

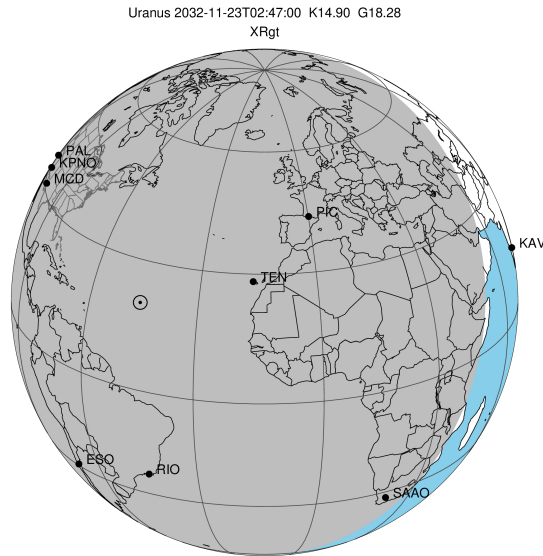
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-23T02:47:00.580
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3424858530157630848
 2Mass ID (if available) : 06011558+2338481

ICRS Star Coord at Epoch: 06h 01m 15.59475s +23:38:47.96648s

RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.897
 G magnitude : 18.280
 RP magnitude : 17.351
 BP magnitude : 19.114
 DUPflag : 0
 Distance (au) : 18.158
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.58
 Sun-Target sep (deg) : 150.61
 Sun-Moon sep (deg) : 40.81
 B (ring opening deg) : 75.11
 PA of pole (deg) : 57.68

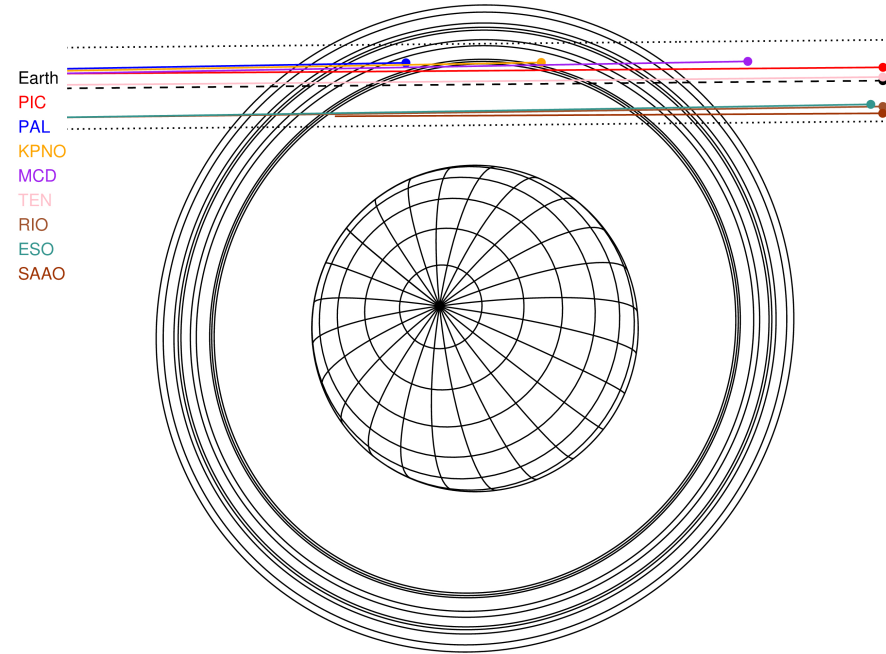
a(km) ring

- 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



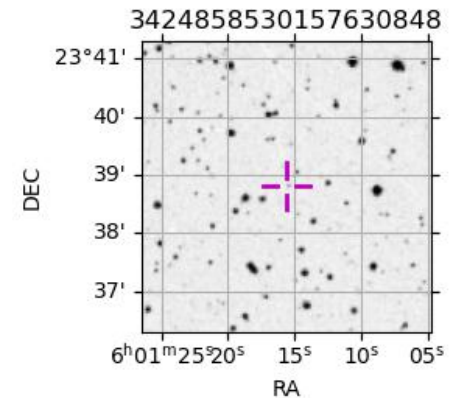
2032-11-23T02:47:00.5800 ra: 06 01 15.5948 s: +23 38 47.966 C/A 2.909° PA 180.54 deg v_sky -19.58 km/s D 18.16 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2032-11-23T02:47:00 K14.90 G18.28 XRgt

