

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-12-26T21:06:43.840
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3425620908330506752
 2Mass ID (if available) : 06152378+2339516

ICRS Star Coord at Epoch: 06h 15m 23.78889s +23:39:51.60144s

RUWE (>1.4 is poor) : 1.08
 K magnitude : 13.587
 G magnitude : 15.532
 RP magnitude : 14.875
 BP magnitude : 16.009
 DUPflag : 0
 Distance (au) : 17.970
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.40
 Sun-Target sep (deg) : 178.56
 Sun-Moon sep (deg) : 115.97
 B (ring opening deg) : 72.26
 PA of pole (deg) : 64.41

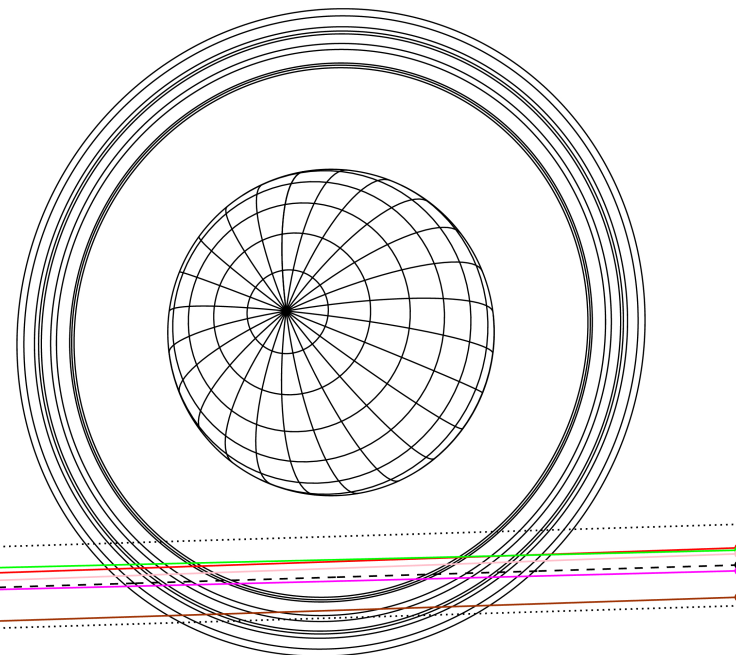
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2033-12-26T21:06:43.8400 α: 06 15 23.78889 δ: +23 39 51.601 C/A 2.933° PA 1.73 deg v_sky -23.40 km/s D 17.97 AU
 Credit: Styled after SORA/Lucky Star

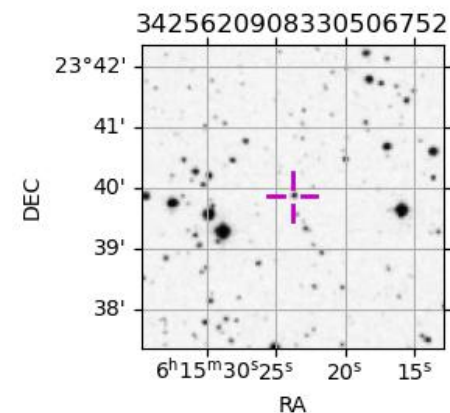
Uranus 2033-12-26T21:06:43 K13.59 G15.53 XRgt

