

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2034-12-15T00:00:23.300
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3382410754194412800
 2Mass ID (if available) : 06375384+2329006

ICRS Star Coord at Epoch: 06h 37m 53.83932s +23:29:00.69324s

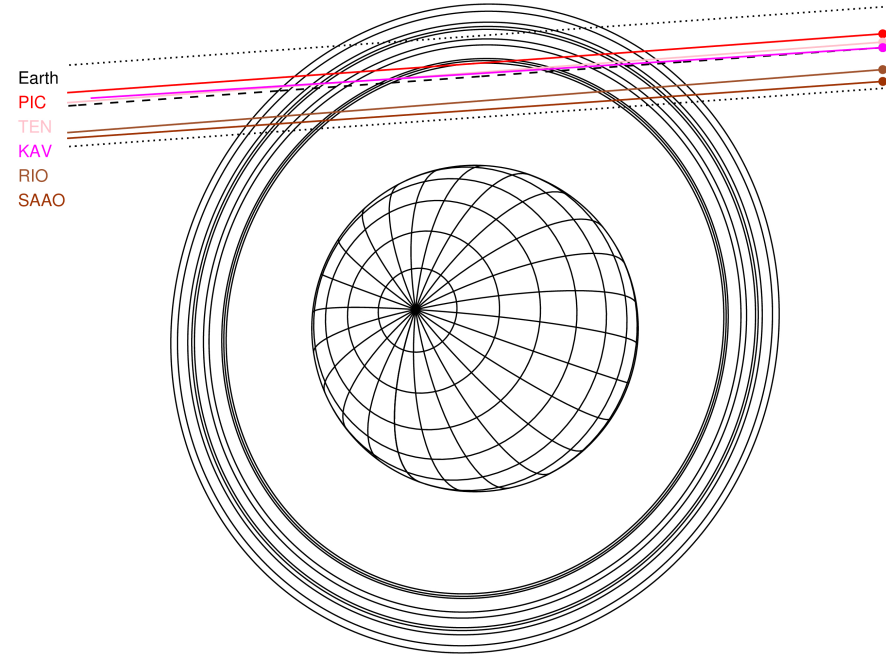
RUWE (>1.4 is poor) : 1.08
 K magnitude : 14.625
 G magnitude : 16.183
 RP magnitude : 15.669
 BP magnitude : 16.517
 DUPflag : 0
 Distance (au) : 17.944
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.21
 Sun-Target sep (deg) : 163.90
 Sun-Moon sep (deg) : 149.90
 B (ring opening deg) : 67.53
 PA of pole (deg) : 72.32

#	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



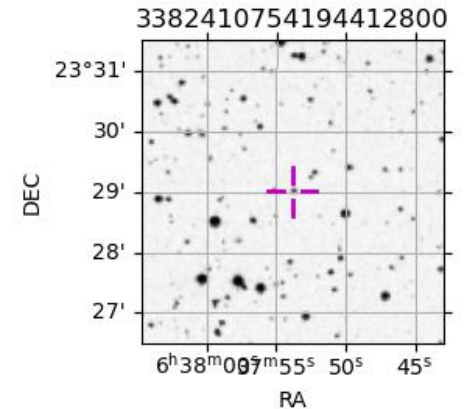
2034-12-15T00:00:23.3000 ra: 06 37 53.8393 s: +23 29 00.693 C/A 3.030° PA 184.09 deg v_sky -22.21 km/s D 17.94 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2034-12-15T00:00:23 K14.62 G16.18 XRgt