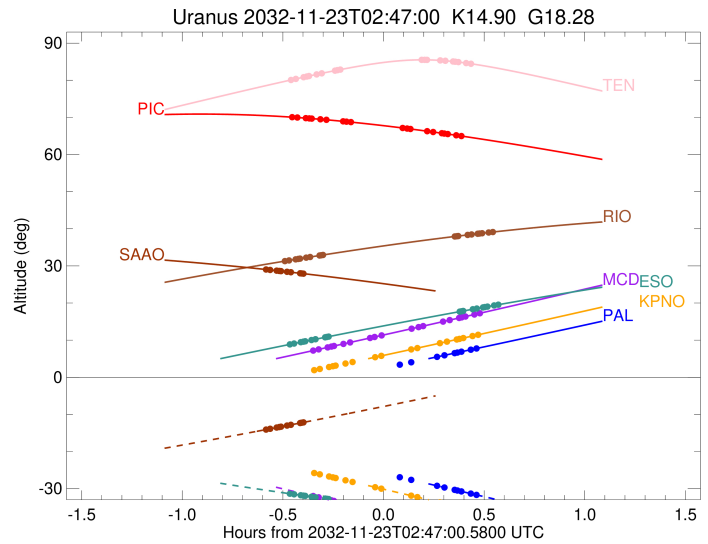
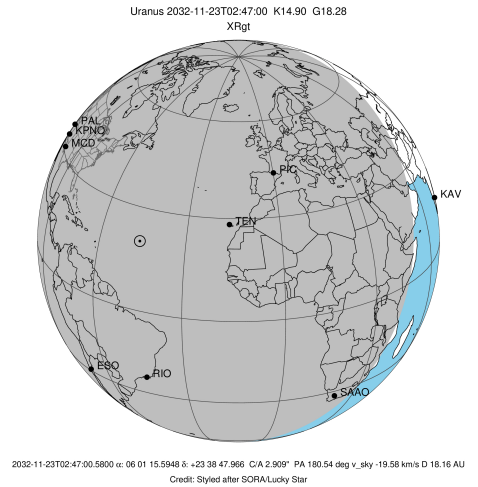


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++		+++++	NOV 23 02:19 - NOV 23 03:10	PnnRie
PAL	Palomar Mt (200")	33.4	243.1			+++++	NOV 23 03:02 - NOV 23 03:14	PnnRne
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4		++	+++++	NOV 23 02:44 - NOV 23 03:15	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++		+++++	NOV 23 02:25 - NOV 23 03:15	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5	+++++		+++++	NOV 23 02:18 - NOV 23 03:13	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 23 02:17 - NOV 23 03:19	PnnRie
ESO	European Southern Obs	-29.3	289.3	+++++		+++++	NOV 23 02:18 - NOV 23 03:21	PnnRie
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	+++++			NOV 23 02:11 - NOV 23 02:23	PnnRin
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-23T02:46:02.560
 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 : 3424858530157630848
 2Mass ID (if available) : 060111558+2338481
 ICRS Star Coord at Epoch: 06h 01m 15.59475s +23:38:47.96648s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.897
 G magnitude : 18.280
 RP magnitude : 17.351
 BP magnitude : 19.114
 DUPflag : 0
 Distance (au) : 18.158
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.58
 Sun-Target sep (deg) : 150.61
 Sun-Moon sep (deg) : 41.28
 B (ring opening deg) : 75.11
 PA of pole (deg) : 57.68
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.065
 C/A sky separation (km) : 40361.5
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.bsp
 ural61.bsp
 vgr2.ural61.bsp
 peph.ural60.bsp
 earthstns_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

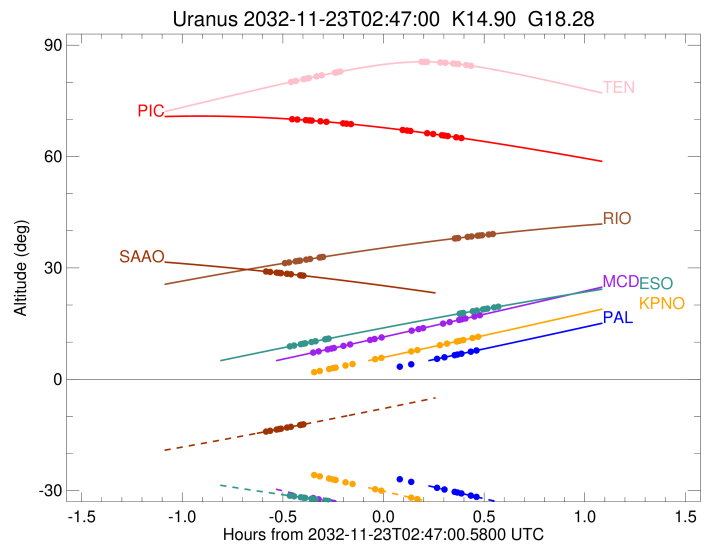
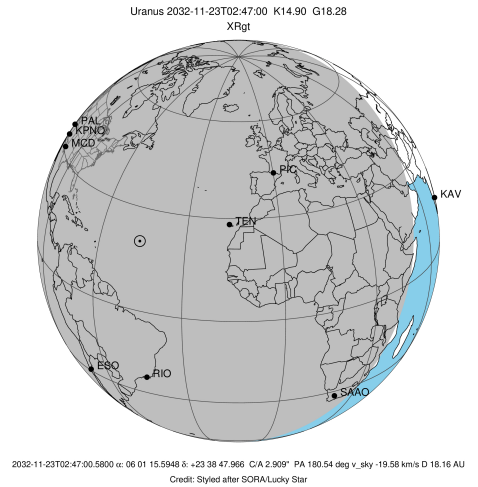


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-23T02:19:15.310		70.09	-50.94	51552.17	-12.51		
lambda	I	2032-11-23T02:21:20.706		69.97	-50.59	50026.71	-11.83		
delta	I	2032-11-23T02:23:52.227		69.80	-50.16	48300.35	-10.94		
gamma	I	2032-11-23T02:24:55.032		69.73	-49.98	47625.34	-10.55		
eta	I	2032-11-23T02:25:38.189		69.68	-49.86	47176.12	-10.27		
beta	I	2032-11-23T02:28:13.959		69.49	-49.41	45659.53	-9.18		
alpha	I	2032-11-23T02:30:00.663		69.36	-49.10	44721.07	-8.37		
4	I	2032-11-23T02:35:08.849		68.93	-48.22	42525.94	-5.80		
5	I	2032-11-23T02:35:59.234		68.85	-48.07	42243.56	-5.31		
6	I	2032-11-23T02:37:13.482		68.74	-47.85	41875.43	-4.66		

