

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2044-04-11T02:09:41.860
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 631016599423739776
 2Mass ID (if available) : 09203704+1617112

Uranus 2044-04-11T02:09:41 K13.34 G16.43 PgtRgt

ICRS Star Coord at Epoch: 09h 20m 37.07038s +16:17:10.93425s

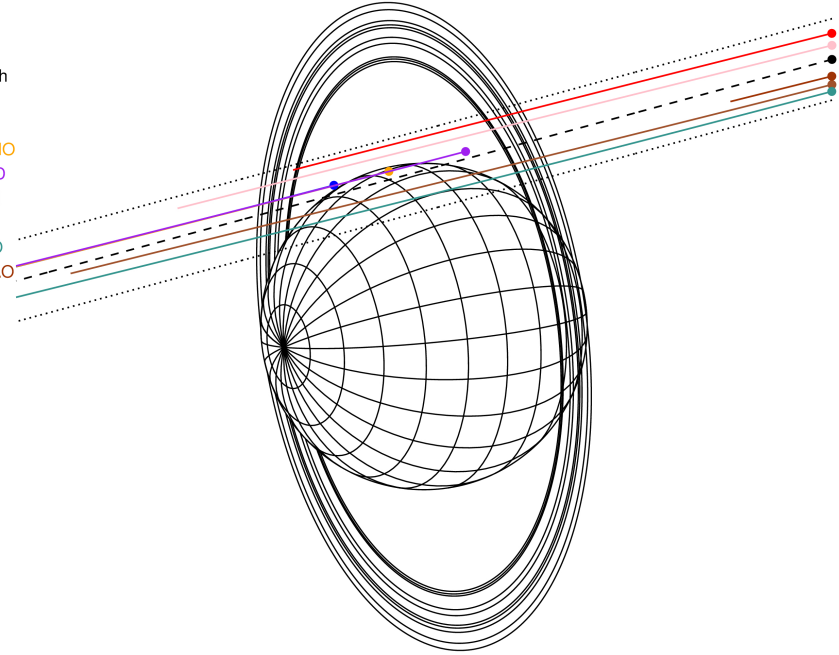
RUWE (>1.4 is poor) : 3.39
 K magnitude : 13.337
 G magnitude : 16.434
 RP magnitude : 15.391
 BP magnitude : 17.296
 DUPflag : 0
 Distance (au) : 17.928
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -6.52
 Sun-Target sep (deg) : 116.24
 Sun-Moon sep (deg) : 48.28
 B (ring opening deg) : 29.75
 PA of pole (deg) : 98.46

| # | 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 |



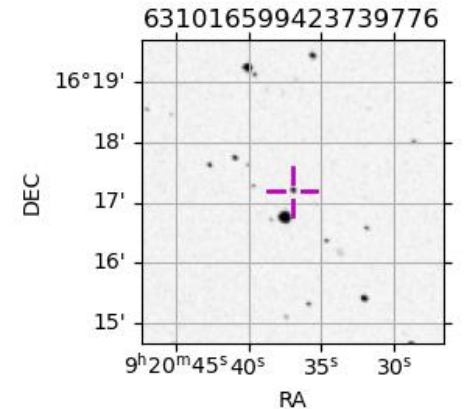
2044-04-11T02:09:41.8600 α: 09 20 37.0704 δ: +16 17 10.934 C/A 1.809° PA 197.31 deg v_sky - 6.53 km/s D 17.93 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 RIO
 ESO
 SAAO

