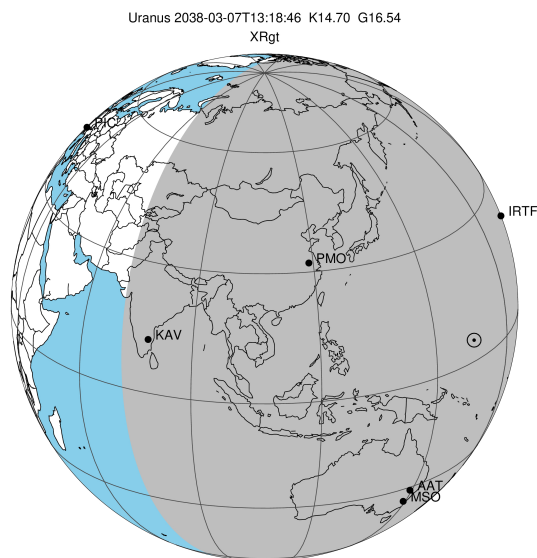


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-03-07T13:18:46.210
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 866276491080622848
 2Mass ID (if available) : 07254523+2228338

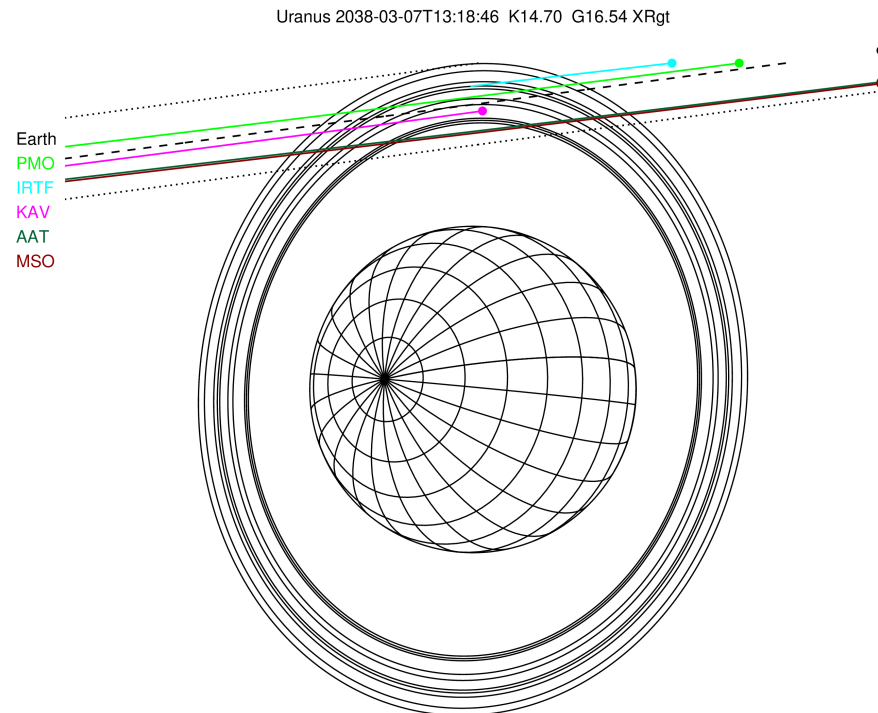
ICRS Star Coord at Epoch: 07h 25m 45.25006s +22:28:33.72050s

RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.695
 G magnitude : 16.539
 RP magnitude : 15.911
 BP magnitude : 17.001
 DUPflag : 0
 Distance (au) : 18.133
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.84
 Sun-Target sep (deg) : 123.20
 Sun-Moon sep (deg) : 105.75
 B (ring opening deg) : 56.96
 PA of pole (deg) : 83.31

#	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

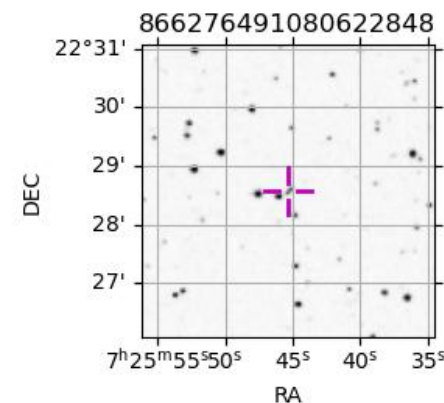


2038-03-07T13:18:46.2100 α: 07 25 45.2501 δ: +22 28 33.721 C/A 3.368° PA 187.54 deg v_sky - 9.84 km/s D 18.13 AU
 Credit: Styled after SORA/Lucky Star

