

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-10-26T07:55:33.120
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3418380589901940864
 2Mass ID (if available) : 05062690+2253307

ICRS Star Coord at Epoch: 05h 06m 26.91333s +22:53:30.74109s

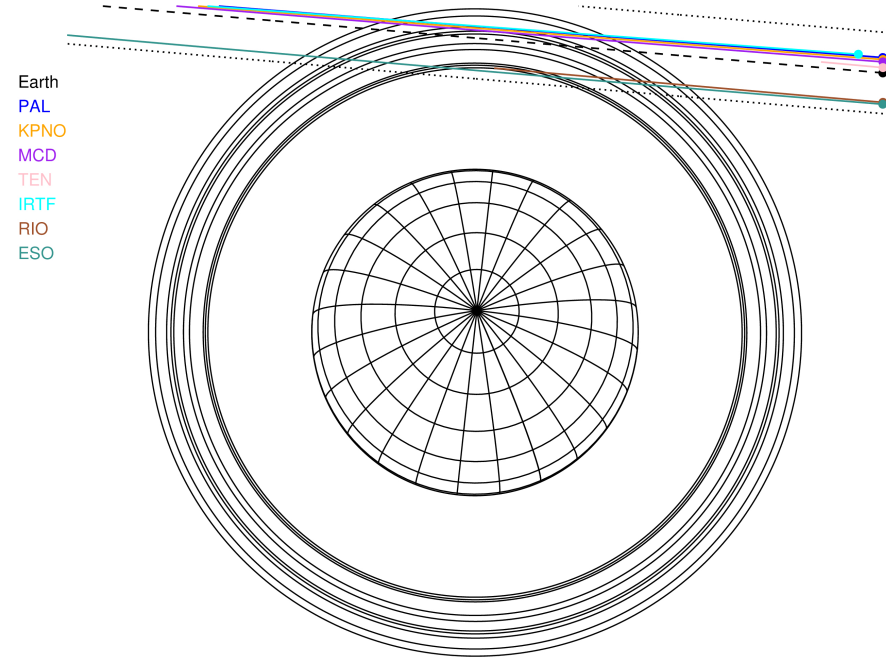
RUWE (>1.4 is poor) : 1.03
 K magnitude : 13.394
 G magnitude : 15.480
 RP magnitude : 14.781
 BP magnitude : 16.013
 DUPflag : 0
 Distance (au) : 18.516
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.75
 Sun-Target sep (deg) : 135.09
 Sun-Moon sep (deg) : 2.36
 B (ring opening deg) : 82.26
 PA of pole (deg) : -5.01

| # | 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 |



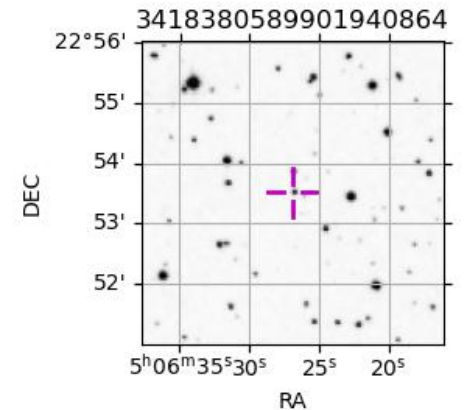
2029-10-26T07:55:33.1200 α: 05 06 26.91333 s: +22 53 30.741 C/A 3.428° PA 175.10 deg v_sky -14.75 km/s D 18.52 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2029-10-26T07:55:33 K13.39 G15.48 XRgt

