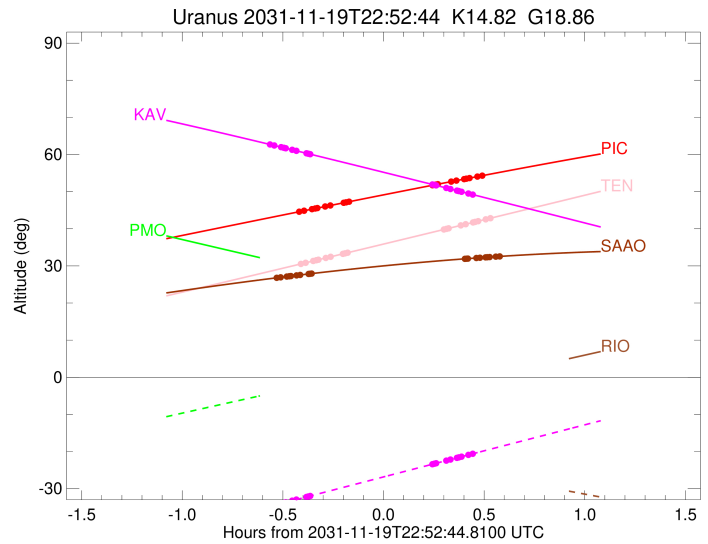
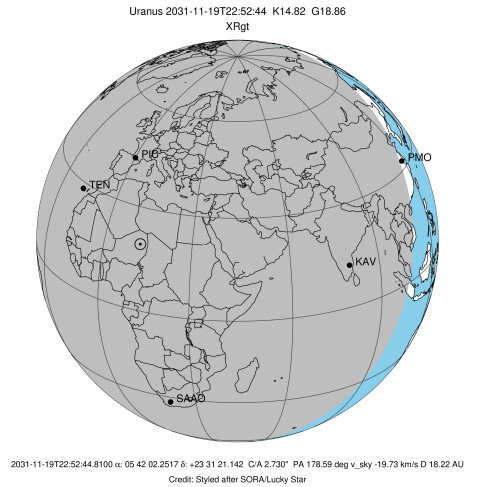


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-11-19T22:55:33.880
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 3404364836007788032
 2Mass ID (if available) : 05420224+2331212
 ICRS Star Coord at Epoch: 05h 42m 02.25174s +23:31:21.14242s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.817
 G magnitude : 18.857
 RP magnitude : 17.739
 BP magnitude : 20.151
 DUPflag : 0
 Distance (au) : 18.221
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.73
 Sun-Target sep (deg) : 151.08
 Sun-Moon sep (deg) : 141.48
 B (ring opening deg) : 78.63
 PA of pole (deg) : 44.26
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.925
 C/A sky separation (km) : 38652.1
 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

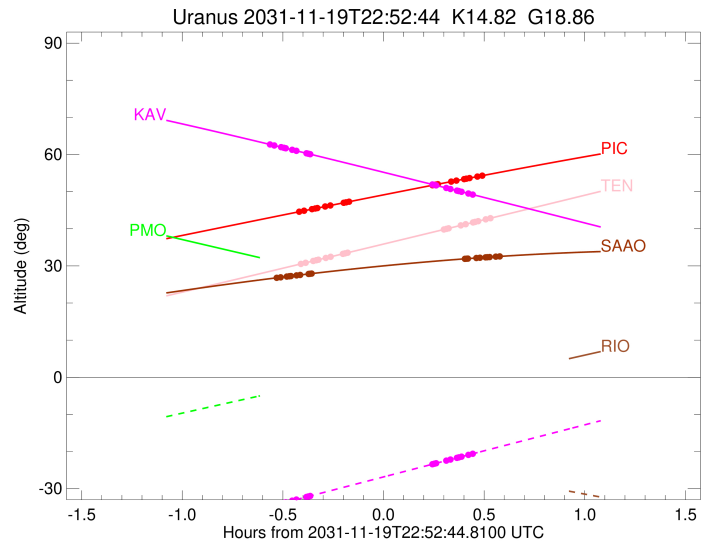
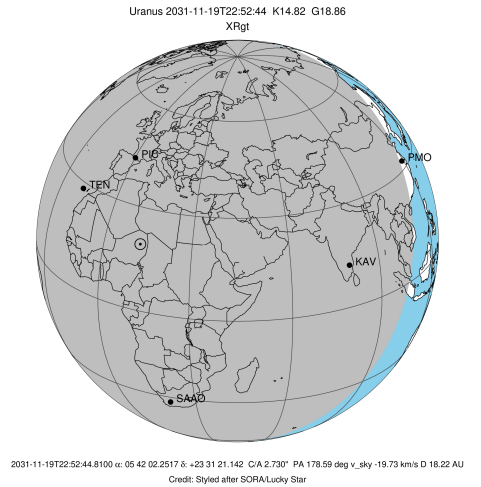