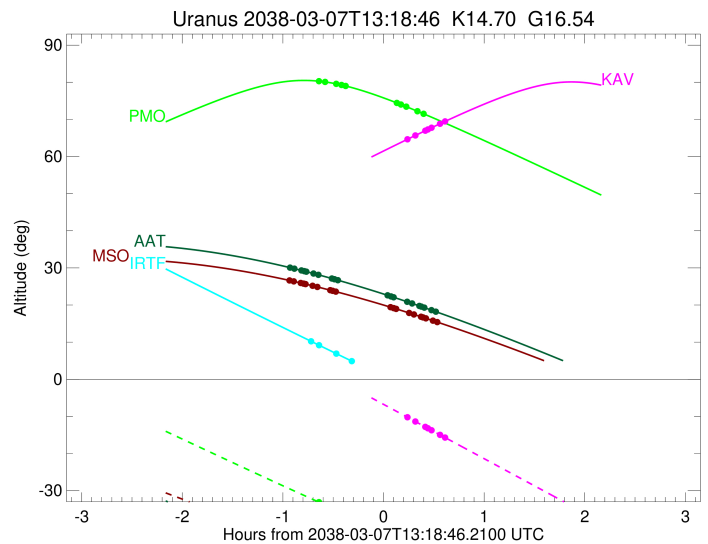
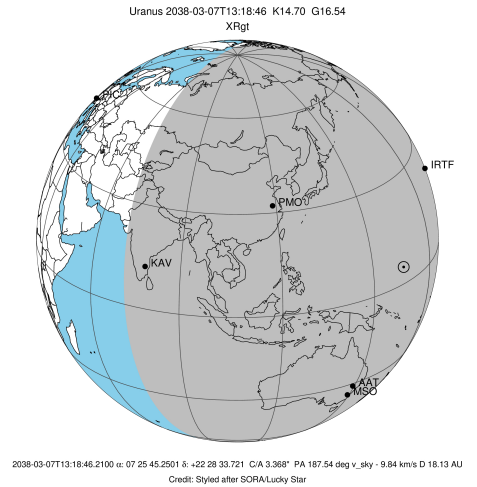


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++		+++++	MAR 07 12:40 - MAR 07 13:43	PnnRie
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	+++			MAR 07 12:36 - MAR 07 12:50	PnnRin
KAV	Kavalur Observatory	12.6	78.8			+++++++	MAR 07 13:32 - MAR 07 13:56	PnnRne
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	+++++++		+++++++	MAR 07 12:23 - MAR 07 13:50	PnnRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++++		+++++++	MAR 07 12:23 - MAR 07 13:51	PnnRie



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-03-07T13:16:37.100
 Event type : XRgt
 : No Uranus occs
 : 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 : 866276491080622848
 2Mass ID (if available) : 07254523+2228338
 ICRS Star Coord at Epoch: 07h 25m 45.25006s +22:28:33.72050s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.695
 G magnitude : 16.539
 RP magnitude : 15.911
 BP magnitude : 17.001
 DUPflag : 0
 Distance (au) : 18.133
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.84
 Sun-Target sep (deg) : 123.20
 Sun-Moon sep (deg) : 106.54
 B (ring opening deg) : 56.96
 PA of pole (deg) : 83.31
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.457
 C/A sky separation (km) : 45465.3
 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