No planet occultations

6	E	2032-11-23T02:52:48.956		67.14	-45.11	41879.74	4.66		
5	E	2032-11-23T02:53:54.975		67.02	-44.92	42202.41	5.31		
4	E	2032-11-23T02:54:52.984		66.90	-44.74	42533.58	5.80		
alpha	E	2032-11-23T02:59:57.353		66.30	-43.84	44694.94	8.37		
beta	E	2032-11-23T03:01:45.441		66.08	-43.52	45644.11	9.18		
eta	E	2032-11-23T03:04:22.915		65.75	-43.05	47176.12	10.26		
gamma	E	2032-11-23T03:05:05.694		65.65	-42.92	47621.21	10.54		
delta	E	2032-11-23T03:06:08.914		65.52	-42.73	48300.35	10.94		
lambda	E	2032-11-23T03:08:40.492		65.19	-42.28	50026.71	11.82		
epsilon	E	2032-11-23T03:10:25.579		64.96	-41.96	51298.96	12.50		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-23T02:51:46.150
 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 : 3424858530157630848
 2Mass ID (if available) : 060111558+2338481
 ICRS Star Coord at Epoch: 06h 01m 15.59475s +23:38:47.96648s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.897
 G magnitude : 18.280
 RP magnitude : 17.351
 BP magnitude : 19.114
 DUPflag : 0
 Distance (au) : 18.158
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.58
 Sun-Target sep (deg) : 150.61
 Sun-Moon sep (deg) : 41.44
 B (ring opening deg) : 75.11
 PA of pole (deg) : 57.68
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.173
 C/A sky separation (km) : 41787.6
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.bsp
 ural61.bsp
 vgr2.ural61.bsp
 peph.ural60.bsp
 earthstns_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

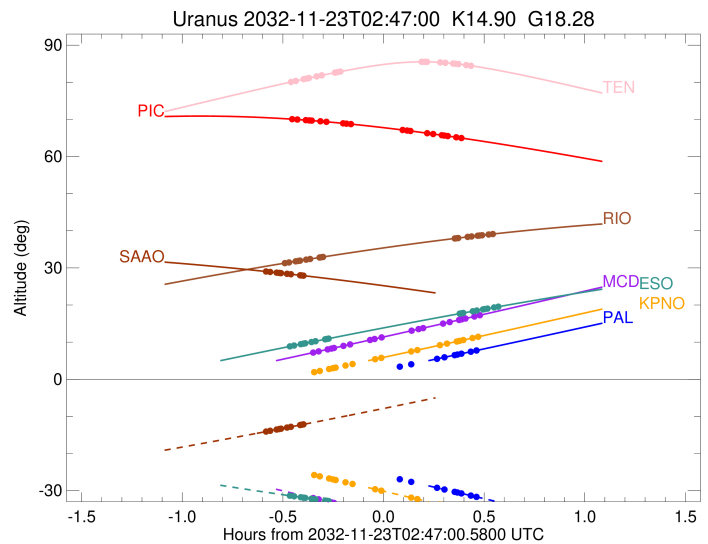
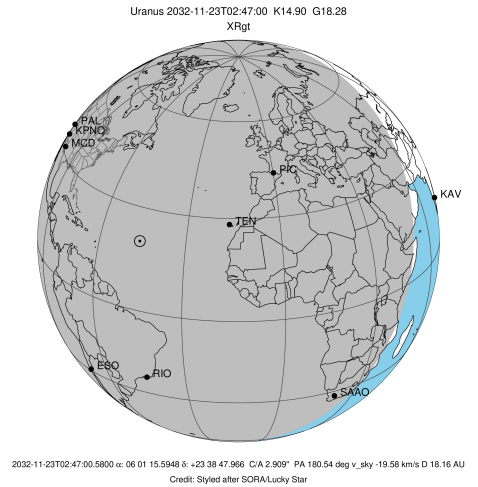


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-23T02:25:57.376	-1.41x	-21.58	51554.38	-11.44			
lambda	I	2032-11-23T02:28:15.433	-0.99x	-22.06	50026.71	-10.69			
delta	I	2032-11-23T02:31:04.817	-0.47x	-22.64	48300.35	-9.68			
gamma	I	2032-11-23T02:32:16.277	-0.26x	-22.88	47624.97	-9.22			
eta	I	2032-11-23T02:33:05.837	-0.10x	-23.05	47176.12	-8.89			
beta	I	2032-11-23T02:36:09.901	0.46x	-23.68	45657.82	-7.58			
alpha	I	2032-11-23T02:38:22.532	0.87x	-24.14	44717.78	-6.55			
4	I	2032-11-23T02:46:27.629	2.38x	-25.81	42526.77	-2.37			
5	I	2032-11-23T02:50:35.550	3.15x	-26.67	42224.07	-0.13			

