

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-15T01:50:07.890
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3424691919788837248
 2Mass ID (if available) : 06022614+2338366

ICRS Star Coord at Epoch: 06h 02m 26.14941s +23:38:36.54715s

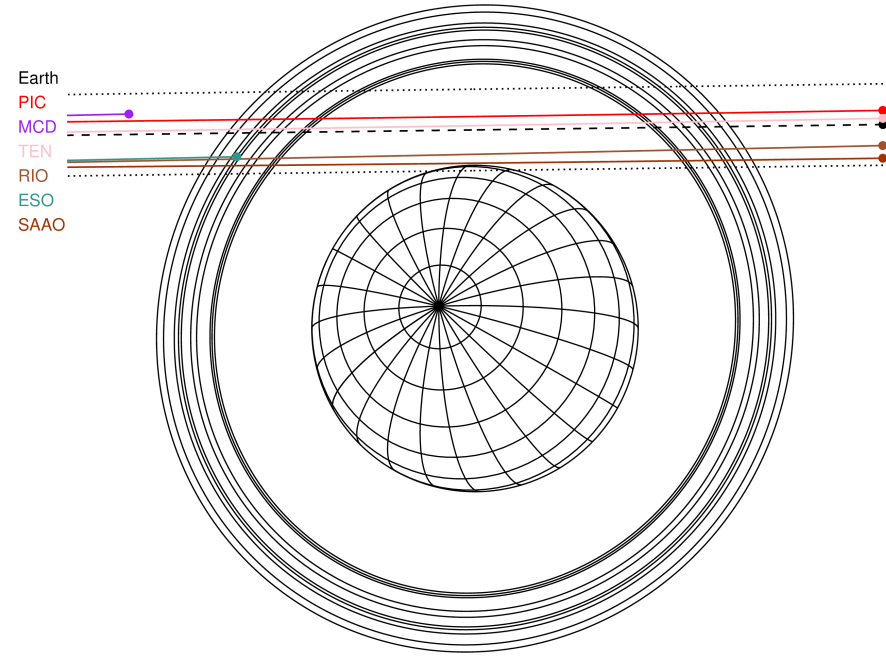
RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.359
 G magnitude : 16.758
 RP magnitude : 15.965
 BP magnitude : 17.410
 DUPflag : 0
 Distance (au) : 18.234
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.18
 Sun-Target sep (deg) : 142.24
 Sun-Moon sep (deg) : 66.68
 B (ring opening deg) : 74.88
 PA of pole (deg) : 58.34

#	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



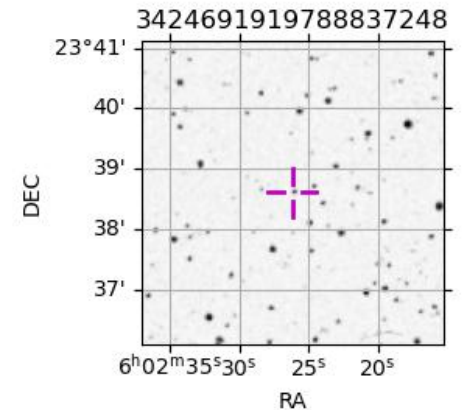
2032-11-15T01:50:07.8900 ra: 06 02 26.1494 s: +23 38 36.547 C/A 2.359° PA 180.75 deg v_sky -17.18 km/s D 18.23 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2032-11-15T01:50:07 K14.36 G16.76 XRgt