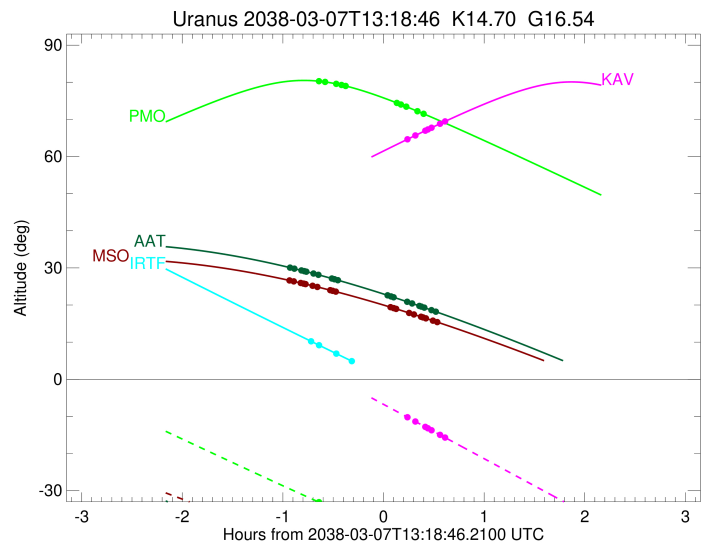
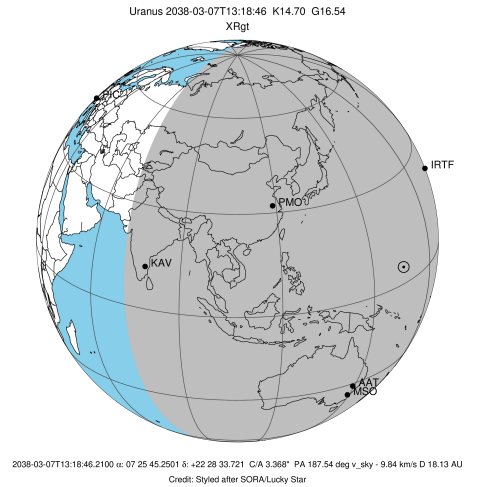
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-03-07T12:40:44.671		80.28	-33.20	51015.30	-5.39		
lambda	I	2038-03-07T12:43:59.388		80.10	-33.86	50026.71	-4.84		
delta	I	2038-03-07T12:50:38.239		79.58	-35.20	48300.35	-3.80		
gamma	I	2038-03-07T12:53:47.644		79.27	-35.84	47631.00	-3.27		
eta	I	2038-03-07T12:56:16.754		79.00	-36.34	47176.12	-2.83		

No planet occultations

eta	E	2038-03-07T13:26:37.733		74.46	-42.30	47176.12	2.83		
gamma	E	2038-03-07T13:29:07.338		74.02	-42.78	47631.56	3.26		
delta	E	2038-03-07T13:32:17.050		73.45	-43.38	48300.35	3.79		
lambda	E	2038-03-07T13:38:57.167		72.21	-44.64	50026.71	4.82		
epsilon	E	2038-03-07T13:43:19.216		71.39	-45.46	51372.46	5.37		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-03-07T13:07:55.150
 Event type : XRgt
 : No Uranus occs
 : 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 : 866276491080622848
 2Mass ID (if available) : 07254523+2228338
 ICRS Star Coord at Epoch: 07h 25m 45.25006s +22:28:33.72050s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.695
 G magnitude : 16.539
 RP magnitude : 15.911
 BP magnitude : 17.001
 DUPflag : 0
 Distance (au) : 18.133
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.84
 Sun-Target sep (deg) : 123.20
 Sun-Moon sep (deg) : 105.54
 B (ring opening deg) : 56.96
 PA of pole (deg) : 83.31
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.590
 C/A sky separation (km) : 47215.7
 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

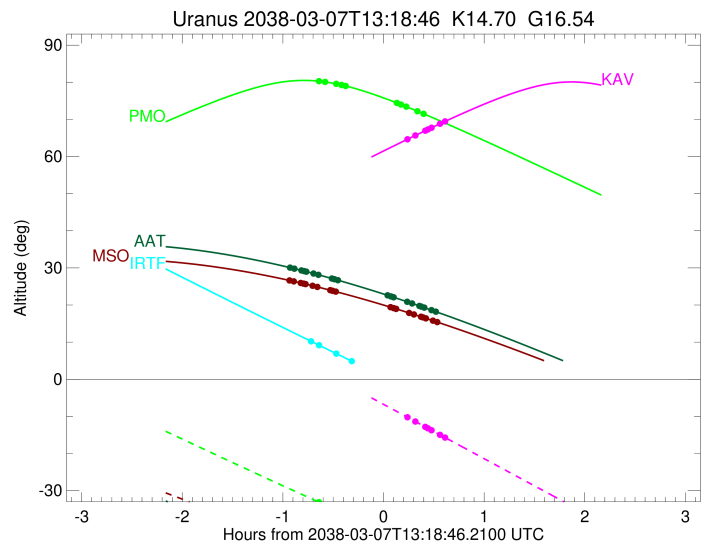
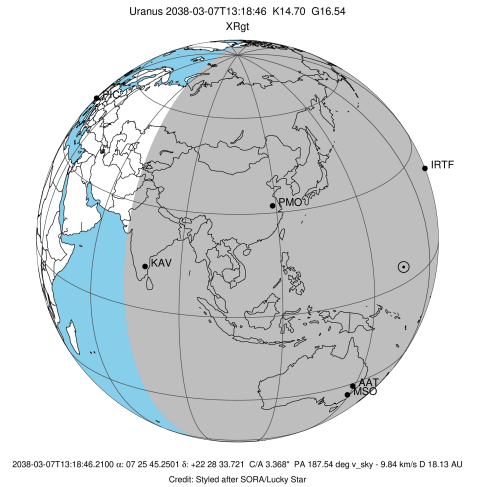