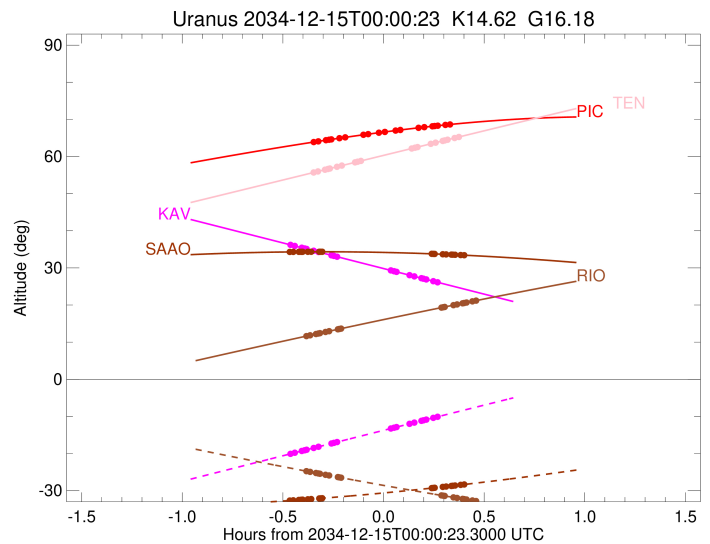
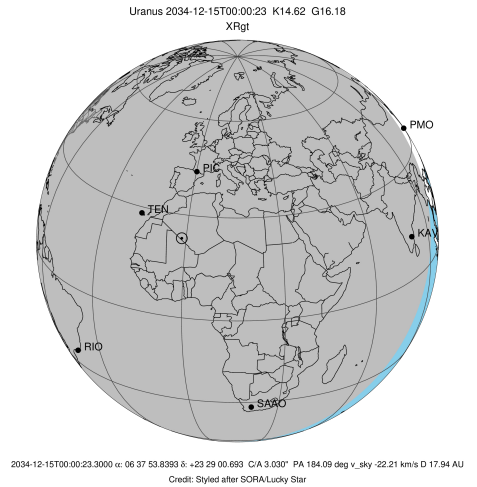


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++		+++++	DEC 14 23:39 - DEC 15 00:19	PnnRie
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
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	+++++		+++++	DEC 14 23:39 - DEC 15 00:22	PnnRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++		+++++	DEC 14 23:32 - DEC 15 00:16	PnnRie
RIO	Rio de Janeiro	-22.9	316.8	+++++		+++++	DEC 14 23:37 - DEC 15 00:27	PnnRie
ESO	European Southern Obs	-29.3	289.3					PnnRnn
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	+++++		+++++	DEC 14 23:32 - DEC 15 00:24	PnnRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2034-12-15T00:01:28.670
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 3382410754194412800
 2Mass ID (if available) : 06375384+2329006
 ICRS Star Coord at Epoch: 06h 37m 53.83932s +23:29:00.69324s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 14.625
 G magnitude : 16.183
 RP magnitude : 15.669
 BP magnitude : 16.517
 DUPflag : 0
 Distance (au) : 17.944
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.21
 Sun-Target sep (deg) : 163.90
 Sun-Moon sep (deg) : 150.52
 B (ring opening deg) : 67.53
 PA of pole (deg) : 72.32
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.181
 C/A sky separation (km) : 41393.6
 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_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

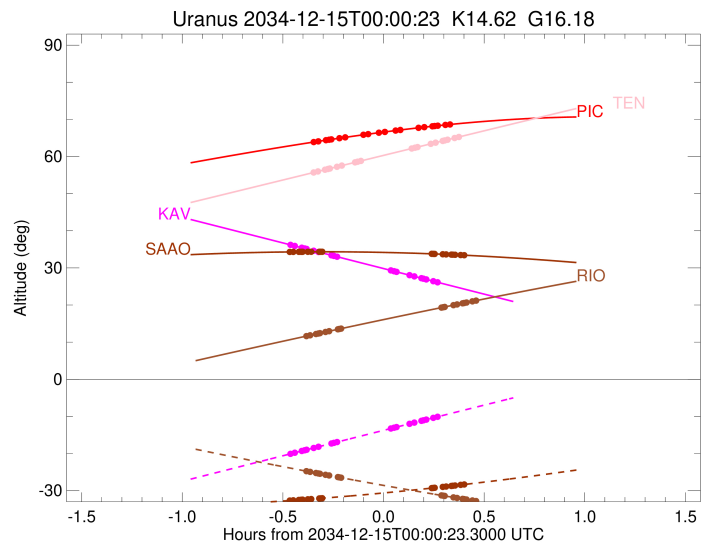
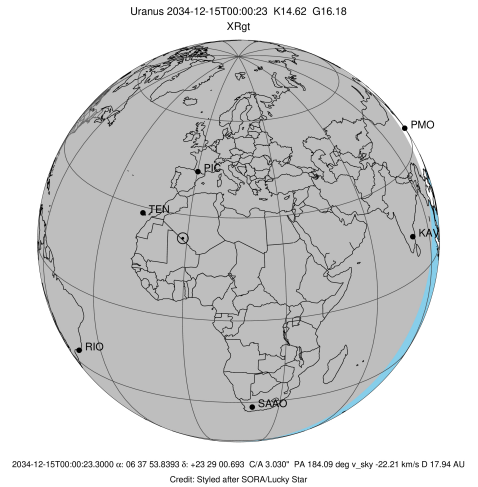