Earth
 PIC
 PMO
 TEN
 KAV
 SAAO

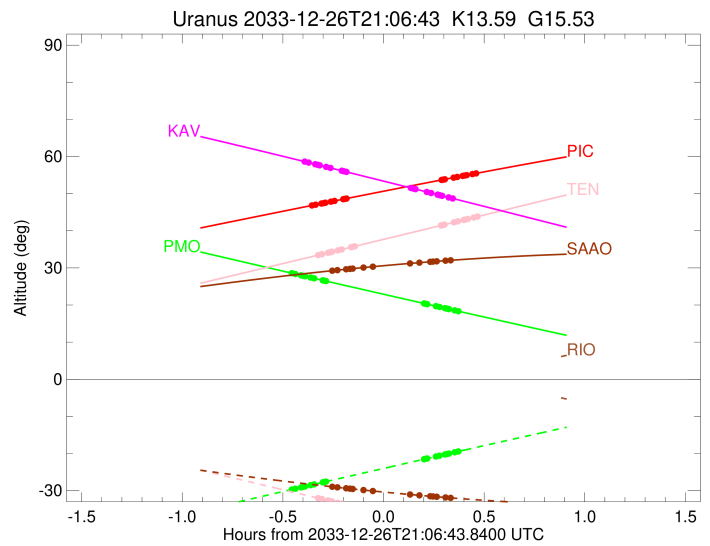
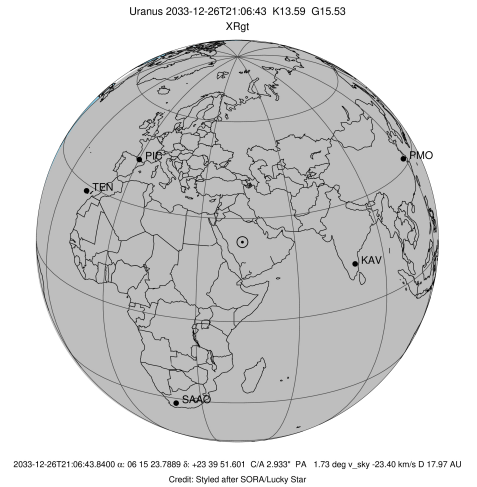


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++		+++++	DEC 26 20:45 - DEC 26 21:34	PnnRie
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++		+++++	DEC 26 20:39 - DEC 26 21:29	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	+++++		+++++	DEC 26 20:47 - DEC 26 21:35	PnnRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++		+++++	DEC 26 20:43 - DEC 26 21:27	PnnRie
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					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	+++++		+++++	DEC 26 20:51 - DEC 26 21:27	PnnRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-12-26T21:08:54.190
 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 : 3425620908330506752
 2Mass ID (if available) : 06152378+2339516
 ICRS Star Coord at Epoch: 06h 15m 23.78889s +23:39:51.60144s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 13.587
 G magnitude : 15.532
 RP magnitude : 14.875
 BP magnitude : 16.009
 DUPflag : 0
 Distance (au) : 17.970
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.40
 Sun-Target sep (deg) : 178.56
 Sun-Moon sep (deg) : 116.86
 B (ring opening deg) : 72.26
 PA of pole (deg) : 64.41
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.753
 C/A sky separation (km) : 35882.5
 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

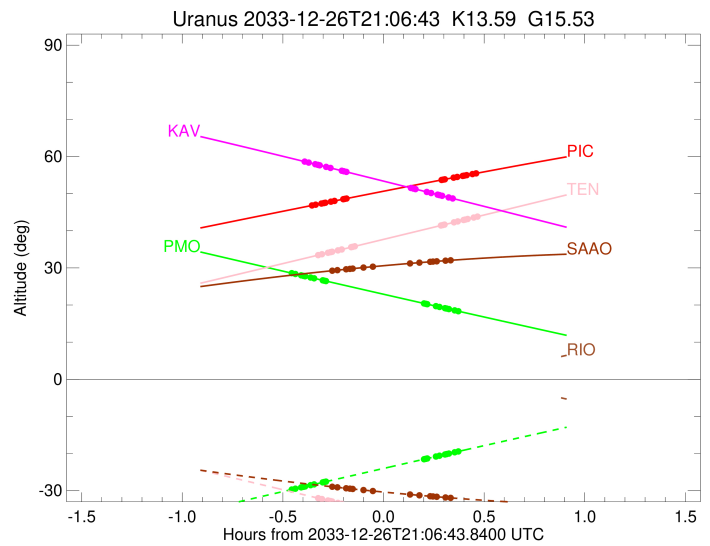
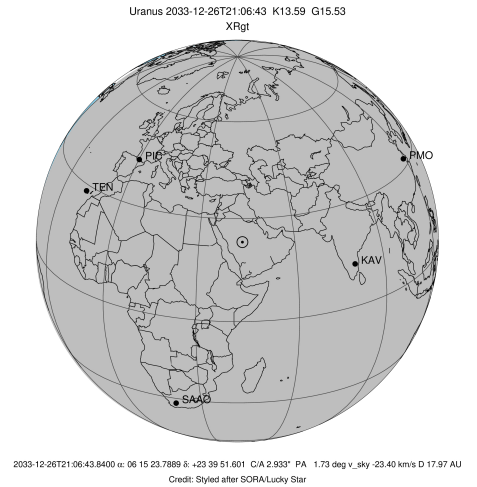