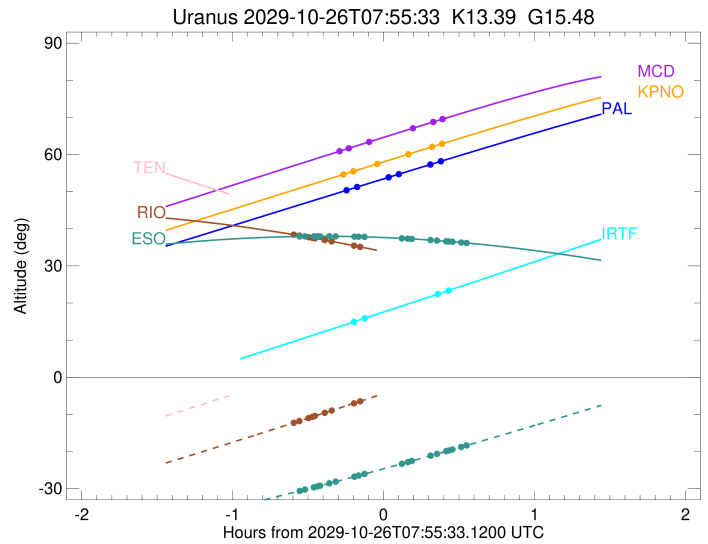
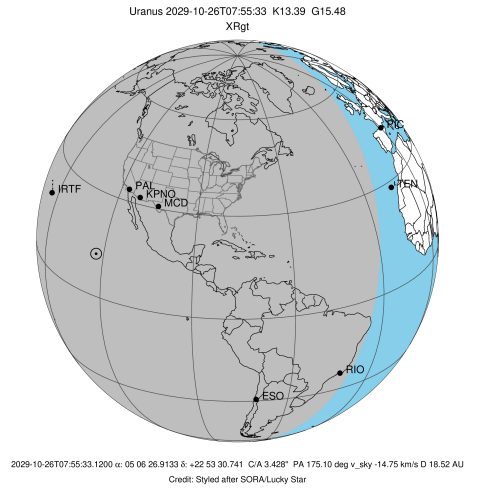


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

| Obs | Location | lat | Elon | Rings I | Planet | Rings E | Observed Events Interval | OEcode |
|------|-----------------------|-------|-------|---------|--------|---------|-----------------------------|--------|
| PIC | Pic du Midi | 42.9 | 0.1 | | | | | PnnRnn |
| PAL | Palomar Mt (200") | 33.4 | 243.1 | +++ | | +++ | OCT 26 07:41 - OCT 26 08:17 | PnnRie |
| PNO | Purple Mtn Obs. Nanki | 32.1 | 118.8 | | | | | PnnRnn |
| KPNO | Kitt Peak Natl Obs | 32.0 | 248.4 | +++ | | +++ | OCT 26 07:40 - OCT 26 08:17 | PnnRie |
| MCD | McDonald Obs. 2.7m | 30.7 | 256.0 | +++ | | +++ | OCT 26 07:38 - OCT 26 08:17 | PnnRie |
| TEN | Teide Obs./Tenerife | 28.3 | 343.5 | | | | | PnnRnn |
| IRTF | Mauna Kea/IRTF | 19.8 | 204.5 | ++ | | ++ | OCT 26 07:44 - OCT 26 08:20 | PnnRie |
| KAV | Kavalur Observatory | 12.6 | 78.8 | | | | | PnnRnn |
| RIO | Rio de Janeiro | -22.9 | 316.8 | +++++++ | | +++++++ | OCT 26 07:19 - OCT 26 07:47 | PnnRin |
| ESO | European Southern Obs | -29.3 | 289.3 | +++++++ | | +++++++ | OCT 26 07:22 - OCT 26 08:27 | PnnRie |
| 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 : 2029-10-26T07:59:36.970
 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 : 3418380589901940864
 2Mass ID (if available) : 05062690+2253307
 ICRS Star Coord at Epoch: 05h 06m 26.91333s +22:53:30.74109s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 13.394
 G magnitude : 15.480
 RP magnitude : 14.781
 BP magnitude : 16.013
 DUPflag : 0
 Distance (au) : 18.516
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.75
 Sun-Target sep (deg) : 135.09
 Sun-Moon sep (deg) : 1.84
 B (ring opening deg) : 82.26
 PA of pole (deg) : -5.01
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.561
 C/A sky separation (km) : 47825.1
 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