No planet occultations

5	E	2032-11-23T02:50:39.195	3.16x	-26.68	42223.24	0.15			
4	E	2032-11-23T02:54:52.811	3.96x	-27.56	42530.06	2.37			
alpha	E	2032-11-23T03:02:53.174	5.48	-29.22	44696.92	6.57			
beta	E	2032-11-23T03:05:06.852	5.90	-29.68	45644.86	7.60			
eta	E	2032-11-23T03:08:12.032	6.49	-30.33	47176.12	8.92			
gamma	E	2032-11-23T03:09:01.026	6.65	-30.50	47621.30	9.25			
delta	E	2032-11-23T03:10:12.624	6.88	-30.74	48300.35	9.72			
lambda	E	2032-11-23T03:13:01.332	7.42	-31.33	50026.71	10.73			
epsilon	E	2032-11-23T03:14:57.673	7.79	-31.73	51313.22	11.49			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-23T02:51:54.640
 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 : 3424858530157630848
 2Mass ID (if available) : 06011558+2338481
 ICRS Star Coord at Epoch: 06h 01m 15.59475s +23:38:47.96648s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.897
 G magnitude : 18.280
 RP magnitude : 17.351
 BP magnitude : 19.114
 DUPflag : 0
 Distance (au) : 18.158
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.58
 Sun-Target sep (deg) : 150.61
 Sun-Moon sep (deg) : 41.49
 B (ring opening deg) : 75.11
 PA of pole (deg) : 57.68
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.149
 C/A sky separation (km) : 41475.5
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.bsp
 ural61.bsp
 vgr2.ural61.bsp
 peph.ural60.bsp
 earthstns_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

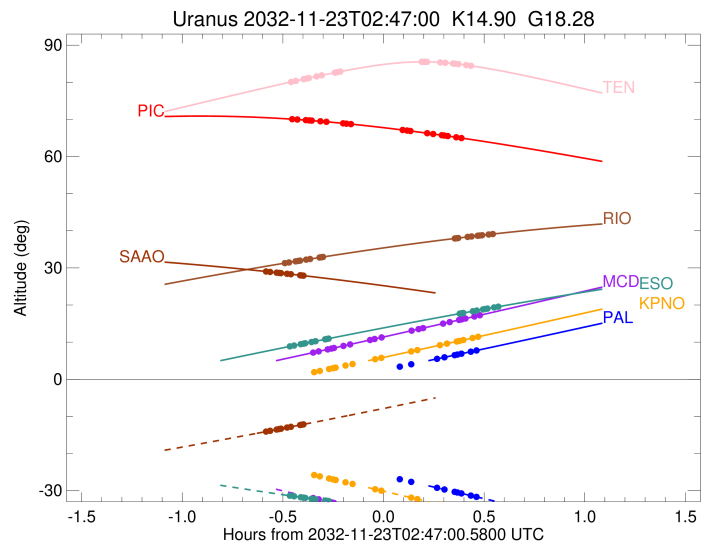
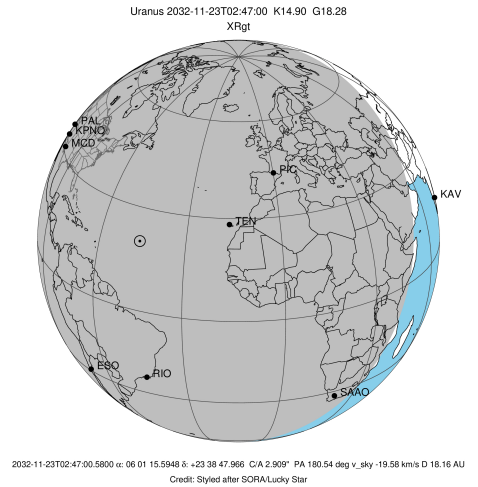


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-23T02:25:46.895	1.81x	-25.68	51554.07	-11.63			
lambda	I	2032-11-23T02:28:02.443	2.24x	-26.15	50026.71	-10.90			
delta	I	2032-11-23T02:30:48.081	2.76x	-26.73	48300.35	-9.93			
gamma	I	2032-11-23T02:31:57.647	2.99x	-26.98	47625.04	-9.48			
eta	I	2032-11-23T02:32:45.772	3.14x	-27.14	47176.12	-9.17			
beta	I	2032-11-23T02:35:43.153	3.71x	-27.77	45658.17	-7.92			
alpha	I	2032-11-23T02:37:49.140	4.11x	-28.21	44718.48	-6.96			
4	I	2032-11-23T02:44:49.001	5.46	-29.68	42526.38	-3.39			
5	I	2032-11-23T02:46:28.501	5.79	-30.03	42231.52	-2.43			

No planet occultations

5	E	2032-11-23T02:55:02.380	7.46	-31.84	42212.28	2.44			
4	E	2032-11-23T02:56:49.524	7.81	-32.22	42531.09	3.39			
alpha	E	2032-11-23T03:03:44.635	9.17	-33.69	44696.37	6.97			
beta	E	2032-11-23T03:05:51.659	9.58	-34.13	45644.65	7.94			
eta	E	2032-11-23T03:08:50.140	10.17	-34.76	47176.12	9.20			
gamma	E	2032-11-23T03:09:37.696	10.33	-34.93	47621.28	9.52			
delta	E	2032-11-23T03:10:47.393	10.56	-35.18	48300.35	9.97			
lambda	E	2032-11-23T03:13:32.339	11.11	-35.76	50026.71	10.95			
epsilon	E	2032-11-23T03:15:26.191	11.48	-36.16	51309.19	11.69			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-23T02:52:00.160
 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 : 3424858530157630848
 2Mass ID (if available) : 060111558+2338481
 ICRS Star Coord at Epoch: 06h 01m 15.59475s +23:38:47.96648s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.897
 G magnitude : 18.280
 RP magnitude : 17.351
 BP magnitude : 19.114
 DUPflag : 0
 Distance (au) : 18.158
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.58
 Sun-Target sep (deg) : 150.61
 Sun-Moon sep (deg) : 41.56
 B (ring opening deg) : 75.11
 PA of pole (deg) : 57.68
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.119
 C/A sky separation (km) : 41073.9
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.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