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-12-14T23:39:17.159		63.86	-70.26	51408.71	-13.91		
lambda	I	2034-12-14T23:40:58.458		64.09	-70.31	50026.71	-13.24		
delta	I	2034-12-14T23:43:14.758		64.40	-70.37	48300.35	-12.07		
gamma	I	2034-12-14T23:44:12.166		64.53	-70.39	47622.56	-11.54		
eta	I	2034-12-14T23:44:51.495		64.62	-70.41	47176.12	-11.16		
beta	I	2034-12-14T23:47:14.679		64.94	-70.45	45680.89	-9.70		
alpha	I	2034-12-14T23:49:01.765		65.17	-70.48	44704.78	-8.53		
4	I	2034-12-14T23:54:19.486		65.85	-70.51	42609.30	-4.57		
5	I	2034-12-14T23:56:06.400		66.07	-70.50	42198.15	-3.18		
6	I	2034-12-14T23:59:12.140		66.44	-70.48	41852.44	-0.55		

No planet occultations

6	E	2034-12-15T00:00:31.697		66.60	-70.46	41850.63	0.56		
5	E	2034-12-15T00:03:47.009		66.97	-70.41	42218.02	3.18		
4	E	2034-12-15T00:05:26.545		67.16	-70.37	42597.43	4.57		
alpha	E	2034-12-15T00:10:49.367		67.74	-70.21	44728.68	8.53		
beta	E	2034-12-15T00:12:32.885		67.91	-70.14	45671.79	9.70		
eta	E	2034-12-15T00:14:56.799		68.15	-70.04	47176.12	11.17		
gamma	E	2034-12-15T00:15:36.525		68.21	-70.01	47627.44	11.55		
delta	E	2034-12-15T00:16:33.472		68.30	-69.97	48300.35	12.08		
lambda	E	2034-12-15T00:18:49.669		68.51	-69.86	50026.71	13.25		
epsilon	E	2034-12-15T00:19:57.400		68.62	-69.79	50942.67	13.93		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2034-12-15T00:02:45.050
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 3382410754194412800
 2Mass ID (if available) : 06375384+2329006
 ICRS Star Coord at Epoch: 06h 37m 53.83932s +23:29:00.69324s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 14.625
 G magnitude : 16.183
 RP magnitude : 15.669
 BP magnitude : 16.517
 DUPflag : 0
 Distance (au) : 17.944
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.21
 Sun-Target sep (deg) : 163.90
 Sun-Moon sep (deg) : 150.68
 B (ring opening deg) : 67.53
 PA of pole (deg) : 72.32
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.070
 C/A sky separation (km) : 39955.6
 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