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-12-26T20:45:17.961		46.81	-45.52	51271.74	-17.49		
lambda	I	2033-12-26T20:46:30.591		47.03	-45.74	50026.71	-16.92		
delta	I	2033-12-26T20:48:14.733		47.34	-46.05	48300.35	-16.22		
gamma	I	2033-12-26T20:48:56.345		47.47	-46.17	47631.44	-15.93		
eta	I	2033-12-26T20:49:25.129		47.55	-46.26	47176.12	-15.71		
beta	I	2033-12-26T20:51:04.394		47.85	-46.56	45653.93	-14.91		
alpha	I	2033-12-26T20:52:10.839		48.05	-46.76	44684.78	-14.35		
4	I	2033-12-26T20:54:45.931		48.51	-47.22	42568.87	-12.89		
5	I	2033-12-26T20:55:06.164		48.57	-47.28	42300.46	-12.63		
6	I	2033-12-26T20:55:46.893		48.70	-47.41	41794.87	-12.21		

No planet occultations

6	E	2033-12-26T21:24:00.098		53.68	-52.40	41818.67	12.23		
5	E	2033-12-26T21:24:32.761		53.78	-52.50	42224.82	12.64		
4	E	2033-12-26T21:25:02.953		53.87	-52.58	42610.65	12.91		
alpha	E	2033-12-26T21:27:36.667		54.31	-53.03	44711.07	14.38		
beta	E	2033-12-26T21:28:40.029		54.49	-53.21	45641.16	14.94		
eta	E	2033-12-26T21:30:20.067		54.78	-53.50	47176.12	15.74		
gamma	E	2033-12-26T21:30:48.604		54.86	-53.58	47628.29	15.95		
delta	E	2033-12-26T21:31:30.339		54.98	-53.70	48300.35	16.25		
lambda	E	2033-12-26T21:33:14.288		55.27	-54.00	50026.71	16.95		
epsilon	E	2033-12-26T21:34:41.831		55.52	-54.25	51534.35	17.53		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-12-26T21:03:13.490
 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 : 3425620908330506752
 2Mass ID (if available) : 06152378+2339516
 ICRS Star Coord at Epoch: 06h 15m 23.78889s +23:39:51.60144s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 13.587
 G magnitude : 15.532
 RP magnitude : 14.875
 BP magnitude : 16.009
 DUPflag : 0
 Distance (au) : 17.970
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.40
 Sun-Target sep (deg) : 178.56
 Sun-Moon sep (deg) : 115.97
 B (ring opening deg) : 72.26
 PA of pole (deg) : 64.41
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.731
 C/A sky separation (km) : 35595.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.bsp
 ural61.bsp
 vgr2.ural61.bsp
 peph.ural60.bsp
 earthstns_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

