

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2046-04-14T08:44:07.490
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 614966096185125632
 2Mass ID (if available) : 09580093+1313500

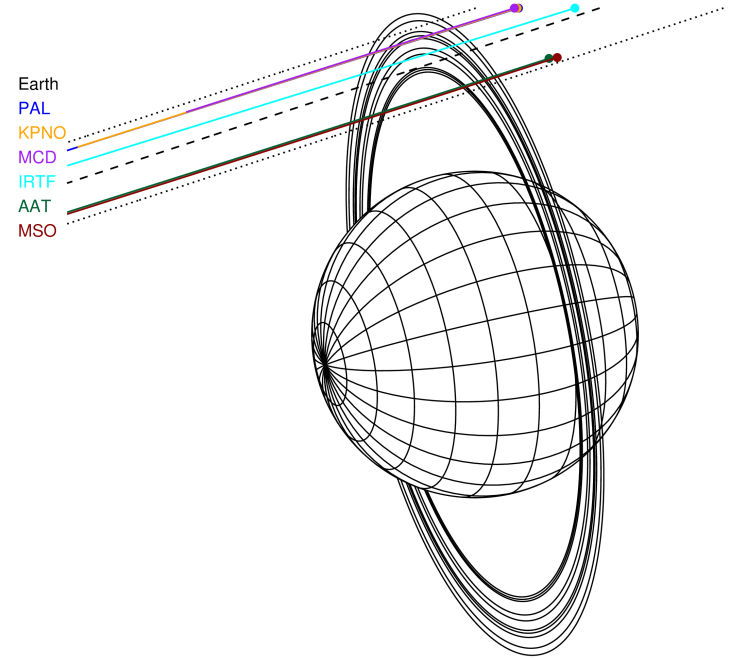
ICRS Star Coord at Epoch: 09h 58m 00.89721s +13:13:49.82607s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.918
 G magnitude : 18.419
 RP magnitude : 17.282
 BP magnitude : 19.833
 DUPflag : 0
 Distance (au) : 17.766
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.53
 Sun-Target sep (deg) : 123.08
 Sun-Moon sep (deg) : 30.24
 B (ring opening deg) : 20.32
 PA of pole (deg) : 101.52

#	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



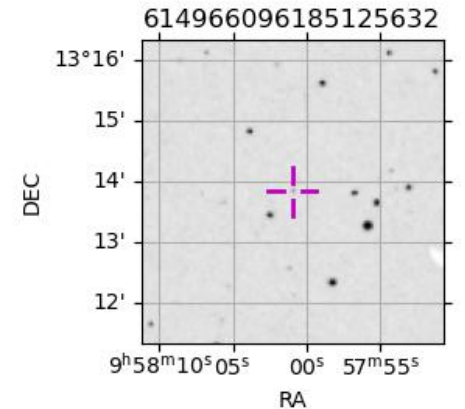
2046-04-14T08:44:07.4900 α: 09 58 00.8972 s; +13 13 49.826 C/A 3.290° PA 198.20 deg v_sky - 9.53 km/s D 17.77 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2046-04-14T08:44:07 K14.92 G18.42 XRgt