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2031-11-19T22:27:59.869		44.66	-61.74	50863.30	-12.83		
lambda	I	2031-11-19T22:29:05.428		44.86	-61.87	50026.71	-12.60		
delta	I	2031-11-19T22:31:26.458		45.29	-62.15	48300.35	-11.87		
gamma	I	2031-11-19T22:32:23.614		45.46	-62.26	47631.15	-11.55		
eta	I	2031-11-19T22:33:03.417		45.58	-62.33	47176.12	-11.32		
beta	I	2031-11-19T22:35:23.486		46.01	-62.60	45651.04	-10.44		
alpha	I	2031-11-19T22:36:58.773		46.30	-62.78	44685.37	-9.80		
4	I	2031-11-19T22:40:51.973		47.00	-63.20	42598.33	-8.05		
5	I	2031-11-19T22:41:27.664		47.11	-63.26	42311.70	-7.79		
6	I	2031-11-19T22:42:31.256		47.30	-63.37	41834.30	-7.27		

No planet occultations

6	E	2031-11-19T23:07:24.039		51.74	-65.53	41863.53	7.28		
5	E	2031-11-19T23:08:21.819		51.90	-65.59	42305.71	7.80		
4	E	2031-11-19T23:08:54.011		52.00	-65.63	42563.17	8.06		
alpha	E	2031-11-19T23:12:52.278		52.69	-65.88	44694.98	9.83		
beta	E	2031-11-19T23:14:25.209		52.96	-65.96	45641.07	10.47		
eta	E	2031-11-19T23:16:45.876		53.37	-66.09	47176.12	11.35		
gamma	E	2031-11-19T23:17:25.126		53.49	-66.13	47625.99	11.58		
delta	E	2031-11-19T23:18:22.566		53.65	-66.17	48300.35	11.90		
lambda	E	2031-11-19T23:20:43.172		54.06	-66.29	50026.71	12.64		
epsilon	E	2031-11-19T23:21:44.575		54.23	-66.33	50812.22	12.87		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-11-19T22:57:02.320
 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 : 3404364836007788032
 2Mass ID (if available) : 05420224+2331212
 ICRS Star Coord at Epoch: 05h 42m 02.25174s +23:31:21.14242s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.817
 G magnitude : 18.857
 RP magnitude : 17.739
 BP magnitude : 20.151
 DUPflag : 0
 Distance (au) : 18.221
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.73
 Sun-Target sep (deg) : 151.08
 Sun-Moon sep (deg) : 141.56
 B (ring opening deg) : 78.63
 PA of pole (deg) : 44.26
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.853
 C/A sky separation (km) : 37700.4
 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

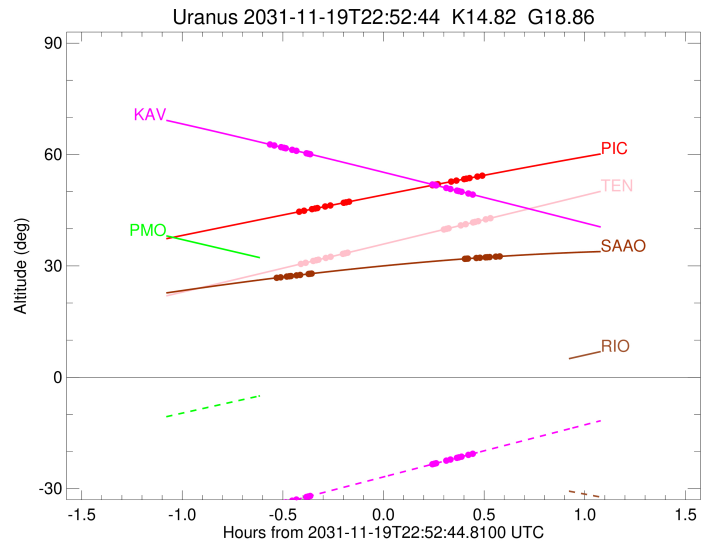
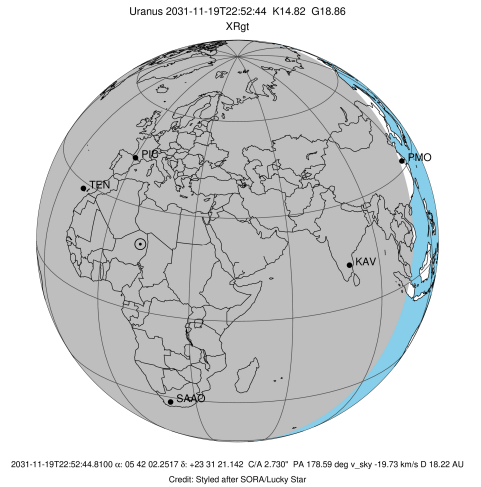