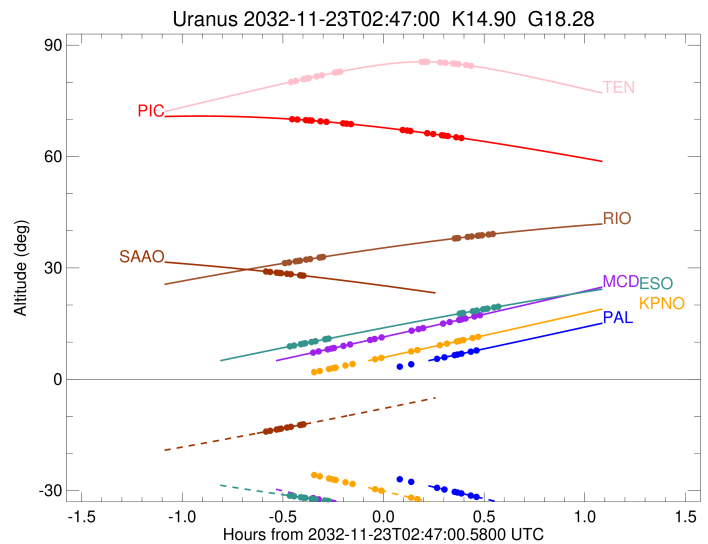
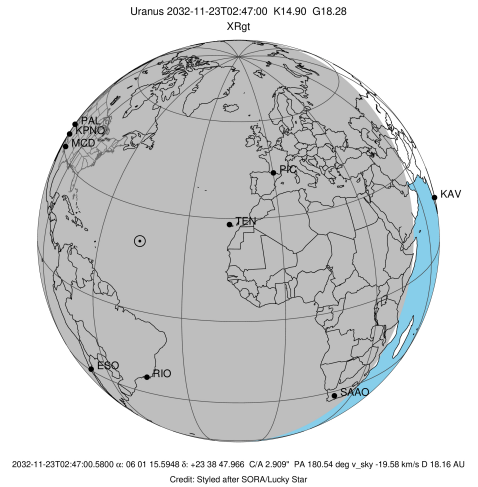


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-23T02:25:29.490		7.08	-31.87	51553.61	-11.88		
lambda	I	2032-11-23T02:27:41.935		7.52	-32.34	50026.71	-11.18		
delta	I	2032-11-23T02:30:23.032		8.05	-32.92	48300.35	-10.24		
gamma	I	2032-11-23T02:31:30.339		8.28	-33.16	47625.13	-9.82		
eta	I	2032-11-23T02:32:16.770		8.43	-33.33	47176.12	-9.52		
beta	I	2032-11-23T02:35:06.465		9.00	-33.93	45658.60	-8.34		
alpha	I	2032-11-23T02:37:05.163		9.39	-34.36	44719.33	-7.45		
4	I	2032-11-23T02:43:13.868		10.63	-35.68	42526.12	-4.36		
5	I	2032-11-23T02:44:24.838		10.86	-35.93	42236.54	-3.68		
6	I	2032-11-23T02:46:18.488		11.25	-36.34	41877.19	-2.67		

No planet occultations

6	E	2032-11-23T02:55:33.388		13.12	-38.33	41879.60	2.67		
5	E	2032-11-23T02:57:18.575		13.47	-38.70	42207.49	3.69		
4	E	2032-11-23T02:58:37.180		13.74	-38.98	42532.17	4.37		
alpha	E	2032-11-23T03:04:41.133		14.98	-40.29	44695.73	7.47		
beta	E	2032-11-23T03:06:40.861		15.39	-40.72	45644.41	8.37		
eta	E	2032-11-23T03:09:31.645		15.97	-41.33	47176.12	9.56		
gamma	E	2032-11-23T03:10:17.506		16.13	-41.50	47621.25	9.86		
delta	E	2032-11-23T03:11:24.940		16.36	-41.74	48300.35	10.28		
lambda	E	2032-11-23T03:14:05.337		16.90	-42.32	50026.71	11.23		
epsilon	E	2032-11-23T03:15:56.138		17.28	-42.71	51304.13	11.94		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-23T02:47:15.510
 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 : 3424858530157630848
 2Mass ID (if available) : 060111558+2338481
 ICRS Star Coord at Epoch: 06h 01m 15.59475s +23:38:47.96648s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.897
 G magnitude : 18.280
 RP magnitude : 17.351
 BP magnitude : 19.114
 DUPflag : 0
 Distance (au) : 18.158
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.58
 Sun-Target sep (deg) : 150.61
 Sun-Moon sep (deg) : 41.45
 B (ring opening deg) : 75.11
 PA of pole (deg) : 57.68
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.939
 C/A sky separation (km) : 38709.0
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.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