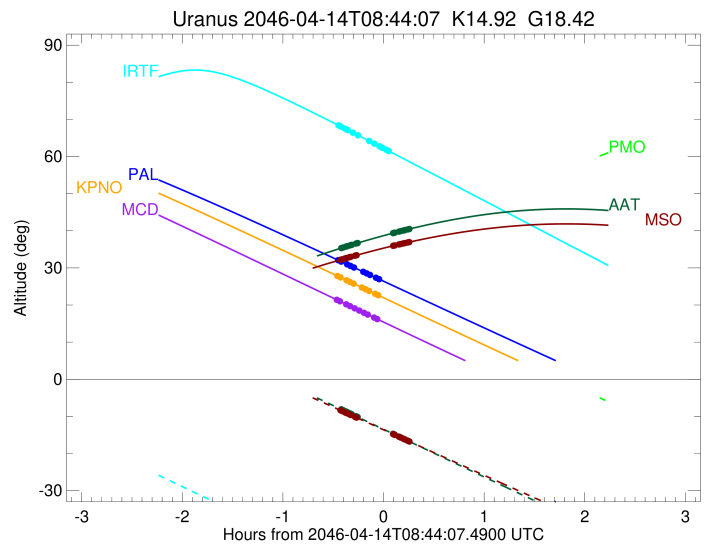
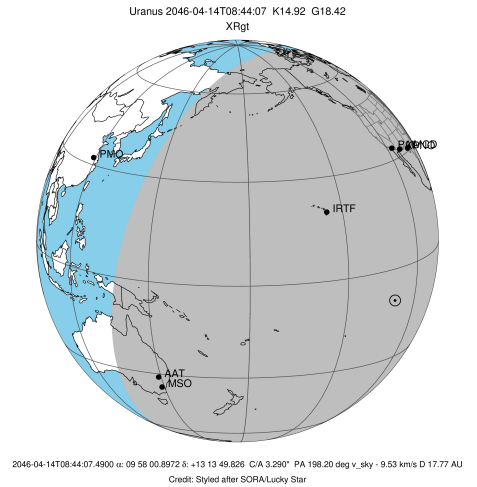


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++		+++++	APR 14 08:17 - APR 14 08:41	PnnRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++		+++++	APR 14 08:17 - APR 14 08:40	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++		+++++	APR 14 08:16 - APR 14 08:39	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++++		+++++++	APR 14 08:17 - APR 14 08:46	PnnRie
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	+++++++		+++++++	APR 14 08:19 - APR 14 08:59	PnnRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++++		+++++++	APR 14 08:18 - APR 14 08:59	PnnRie



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2046-04-14T08:36:37.170
 Event type : XRgt
 : No Uranus occs
 : 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 : 614966096185125632
 2Mass ID (if available) : 09580093+1313500
 ICRS Star Coord at Epoch: 09h 58m 00.89721s +13:13:49.82607s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.918
 G magnitude : 18.419
 RP magnitude : 17.282
 BP magnitude : 19.833
 DUPflag : 0
 Distance (au) : 17.766
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.53
 Sun-Target sep (deg) : 123.08
 Sun-Moon sep (deg) : 30.93
 B (ring opening deg) : 20.32
 PA of pole (deg) : 101.52
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.627
 C/A sky separation (km) : 46729.5
 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

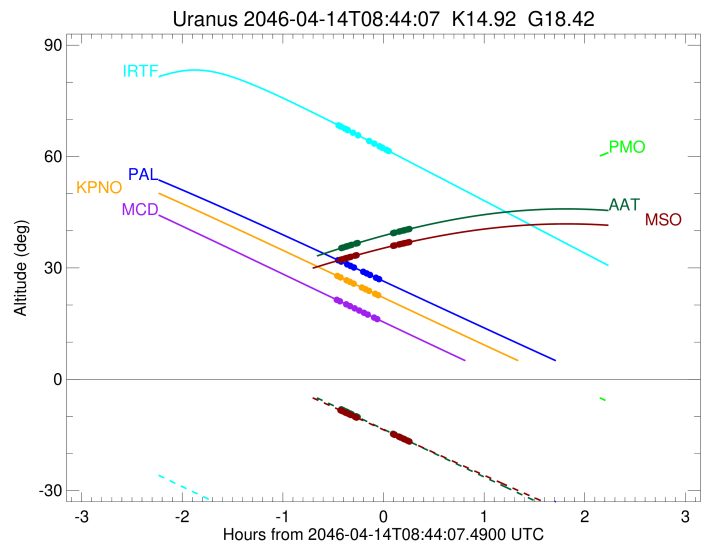
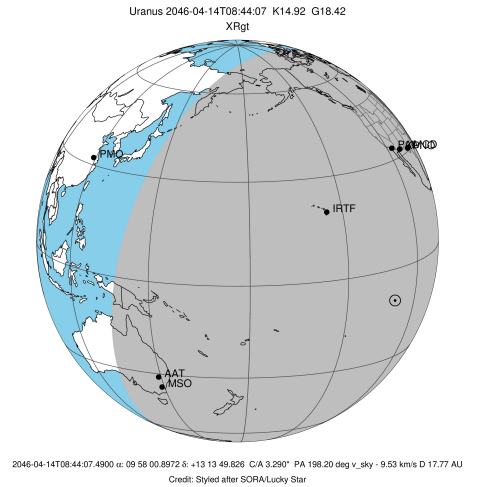