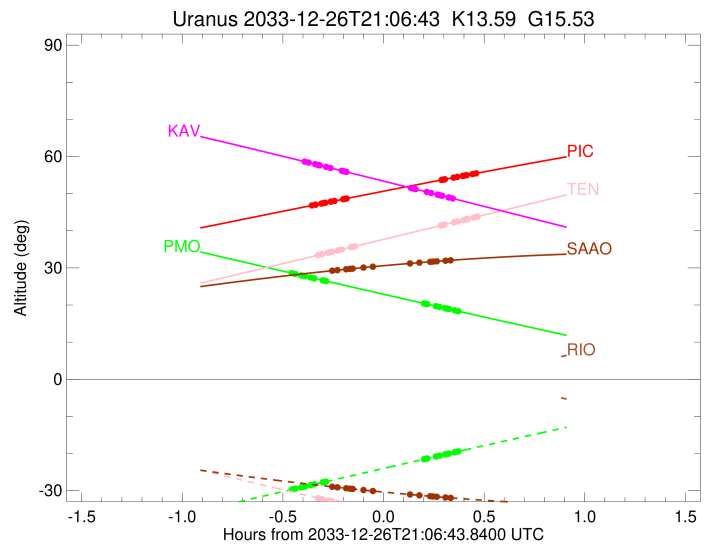
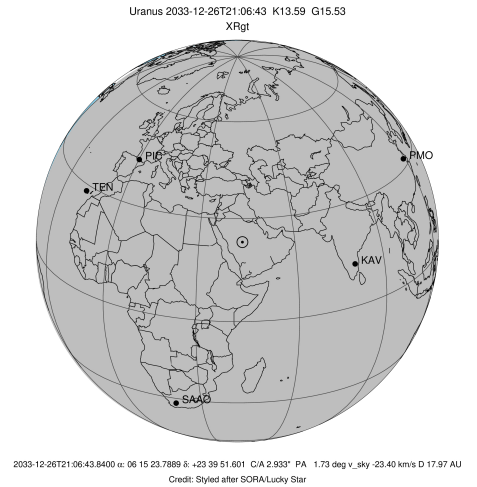


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-12-26T20:39:16.149		28.60	-29.72	51272.33	-17.57		
lambda	I	2033-12-26T20:40:28.468		28.35	-29.47	50026.71	-17.00		
delta	I	2033-12-26T20:42:12.012		27.99	-29.11	48300.35	-16.33		
gamma	I	2033-12-26T20:42:53.344		27.85	-28.97	47631.44	-16.04		
eta	I	2033-12-26T20:43:21.918		27.75	-28.87	47176.12	-15.83		
beta	I	2033-12-26T20:45:00.343		27.41	-28.53	45653.95	-15.06		
alpha	I	2033-12-26T20:46:06.107		27.18	-28.30	44684.77	-14.51		
4	I	2033-12-26T20:48:39.107		26.65	-27.77	42568.70	-13.11		
5	I	2033-12-26T20:48:58.965		26.58	-27.70	42300.64	-12.85		
6	I	2033-12-26T20:49:38.958		26.44	-27.56	41794.85	-12.46		

No planet occultations

6	E	2033-12-26T21:18:46.152		20.43	-21.55	41819.59	12.43		
5	E	2033-12-26T21:19:18.089		20.33	-21.44	42222.96	12.82		
4	E	2033-12-26T21:19:48.037		20.22	-21.34	42611.15	13.08		
alpha	E	2033-12-26T21:22:20.268		19.70	-20.82	44711.77	14.48		
beta	E	2033-12-26T21:23:23.190		19.49	-20.60	45641.21	15.02		
eta	E	2033-12-26T21:25:02.819		19.15	-20.26	47176.12	15.78		
gamma	E	2033-12-26T21:25:31.274		19.05	-20.17	47628.19	15.99		
delta	E	2033-12-26T21:26:12.933		18.91	-20.02	48300.35	16.28		
lambda	E	2033-12-26T21:27:56.809		18.56	-19.67	50026.71	16.95		
epsilon	E	2033-12-26T21:29:24.281		18.26	-19.37	51531.99	17.51		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-12-26T21:10:00.250
 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 : 3425620908330506752
 2Mass ID (if available) : 06152378+2339516
 ICRS Star Coord at Epoch: 06h 15m 23.78889s +23:39:51.60144s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 13.587
 G magnitude : 15.532
 RP magnitude : 14.875
 BP magnitude : 16.009
 DUPflag : 0
 Distance (au) : 17.970
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.40
 Sun-Target sep (deg) : 178.56
 Sun-Moon sep (deg) : 116.83
 B (ring opening deg) : 72.26
 PA of pole (deg) : 64.41
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.834
 C/A sky separation (km) : 36942.2
 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