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

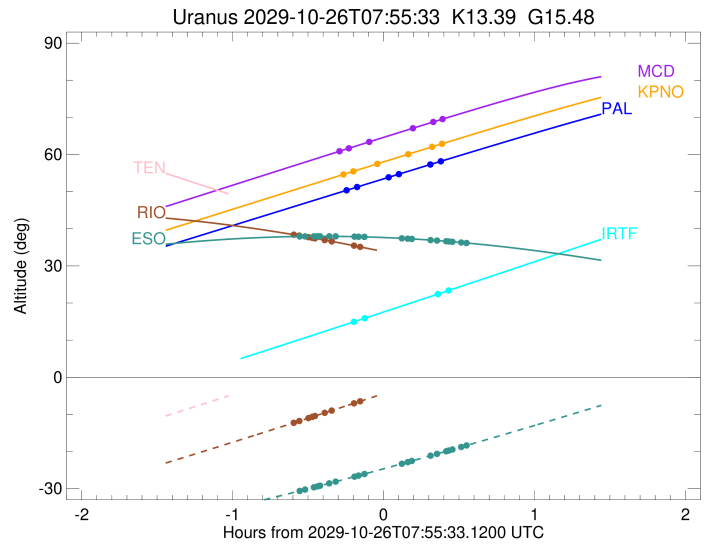
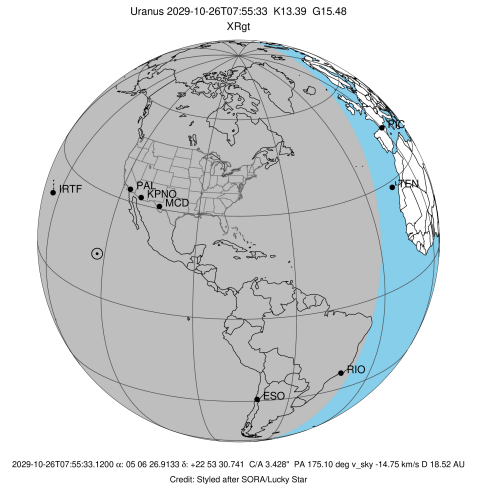
| Ring | I/E | UTC | b? | alt | alt-sun | radius | r-dot | lat-geo | lat-geodetic |
|---------|-----|-------------------------|----|-------|---------|----------|-------|---------|--------------|
| epsilon | I | 2029-10-26T07:41:16.401 | | 50.45 | -69.27 | 51044.75 | -4.77 | | |
| lambda | I | 2029-10-26T07:45:06.998 | | 51.26 | -69.16 | 50026.71 | -3.94 | | |
| delta | I | 2029-10-26T07:58:05.266 | | 53.97 | -68.52 | 48300.38 | -0.43 | | |

No planet occultations

| | | | | | | | | | |
|---------|---|-------------------------|--|-------|--------|----------|------|--|--|
| delta | E | 2029-10-26T08:01:09.825 | | 54.61 | -68.31 | 48300.38 | 0.43 | | |
| lambda | E | 2029-10-26T08:14:06.933 | | 57.30 | -67.21 | 50026.71 | 3.95 | | |
| epsilon | E | 2029-10-26T08:17:12.161 | | 57.94 | -66.90 | 50830.01 | 4.79 | | |