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2031-11-19T22:28:29.072		30.61	-56.36	50871.06	-13.23		
lambda	I	2031-11-19T22:29:33.149		30.84	-56.59	50026.71	-13.03		
delta	I	2031-11-19T22:31:49.062		31.33	-57.08	48300.35	-12.36		
gamma	I	2031-11-19T22:32:43.829		31.53	-57.28	47631.21	-12.07		
eta	I	2031-11-19T22:33:21.856		31.67	-57.42	47176.12	-11.86		
beta	I	2031-11-19T22:35:34.650		32.15	-57.91	45651.69	-11.08		
alpha	I	2031-11-19T22:37:04.036		32.47	-58.23	44685.68	-10.51		
4	I	2031-11-19T22:40:37.388		33.24	-59.01	42600.14	-8.99		
5	I	2031-11-19T22:41:09.600		33.36	-59.12	42310.34	-8.78		
6	I	2031-11-19T22:42:05.652		33.56	-59.33	41831.90	-8.34		

No planet occultations

6	E	2031-11-19T23:10:47.724		39.82	-65.52	41865.53	8.36		
5	E	2031-11-19T23:11:37.913		40.00	-65.70	42303.42	8.80		
4	E	2031-11-19T23:12:06.610		40.10	-65.80	42560.71	9.02		
alpha	E	2031-11-19T23:15:44.842		40.90	-66.57	44696.10	10.55		
beta	E	2031-11-19T23:17:11.774		41.22	-66.88	45641.13	11.12		
eta	E	2031-11-19T23:19:25.007		41.71	-67.35	47176.12	11.91		
gamma	E	2031-11-19T23:20:02.431		41.84	-67.48	47625.80	12.12		
delta	E	2031-11-19T23:20:57.414		42.04	-67.67	48300.35	12.42		
lambda	E	2031-11-19T23:23:12.715		42.54	-68.14	50026.71	13.09		
epsilon	E	2031-11-19T23:24:12.627		42.76	-68.35	50819.44	13.30		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-11-19T22:49:40.870
 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 : 3404364836007788032
 2Mass ID (if available) : 05420224+2331212
 ICRS Star Coord at Epoch: 05h 42m 02.25174s +23:31:21.14242s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.817
 G magnitude : 18.857
 RP magnitude : 17.739
 BP magnitude : 20.151
 DUPflag : 0
 Distance (au) : 18.221
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.73
 Sun-Target sep (deg) : 151.08
 Sun-Moon sep (deg) : 140.66
 B (ring opening deg) : 78.63
 PA of pole (deg) : 44.26
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.657
 C/A sky separation (km) : 35112.6
 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_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



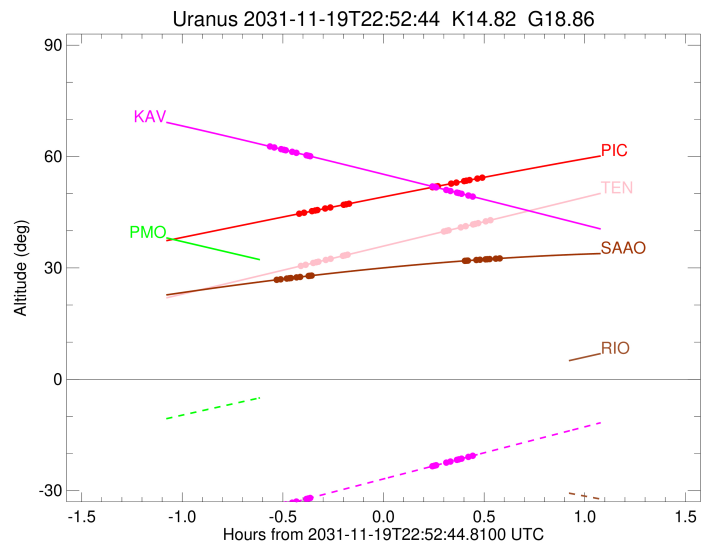
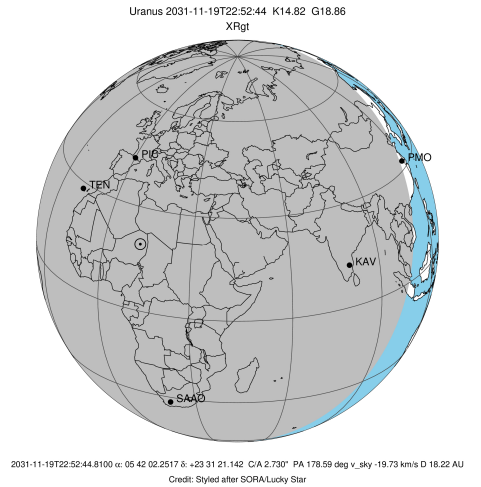
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2031-11-19T22:19:12.001		62.65	-34.73	50897.54	-14.51		
lambda	I	2031-11-19T22:20:12.145		62.43	-34.50	50026.71	-14.36		
delta	I	2031-11-19T22:22:14.660		61.99	-34.02	48300.35	-13.82		
gamma	I	2031-11-19T22:23:03.482		61.81	-33.83	47631.38	-13.59		
eta	I	2031-11-19T22:23:37.197		61.69	-33.69	47176.12	-13.42		
beta	I	2031-11-19T22:25:33.220		61.26	-33.24	45653.67	-12.81		
alpha	I	2031-11-19T22:26:49.947		60.98	-32.94	44686.86	-12.38		
4	I	2031-11-19T22:29:45.884		60.34	-32.25	42604.56	-11.26		
5	I	2031-11-19T22:30:12.401		60.24	-32.14	42305.84	-11.11		
6	I	2031-11-19T22:30:56.316		60.08	-31.97	41825.92	-10.80		