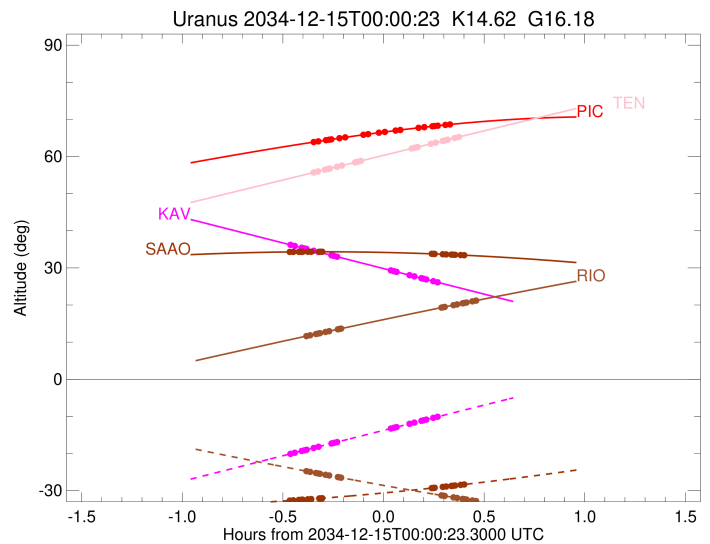
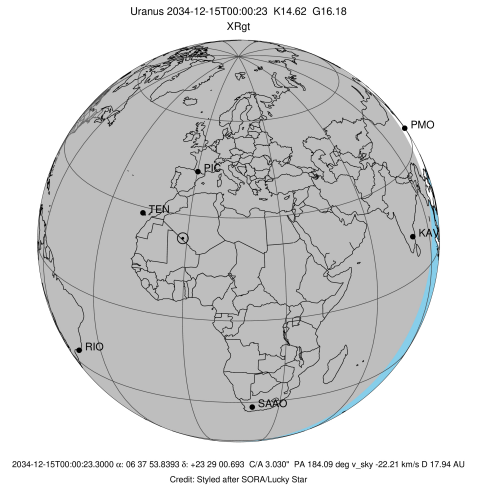


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-12-14T23:39:16.565		55.64	-71.01	51422.62	-14.84		
lambda	I	2034-12-14T23:40:52.129		55.99	-71.36	50026.71	-14.25		
delta	I	2034-12-14T23:42:57.584		56.45	-71.81	48300.35	-13.25		
gamma	I	2034-12-14T23:43:49.630		56.65	-72.00	47622.35	-12.80		
eta	I	2034-12-14T23:44:24.921		56.78	-72.13	47176.12	-12.49		
beta	I	2034-12-14T23:46:30.589		57.24	-72.58	45681.10	-11.29		
alpha	I	2034-12-14T23:48:00.924		57.57	-72.90	44702.33	-10.37		
4	I	2034-12-14T23:51:51.568		58.42	-73.73	42612.20	-7.69		
5	I	2034-12-14T23:52:49.508		58.63	-73.93	42187.28	-7.01		
6	I	2034-12-14T23:53:38.474		58.82	-74.11	41861.41	-6.32		

No planet occultations

6	E	2034-12-15T00:08:43.986		62.15	-77.29	41840.47	6.33		
5	E	2034-12-15T00:09:42.499		62.37	-77.50	42231.04	7.02		
4	E	2034-12-15T00:10:32.986		62.55	-77.67	42592.20	7.70		
alpha	E	2034-12-15T00:14:28.608		63.42	-78.48	44731.37	10.38		
beta	E	2034-12-15T00:15:55.306		63.74	-78.77	45670.49	11.30		
eta	E	2034-12-15T00:18:01.613		64.20	-79.19	47176.12	12.51		
gamma	E	2034-12-15T00:18:37.271		64.33	-79.31	47627.76	12.82		
delta	E	2034-12-15T00:19:28.811		64.52	-79.48	48300.35	13.27		
lambda	E	2034-12-15T00:21:34.045		64.98	-79.90	50026.71	14.28		
epsilon	E	2034-12-15T00:22:35.985		65.21	-80.10	50925.67	14.87		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2034-12-14T23:56:03.800
 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 : 3382410754194412800
 2Mass ID (if available) : 06375384+2329006
 ICRS Star Coord at Epoch: 06h 37m 53.83932s +23:29:00.69324s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 14.625
 G magnitude : 16.183
 RP magnitude : 15.669
 BP magnitude : 16.517
 DUPflag : 0
 Distance (au) : 17.944
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.21
 Sun-Target sep (deg) : 163.90
 Sun-Moon sep (deg) : 149.46
 B (ring opening deg) : 67.53
 PA of pole (deg) : 72.32
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.060
 C/A sky separation (km) : 39817.7
 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_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

