

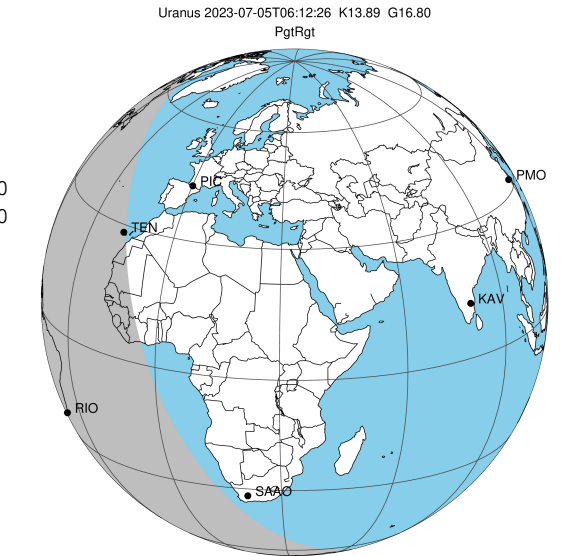
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2023-07-05T06:12:26.070
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 55705214728775296
 2Mass ID (if available) : 03165330+1751029

ICRS Star Coord at Epoch: 03h 16m 53.31537s +17:51:03.10932s

RUWE (>1.4 is poor) : 1.03
 K magnitude : 13.895
 G magnitude : 16.799
 RP magnitude : 15.912
 BP magnitude : 17.618
 DUPflag : 0
 Distance (au) : 20.264
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 25.04
 Sun-Target sep (deg) : 51.12
 Sun-Moon sep (deg) : 103.83
 B (ring opening deg) : 62.96
 PA of pole (deg) : -88.51

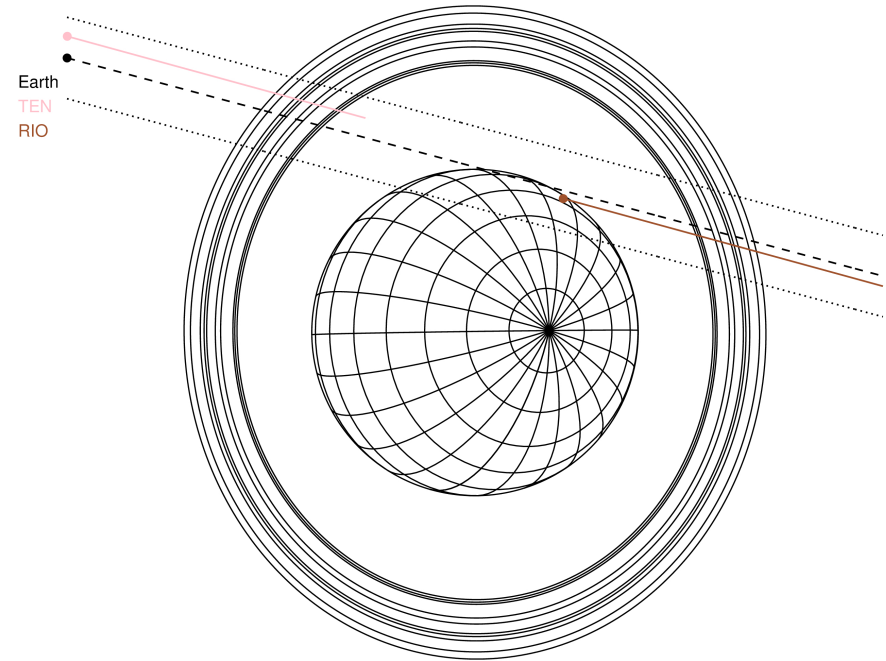
a(km) ring

- 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



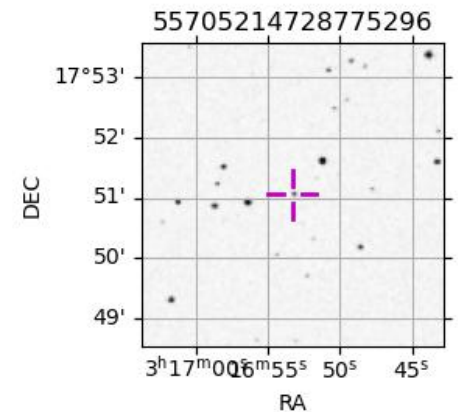
2023-07-05T06:12:26.0700 ex: 03 16 53.3154 s: +17 51 03.109 C/A 1.705° PA 165.03 deg v_sky +25.04 km/s D 20.26 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2023-07-05T06:12:26 K13.89 G16.80 PgtRgt