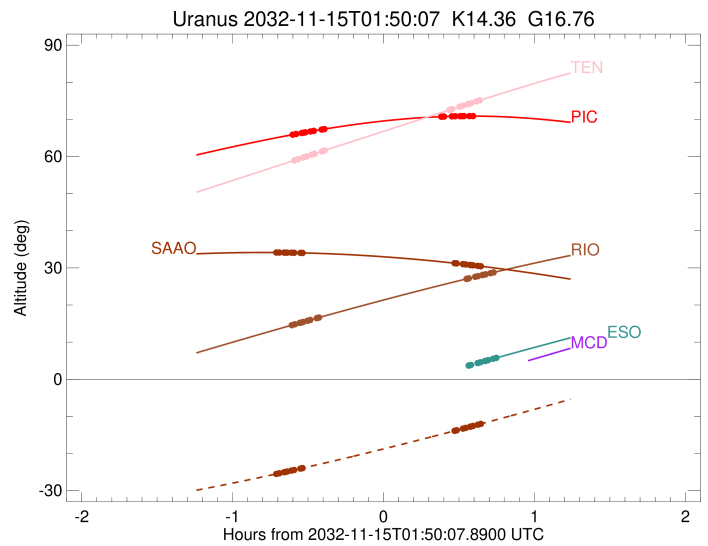
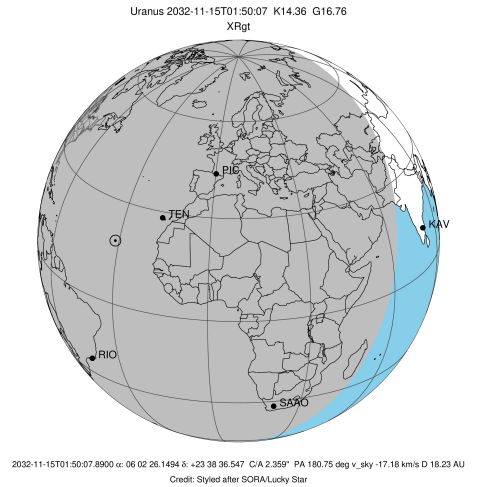


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++		+++++	NOV 15 01:13 - NOV 15 02:25	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	+++++		+++++	NOV 15 01:14 - NOV 15 02:28	PnnRie
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	+++++		+++++	NOV 15 01:13 - NOV 15 02:33	PnnRie
ESO	European Southern Obs	-29.3	289.3			++++	NOV 15 02:30 - NOV 15 02:34	PnnRne
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	+++++		+++++	NOV 15 01:07 - NOV 15 02:28	PnnRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-15T01:50:51.960
 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 : 3424691919788837248
 2Mass ID (if available) : 06022614+2338366
 ICRS Star Coord at Epoch: 06h 02m 26.14941s +23:38:36.54715s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.359
 G magnitude : 16.758
 RP magnitude : 15.965
 BP magnitude : 17.410
 DUPflag : 0
 Distance (au) : 18.234
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.18
 Sun-Target sep (deg) : 142.24
 Sun-Moon sep (deg) : 67.50
 B (ring opening deg) : 74.88
 PA of pole (deg) : 58.34
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.510
 C/A sky separation (km) : 33190.7
 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

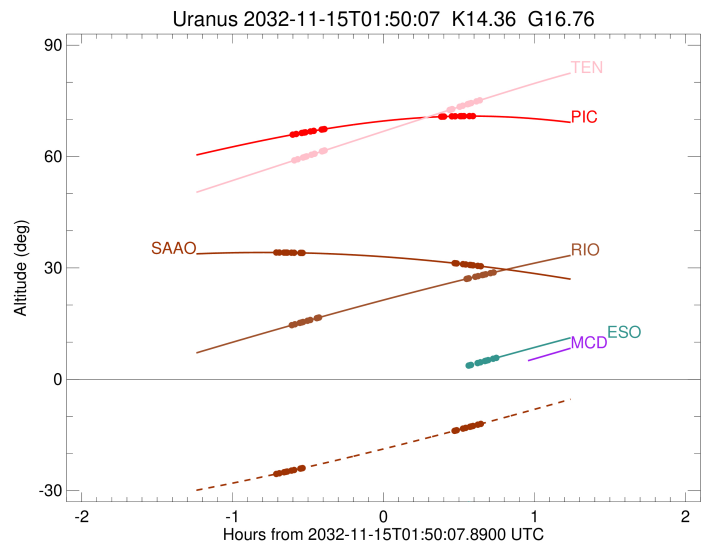
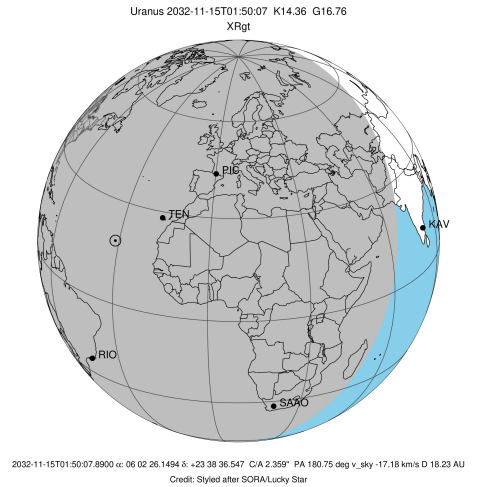