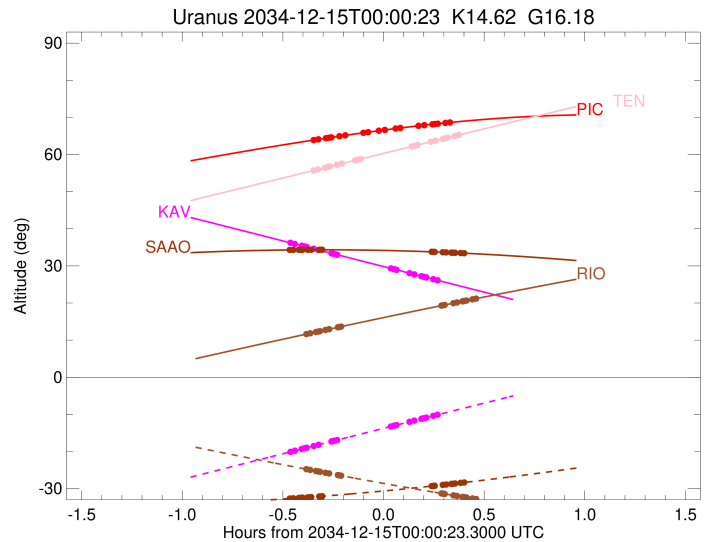
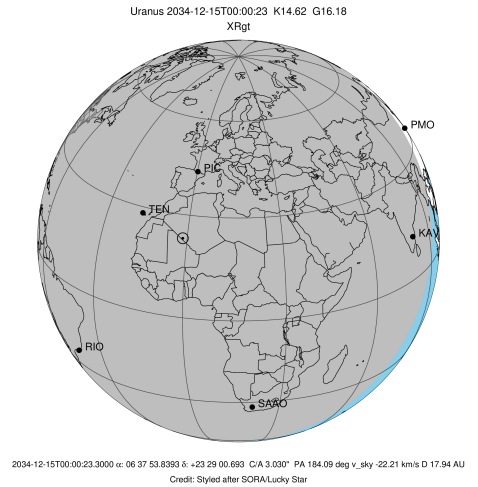


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-12-14T23:32:21.902		36.27	-20.16	51427.16	-14.89		
lambda	I	2034-12-14T23:33:57.450		35.91	-19.79	50026.71	-14.31		
delta	I	2034-12-14T23:36:02.342		35.43	-19.32	48300.35	-13.32		
gamma	I	2034-12-14T23:36:54.096		35.23	-19.12	47622.29	-12.88		
eta	I	2034-12-14T23:37:29.156		35.10	-18.99	47176.12	-12.57		
beta	I	2034-12-14T23:39:33.799		34.62	-18.51	45681.14	-11.40		
alpha	I	2034-12-14T23:41:03.167		34.28	-18.17	44701.79	-10.50		
4	I	2034-12-14T23:44:49.212		33.41	-17.31	42612.60	-7.92		
5	I	2034-12-14T23:45:45.497		33.19	-17.10	42185.83	-7.27		
6	I	2034-12-14T23:46:32.137		33.02	-16.92	41862.25	-6.63		