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2029-10-26T07:59:13.640
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       : 3418380589901940864
2Mass ID (if available) : 05062690+2253307
ICRS Star Coord at Epoch: 05h 06m 26.91333s +22:53:30.74109s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 13.394
G magnitude           : 15.480
RP magnitude          : 14.781
BP magnitude          : 16.013
DUPflag              : 0
Distance (au)         : 18.516
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -14.75
Sun-Target sep (deg) : 135.09
Sun-Moon sep (deg)   : 1.90
B (ring opening deg) : 82.26
PA of pole (deg)     : -5.01
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.540
C/A sky separation (km) : 47539.8
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
  
```



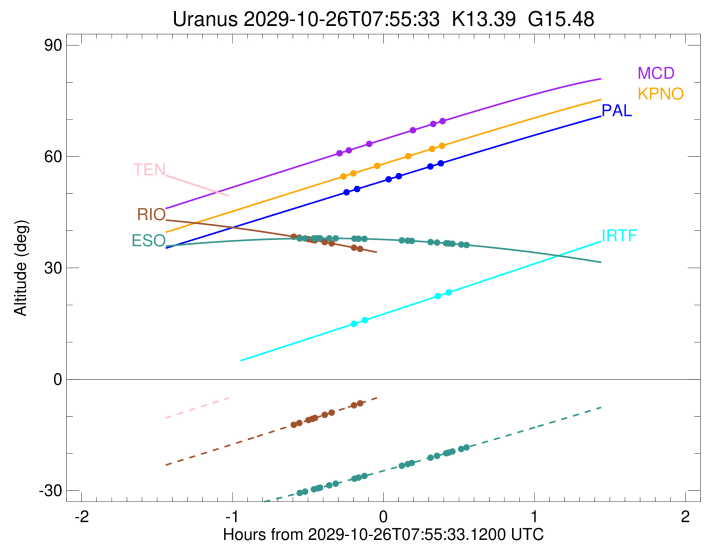
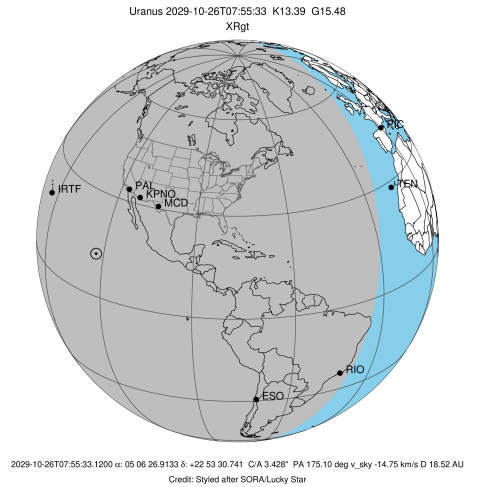
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

| Ring | I/E | UTC | b? alt | alt-sun | radius | r-dot | lat-geo | lat-geodetic |
|---------|-----|-------------------------|--------|---------|----------|-------|---------|--------------|
| epsilon | I | 2029-10-26T07:39:59.599 | 54.71 | -69.61 | 51051.73 | -5.03 | | |
| lambda | I | 2029-10-26T07:43:37.730 | 55.48 | -69.32 | 50026.71 | -4.25 | | |
| delta | I | 2029-10-26T07:53:13.273 | 57.51 | -68.41 | 48300.35 | -1.70 | | |

No planet occultations

| | | | | | | | | |
|---------|---|-------------------------|-------|--------|----------|------|--|--|
| delta | E | 2029-10-26T08:05:14.911 | 60.05 | -67.02 | 48300.35 | 1.70 | | |
| lambda | E | 2029-10-26T08:14:49.390 | 62.06 | -65.74 | 50026.71 | 4.26 | | |
| epsilon | E | 2029-10-26T08:17:42.270 | 62.66 | -65.33 | 50825.87 | 5.04 | | |

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-10-26T07:58:33.420
 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 : 3418380589901940864
 2Mass ID (if available) : 05062690+2253307
 ICRS Star Coord at Epoch: 05h 06m 26.91333s +22:53:30.74109s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 13.394
 G magnitude : 15.480
 RP magnitude : 14.781
 BP magnitude : 16.013
 DUPflag : 0
 Distance (au) : 18.516
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.75
 Sun-Target sep (deg) : 135.09