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-15T01:13:33.232		65.84	-59.30	51551.75	-13.64		
lambda	I	2032-11-15T01:15:26.374		66.07	-59.06	50026.71	-13.32		
delta	I	2032-11-15T01:17:37.920		66.34	-58.77	48300.35	-12.92		
gamma	I	2032-11-15T01:18:30.517		66.45	-58.65	47625.32	-12.75		
eta	I	2032-11-15T01:19:05.922		66.52	-58.57	47176.12	-12.63		
beta	I	2032-11-15T01:21:08.138		66.76	-58.30	45659.32	-12.18		
alpha	I	2032-11-15T01:22:26.207		66.92	-58.12	44720.67	-11.87		
4	I	2032-11-15T01:25:37.552		67.28	-57.68	42525.93	-11.04		
5	I	2032-11-15T01:26:03.145		67.33	-57.62	42244.27	-10.89		
6	I	2032-11-15T01:26:37.147		67.39	-57.54	41875.06	-10.76		

No planet occultations

6	E	2032-11-15T02:13:06.246		70.74	-50.38	41866.59	10.77		
5	E	2032-11-15T02:13:34.024		70.75	-50.30	42160.69	10.90		
4	E	2032-11-15T02:14:09.269		70.76	-50.20	42560.52	11.06		
alpha	E	2032-11-15T02:17:14.693		70.83	-49.69	44685.24	11.89		
beta	E	2032-11-15T02:18:33.955		70.85	-49.47	45641.06	12.20		
eta	E	2032-11-15T02:20:37.483		70.87	-49.12	47176.12	12.65		
gamma	E	2032-11-15T02:21:12.498		70.88	-49.03	47621.05	12.77		
delta	E	2032-11-15T02:22:05.343		70.88	-48.88	48300.35	12.94		
lambda	E	2032-11-15T02:24:16.665		70.89	-48.51	50026.71	13.34		
epsilon	E	2032-11-15T02:25:39.405		70.89	-48.28	51140.54	13.67		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-15T01:52:32.210
 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 : 3424691919788837248
 2Mass ID (if available) : 06022614+2338366
 ICRS Star Coord at Epoch: 06h 02m 26.14941s +23:38:36.54715s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.359
 G magnitude : 16.758
 RP magnitude : 15.965
 BP magnitude : 17.410
 DUPflag : 0
 Distance (au) : 18.234
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.18
 Sun-Target sep (deg) : 142.24
 Sun-Moon sep (deg) : 67.38
 B (ring opening deg) : 74.88
 PA of pole (deg) : 58.34
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.402
 C/A sky separation (km) : 31763.8
 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