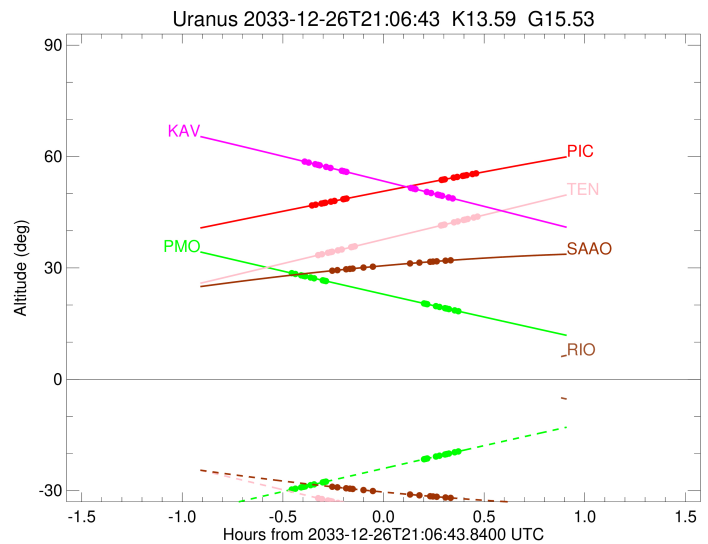
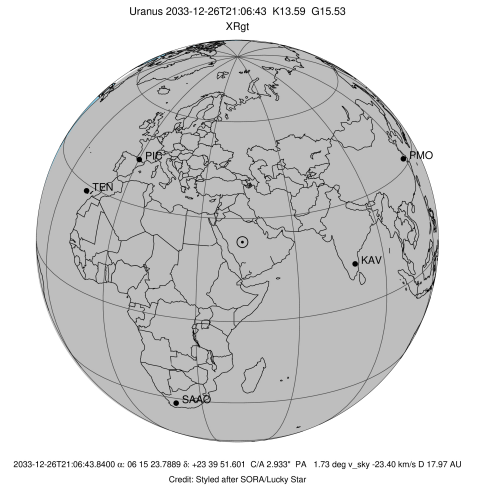


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-12-26T20:47:07.825		33.41	-32.00	51282.48	-16.94		
lambda	I	2033-12-26T20:48:23.653		33.69	-32.27	50026.71	-16.31		
delta	I	2033-12-26T20:50:11.958		34.08	-32.66	48300.35	-15.55		
gamma	I	2033-12-26T20:50:55.423		34.24	-32.82	47631.47	-15.22		
eta	I	2033-12-26T20:51:25.569		34.35	-32.93	47176.12	-14.99		
beta	I	2033-12-26T20:53:10.119		34.73	-33.31	45653.23	-14.10		
alpha	I	2033-12-26T20:54:20.579		34.98	-33.56	44684.94	-13.47		
4	I	2033-12-26T20:57:07.499		35.59	-34.16	42571.05	-11.81		
5	I	2033-12-26T20:57:30.111		35.67	-34.25	42298.07	-11.50		
6	I	2033-12-26T20:58:14.793		35.83	-34.41	41795.09	-11.03		