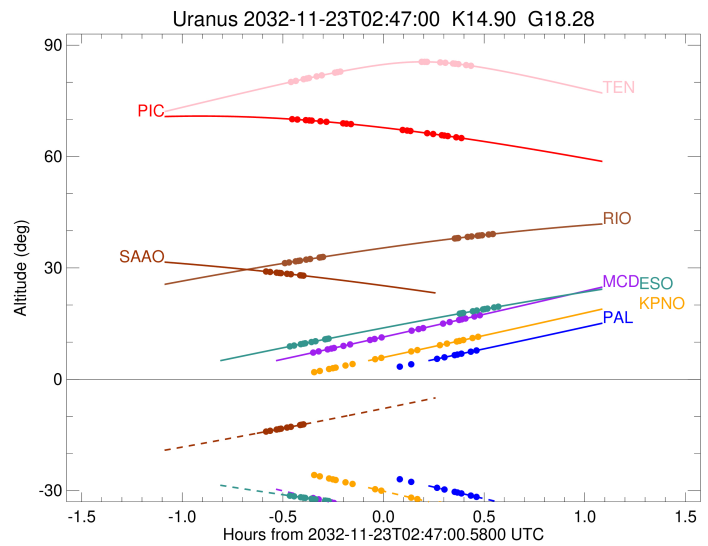
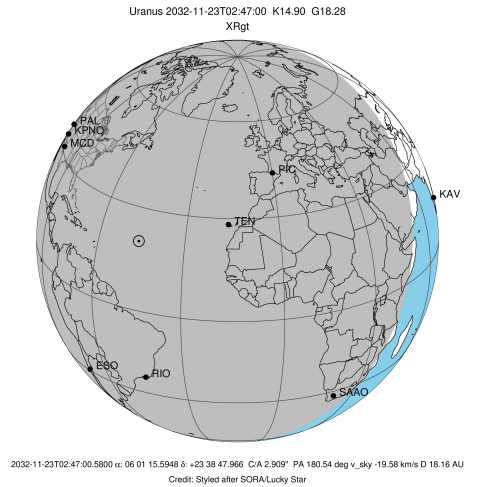


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-23T02:18:57.154		79.99	-68.86	51549.20	-13.36		
lambda	I	2032-11-23T02:20:53.710		80.38	-68.45	50026.71	-12.77		
delta	I	2032-11-23T02:23:12.896		80.84	-67.96	48300.35	-12.02		
gamma	I	2032-11-23T02:24:09.800		81.02	-67.75	47625.67	-11.69		
eta	I	2032-11-23T02:24:48.643		81.15	-67.62	47176.12	-11.46		
beta	I	2032-11-23T02:27:06.111		81.59	-67.13	45661.01	-10.56		
alpha	I	2032-11-23T02:28:37.451		81.88	-66.80	44723.80	-9.93		
4	I	2032-11-23T02:32:41.217		82.62	-65.93	42526.15	-8.04		
5	I	2032-11-23T02:33:15.674		82.73	-65.81	42253.16	-7.72		
6	I	2032-11-23T02:34:06.389		82.87	-65.63	41872.61	-7.33		

No planet occultations

6	E	2032-11-23T02:58:27.244		85.51	-60.35	41879.31	7.33		
5	E	2032-11-23T02:59:09.725		85.51	-60.20	42193.51	7.73		
4	E	2032-11-23T02:59:51.816		85.50	-60.04	42536.78	8.05		
alpha	E	2032-11-23T03:03:51.582		85.36	-59.17	44692.96	9.93		
beta	E	2032-11-23T03:05:24.229		85.26	-58.83	45643.34	10.57		
eta	E	2032-11-23T03:07:43.266		85.07	-58.32	47176.12	11.46		
gamma	E	2032-11-23T03:08:21.697		85.00	-58.18	47621.11	11.70		
delta	E	2032-11-23T03:09:18.955		84.91	-57.98	48300.35	12.03		
lambda	E	2032-11-23T03:11:38.048		84.64	-57.47	50026.71	12.78		
epsilon	E	2032-11-23T03:13:14.187		84.43	-57.12	51278.68	13.38		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-23T02:49:30.160
 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 : 3424858530157630848
 2Mass ID (if available) : 060111558+2338481
 ICRS Star Coord at Epoch: 06h 01m 15.59475s +23:38:47.96648s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.897
 G magnitude : 18.280
 RP magnitude : 17.351
 BP magnitude : 19.114
 DUPflag : 0
 Distance (au) : 18.158
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.58
 Sun-Target sep (deg) : 150.61
 Sun-Moon sep (deg) : 41.40
 B (ring opening deg) : 75.11
 PA of pole (deg) : 57.68
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.571
 C/A sky separation (km) : 33854.0
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.bsp
 ural61.bsp
 vgr2.ural61.bsp
 peph.ural60.bsp
 earthstns_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