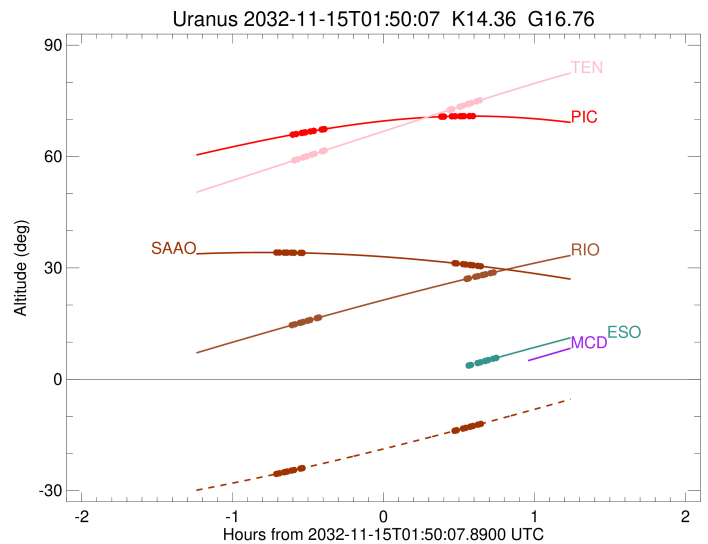
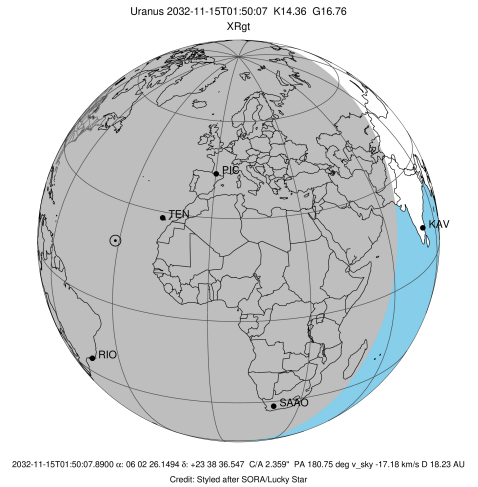
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-15T01:14:13.284	58.87	-79.01	51549.72	-14.07		
lambda	I	2032-11-15T01:16:02.693	59.27	-78.80	50026.71	-13.78		
delta	I	2032-11-15T01:18:09.571	59.74	-78.54	48300.35	-13.43		
gamma	I	2032-11-15T01:19:00.115	59.92	-78.43	47625.52	-13.27		
eta	I	2032-11-15T01:19:34.104	60.05	-78.36	47176.12	-13.17		
beta	I	2032-11-15T01:21:30.889	60.48	-78.10	45660.17	-12.78		
alpha	I	2032-11-15T01:22:45.111	60.75	-77.93	44722.17	-12.51		
4	I	2032-11-15T01:25:45.698	61.42	-77.50	42525.97	-11.79		
5	I	2032-11-15T01:26:09.254	61.50	-77.44	42248.36	-11.66		
6	I	2032-11-15T01:26:41.380	61.62	-77.36	41873.99	-11.55		

No planet occultations

6	E	2032-11-15T02:16:26.407	72.56	-68.15	41864.77	11.58		
5	E	2032-11-15T02:16:52.268	72.65	-68.06	42159.10	11.69		
4	E	2032-11-15T02:17:25.454	72.77	-67.95	42562.99	11.83		
alpha	E	2032-11-15T02:20:19.814	73.40	-67.35	44684.96	12.55		
beta	E	2032-11-15T02:21:35.100	73.67	-67.09	45641.09	12.82		
eta	E	2032-11-15T02:23:32.968	74.10	-66.68	47176.12	13.22		
gamma	E	2032-11-15T02:24:06.502	74.22	-66.56	47621.10	13.32		
delta	E	2032-11-15T02:24:57.192	74.40	-66.39	48300.35	13.48		
lambda	E	2032-11-15T02:27:03.580	74.85	-65.95	50026.71	13.84		
epsilon	E	2032-11-15T02:28:22.355	75.13	-65.67	51124.75	14.13		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-15T01:54:41.680
 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 : 3424691919788837248
 2Mass ID (if available) : 06022614+2338366
 ICRS Star Coord at Epoch: 06h 02m 26.14941s +23:38:36.54715s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.359
 G magnitude : 16.758
 RP magnitude : 15.965
 BP magnitude : 17.410
 DUPflag : 0
 Distance (au) : 18.234
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.18
 Sun-Target sep (deg) : 142.24
 Sun-Moon sep (deg) : 66.74
 B (ring opening deg) : 74.88
 PA of pole (deg) : 58.34
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.063
 C/A sky separation (km) : 27277.1
 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_itrfr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