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-03-07T12:36:03.344		10.12	-56.66	51044.47	-4.29		
lambda	I	2038-03-07T12:40:24.672		9.16	-55.70	50026.71	-3.58		
delta	I	2038-03-07T12:50:44.948		6.88	-53.41	48300.35	-1.96		
gamma	I	2038-03-07T13:00:14.619		4.80x	-51.29	47631.43	-0.38		

No planet occultations

gamma	E	2038-03-07T13:04:42.291		3.83x	-50.28	47631.50	0.38		
delta	E	2038-03-07T13:14:13.633		1.75x	-48.12	48300.35	1.95		
lambda	E	2038-03-07T13:24:38.819		-0.50x	-45.74	50026.71	3.54		
epsilon	E	2038-03-07T13:30:13.225		-1.70x	-44.46	51341.14	4.23		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-03-07T13:23:28.500
 Event type : XRgt
 : No Uranus occs
 : 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 : 866276491080622848
 2Mass ID (if available) : 07254523+2228338
 ICRS Star Coord at Epoch: 07h 25m 45.25006s +22:28:33.72050s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.695
 G magnitude : 16.539
 RP magnitude : 15.911
 BP magnitude : 17.001
 DUPflag : 0
 Distance (au) : 18.133
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.84
 Sun-Target sep (deg) : 123.20
 Sun-Moon sep (deg) : 106.62
 B (ring opening deg) : 56.96
 PA of pole (deg) : 83.31
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.272
 C/A sky separation (km) : 43026.1
 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

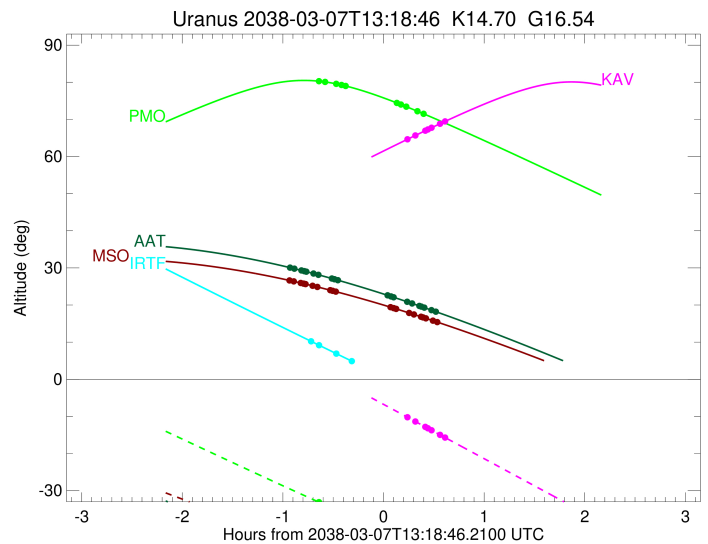
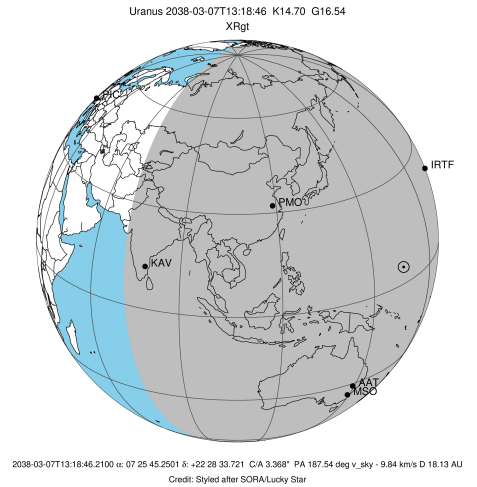