 Sun-Moon sep (deg) : 2.00
 B (ring opening deg) : 82.26
 PA of pole (deg) : -5.01
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.516
 C/A sky separation (km) : 47217.5
 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



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

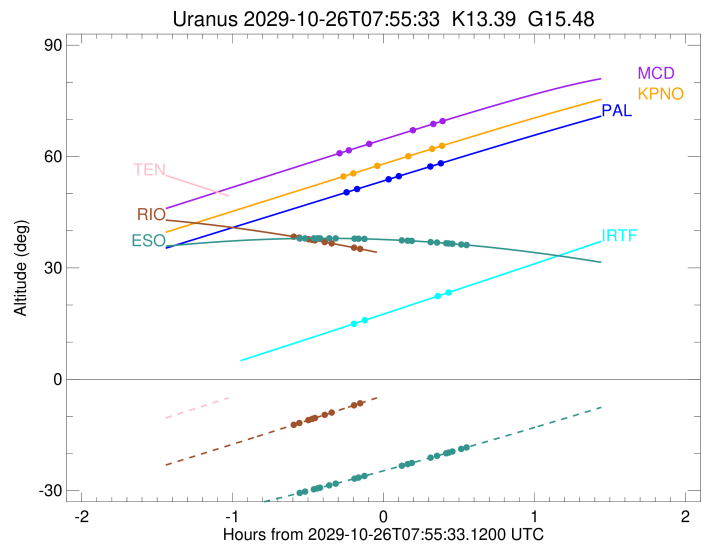
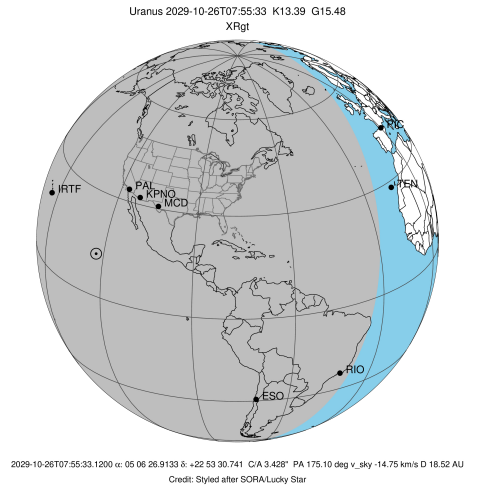
| Ring | I/E | UTC | b? | alt | alt-sun | radius | r-dot | lat-geo | lat-geodetic |
|---------|-----|-------------------------|----|-------|---------|----------|-------|---------|--------------|
| epsilon | I | 2029-10-26T07:38:22.839 | | 60.95 | -67.57 | 51059.40 | -5.30 | | |
| lambda | I | 2029-10-26T07:41:49.312 | | 61.69 | -67.08 | 50026.71 | -4.58 | | |
| delta | I | 2029-10-26T07:49:58.355 | | 63.43 | -65.87 | 48300.35 | -2.44 | | |

No planet occultations

| | | | | | | | | | |
|---------|---|-------------------------|--|-------|--------|----------|------|--|--|
| delta | E | 2029-10-26T08:07:09.123 | | 67.06 | -63.06 | 48300.35 | 2.44 | | |
| lambda | E | 2029-10-26T08:15:17.258 | | 68.77 | -61.63 | 50026.71 | 4.59 | | |
| epsilon | E | 2029-10-26T08:17:58.637 | | 69.32 | -61.15 | 50821.60 | 5.32 | | |

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2029-10-26T08:02:38.130
Event type          : XRgt
: No Uranus occs
: Ring occs: geocentric, topocentric
Observer code       : IRTF
Location            : Mauna Kea/IRTF
Latitude (deg)      : 19.82622
E. Longitude (deg)  : 204.52800
Altitude (km)       : 4.168
Gaia source ID      : 3418380589901940864
2Mass ID (if available) : 05062690+2253307
ICRS Star Coord at Epoch: 05h 06m 26.91333s +22:53:30.74109s
RUWE (>1.4 is poor) : 1.03
K magnitude         : 13.394
G magnitude         : 15.480
RP magnitude        : 14.781
BP magnitude        : 16.013
DUPflag            : 0
Distance (au)       : 18.516
f0 (km)            : 0.000
g0 (km)            : 0.000
skyplane vel. (km/s) : -14.75
Sun-Target sep (deg) : 135.09
Sun-Moon sep (deg)  : 1.50
B (ring opening deg) : 82.26
PA of pole (deg)    : -5.01
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.566
C/A sky separation (km) : 47884.3
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_itr93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
  