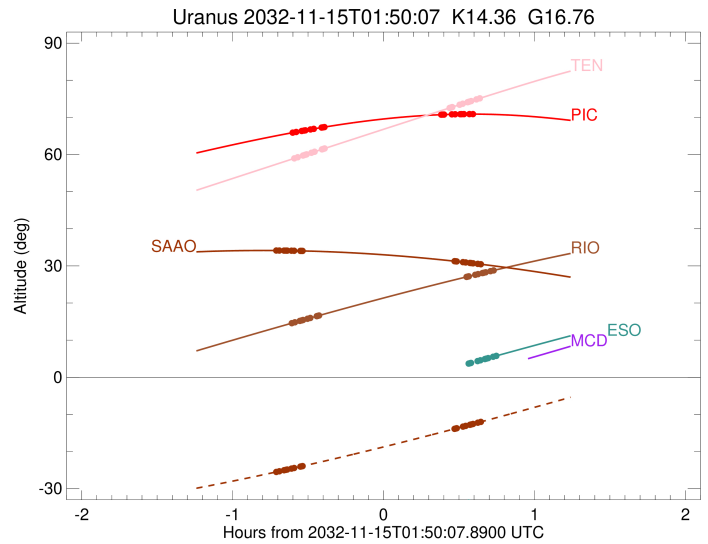
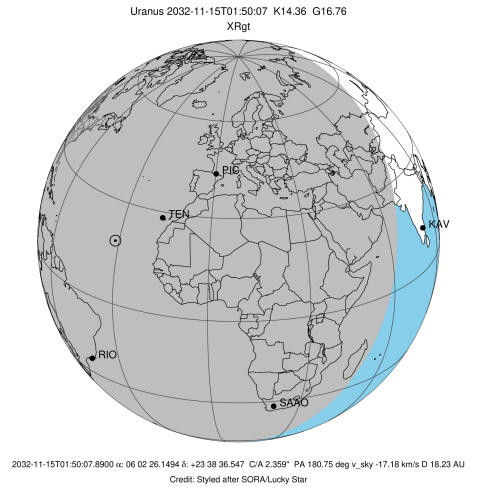
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-15T01:13:14.918		14.49	-43.83	51540.49	-15.08		
lambda	I	2032-11-15T01:14:56.051		14.81	-44.01	50026.71	-14.87		
delta	I	2032-11-15T01:16:53.018		15.19	-44.22	48300.35	-14.64		
gamma	I	2032-11-15T01:17:39.228		15.33	-44.30	47626.15	-14.54		
eta	I	2032-11-15T01:18:10.254		15.43	-44.36	47176.12	-14.47		
beta	I	2032-11-15T01:19:55.721		15.77	-44.54	45662.73	-14.21		
alpha	I	2032-11-15T01:21:02.056		15.98	-44.65	44726.60	-14.04		
4	I	2032-11-15T01:23:41.278		16.48	-44.91	42526.72	-13.58		
5	I	2032-11-15T01:24:00.765		16.54	-44.94	42259.92	-13.50		
6	I	2032-11-15T01:24:29.513		16.63	-44.99	41870.35	-13.43		