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-03-07T12:41:42.241		53.09	2.26x	50982.01	-6.41		
lambda	I	2038-03-07T12:44:17.080		53.68	1.64x	50026.71	-6.00		
delta	I	2038-03-07T12:49:22.414		54.84	0.40x	48300.35	-5.29		
gamma	I	2038-03-07T12:51:32.947		55.34	-0.13x	47630.62	-4.97		
eta	I	2038-03-07T12:53:06.749		55.69	-0.51x	47176.12	-4.72		
beta	I	2038-03-07T12:59:08.601		57.06	-1.98x	45645.30	-3.72		
alpha	I	2038-03-07T13:04:00.706		58.17	-3.16x	44686.04	-2.84		

No planet occultations

alpha	E	2038-03-07T13:32:49.862		64.60	-10.18	44694.02	2.85		
beta	E	2038-03-07T13:37:36.575		65.64	-11.34	45641.07	3.72		
eta	E	2038-03-07T13:43:38.950		66.95	-12.82	47176.12	4.74		
gamma	E	2038-03-07T13:45:12.636		67.29	-13.20	47631.44	4.98		
delta	E	2038-03-07T13:47:22.585		67.75	-13.72	48300.35	5.31		
lambda	E	2038-03-07T13:52:26.811		68.83	-14.96	50026.71	6.03		
epsilon	E	2038-03-07T13:56:07.122		69.60	-15.86	51406.99	6.44		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-03-07T13:10:52.740
 Event type : XRgt
 : No Uranus occs
 : 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 : 866276491080622848
 2Mass ID (if available) : 07254523+2228338
 ICRS Star Coord at Epoch: 07h 25m 45.25006s +22:28:33.72050s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.695
 G magnitude : 16.539
 RP magnitude : 15.911
 BP magnitude : 17.001
 DUPflag : 0
 Distance (au) : 18.133
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.84
 Sun-Target sep (deg) : 123.20
 Sun-Moon sep (deg) : 105.93
 B (ring opening deg) : 56.96
 PA of pole (deg) : 83.31
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.051
 C/A sky separation (km) : 40125.9
 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

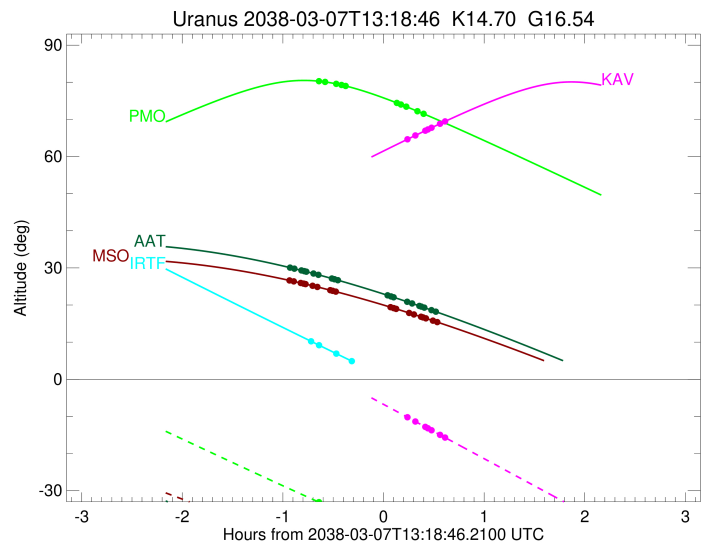
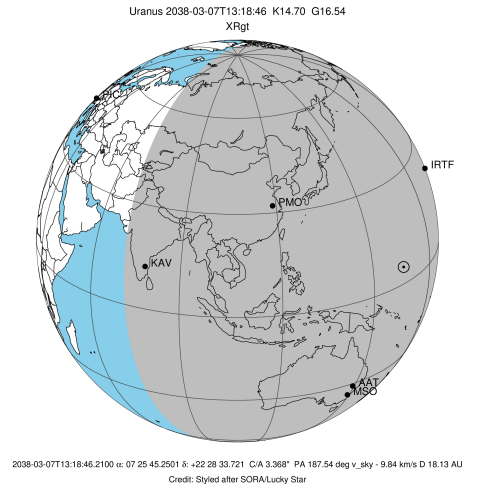