```

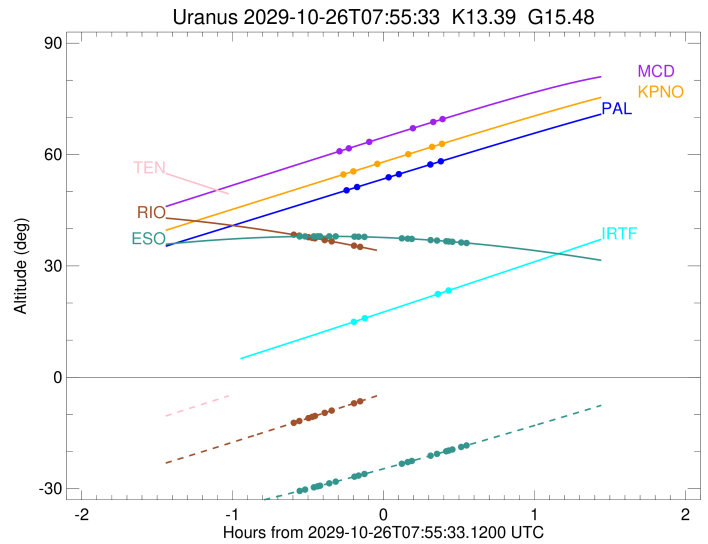
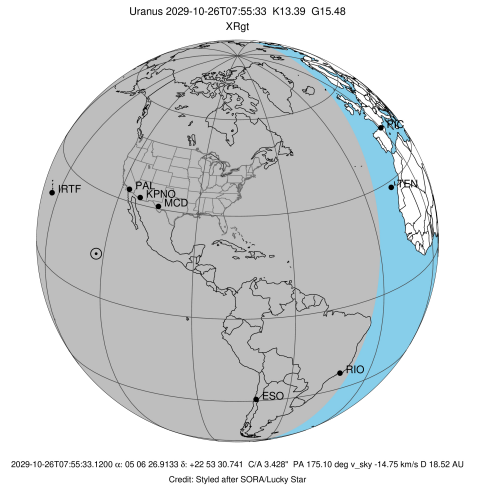


| Ring | I/E | UTC | b? | alt | alt-sun | radius | r-dot | lat-geo | lat-geodetic |
|---------|-----|-------------------------|----|-------|---------|----------|-------|---------|--------------|
| epsilon | I | 2029-10-26T07:44:13.523 | | 15.04 | -55.32 | 51041.91 | -4.65 | | |
| lambda | I | 2029-10-26T07:48:10.275 | | 15.92 | -56.25 | 50026.71 | -3.81 | | |

No planet occultations

| | | | | | | | | | |
|---------|---|-------------------------|--|-------|--------|----------|------|--|--|
| lambda | E | 2029-10-26T08:17:05.747 | | 22.40 | -62.97 | 50026.71 | 3.83 | | |
| epsilon | E | 2029-10-26T08:20:16.163 | | 23.11 | -63.71 | 50829.97 | 4.67 | | |

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-10-26T07:52:10.550
 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 : 3418380589901940864
 2Mass ID (if available) : 05062690+2253307
 ICRS Star Coord at Epoch: 05h 06m 26.91333s +22:53:30.74109s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 13.394
 G magnitude : 15.480
 RP magnitude : 14.781
 BP magnitude : 16.013
 DUPflag : 0
 Distance (au) : 18.516
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.75
 Sun-Target sep (deg) : 135.09
 Sun-Moon sep (deg) : 3.04
 B (ring opening deg) : 82.26
 PA of pole (deg) : -5.01
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.091
 C/A sky separation (km) : 41509.8
 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