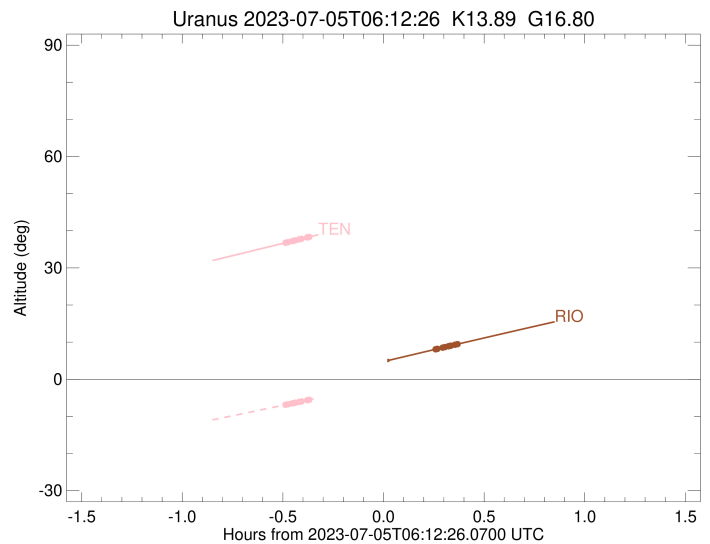
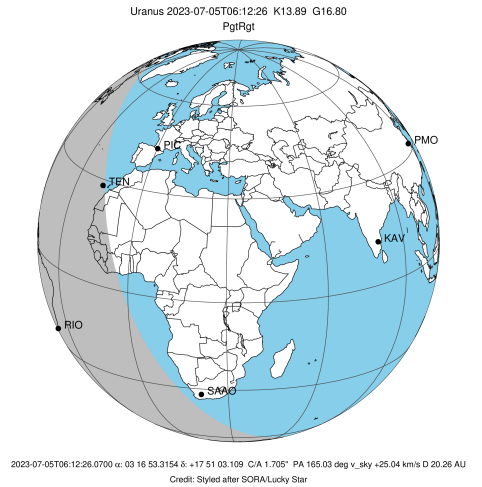


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

| Obs | Location | lat | Elon | Rings I | Planet | Rings E | Observed Events Interval | OEcode |
|------|-----------------------|-------|-------|---------|--------|---------|-----------------------------|--------|
| PIC | Pic du Midi | 42.9 | 0.1 | | | | | PnnRnn |
| 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 | +++++ | | | JUL 05 05:43 - JUL 05 05:50 | PnnRin |
| 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 | | + | +++++ | JUL 05 06:14 - JUL 05 06:34 | PneRne |
| 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 | | | | | PnnRnn |
| MSO | Mt. Stromlo Observato | -35.3 | 149.0 | | | | | PnnRnn |



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2023-07-05T06:10:03.760
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 55705214728775296
 2Mass ID (if available) : 03165330+1751029
 ICRS Star Coord at Epoch: 03h 16m 53.31537s +17:51:03.10932s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 13.895
 G magnitude : 16.799
 RP magnitude : 15.912
 BP magnitude : 17.618
 DUPflag : 0
 Distance (au) : 20.264
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 25.04
 Sun-Target sep (deg) : 51.12
 Sun-Moon sep (deg) : 104.64
 B (ring opening deg) : 62.96
 PA of pole (deg) : -88.51
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.895
 C/A sky separation (km) : 27851.5
 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