No planet occultations

6	E	2033-12-26T21:23:48.238	41.41	-39.97	41816.56	11.05		
5	E	2033-12-26T21:24:24.827	41.55	-40.10	42229.10	11.52		
4	E	2033-12-26T21:24:57.422	41.67	-40.22	42609.43	11.83		
alpha	E	2033-12-26T21:27:42.844	42.27	-40.82	44709.61	13.50		
beta	E	2033-12-26T21:28:50.157	42.52	-41.07	45641.09	14.14		
eta	E	2033-12-26T21:30:35.399	42.90	-41.45	47176.12	15.02		
gamma	E	2033-12-26T21:31:05.271	43.01	-41.56	47628.47	15.26		
delta	E	2033-12-26T21:31:48.821	43.17	-41.72	48300.35	15.59		
lambda	E	2033-12-26T21:33:36.827	43.56	-42.11	50026.71	16.36		
epsilon	E	2033-12-26T21:35:07.566	43.90	-42.44	51538.26	16.99		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-12-26T21:04:14.050
 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 : 3425620908330506752
 2Mass ID (if available) : 06152378+2339516
 ICRS Star Coord at Epoch: 06h 15m 23.78889s +23:39:51.60144s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 13.587
 G magnitude : 15.532
 RP magnitude : 14.875
 BP magnitude : 16.009
 DUPflag : 0
 Distance (au) : 17.970
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.40
 Sun-Target sep (deg) : 178.56
 Sun-Moon sep (deg) : 116.41
 B (ring opening deg) : 72.26
 PA of pole (deg) : 64.41
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.989
 C/A sky separation (km) : 38955.2
 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

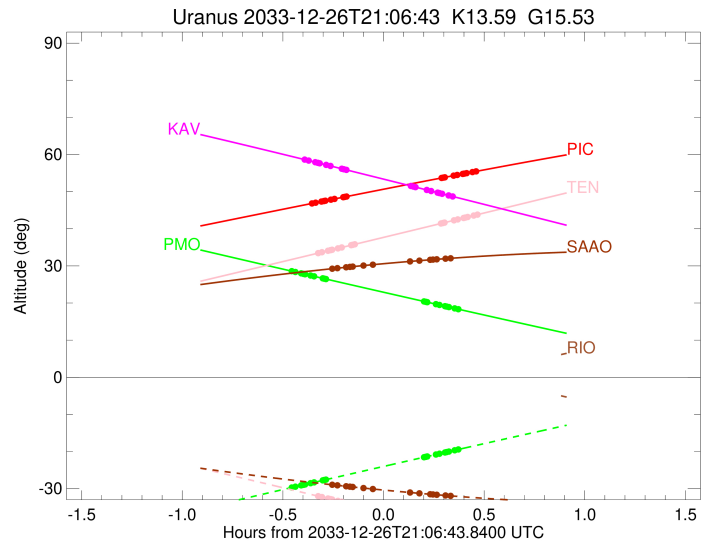
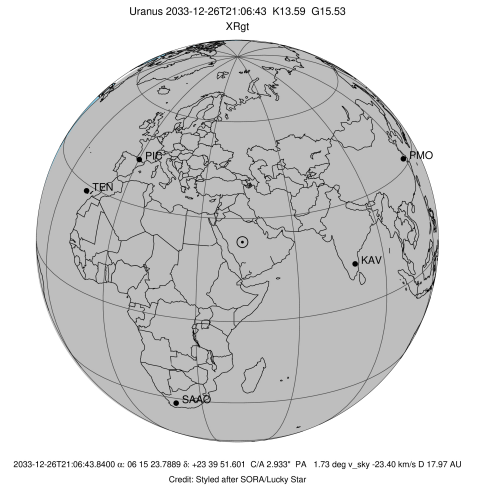