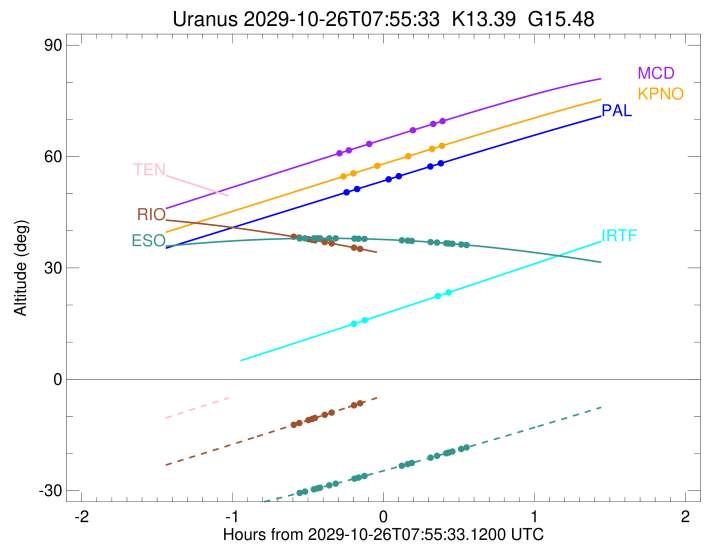
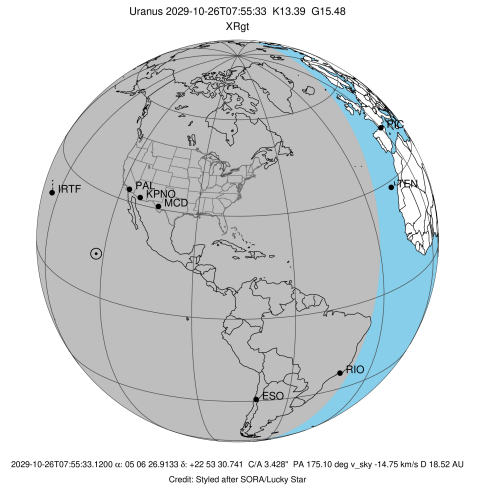


| Ring | I/E | UTC | b? | alt | alt-sun | radius | r-dot | lat-geo | lat-geodetic |
|---------|-----|-------------------------|----|-------|---------|----------|-------|---------|--------------|
| epsilon | I | 2029-10-26T07:19:53.143 | | 38.41 | -12.27 | 51161.79 | -8.60 | | |
| lambda | I | 2029-10-26T07:22:06.886 | | 38.15 | -11.78 | 50026.71 | -8.28 | | |
| delta | I | 2029-10-26T07:25:45.108 | | 37.73 | -10.99 | 48300.35 | -7.53 | | |
| gamma | I | 2029-10-26T07:27:16.598 | | 37.54 | -10.65 | 47626.35 | -7.20 | | |
| eta | I | 2029-10-26T07:28:20.205 | | 37.42 | -10.42 | 47176.12 | -6.96 | | |
| beta | I | 2029-10-26T07:32:16.111 | | 36.94 | -9.56 | 45645.77 | -6.01 | | |
| alpha | I | 2029-10-26T07:34:54.435 | | 36.61 | -8.98 | 44749.22 | -5.31 | | |
| 4 | I | 2029-10-26T07:44:07.719 | | 35.41 | -6.95 | 42540.34 | -2.61 | | |
| 5 | I | 2029-10-26T07:47:04.872 | | 35.01 | -6.30 | 42169.19 | -1.68 | | |

No planet occultations

| | | | | | | | | | |
|---------|---|-------------------------|--|-------|--------|----------|------|--|--|
| 5 | E | 2029-10-26T07:57:23.323 | | 33.57 | -4.01x | 42180.85 | 1.68 | | |
| 4 | E | 2029-10-26T08:00:17.959 | | 33.15 | -3.37x | 42553.41 | 2.61 | | |
| alpha | E | 2029-10-26T08:09:23.902 | | 31.81 | -1.34x | 44732.29 | 5.30 | | |
| beta | E | 2029-10-26T08:12:08.228 | | 31.39 | -0.72x | 45659.98 | 6.00 | | |
| eta | E | 2029-10-26T08:16:02.300 | | 30.79 | 0.15x | 47176.12 | 6.94 | | |
| gamma | E | 2029-10-26T08:17:06.667 | | 30.62 | 0.39x | 47630.75 | 7.18 | | |
| delta | E | 2029-10-26T08:18:37.768 | | 30.39 | 0.73x | 48300.35 | 7.51 | | |
| lambda | E | 2029-10-26T08:22:16.575 | | 29.81 | 1.55x | 50026.71 | 8.25 | | |
| epsilon | E | 2029-10-26T08:23:45.754 | | 29.58 | 1.89x | 50775.17 | 8.57 | | |