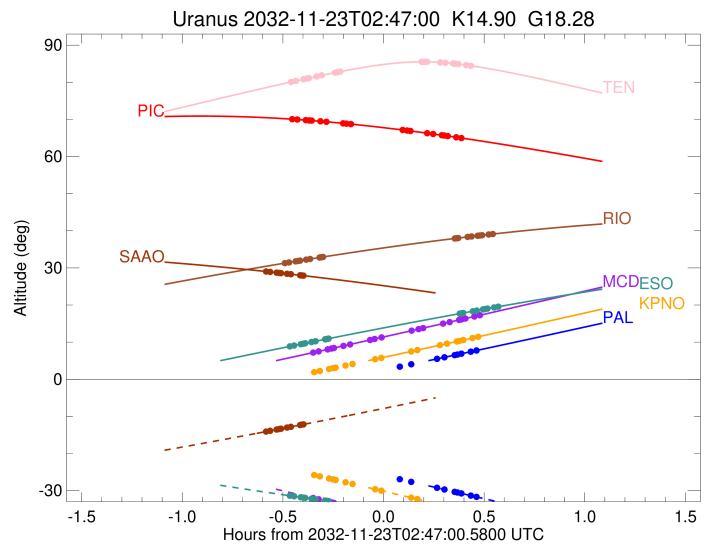
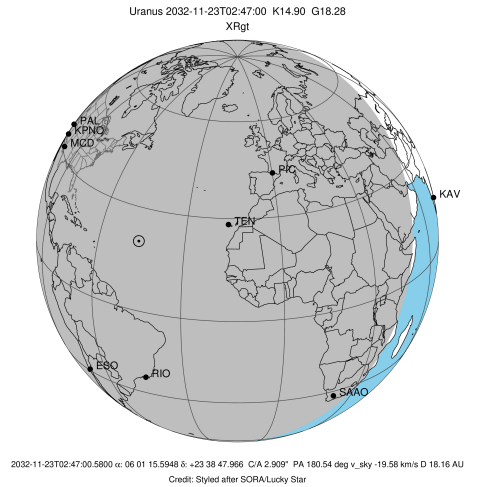


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-23T02:17:11.894		31.23	-46.49	51536.41	-15.30		
lambda	I	2032-11-23T02:18:51.974		31.48	-46.53	50026.71	-14.90		
delta	I	2032-11-23T02:20:49.738		31.77	-46.59	48300.35	-14.41		
gamma	I	2032-11-23T02:21:36.823		31.88	-46.61	47626.51	-14.20		
eta	I	2032-11-23T02:22:08.688		31.96	-46.62	47176.12	-14.06		
beta	I	2032-11-23T02:23:58.221		32.23	-46.66	45664.56	-13.52		
alpha	I	2032-11-23T02:25:08.296		32.40	-46.68	44730.02	-13.15		
4	I	2032-11-23T02:28:02.189		32.81	-46.73	42528.34	-12.13		
5	I	2032-11-23T02:28:23.524		32.86	-46.74	42270.91	-11.97		
6	I	2032-11-23T02:28:57.555		32.94	-46.75	41865.83	-11.78		

No planet occultations

6	E	2032-11-23T03:08:18.327		37.93	-46.24	41876.47	11.81		
5	E	2032-11-23T03:08:44.018		37.98	-46.22	42178.21	12.00		
4	E	2032-11-23T03:09:13.143		38.03	-46.20	42544.61	12.16		
alpha	E	2032-11-23T03:12:02.637		38.34	-46.08	44689.09	13.18		
beta	E	2032-11-23T03:13:13.892		38.47	-46.03	45641.93	13.56		
eta	E	2032-11-23T03:15:04.763		38.66	-45.94	47176.12	14.10		
gamma	E	2032-11-23T03:15:36.146		38.72	-45.91	47620.97	14.25		
delta	E	2032-11-23T03:16:23.477		38.80	-45.87	48300.35	14.46		
lambda	E	2032-11-23T03:18:20.867		39.00	-45.77	50026.71	14.95		
epsilon	E	2032-11-23T03:19:40.150		39.13	-45.70	51223.72	15.35		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-23T02:51:05.700
 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 : 3424858530157630848
 2Mass ID (if available) : 060111558+2338481
 ICRS Star Coord at Epoch: 06h 01m 15.59475s +23:38:47.96648s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.897
 G magnitude : 18.280
 RP magnitude : 17.351
 BP magnitude : 19.114
 DUPflag : 0
 Distance (au) : 18.158
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.58
 Sun-Target sep (deg) : 150.61
 Sun-Moon sep (deg) : 41.39
 B (ring opening deg) : 75.11
 PA of pole (deg) : 57.68
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.587
 C/A sky separation (km) : 34066.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.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



