300.35	-20.47		
gamma	I	2037-09-25T18:38:11.980		23.47	-15.74	47631.52	-20.46		
eta	I	2037-09-25T18:38:34.234		23.52	-15.66	47176.12	-20.46		
beta	I	2037-09-25T18:39:48.857		23.70	-15.40	45646.92	-20.45		
alpha	I	2037-09-25T18:40:33.147		23.81	-15.24	44735.74	-20.45		
4	I	2037-09-25T18:42:17.498		24.06	-14.88	42614.22	-20.44		
5	I	2037-09-25T18:42:39.186		24.11	-14.80	42165.31	-20.43		
6	I	2037-09-25T18:42:57.898		24.15	-14.73	41815.14	-20.45		
Uranus	I	2037-09-25T18:52:05.776		25.43	-12.81	25229.49		33.48	34.71
Uranus	E	2037-09-25T19:42:00.302		31.47	-2.18x	25181.94		-36.23	-37.49
6	E	2037-09-25T19:50:40.675		32.33	-0.32x	41865.64	20.35		
5	E	2037-09-25T19:51:03.803		32.37	-0.24x	42296.20	20.33		
4	E	2037-09-25T19:51:14.721		32.39	-0.20x	42526.38	20.34		
alpha	E	2037-09-25T19:53:02.398		32.56	0.18x	44706.58	20.34		
beta	E	2037-09-25T19:53:49.820		32.63	0.35x	45677.56	20.34		
eta	E	2037-09-25T19:55:03.360		32.74	0.62x	47176.12	20.35		
gamma	E	2037-09-25T19:55:25.221		32.78	0.69x	47620.96	20.35		
delta	E	2037-09-25T19:55:58.606		32.83	0.81x	48300.35	20.35		
lambda	E	2037-09-25T19:57:23.429		32.96	1.12x	50026.71	20.35		
epsilon	E	2037-09-25T19:58:32.653		33.06	1.36x	51435.81	20.37		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-09-25T19:17:13.230
 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 : 865433990294814208
 2Mass ID (if available) : 07401575+2153464
 ICRS Star Coord at Epoch: 07h 40m 15.74181s +21:53:46.43405s
 RUWE (>1.4 is poor) : 0.00
 K magnitude : 14.016
 G magnitude : 15.695
 RP magnitude : 14.876
 BP magnitude : 15.618
 DUPflag : 1
 Distance (au) : 19.050
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 16.98
 Sun-Target sep (deg) : 69.40
 Sun-Moon sep (deg) : 96.60
 B (ring opening deg) : 53.67
 PA of pole (deg) : 85.96
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.295
 C/A sky separation (km) : 4078.6
 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	2037-09-25T18:35:44.010		20.11	-15.45	50907.32	-20.50		
lambda	I	2037-09-25T18:36:26.995		20.21	-15.31	50026.71	-20.48		
delta	I	2037-09-25T18:37:51.290		20.40	-15.02	48300.35	-20.48		
gamma	I	2037-09-25T18:38:23.957		20.47	-14.92	47631.52	-20.47		
eta	I	2037-09-25T18:38:46.202		20.52	-14.84	47176.12	-20.47		
beta	I	2037-09-25T18:40:00.795		20.69	-14.59	45647.00	-20.46		
alpha	I	2037-09-25T18:40:45.067		20.79	-14.45	44735.90	-20.45		
4	I	2037-09-25T18:42:29.402		21.02	-14.10	42614.13	-20.44		
5	I	2037-09-25T18:42:51.096		21.07	-14.02	42165.07	-20.44		
6	I	2037-09-25T18:43:09.767		21.11	-13.96	41815.36	-20.46		
Uranus	I	2037-09-25T18:52:19.372		22.31	-12.12	25232.04		33.33	34.56
Uranus	E	2037-09-25T19:42:06.533		27.90	-2.01x	25181.48		-36.25	-37.52
6	E	2037-09-25T19:50:46.484		28.70	-0.23x	41865.83	20.36		
5	E	2037-09-25T19:51:09.587		28.73	-0.16x	42295.89	20.34		
4	E	2037-09-25T19:51:20.510		28.75	-0.12x	42526.34	20.34		
alpha	E	2037-09-25T19:53:08.142		28.90	0.25x	44706.75	20.35		
beta	E	2037-09-25T19:53:55.533		28.97	0.41x	45677.62	20.35		
eta	E	2037-09-25T19:55:09.030		29.07	0.66x	47176.12	20.36		
gamma	E	2037-09-25T19:55:30.878		29.10	0.74x	47620.96	20.36		
delta	E	2037-09-25T19:56:04.244		29.15	0.85x	48300.35	20.36		
lambda	E	2037-09-25T19:57:29.016		29.27	1.14x	50026.71	20.37		
epsilon	E	2037-09-25T19:58:38.265		29.36	1.37x	51437.20	20.38		