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-10-26T07:55:24.520
 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 : 3418380589901940864
 2Mass ID (if available) : 05062690+2253307
 ICRS Star Coord at Epoch: 05h 06m 26.91333s +22:53:30.74109s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 13.394
 G magnitude : 15.480
 RP magnitude : 14.781
 BP magnitude : 16.013
 DUPflag : 0
 Distance (au) : 18.516
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.75
 Sun-Target sep (deg) : 135.09
 Sun-Moon sep (deg) : 2.76
 B (ring opening deg) : 82.26
 PA of pole (deg) : -5.01
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.046
 C/A sky separation (km) : 40909.5
 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 | 2029-10-26T07:22:13.917 | | 37.93 | -30.62 | 51168.05 | -8.85 | | |
| lambda | I | 2029-10-26T07:24:24.254 | | 37.95 | -30.25 | 50026.71 | -8.56 | | |
| delta | I | 2029-10-26T07:27:54.367 | | 37.97 | -29.64 | 48300.35 | -7.86 | | |
| gamma | I | 2029-10-26T07:29:21.814 | | 37.97 | -29.39 | 47626.24 | -7.55 | | |
| eta | I | 2029-10-26T07:30:22.304 | | 37.97 | -29.21 | 47176.12 | -7.33 | | |
| beta | I | 2029-10-26T07:34:04.151 | | 37.97 | -28.56 | 45645.42 | -6.46 | | |
| alpha | I | 2029-10-26T07:36:29.718 | | 37.96 | -28.13 | 44749.66 | -5.83 | | |
| 4 | I | 2029-10-26T07:44:13.750 | | 37.88 | -26.74 | 42538.29 | -3.64 | | |
| 5 | I | 2029-10-26T07:46:07.522 | | 37.85 | -26.39 | 42165.45 | -3.06 | | |
| 6 | I | 2029-10-26T07:48:20.448 | | 37.81 | -25.99 | 41797.94 | -2.34 | | |

No planet occultations

| | | | | | | | | | |
|---------|---|-------------------------|--|-------|--------|----------|------|--|--|
| 6 | E | 2029-10-26T08:02:31.145 | | 37.43 | -23.36 | 41804.72 | 2.34 | | |
| 5 | E | 2029-10-26T08:04:49.034 | | 37.35 | -22.93 | 42186.80 | 3.06 | | |
| 4 | E | 2029-10-26T08:06:40.141 | | 37.28 | -22.58 | 42556.53 | 3.64 | | |
| alpha | E | 2029-10-26T08:14:16.041 | | 36.95 | -21.13 | 44730.98 | 5.84 | | |
| beta | E | 2029-10-26T08:16:47.279 | | 36.83 | -20.65 | 45660.73 | 6.46 | | |
| eta | E | 2029-10-26T08:20:26.717 | | 36.64 | -19.94 | 47176.12 | 7.33 | | |
| gamma | E | 2029-10-26T08:21:27.788 | | 36.58 | -19.74 | 47630.83 | 7.56 | | |
| delta | E | 2029-10-26T08:22:54.588 | | 36.50 | -19.46 | 48300.35 | 7.87 | | |
| lambda | E | 2029-10-26T08:26:24.597 | | 36.30 | -18.78 | 50026.71 | 8.56 | | |
| epsilon | E | 2029-10-26T08:27:50.236 | | 36.21 | -18.50 | 50771.28 | 8.86 | | |