No planet occultations

6	E	2032-11-15T02:23:09.261		27.04	-48.51	41859.31	13.51		
5	E	2032-11-15T02:23:31.575		27.10	-48.52	42156.01	13.58		
4	E	2032-11-15T02:24:00.838		27.18	-48.53	42569.90	13.66		
alpha	E	2032-11-15T02:26:33.326		27.60	-48.57	44684.61	14.13		
beta	E	2032-11-15T02:27:40.572		27.78	-48.59	45641.42	14.31		
eta	E	2032-11-15T02:29:26.820		28.06	-48.61	47176.12	14.57		
gamma	E	2032-11-15T02:29:57.300		28.15	-48.61	47621.29	14.64		
delta	E	2032-11-15T02:30:43.515		28.27	-48.62	48300.35	14.74		
lambda	E	2032-11-15T02:32:39.627		28.58	-48.64	50026.71	14.99		
epsilon	E	2032-11-15T02:33:49.555		28.77	-48.65	51079.49	15.20		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-15T01:55:36.880
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 3424691919788837248
 2Mass ID (if available) : 06022614+2338366
 ICRS Star Coord at Epoch: 06h 02m 26.14941s +23:38:36.54715s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.359
 G magnitude : 16.758
 RP magnitude : 15.965
 BP magnitude : 17.410
 DUPflag : 0
 Distance (au) : 18.234
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.18
 Sun-Target sep (deg) : 142.24
 Sun-Moon sep (deg) : 66.30
 B (ring opening deg) : 74.88
 PA of pole (deg) : 58.34
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.095
 C/A sky separation (km) : 27710.8
 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_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



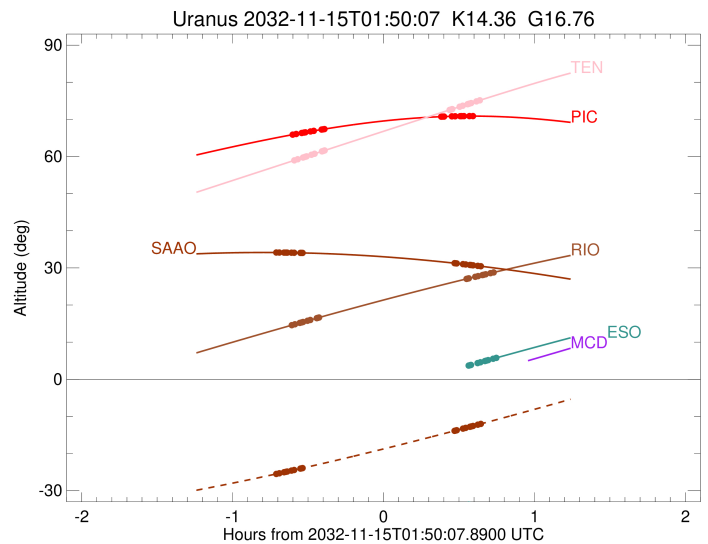
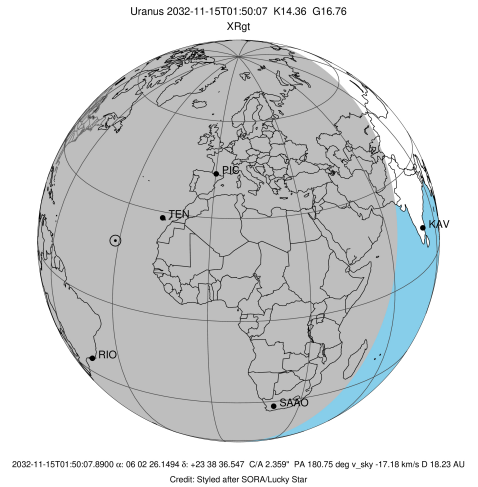
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-15T01:13:56.731	-10.15x	-23.28	51541.72	-14.81			
lambda	I	2032-11-15T01:15:39.819	-9.80x	-23.57	50026.71	-14.60			
delta	I	2032-11-15T01:17:39.030	-9.40x	-23.90	48300.35	-14.36			
gamma	I	2032-11-15T01:18:26.156	-9.24x	-24.03	47626.08	-14.25			
eta	I	2032-11-15T01:18:57.798	-9.13x	-24.12	47176.12	-14.18			
beta	I	2032-11-15T01:20:45.456	-8.77x	-24.41	45662.46	-13.92			
alpha	I	2032-11-15T01:21:53.218	-8.54x	-24.60	44726.14	-13.74			
4	I	2032-11-15T01:24:36.004	-7.99x	-25.05	42526.60	-13.27			
5	I	2032-11-15T01:24:56.046	-7.92x	-25.10	42258.75	-13.18			
6	I	2032-11-15T01:25:25.370	-7.83x	-25.18	41870.76	-13.12			