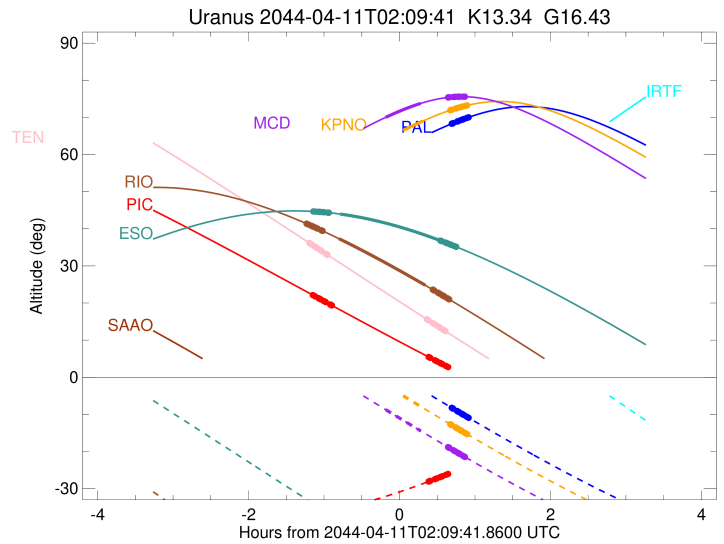
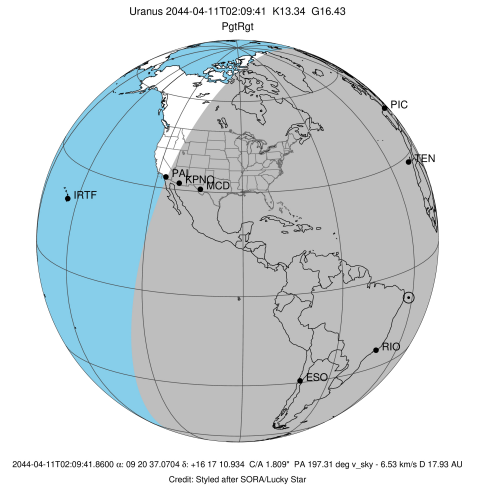


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

| Obs | Location | lat | Elon | Rings I | Planet | Rings E | Observed Events Interval | OEcode |
|------|-----------------------|-------|-------|---------|--------|---------|-----------------------------|--------|
| PIC | Pic du Midi | 42.9 | 0.1 | +++++++ | | +++ | APR 11 01:00 - APR 11 02:34 | PnnRie |
| PAL | Palomar Mt (200") | 33.4 | 243.1 | | | +++++++ | APR 11 02:51 - APR 11 03:04 | PnnRne |
| PNO | Purple Mtn Obs. Nanki | 32.1 | 118.8 | | | | | PnnRnn |
| KPNO | Kitt Peak Natl Obs | 32.0 | 248.4 | | + | +++++++ | APR 11 02:28 - APR 11 03:02 | PneRne |
| MCD | McDonald Obs. 2.7m | 30.7 | 256.0 | | + | +++++++ | APR 11 01:58 - APR 11 03:01 | PieRne |
| TEN | Teide Obs./Tenerife | 28.3 | 343.5 | +++++++ | | +++++++ | APR 11 00:57 - APR 11 02:45 | 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 | +++++++ | + | +++++++ | APR 11 00:55 - APR 11 02:48 | PieRie |
| ESO | European Southern Obs | -29.3 | 289.3 | +++++++ | + | +++++++ | APR 11 01:00 - APR 11 02:54 | PieRie |
| 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 : 2044-04-11T01:59:55.700
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 631016599423739776
 2Mass ID (if available) : 09203704+1617112
 ICRS Star Coord at Epoch: 09h 20m 37.07038s +16:17:10.93425s
 RUWE (>1.4 is poor) : 3.39
 K magnitude : 13.337
 G magnitude : 16.434
 RP magnitude : 15.391
 BP magnitude : 17.296
 DUPflag : 0
 Distance (au) : 17.928
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -6.52
 Sun-Target sep (deg) : 116.24
 Sun-Moon sep (deg) : 48.11
 B (ring opening deg) : 29.75
 PA of pole (deg) : 98.46
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.219
 C/A sky separation (km) : 28846.7
 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

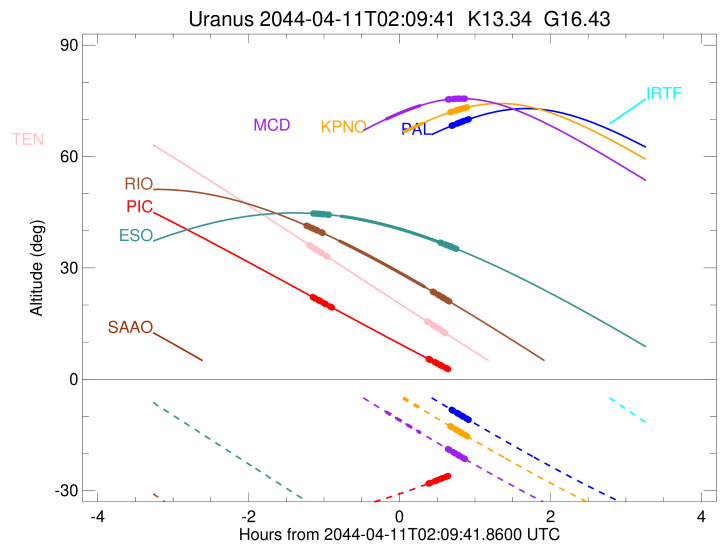
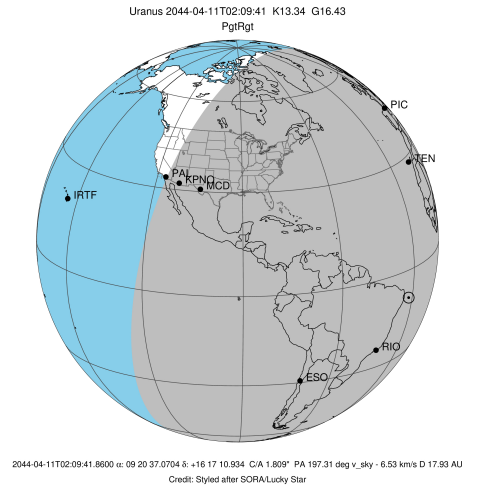