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2046-04-14T08:17:44.518		31.94	-46.71	50743.58	-10.52		
lambda	I	2046-04-14T08:18:55.817		31.69	-46.66	50026.71	-9.57		
delta	I	2046-04-14T08:22:30.064		30.95	-46.50	48300.35	-6.49		
gamma	I	2046-04-14T08:24:32.480		30.52	-46.41	47621.14	-4.60		
eta	I	2046-04-14T08:26:35.531		30.09	-46.31	47176.12	-2.63		

No planet occultations

eta	E	2046-04-14T08:31:57.657		28.97	-46.02	47176.12	2.63		
gamma	E	2046-04-14T08:34:01.040		28.54	-45.90	47621.87	4.59		
delta	E	2046-04-14T08:36:03.561		28.11	-45.77	48300.35	6.47		
lambda	E	2046-04-14T08:39:38.500		27.36	-45.54	50026.71	9.54		
epsilon	E	2046-04-14T08:41:00.640		27.07	-45.45	50854.84	10.48		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2046-04-14T08:36:12.400
 Event type : XRgt
 : No Uranus occs
 : 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 : 614966096185125632
 2Mass ID (if available) : 09580093+1313500
 ICRS Star Coord at Epoch: 09h 58m 00.89721s +13:13:49.82607s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.918
 G magnitude : 18.419
 RP magnitude : 17.282
 BP magnitude : 19.833
 DUPflag : 0
 Distance (au) : 17.766
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.53
 Sun-Target sep (deg) : 123.08
 Sun-Moon sep (deg) : 30.92
 B (ring opening deg) : 20.32
 PA of pole (deg) : 101.52
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.631
 C/A sky separation (km) : 46780.4
 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

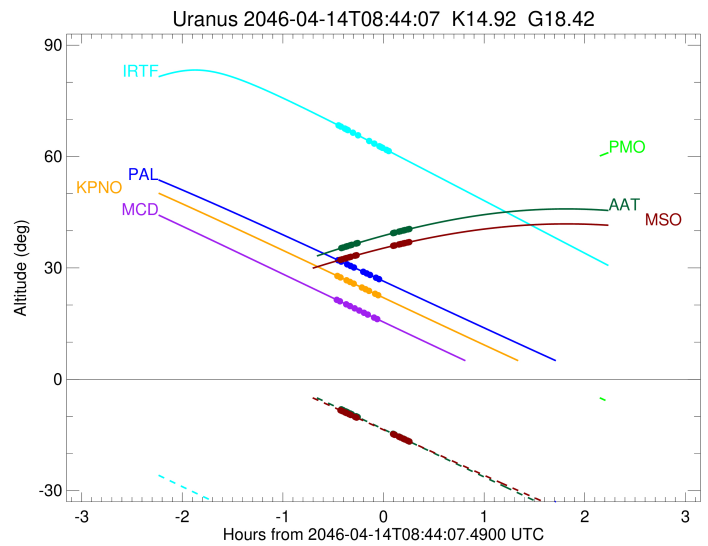
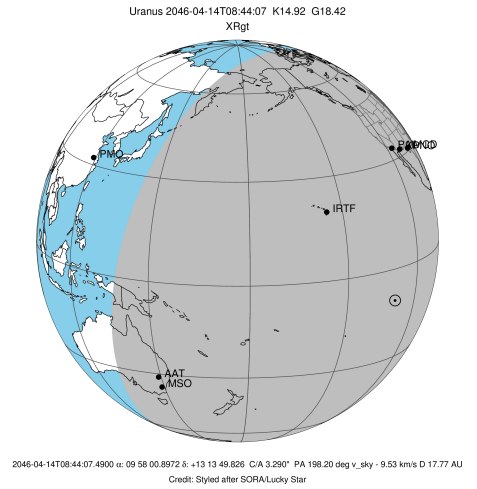