No planet occultations

6	E	2034-12-15T00:02:31.726		29.34	-13.28	41840.26	6.62		
5	E	2034-12-15T00:03:28.054		29.12	-13.06	42231.30	7.26		
4	E	2034-12-15T00:04:16.986		28.93	-12.88	42592.11	7.91		
alpha	E	2034-12-15T00:08:08.668		28.05	-12.00	44731.33	10.48		
beta	E	2034-12-15T00:09:34.700		27.72	-11.68	45670.53	11.38		
eta	E	2034-12-15T00:11:40.461		27.23	-11.20	47176.12	12.54		
gamma	E	2034-12-15T00:12:16.039		27.10	-11.07	47627.75	12.85		
delta	E	2034-12-15T00:13:07.511		26.90	-10.87	48300.35	13.28		
lambda	E	2034-12-15T00:15:12.774		26.42	-10.40	50026.71	14.26		
epsilon	E	2034-12-15T00:16:14.916		26.18	-10.16	50927.14	14.84		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2034-12-15T00:04:05.570
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 3382410754194412800
 2Mass ID (if available) : 06375384+2329006
 ICRS Star Coord at Epoch: 06h 37m 53.83932s +23:29:00.69324s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 14.625
 G magnitude : 16.183
 RP magnitude : 15.669
 BP magnitude : 16.517
 DUPflag : 0
 Distance (au) : 17.944
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.21
 Sun-Target sep (deg) : 163.90
 Sun-Moon sep (deg) : 150.56
 B (ring opening deg) : 67.53
 PA of pole (deg) : 72.32
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.725
 C/A sky separation (km) : 35468.4
 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_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



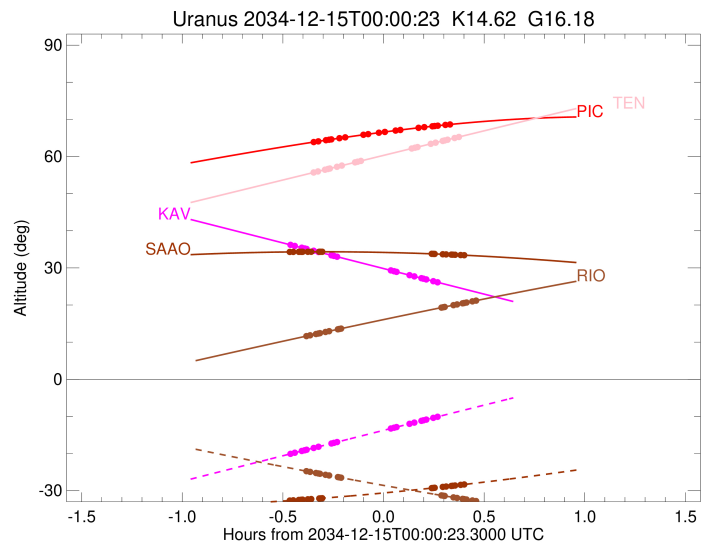
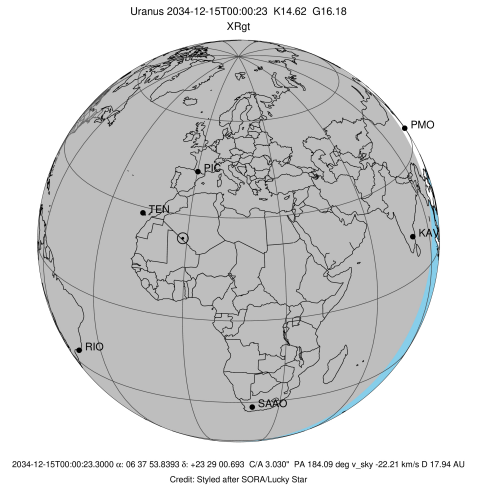
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-12-14T23:37:07.039		11.57	-24.71	51459.30	-17.12		
lambda	I	2034-12-14T23:38:31.430		11.85	-24.95	50026.71	-16.73		
delta	I	2034-12-14T23:40:16.616		12.19	-25.25	48300.35	-16.08		
gamma	I	2034-12-14T23:40:59.187		12.33	-25.37	47621.83	-15.80		
eta	I	2034-12-14T23:41:27.583		12.42	-25.45	47176.12	-15.60		
beta	I	2034-12-14T23:43:05.685		12.74	-25.73	45681.19	-14.87		
alpha	I	2034-12-14T23:44:12.967		12.96	-25.92	44696.90	-14.34		
4	I	2034-12-14T23:46:45.192		13.45	-26.35	42615.67	-12.97		
5	I	2034-12-14T23:47:19.736		13.56	-26.44	42172.42	-12.66		
6	I	2034-12-14T23:47:43.837		13.64	-26.51	41869.96	-12.38		