| Ring | I/E | UTC | b? | alt | alt-sun | radius | r-dot | lat-geo | lat-geodetic |
|---------|-----|-------------------------|----|-------|---------|----------|--------|---------|--------------|
| epsilon | I | 2044-04-11T01:00:35.560 | | 22.17 | -36.95 | 51320.32 | -10.89 | | |
| lambda | I | 2044-04-11T01:02:34.479 | | 21.81 | -36.83 | 50026.71 | -10.81 | | |
| delta | I | 2044-04-11T01:05:15.753 | | 21.31 | -36.66 | 48300.35 | -10.60 | | |
| gamma | I | 2044-04-11T01:06:19.112 | | 21.12 | -36.60 | 47631.56 | -10.51 | | |
| eta | I | 2044-04-11T01:07:02.569 | | 20.99 | -36.55 | 47176.12 | -10.45 | | |
| beta | I | 2044-04-11T01:09:29.718 | | 20.53 | -36.39 | 45659.78 | -10.23 | | |
| alpha | I | 2044-04-11T01:10:59.899 | | 20.26 | -36.29 | 44748.86 | -10.09 | | |
| 4 | I | 2044-04-11T01:14:45.563 | | 19.57 | -36.02 | 42533.02 | -9.68 | | |
| 5 | I | 2044-04-11T01:15:11.147 | | 19.49 | -35.99 | 42215.40 | -9.58 | | |
| 6 | I | 2044-04-11T01:15:46.317 | | 19.38 | -35.95 | 41876.31 | -9.53 | | |

No planet occultations

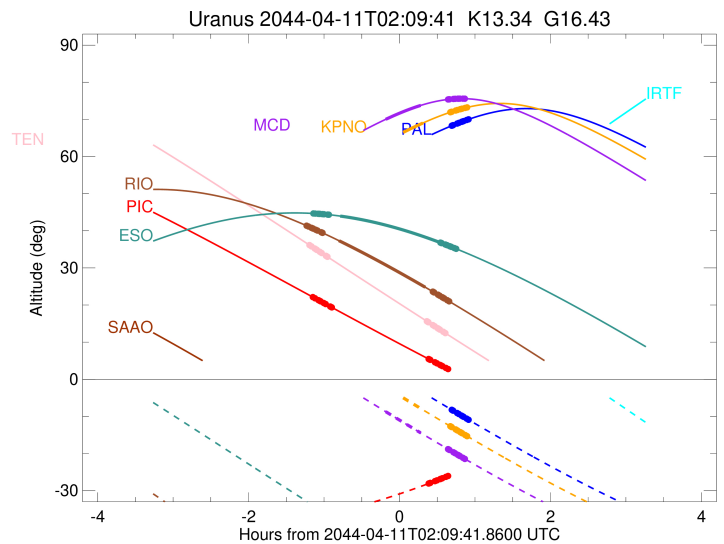
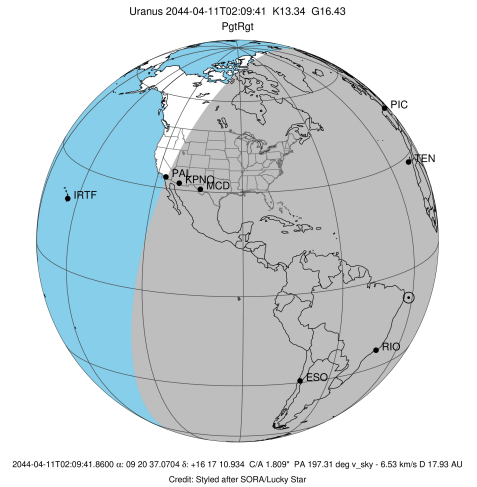
| | | | | | | | | | |
|---------|---|-------------------------|--|-------|--------|----------|-------|--|--|
| 6 | E | 2044-04-11T02:32:48.950 | | 5.47 | -28.09 | 41852.36 | 9.33 | | |
| 5 | E | 2044-04-11T02:33:25.481 | | 5.36 | -28.01 | 42158.39 | 9.37 | | |
| 4 | E | 2044-04-11T02:34:03.014 | | 5.25 | -27.93 | 42549.61 | 9.47 | | |
| alpha | E | 2044-04-11T02:37:49.321 | | 4.59x | -27.45 | 44728.60 | 9.85 | | |
| beta | E | 2044-04-11T02:39:26.921 | | 4.30x | -27.23 | 45681.07 | 9.98 | | |
| eta | E | 2044-04-11T02:41:55.218 | | 3.87x | -26.91 | 47176.12 | 10.18 | | |
| gamma | E | 2044-04-11T02:42:39.219 | | 3.74x | -26.81 | 47625.29 | 10.24 | | |
| delta | E | 2044-04-11T02:43:44.912 | | 3.55x | -26.67 | 48300.35 | 10.32 | | |
| lambda | E | 2044-04-11T02:46:30.734 | | 3.07x | -26.30 | 50026.71 | 10.50 | | |
| epsilon | E | 2044-04-11T02:47:38.871 | | 2.87x | -26.14 | 50744.77 | 10.58 | | |