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2046-04-14T08:17:18.230		27.68	-46.95	50743.56	-10.42		
lambda	I	2046-04-14T08:18:30.290		27.43	-46.87	50026.71	-9.46		
delta	I	2046-04-14T08:22:08.018		26.65	-46.61	48300.35	-6.34		
gamma	I	2046-04-14T08:24:14.427		26.21	-46.45	47621.15	-4.39		
eta	I	2046-04-14T08:26:27.860		25.73	-46.28	47176.12	-2.27		

No planet occultations

eta	E	2046-04-14T08:31:07.536		24.74	-45.90	47176.12	2.27		
gamma	E	2046-04-14T08:33:21.311		24.26	-45.71	47621.85	4.39		
delta	E	2046-04-14T08:35:27.839		23.81	-45.52	48300.35	6.32		
lambda	E	2046-04-14T08:39:06.295		23.04	-45.19	50026.71	9.43		
epsilon	E	2046-04-14T08:40:29.250		22.74	-45.07	50854.12	10.37		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2046-04-14T08:35:51.650
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 614966096185125632
 2Mass ID (if available) : 09580093+1313500
 ICRS Star Coord at Epoch: 09h 58m 00.89721s +13:13:49.82607s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.918
 G magnitude : 18.419
 RP magnitude : 17.282
 BP magnitude : 19.833
 DUPflag : 0
 Distance (au) : 17.766
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.53
 Sun-Target sep (deg) : 123.08
 Sun-Moon sep (deg) : 30.90
 B (ring opening deg) : 20.32
 PA of pole (deg) : 101.52
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.639
 C/A sky separation (km) : 46893.4
 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

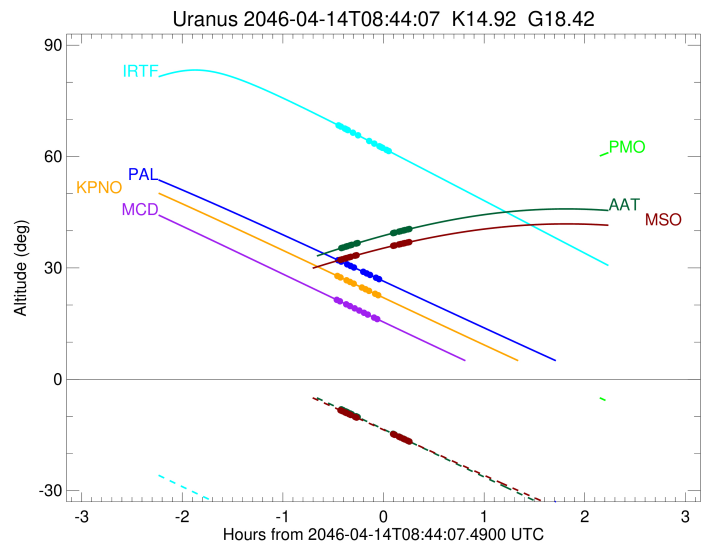
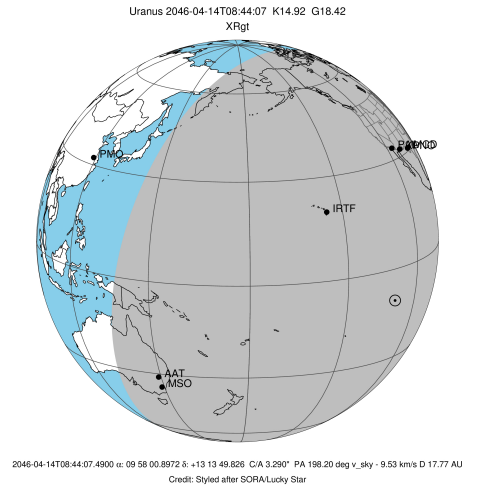


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2046-04-14T08:16:56.740		21.26	-45.54	50743.53	-10.21		
lambda	I	2046-04-14T08:18:10.418		20.99	-45.41	50026.71	-9.24		
delta	I	2046-04-14T08:21:55.978		20.18	-45.00	48300.35	-6.01		
gamma	I	2046-04-14T08:24:12.470		19.69	-44.75	47621.17	-3.92		
eta	I	2046-04-14T08:27:07.759		19.06	-44.42	47176.12	-1.14		