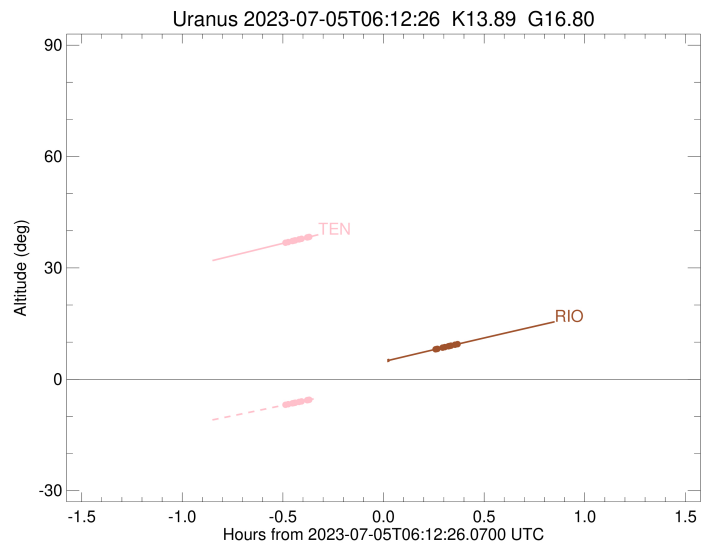
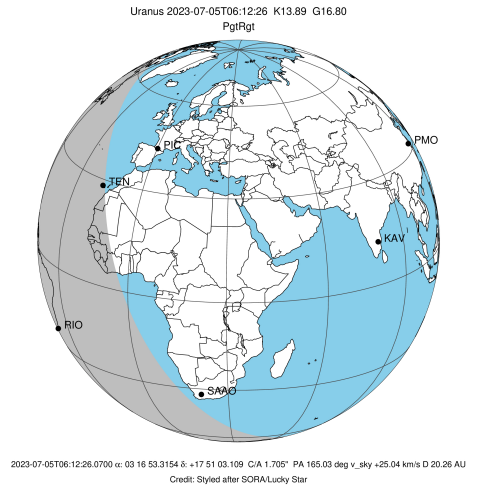


| Ring | I/E | UTC | b? alt | alt-sun | radius | r-dot | lat-geo | lat-geodetic |
|---------|-----|-------------------------|--------|---------|----------|--------|---------|--------------|
| epsilon | I | 2023-07-05T05:43:10.831 | 36.77 | -6.88 | 51204.67 | -23.25 | | |
| lambda | I | 2023-07-05T05:44:02.031 | 36.96 | -6.72 | 50026.71 | -22.88 | | |
| delta | I | 2023-07-05T05:45:18.104 | 37.24 | -6.48 | 48300.35 | -22.49 | | |
| gamma | I | 2023-07-05T05:45:48.097 | 37.35 | -6.38 | 47628.12 | -22.33 | | |
| eta | I | 2023-07-05T05:46:08.391 | 37.43 | -6.32 | 47176.12 | -22.21 | | |
| beta | I | 2023-07-05T05:47:16.770 | 37.68 | -6.10 | 45669.95 | -21.79 | | |
| alpha | I | 2023-07-05T05:48:00.693 | 37.84 | -5.96 | 44716.50 | -21.52 | | |
| 4 | I | 2023-07-05T05:49:44.228 | 38.22 | -5.63 | 42530.57 | -20.76 | | |
| 5 | I | 2023-07-05T05:49:55.812 | 38.26 | -5.59 | 42283.39 | -20.62 | | |
| 6 | I | 2023-07-05T05:50:19.162 | 38.35 | -5.52 | 41802.51 | -20.47 | | |

No planet occultations

| | | | | | | | | |
|---------|---|-------------------------|-------|-------|----------|-------|--|--|
| 6 | E | 2023-07-05T06:27:40.868 | 46.61 | 1.80x | 41865.02 | 20.42 | | |
| 5 | E | 2023-07-05T06:27:55.608 | 46.66 | 1.85x | 42165.94 | 20.57 | | |
| 4 | E | 2023-07-05T06:28:16.517 | 46.74 | 1.92x | 42596.27 | 20.71 | | |
| alpha | E | 2023-07-05T06:29:59.326 | 47.12 | 2.26x | 44752.03 | 21.46 | | |
| beta | E | 2023-07-05T06:30:40.403 | 47.27 | 2.40x | 45641.49 | 21.72 | | |
| eta | E | 2023-07-05T06:31:50.359 | 47.52 | 2.63x | 47176.12 | 22.14 | | |
| gamma | E | 2023-07-05T06:32:10.823 | 47.60 | 2.70x | 47630.44 | 22.26 | | |
| delta | E | 2023-07-05T06:32:40.809 | 47.71 | 2.80x | 48300.35 | 22.42 | | |
| lambda | E | 2023-07-05T06:33:57.139 | 47.99 | 3.06x | 50026.71 | 22.81 | | |
| epsilon | E | 2023-07-05T06:35:01.012 | 48.22 | 3.27x | 51492.89 | 23.16 | | |