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2044-04-11T02:15:50.630
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 631016599423739776
 2Mass ID (if available) : 09203704+1617112
 ICRS Star Coord at Epoch: 09h 20m 37.07038s +16:17:10.93425s
 RUWE (>1.4 is poor) : 3.39
 K magnitude : 13.337
 G magnitude : 16.434
 RP magnitude : 15.391
 BP magnitude : 17.296
 DUPflag : 0
 Distance (au) : 17.928
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -6.52
 Sun-Target sep (deg) : 116.24
 Sun-Moon sep (deg) : 49.18
 B (ring opening deg) : 29.75
 PA of pole (deg) : 98.46
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.921
 C/A sky separation (km) : 24972.5
 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



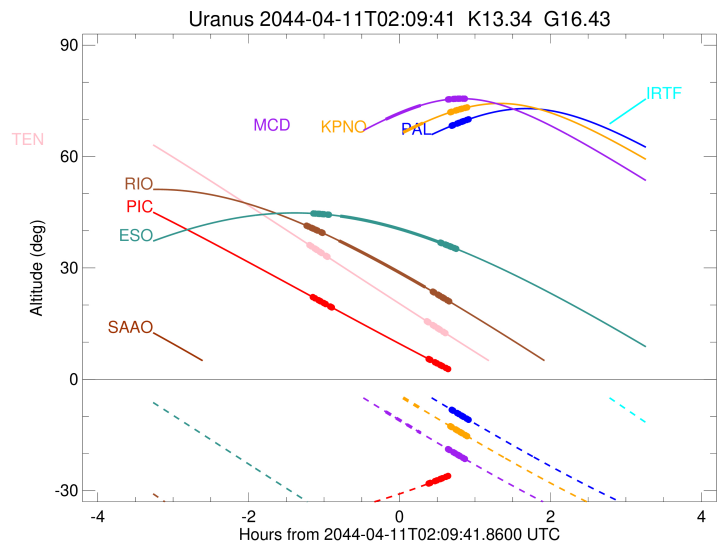
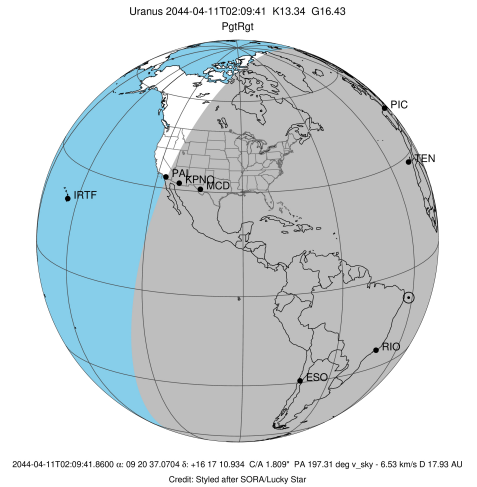
| Ring | I/E | UTC | b? alt | x: target alt < 5.0 deg or sun > -5.0 deg alt-sun | radius | r-dot | lat-geo | lat-geodetic |
|---------|-----|-------------------------|--------|--|----------|--------|---------|--------------|
| epsilon | I | 2044-04-11T01:16:40.586 | 51.34 | 11.24x | 51350.72 | -11.95 | | |
| lambda | I | 2044-04-11T01:18:31.451 | 51.71 | 10.86x | 50026.71 | -11.89 | | |
| delta | I | 2044-04-11T01:20:57.484 | 52.19 | 10.35x | 48300.35 | -11.75 | | |
| gamma | I | 2044-04-11T01:21:54.561 | 52.38 | 10.15x | 47631.50 | -11.69 | | |
| eta | I | 2044-04-11T01:22:33.594 | 52.51 | 10.02x | 47176.12 | -11.64 | | |
| beta | I | 2044-04-11T01:24:45.300 | 52.95 | 9.56x | 45657.78 | -11.50 | | |
| alpha | I | 2044-04-11T01:26:05.476 | 53.22 | 9.28x | 44747.12 | -11.40 | | |
| 4 | I | 2044-04-11T01:29:23.389 | 53.87 | 8.59x | 42536.02 | -11.12 | | |
| 5 | I | 2044-04-11T01:29:44.081 | 53.94 | 8.52x | 42224.48 | -11.03 | | |