No planet occultations

6	E	2034-12-15T00:17:37.389		19.30	-31.28	41828.66	12.41		
5	E	2034-12-15T00:18:11.070		19.40	-31.36	42252.05	12.69		
4	E	2034-12-15T00:18:37.918		19.48	-31.43	42581.64	13.00		
alpha	E	2034-12-15T00:21:15.016		19.96	-31.82	44737.33	14.38		
beta	E	2034-12-15T00:22:18.538		20.16	-31.98	45667.07	14.92		
eta	E	2034-12-15T00:23:57.180		20.46	-32.22	47176.12	15.65		
gamma	E	2034-12-15T00:24:25.909		20.54	-32.29	47628.57	15.85		
delta	E	2034-12-15T00:25:07.915		20.67	-32.39	48300.35	16.13		
lambda	E	2034-12-15T00:26:52.733		20.99	-32.65	50026.71	16.79		
epsilon	E	2034-12-15T00:27:43.204		21.14	-32.77	50881.85	17.19		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2034-12-14T23:59:43.840
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : SAAO
 Location : So. Afr. Astro. Obs. (Sutherland)
 Latitude (deg) : -32.37953
 E. Longitude (deg) : 20.81070
 Altitude (km) : 1.768
 Gaia source ID : 3382410754194412800
 2Mass ID (if available) : 06375384+2329006
 ICRS Star Coord at Epoch: 06h 37m 53.83932s +23:29:00.69324s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 14.625
 G magnitude : 16.183
 RP magnitude : 15.669
 BP magnitude : 16.517
 DUPflag : 0
 Distance (au) : 17.944
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.21
 Sun-Target sep (deg) : 163.90
 Sun-Moon sep (deg) : 149.97
 B (ring opening deg) : 67.53
 PA of pole (deg) : 72.32
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.621
 C/A sky separation (km) : 34110.1
 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_itrf93_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	2034-12-14T23:32:09.000		34.30	-32.69	51470.61	-17.91		
lambda	I	2034-12-14T23:33:30.242		34.31	-32.61	50026.71	-17.55		
delta	I	2034-12-14T23:35:10.236		34.32	-32.51	48300.35	-16.97		
gamma	I	2034-12-14T23:35:50.538		34.33	-32.46	47621.69	-16.71		
eta	I	2034-12-14T23:36:17.342		34.33	-32.43	47176.12	-16.54		
beta	I	2034-12-14T23:37:49.534		34.34	-32.33	45681.09	-15.89		
alpha	I	2034-12-14T23:38:52.363		34.34	-32.27	44695.44	-15.43		
4	I	2034-12-14T23:41:12.413		34.35	-32.11	42616.16	-14.23		
5	I	2034-12-14T23:41:44.062		34.35	-32.07	42169.23	-13.97		
6	I	2034-12-14T23:42:05.463		34.35	-32.05	41871.73	-13.73		

No planet occultations

6	E	2034-12-15T00:14:43.427		33.79	-29.32	41826.42	13.73		
5	E	2034-12-15T00:15:14.385		33.78	-29.27	42256.13	13.97		
4	E	2034-12-15T00:15:38.447		33.76	-29.23	42579.39	14.23		
alpha	E	2034-12-15T00:18:03.739		33.68	-28.99	44738.53	15.42		
beta	E	2034-12-15T00:19:03.036		33.64	-28.90	45666.28	15.89		
eta	E	2034-12-15T00:20:36.071		33.58	-28.74	47176.12	16.53		
gamma	E	2034-12-15T00:21:03.300		33.56	-28.69	47628.74	16.71		
delta	E	2034-12-15T00:21:43.186		33.53	-28.63	48300.35	16.96		
lambda	E	2034-12-15T00:23:23.196		33.47	-28.45	50026.71	17.55		
epsilon	E	2034-12-15T00:24:11.045		33.43	-28.37	50872.74	17.91		