No planet occultations

6	E	2032-11-15T02:24:00.032	3.69x	-33.77	41859.75	13.20			
5	E	2032-11-15T02:24:22.845	3.76x	-33.82	42156.18	13.27			
4	E	2032-11-15T02:24:52.726	3.85x	-33.88	42569.37	13.36			
alpha	E	2032-11-15T02:27:28.521	4.35x	-34.21	44684.62	13.84			
beta	E	2032-11-15T02:28:37.118	4.56x	-34.35	45641.39	14.03			
eta	E	2032-11-15T02:30:25.423	4.90x	-34.57	47176.12	14.30			
gamma	E	2032-11-15T02:30:56.472	5.00	-34.64	47621.27	14.37			
delta	E	2032-11-15T02:31:43.540	5.15	-34.73	48300.35	14.48			
lambda	E	2032-11-15T02:33:41.718	5.52	-34.97	50026.71	14.73			
epsilon	E	2032-11-15T02:34:53.066	5.74	-35.11	51082.75	14.95			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-15T01:48:56.140
 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 : 3424691919788837248
 2Mass ID (if available) : 06022614+2338366
 ICRS Star Coord at Epoch: 06h 02m 26.14941s +23:38:36.54715s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.359
 G magnitude : 16.758
 RP magnitude : 15.965
 BP magnitude : 17.410
 DUPflag : 0
 Distance (au) : 18.234
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.18
 Sun-Target sep (deg) : 142.24
 Sun-Moon sep (deg) : 67.26
 B (ring opening deg) : 74.88
 PA of pole (deg) : 58.34
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.957
 C/A sky separation (km) : 25885.4
 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	2032-11-15T01:07:06.580		34.15	-25.56	51535.65	-15.55		
lambda	I	2032-11-15T01:08:44.286		34.14	-25.32	50026.71	-15.36		
delta	I	2032-11-15T01:10:37.450		34.12	-25.04	48300.35	-15.15		
gamma	I	2032-11-15T01:11:22.073		34.12	-24.93	47626.39	-15.06		
eta	I	2032-11-15T01:11:52.038		34.11	-24.86	47176.12	-15.00		
beta	I	2032-11-15T01:13:33.621		34.09	-24.60	45663.68	-14.76		
alpha	I	2032-11-15T01:14:37.385		34.08	-24.44	44728.19	-14.61		
4	I	2032-11-15T01:17:10.113		34.05	-24.05	42527.22	-14.21		
5	I	2032-11-15T01:17:28.445		34.04	-24.01	42263.89	-14.13		
6	I	2032-11-15T01:17:56.263		34.03	-23.94	41868.89	-14.07		

No planet occultations

6	E	2032-11-15T02:18:23.391		31.27	-13.89	41858.04	14.07		
5	E	2032-11-15T02:18:44.869		31.24	-13.83	42155.59	14.12		
4	E	2032-11-15T02:19:13.129		31.21	-13.74	42571.42	14.20		
alpha	E	2032-11-15T02:21:40.172		31.02	-13.31	44684.63	14.60		
beta	E	2032-11-15T02:22:45.310		30.94	-13.11	45641.54	14.76		
eta	E	2032-11-15T02:24:28.445		30.80	-12.80	47176.12	14.99		
gamma	E	2032-11-15T02:24:58.089		30.76	-12.71	47621.34	15.05		
delta	E	2032-11-15T02:25:43.071		30.70	-12.58	48300.35	15.14		
lambda	E	2032-11-15T02:27:36.295		30.55	-12.24	50026.71	15.35		
epsilon	E	2032-11-15T02:28:44.020		30.46	-12.04	51070.34	15.54		