| 6 | I | 2044-04-11T01:30:15.946 | 54.04 | 8.41x | 41874.09 | -11.01 | | |
| Uranus | I | 2044-04-11T02:02:41.911 | 60.26 | 1.68x | 25557.45 | | -5.17 | -5.42 |
| Uranus | E | 2044-04-11T02:28:50.267 | 64.86 | -3.69x | 25544.65 | | 15.91 | 16.62 |
| 6 | E | 2044-04-11T02:51:11.526 | 68.29 | -8.22 | 41847.37 | 11.05 | | |
| 5 | E | 2044-04-11T02:51:43.392 | 68.37 | -8.33 | 42161.83 | 11.08 | | |
| 4 | E | 2044-04-11T02:52:14.134 | 68.44 | -8.43 | 42554.52 | 11.16 | | |
| alpha | E | 2044-04-11T02:55:27.078 | 68.87 | -9.08 | 44724.97 | 11.44 | | |
| beta | E | 2044-04-11T02:56:51.676 | 69.06 | -9.36 | 45680.68 | 11.54 | | |
| eta | E | 2044-04-11T02:59:00.434 | 69.34 | -9.79 | 47176.12 | 11.70 | | |
| gamma | E | 2044-04-11T02:59:38.724 | 69.42 | -9.92 | 47624.77 | 11.74 | | |
| delta | E | 2044-04-11T03:00:36.121 | 69.54 | -10.11 | 48300.35 | 11.80 | | |
| lambda | E | 2044-04-11T03:03:01.489 | 69.83 | -10.59 | 50026.71 | 11.95 | | |
| epsilon | E | 2044-04-11T03:04:01.344 | 69.95 | -10.79 | 50743.54 | 12.00 | | |

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2044-04-11T02:14:36.410
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 631016599423739776
 2Mass ID (if available) : 09203704+1617112
 ICRS Star Coord at Epoch: 09h 20m 37.07038s +16:17:10.93425s
 RUWE (>1.4 is poor) : 3.39
 K magnitude : 13.337
 G magnitude : 16.434
 RP magnitude : 15.391
 BP magnitude : 17.296
 DUPflag : 0
 Distance (au) : 17.928
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -6.52
 Sun-Target sep (deg) : 116.24
 Sun-Moon sep (deg) : 49.16
 B (ring opening deg) : 29.75
 PA of pole (deg) : 98.46
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.914
 C/A sky separation (km) : 24893.4
 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