No planet occultations

eta	E	2046-04-14T08:29:30.116		18.55	-44.14	47176.12	1.14		
gamma	E	2046-04-14T08:32:25.758		17.92	-43.80	47621.81	3.92		
delta	E	2046-04-14T08:34:42.384		17.43	-43.52	48300.35	6.00		
lambda	E	2046-04-14T08:38:28.715		16.62	-43.05	50026.71	9.20		
epsilon	E	2046-04-14T08:39:53.370		16.32	-42.87	50852.51	10.16		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2046-04-14T08:38:49.400
 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 : 614966096185125632
 2Mass ID (if available) : 09580093+1313500
 ICRS Star Coord at Epoch: 09h 58m 00.89721s +13:13:49.82607s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.918
 G magnitude : 18.419
 RP magnitude : 17.282
 BP magnitude : 19.833
 DUPflag : 0
 Distance (au) : 17.766
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.53
 Sun-Target sep (deg) : 123.08
 Sun-Moon sep (deg) : 30.99
 B (ring opening deg) : 20.32
 PA of pole (deg) : 101.52
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.428
 C/A sky separation (km) : 44167.1
 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

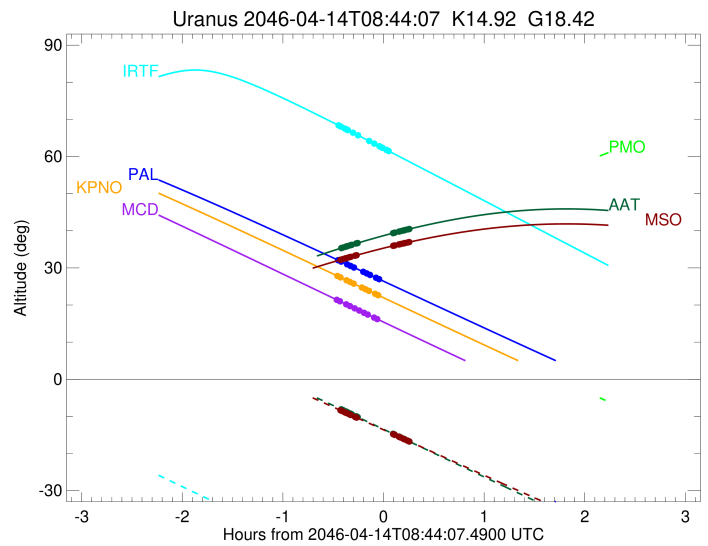
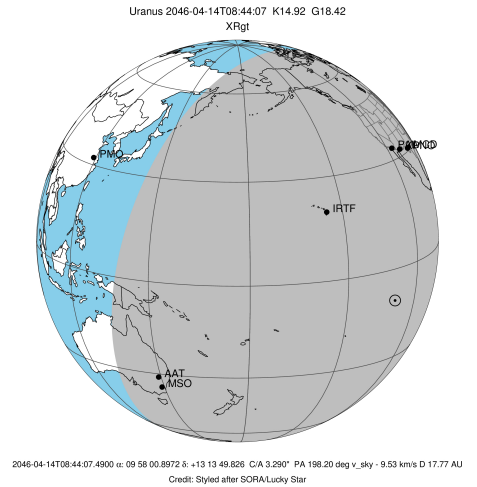


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2046-04-14T08:17:49.941		68.27	-47.70	50747.25	-13.76		
lambda	I	2046-04-14T08:18:43.476		68.07	-47.86	50026.71	-13.12		
delta	I	2046-04-14T08:21:05.121		67.53	-48.27	48300.35	-11.22		
gamma	I	2046-04-14T08:22:08.217		67.29	-48.46	47620.97	-10.31		
eta	I	2046-04-14T08:22:52.805		67.12	-48.59	47176.12	-9.64		
beta	I	2046-04-14T08:25:58.694		66.41	-49.12	45655.81	-6.69		
alpha	I	2046-04-14T08:29:10.124		65.67	-49.67	44690.58	-3.37		