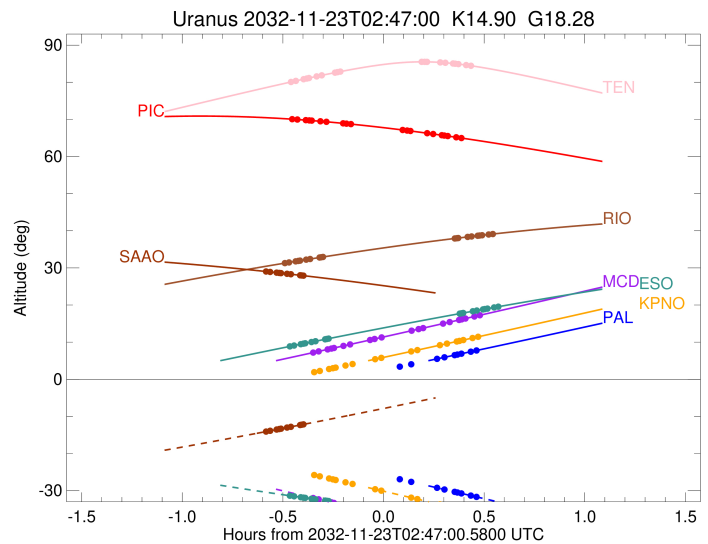
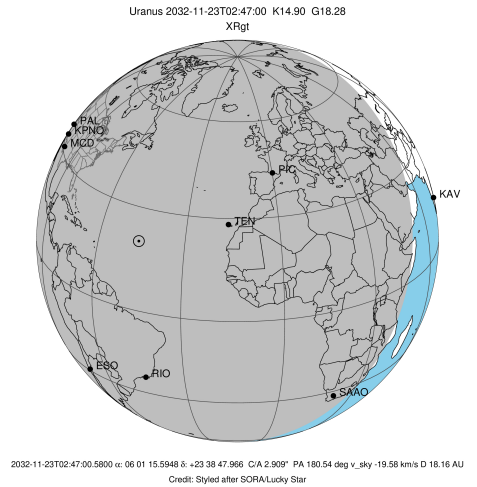
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-23T02:18:40.720		8.78	-31.31	51537.40	-15.09		
lambda	I	2032-11-23T02:20:22.262		9.09	-31.53	50026.71	-14.69		
delta	I	2032-11-23T02:22:21.746		9.45	-31.79	48300.35	-14.20		
gamma	I	2032-11-23T02:23:09.550		9.60	-31.89	47626.46	-13.99		
eta	I	2032-11-23T02:23:41.907		9.70	-31.95	47176.12	-13.84		
beta	I	2032-11-23T02:25:33.226		10.03	-32.19	45664.37	-13.30		
alpha	I	2032-11-23T02:26:44.509		10.25	-32.33	44729.70	-12.92		
4	I	2032-11-23T02:29:41.666		10.78	-32.69	42528.18	-11.89		
5	I	2032-11-23T02:30:03.495		10.84	-32.74	42270.09	-11.73		
6	I	2032-11-23T02:30:38.151		10.95	-32.81	41866.19	-11.54		

No planet occultations

6	E	2032-11-23T03:09:46.423		17.69	-36.89	41876.57	11.58		
5	E	2032-11-23T03:10:12.651		17.76	-36.93	42178.56	11.77		
4	E	2032-11-23T03:10:42.299		17.84	-36.97	42544.39	11.93		
alpha	E	2032-11-23T03:13:34.791		18.31	-37.21	44689.17	12.97		
beta	E	2032-11-23T03:14:47.162		18.51	-37.31	45641.96	13.35		
eta	E	2032-11-23T03:16:39.658		18.81	-37.46	47176.12	13.91		
gamma	E	2032-11-23T03:17:11.479		18.90	-37.51	47620.98	14.05		
delta	E	2032-11-23T03:17:59.453		19.03	-37.57	48300.35	14.27		
lambda	E	2032-11-23T03:19:58.357		19.35	-37.73	50026.71	14.76		
epsilon	E	2032-11-23T03:21:18.684		19.56	-37.83	51224.86	15.17		


```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch             : 2032-11-23T02:44:16.650
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        : 3424858530157630848
2Mass ID (if available) : 060111558+2338481
ICRS Star Coord at Epoch: 06h 01m 15.59475s +23:38:47.96648s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 14.897
G magnitude           : 18.280
RP magnitude          : 17.351
BP magnitude          : 19.114
DUPflag              : 0
Distance (au)         : 18.158
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -19.58
Sun-Target sep (deg)  : 150.61
Sun-Moon sep (deg)   : 40.66
B (ring opening deg) : 75.11
PA of pole (deg)     : 57.68
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.532
C/A sky separation (km) : 33339.2
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLvl1.spk
ural11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.ural11.bsp
ural61.bsp
vgr2.ural61.bsp
peph.ural60.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	2032-11-23T02:11:35.521		29.07	-14.16	51533.61	-15.50		
lambda	I	2032-11-23T02:13:14.104		28.91	-13.88	50026.71	-15.10		
delta	I	2032-11-23T02:15:10.152		28.72	-13.54	48300.35	-14.64		
gamma	I	2032-11-23T02:15:56.482		28.64	-13.41	47626.63	-14.44		
eta	I	2032-11-23T02:16:27.829		28.59	-13.32	47176.12	-14.30		
beta	I	2032-11-23T02:18:15.359		28.41	-13.01	45665.07	-13.78		
alpha	I	2032-11-23T02:19:24.015		28.30	-12.81	44730.86	-13.43		
4	I	2032-11-23T02:22:13.831		28.00	-12.31	42528.78	-12.46		
5	I	2032-11-23T02:22:34.451		27.97	-12.25	42273.00	-12.31		
6	I	2032-11-23T02:23:07.743		27.91	-12.16	41864.87	-12.14		

No planet occultations

6	E	2032-11-23T03:03:45.564		23.09	-4.77x	41876.24	12.12		
5	E	2032-11-23T03:04:10.572		23.03	-4.70x	42177.49	12.29		
4	E	2032-11-23T03:04:39.100		22.97	-4.61x	42545.07	12.44		
alpha	E	2032-11-23T03:07:25.242		22.60	-4.09x	44688.92	13.40		
beta	E	2032-11-23T03:08:35.400		22.44	-3.87x	45641.88	13.76		
eta	E	2032-11-23T03:10:24.816		22.20	-3.52x	47176.12	14.27		
gamma	E	2032-11-23T03:10:55.837		22.13	-3.43x	47620.97	14.41		
delta	E	2032-11-23T03:11:42.662		22.02	-3.28x	48300.35	14.61		
lambda	E	2032-11-23T03:13:38.976		21.76	-2.91x	50026.71	15.07		
epsilon	E	2032-11-23T03:14:57.518		21.58	-2.66x	51221.52	15.46		