No planet occultations

6	E	2031-11-19T23:07:21.896		51.93	-23.42	41869.14	10.79		
5	E	2031-11-19T23:08:00.360		51.78	-23.27	42298.19	11.09		
4	E	2031-11-19T23:08:23.405		51.70	-23.18	42555.89	11.24		
alpha	E	2031-11-19T23:11:25.125		51.01	-22.47	44698.52	12.35		
beta	E	2031-11-19T23:12:39.918		50.73	-22.17	45641.35	12.78		
eta	E	2031-11-19T23:14:37.168		50.28	-21.72	47176.12	13.39		
gamma	E	2031-11-19T23:15:10.522		50.16	-21.59	47625.41	13.55		
delta	E	2031-11-19T23:15:59.904		49.97	-21.39	48300.35	13.78		
lambda	E	2031-11-19T23:18:02.733		49.51	-20.91	50026.71	14.32		
epsilon	E	2031-11-19T23:18:58.735		49.29	-20.70	50834.90	14.47		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2031-11-19T22:54:41.240
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      : 3404364836007788032
2Mass ID (if available) : 05420224+2331212
ICRS Star Coord at Epoch: 05h 42m 02.25174s +23:31:21.14242s
RUWE (>1.4 is poor) : 1.01
K magnitude          : 14.817
G magnitude          : 18.857
RP magnitude         : 17.739
BP magnitude         : 20.151
DUPflag             : 0
Distance (au)       : 18.221
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -19.73
Sun-Target sep (deg) : 151.08
Sun-Moon sep (deg)  : 141.07
B (ring opening deg) : 78.63
PA of pole (deg)    : 44.26
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.340
C/A sky separation (km) : 30926.8
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall1.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall1.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	2031-11-19T22:21:08.957		26.82	-38.22	50931.27	-15.93		
lambda	I	2031-11-19T22:22:05.762		26.92	-38.22	50026.71	-15.83		
delta	I	2031-11-19T22:23:56.056		27.13	-38.22	48300.35	-15.46		
gamma	I	2031-11-19T22:24:39.529		27.21	-38.22	47631.51	-15.31		
eta	I	2031-11-19T22:25:09.392		27.26	-38.22	47176.12	-15.19		
beta	I	2031-11-19T22:26:50.765		27.45	-38.21	45656.11	-14.78		
alpha	I	2031-11-19T22:27:56.818		27.57	-38.20	44688.77	-14.49		
4	I	2031-11-19T22:30:23.777		27.83	-38.19	42608.84	-13.78		
5	I	2031-11-19T22:30:46.307		27.87	-38.18	42299.16	-13.69		
6	I	2031-11-19T22:31:21.637		27.93	-38.18	41819.53	-13.50		

No planet occultations

6	E	2031-11-19T23:17:03.099		31.91	-36.58	41873.56	13.52		
5	E	2031-11-19T23:17:32.875		31.94	-36.55	42288.85	13.72		
4	E	2031-11-19T23:17:51.897		31.96	-36.53	42548.97	13.81		
alpha	E	2031-11-19T23:20:23.989		32.13	-36.37	44702.84	14.53		
beta	E	2031-11-19T23:21:27.806		32.20	-36.31	45642.04	14.82		
eta	E	2031-11-19T23:23:09.883		32.30	-36.20	47176.12	15.23		
gamma	E	2031-11-19T23:23:39.227		32.33	-36.16	47624.72	15.34		
delta	E	2031-11-19T23:24:23.031		32.38	-36.12	48300.35	15.50		
lambda	E	2031-11-19T23:26:13.029		32.49	-35.99	50026.71	15.88		
epsilon	E	2031-11-19T23:27:05.687		32.54	-35.93	50867.27	15.97		