No planet occultations

alpha	E	2046-04-14T08:35:24.223		64.23	-50.71	44695.89	3.36		
beta	E	2046-04-14T08:38:35.996		63.49	-51.23	45665.26	6.68		
eta	E	2046-04-14T08:41:40.802		62.77	-51.72	47176.12	9.62		
gamma	E	2046-04-14T08:42:25.650		62.60	-51.84	47622.57	10.28		
delta	E	2046-04-14T08:43:28.751		62.36	-52.01	48300.35	11.19		
lambda	E	2046-04-14T08:45:50.813		61.81	-52.38	50026.71	13.08		
epsilon	E	2046-04-14T08:46:54.800		61.56	-52.54	50889.07	13.72		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2046-04-14T08:45:23.080
 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 : 614966096185125632
 2Mass ID (if available) : 09580093+1313500
 ICRS Star Coord at Epoch: 09h 58m 00.89721s +13:13:49.82607s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.918
 G magnitude : 18.419
 RP magnitude : 17.282
 BP magnitude : 19.833
 DUPflag : 0
 Distance (au) : 17.766
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.53
 Sun-Target sep (deg) : 123.08
 Sun-Moon sep (deg) : 30.45
 B (ring opening deg) : 20.32
 PA of pole (deg) : 101.52
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.918
 C/A sky separation (km) : 37601.8
 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

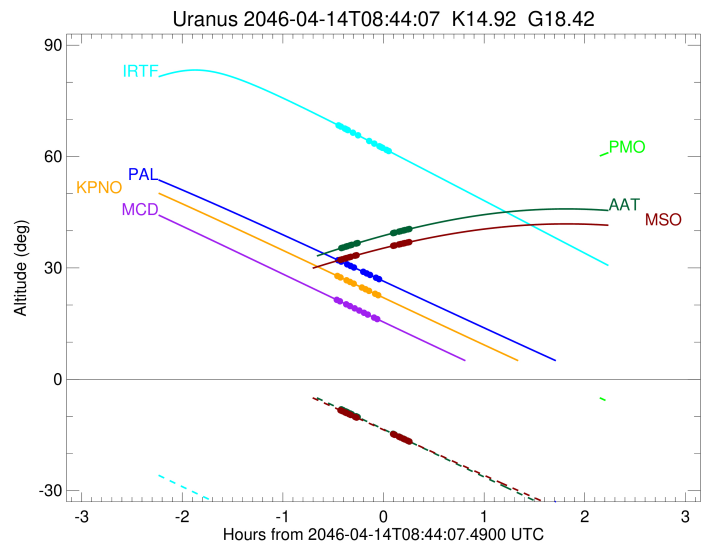
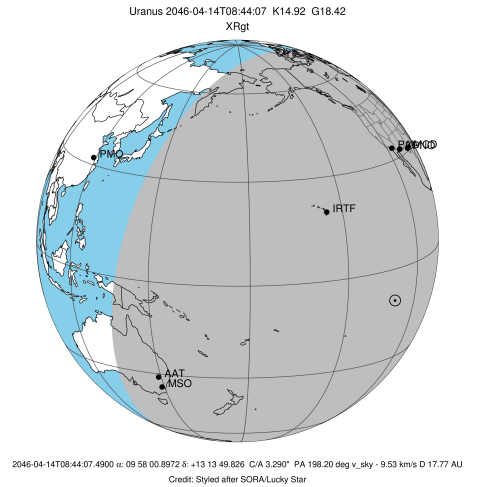


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2046-04-14T08:19:19.522		35.39	-8.17	50768.75	-18.80		
lambda	I	2046-04-14T08:19:59.229		35.49	-8.31	50026.71	-18.51		
delta	I	2046-04-14T08:21:34.830		35.71	-8.65	48300.35	-17.59		
gamma	I	2046-04-14T08:22:13.892		35.80	-8.79	47621.09	-17.18		
eta	I	2046-04-14T08:22:39.994		35.86	-8.88	47176.12	-16.91		
beta	I	2046-04-14T08:24:13.404		36.08	-9.22	45649.43	-15.85		
alpha	I	2046-04-14T08:25:14.866		36.22	-9.43	44685.06	-15.06		
4	I	2046-04-14T08:27:42.474		36.56	-9.96	42591.89	-12.98		
5	I	2046-04-14T08:28:10.574		36.62	-10.06	42301.39	-12.73		
6	I	2046-04-14T08:28:49.829		36.71	-10.20	41808.09	-12.08		