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2023-07-05T06:08:22.080
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 55705214728775296
 2Mass ID (if available) : 03165330+1751029
 ICRS Star Coord at Epoch: 03h 16m 53.31537s +17:51:03.10932s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 13.895
 G magnitude : 16.799
 RP magnitude : 15.912
 BP magnitude : 17.618
 DUPflag : 0
 Distance (au) : 20.264
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 25.04
 Sun-Target sep (deg) : 51.12
 Sun-Moon sep (deg) : 104.16
 B (ring opening deg) : 62.96
 PA of pole (deg) : -88.51
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.624
 C/A sky separation (km) : 23869.6
 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 | 2023-07-05T05:40:25.818 | -2.18x | -52.56 | 51167.60 | -24.69 | | | |
| lambda | I | 2023-07-05T05:41:12.372 | -2.01x | -52.38 | 50026.71 | -24.42 | | | |
| delta | I | 2023-07-05T05:42:23.446 | -1.75x | -52.11 | 48300.35 | -24.15 | | | |
| gamma | I | 2023-07-05T05:42:51.368 | -1.65x | -52.01 | 47627.61 | -24.04 | | | |
| eta | I | 2023-07-05T05:43:10.183 | -1.58x | -51.94 | 47176.12 | -23.96 | | | |
| beta | I | 2023-07-05T05:44:13.295 | -1.35x | -51.70 | 45671.85 | -23.66 | | | |
| alpha | I | 2023-07-05T05:44:53.868 | -1.21x | -51.54 | 44712.74 | -23.48 | | | |
| 4 | I | 2023-07-05T05:46:28.126 | -0.86x | -51.18 | 42528.46 | -22.96 | | | |
| 5 | I | 2023-07-05T05:46:38.127 | -0.83x | -51.15 | 42290.83 | -22.87 | | | |
| 6 | I | 2023-07-05T05:46:59.604 | -0.75x | -51.07 | 41799.75 | -22.76 | | | |
| Uranus | I | 2023-07-05T06:02:16.757 | 2.57x | -47.59 | 25556.52 | | | -1.88 | -1.97 |
| Uranus | E | 2023-07-05T06:14:08.515 | 5.13 | -44.89 | 25390.21 | | | 15.77 | 16.48 |
| 6 | E | 2023-07-05T06:27:57.556 | 8.08 | -41.76 | 41868.75 | 22.69 | | | |
| 5 | E | 2023-07-05T06:28:10.477 | 8.12 | -41.71 | 42161.53 | 22.79 | | | |
| 4 | E | 2023-07-05T06:28:29.692 | 8.19 | -41.64 | 42600.59 | 22.88 | | | |
| alpha | E | 2023-07-05T06:30:03.218 | 8.52 | -41.28 | 44751.25 | 23.39 | | | |
| beta | E | 2023-07-05T06:30:40.992 | 8.65 | -41.14 | 45641.16 | 23.57 | | | |
| eta | E | 2023-07-05T06:31:45.707 | 8.88 | -40.90 | 47176.12 | 23.86 | | | |
| gamma | E | 2023-07-05T06:32:04.704 | 8.95 | -40.83 | 47630.09 | 23.94 | | | |
| delta | E | 2023-07-05T06:32:32.639 | 9.05 | -40.72 | 48300.35 | 24.05 | | | |
| lambda | E | 2023-07-05T06:33:44.021 | 9.30 | -40.45 | 50026.71 | 24.32 | | | |
| epsilon | E | 2023-07-05T06:34:43.207 | 9.51 | -40.23 | 51471.91 | 24.58 | | | |