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-03-07T12:23:32.822		30.02	-45.11	50940.56	-7.40		
lambda	I	2038-03-07T12:25:39.496		29.78	-45.40	50026.71	-7.09		
delta	I	2038-03-07T12:29:51.738		29.31	-45.98	48300.35	-6.58		
gamma	I	2038-03-07T12:31:35.282		29.12	-46.22	47630.13	-6.36		
eta	I	2038-03-07T12:32:47.592		28.98	-46.38	47176.12	-6.20		
beta	I	2038-03-07T12:37:06.891		28.47	-46.94	45647.80	-5.57		
alpha	I	2038-03-07T12:40:07.175		28.11	-47.33	44684.71	-5.11		
4	I	2038-03-07T12:48:15.137		27.11	-48.32	42529.26	-3.71		
5	I	2038-03-07T12:49:19.325		26.97	-48.45	42298.94	-3.52		
6	I	2038-03-07T12:51:28.381		26.70	-48.70	41870.44	-3.07		

No planet occultations

6	E	2038-03-07T13:21:08.029		22.62	-51.60	41853.06	3.06		
5	E	2038-03-07T13:23:33.425		22.27	-51.79	42315.12	3.50		
4	E	2038-03-07T13:24:37.504		22.11	-51.87	42547.14	3.69		
alpha	E	2038-03-07T13:32:46.737		20.89	-52.44	44698.82	5.07		
beta	E	2038-03-07T13:35:43.681		20.44	-52.62	45641.19	5.52		
eta	E	2038-03-07T13:40:06.860		19.76	-52.87	47176.12	6.14		
gamma	E	2038-03-07T13:41:20.071		19.57	-52.93	47631.25	6.30		
delta	E	2038-03-07T13:43:04.514		19.30	-53.02	48300.35	6.52		
lambda	E	2038-03-07T13:47:19.600		18.63	-53.21	50026.71	7.01		
epsilon	E	2038-03-07T13:50:35.378		18.11	-53.34	51433.70	7.30		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-03-07T13:11:07.770
 Event type : XRgt
 : No Uranus occs
 : 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 : 866276491080622848
 2Mass ID (if available) : 07254523+2228338
 ICRS Star Coord at Epoch: 07h 25m 45.25006s +22:28:33.72050s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.695
 G magnitude : 16.539
 RP magnitude : 15.911
 BP magnitude : 17.001
 DUPflag : 0
 Distance (au) : 18.133
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.84
 Sun-Target sep (deg) : 123.20
 Sun-Moon sep (deg) : 105.89
 B (ring opening deg) : 56.96
 PA of pole (deg) : 83.31
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.029
 C/A sky separation (km) : 39832.3
 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	2038-03-07T12:23:13.708		26.57	-41.94	50937.49	-7.47		
lambda	I	2038-03-07T12:25:18.538		26.36	-42.21	50026.71	-7.18		
delta	I	2038-03-07T12:29:27.383		25.94	-42.73	48300.35	-6.69		
gamma	I	2038-03-07T12:31:09.278		25.76	-42.94	47630.08	-6.47		
eta	I	2038-03-07T12:32:20.318		25.63	-43.08	47176.12	-6.31		
beta	I	2038-03-07T12:36:34.140		25.18	-43.58	45648.00	-5.71		
alpha	I	2038-03-07T12:39:29.594		24.85	-43.92	44684.68	-5.27		
4	I	2038-03-07T12:47:16.584		23.97	-44.78	42528.91	-3.95		
5	I	2038-03-07T12:48:16.847		23.85	-44.89	42297.84	-3.78		
6	I	2038-03-07T12:50:15.004		23.62	-45.10	41871.11	-3.37		

No planet occultations

6	E	2038-03-07T13:22:53.698		19.43	-47.94	41852.00	3.36		
5	E	2038-03-07T13:25:08.148		19.12	-48.09	42315.21	3.76		
4	E	2038-03-07T13:26:08.308		18.98	-48.16	42548.00	3.93		
alpha	E	2038-03-07T13:33:56.468		17.88	-48.63	44699.26	5.23		
beta	E	2038-03-07T13:36:48.534		17.47	-48.78	45641.22	5.66		
eta	E	2038-03-07T13:41:06.160		16.85	-48.99	47176.12	6.25		
gamma	E	2038-03-07T13:42:18.078		16.67	-49.04	47631.23	6.41		
delta	E	2038-03-07T13:44:00.838		16.42	-49.11	48300.35	6.62		
lambda	E	2038-03-07T13:48:12.437		15.79	-49.28	50026.71	7.10		
epsilon	E	2038-03-07T13:51:26.403		15.31	-49.39	51436.54	7.38		