No planet occultations

6	E	2046-04-14T08:49:44.976		39.36	-14.67	41794.83	12.09		
5	E	2046-04-14T08:50:28.674		39.45	-14.83	42310.82	12.74		
4	E	2046-04-14T08:50:43.474		39.48	-14.88	42550.32	13.00		
alpha	E	2046-04-14T08:53:19.405		39.78	-15.44	44708.98	15.08		
beta	E	2046-04-14T08:54:20.847		39.89	-15.65	45671.92	15.88		
eta	E	2046-04-14T08:55:52.693		40.07	-15.98	47176.12	16.93		
gamma	E	2046-04-14T08:56:18.912		40.12	-16.08	47623.78	17.21		
delta	E	2046-04-14T08:56:57.754		40.19	-16.21	48300.35	17.62		
lambda	E	2046-04-14T08:58:33.191		40.37	-16.56	50026.71	18.54		
epsilon	E	2046-04-14T08:59:23.197		40.46	-16.73	50965.20	18.84		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2046-04-14T08:45:04.240
 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 : 614966096185125632
 2Mass ID (if available) : 09580093+1313500
 ICRS Star Coord at Epoch: 09h 58m 00.89721s +13:13:49.82607s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.918
 G magnitude : 18.419
 RP magnitude : 17.282
 BP magnitude : 19.833
 DUPflag : 0
 Distance (au) : 17.766
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.53
 Sun-Target sep (deg) : 123.08
 Sun-Moon sep (deg) : 30.46
 B (ring opening deg) : 20.32
 PA of pole (deg) : 101.52
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.898
 C/A sky separation (km) : 37335.1
 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	2046-04-14T08:18:49.046		32.23	-8.44	50769.85	-18.94		
lambda	I	2046-04-14T08:19:28.519		32.31	-8.57	50026.71	-18.65		
delta	I	2046-04-14T08:21:03.310		32.52	-8.90	48300.35	-17.76		
gamma	I	2046-04-14T08:21:41.989		32.60	-9.03	47621.10	-17.36		
eta	I	2046-04-14T08:22:07.818		32.66	-9.11	47176.12	-17.09		
beta	I	2046-04-14T08:23:40.117		32.86	-9.43	45649.27	-16.07		
alpha	I	2046-04-14T08:24:40.653		32.98	-9.63	44685.00	-15.30		
4	I	2046-04-14T08:27:05.361		33.29	-10.13	42592.43	-13.30		
5	I	2046-04-14T08:27:33.018		33.35	-10.22	42300.76	-13.05		
6	I	2046-04-14T08:28:11.143		33.43	-10.35	41808.55	-12.43		

No planet occultations

6	E	2046-04-14T08:49:47.616		35.94	-14.76	41794.88	12.45		
5	E	2046-04-14T08:50:30.175		36.02	-14.91	42310.45	13.07		
4	E	2046-04-14T08:50:44.578		36.04	-14.96	42549.78	13.31		
alpha	E	2046-04-14T08:53:17.609		36.31	-15.48	44709.35	15.32		
beta	E	2046-04-14T08:54:18.126		36.42	-15.69	45672.10	16.09		
eta	E	2046-04-14T08:55:48.869		36.58	-16.00	47176.12	17.12		
gamma	E	2046-04-14T08:56:14.817		36.62	-16.08	47623.83	17.39		
delta	E	2046-04-14T08:56:53.280		36.69	-16.22	48300.35	17.78		
lambda	E	2046-04-14T08:58:27.917		36.85	-16.54	50026.71	18.68		
epsilon	E	2046-04-14T08:59:17.714		36.93	-16.71	50968.07	18.97		