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-12-26T20:43:04.430		58.67	-60.09	51308.63	-16.00		
lambda	I	2033-12-26T20:44:26.784		58.36	-59.79	50026.71	-15.26		
delta	I	2033-12-26T20:46:23.392		57.93	-59.36	48300.35	-14.33		
gamma	I	2033-12-26T20:47:10.725		57.76	-59.18	47631.54	-13.92		
eta	I	2033-12-26T20:47:43.777		57.63	-59.06	47176.12	-13.63		
beta	I	2033-12-26T20:49:40.178		57.20	-58.63	45651.57	-12.52		
alpha	I	2033-12-26T20:51:00.178		56.91	-58.33	44685.57	-11.71		
4	I	2033-12-26T20:54:18.897		56.17	-57.60	42576.46	-9.46		
5	I	2033-12-26T20:54:48.955		56.05	-57.49	42291.41	-9.02		
6	I	2033-12-26T20:55:46.069		55.84	-57.27	41796.18	-8.33		

No planet occultations

6	E	2033-12-26T21:14:49.305		51.55	-53.00	41812.52	8.32		
5	E	2033-12-26T21:15:38.428		51.37	-52.81	42237.47	9.01		
4	E	2033-12-26T21:16:18.521		51.22	-52.66	42606.81	9.45		
alpha	E	2033-12-26T21:19:36.382		50.47	-51.92	44707.09	11.69		
beta	E	2033-12-26T21:20:53.489		50.18	-51.62	45641.06	12.50		
eta	E	2033-12-26T21:22:51.004		49.73	-51.18	47176.12	13.61		
gamma	E	2033-12-26T21:23:23.913		49.61	-51.06	47628.76	13.90		
delta	E	2033-12-26T21:24:11.531		49.43	-50.88	48300.35	14.31		
lambda	E	2033-12-26T21:26:08.362		48.99	-50.44	50026.71	15.23		
epsilon	E	2033-12-26T21:27:45.675		48.62	-50.07	51543.46	15.97		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-12-26T21:07:55.160
 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 : 3425620908330506752
 2Mass ID (if available) : 06152378+2339516
 ICRS Star Coord at Epoch: 06h 15m 23.78889s +23:39:51.60144s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 13.587
 G magnitude : 15.532
 RP magnitude : 14.875
 BP magnitude : 16.009
 DUPflag : 0
 Distance (au) : 17.970
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.40
 Sun-Target sep (deg) : 178.56
 Sun-Moon sep (deg) : 116.51
 B (ring opening deg) : 72.26
 PA of pole (deg) : 64.41
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.339
 C/A sky separation (km) : 43522.9
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.bsp
 ural61.bsp
 vgr2.ural61.bsp
 peph.ural60.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	2033-12-26T20:51:11.226		29.22	-28.93	51361.87	-12.90		
lambda	I	2033-12-26T20:53:00.056		29.39	-29.11	50026.71	-11.77		
delta	I	2033-12-26T20:55:36.934		29.63	-29.37	48300.35	-10.21		
gamma	I	2033-12-26T20:56:44.817		29.73	-29.47	47631.56	-9.49		
eta	I	2033-12-26T20:57:34.240		29.81	-29.55	47176.12	-8.94		
beta	I	2033-12-26T21:00:50.059		30.09	-29.86	45647.44	-6.62		
alpha	I	2033-12-26T21:03:44.086		30.34	-30.12	44689.55	-4.40		

No planet occultations

alpha	E	2033-12-26T21:14:30.250		31.20	-31.03	44697.59	4.41		
beta	E	2033-12-26T21:17:21.179		31.41	-31.26	45641.82	6.62		
eta	E	2033-12-26T21:20:37.844		31.64	-31.51	47176.12	8.95		
gamma	E	2033-12-26T21:21:27.039		31.70	-31.57	47629.69	9.49		
delta	E	2033-12-26T21:22:35.074		31.77	-31.65	48300.35	10.22		
lambda	E	2033-12-26T21:25:11.831		31.95	-31.84	50026.71	11.78		
epsilon	E	2033-12-26T21:27:15.537		32.08	-31.99	51553.96	12.91		