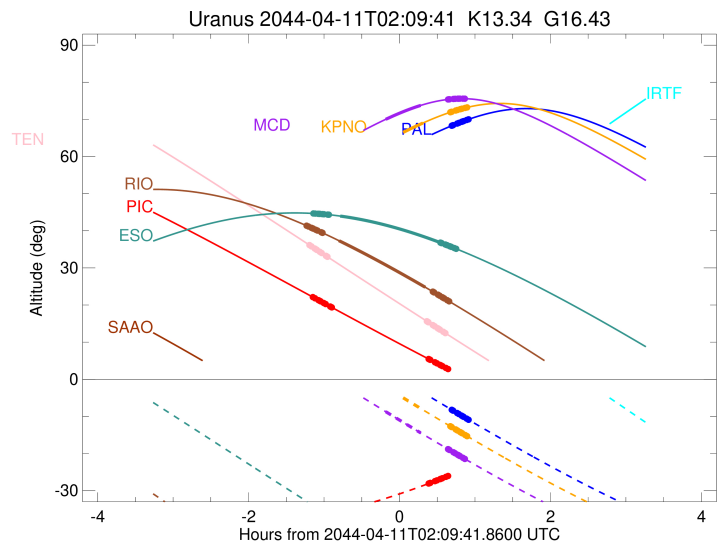
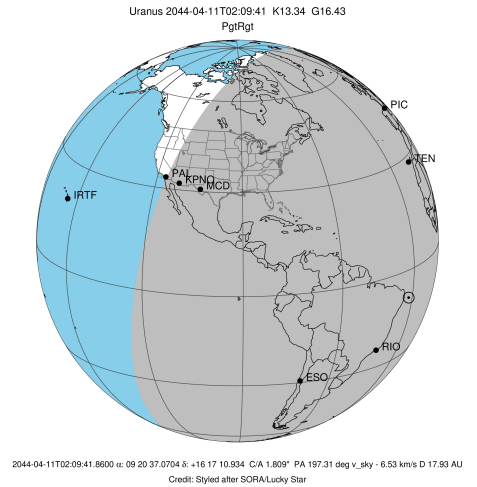
| Ring | I/E | UTC | b? | alt | alt-sun | radius | r-dot | lat-geo | lat-geodetic |
|---------|-----|-------------------------|----|-------|---------|----------|--------|---------|--------------|
| epsilon | I | 2044-04-11T01:15:39.219 | | 55.78 | 6.93x | 51351.71 | -12.00 | | |
| lambda | I | 2044-04-11T01:17:29.665 | | 56.15 | 6.54x | 50026.71 | -11.95 | | |
| delta | I | 2044-04-11T01:19:55.030 | | 56.64 | 6.03x | 48300.35 | -11.80 | | |
| gamma | I | 2044-04-11T01:20:51.842 | | 56.82 | 5.83x | 47631.50 | -11.74 | | |
| eta | I | 2044-04-11T01:21:30.693 | | 56.95 | 5.69x | 47176.12 | -11.70 | | |
| beta | I | 2044-04-11T01:23:41.786 | | 57.39 | 5.23x | 45657.72 | -11.55 | | |
| alpha | I | 2044-04-11T01:25:01.583 | | 57.65 | 4.95x | 44747.06 | -11.45 | | |
| 4 | I | 2044-04-11T01:28:18.517 | | 58.30 | 4.26x | 42536.12 | -11.17 | | |
| 5 | I | 2044-04-11T01:28:39.061 | | 58.37 | 4.18x | 42224.75 | -11.09 | | |
| 6 | I | 2044-04-11T01:29:10.808 | | 58.47 | 4.07x | 41874.02 | -11.07 | | |
| Uranus | I | 2044-04-11T02:00:38.966 | | 64.42 | -2.52x | 25556.95 | | -5.96 | -6.24 |
| Uranus | E | 2044-04-11T02:28:25.127 | | 69.04 | -8.25 | 25543.57 | | 16.51 | 17.24 |
| 6 | E | 2044-04-11T02:50:03.268 | | 71.93 | -12.65 | 41847.30 | 11.09 | | |
| 5 | E | 2044-04-11T02:50:35.034 | | 71.99 | -12.75 | 42161.88 | 11.11 | | |
| 4 | E | 2044-04-11T02:51:05.656 | | 72.04 | -12.85 | 42554.59 | 11.20 | | |
| alpha | E | 2044-04-11T02:54:17.962 | | 72.39 | -13.50 | 44724.92 | 11.48 | | |
| beta | E | 2044-04-11T02:55:42.304 | | 72.53 | -13.78 | 45680.68 | 11.58 | | |
| eta | E | 2044-04-11T02:57:50.687 | | 72.74 | -14.21 | 47176.12 | 11.73 | | |
| gamma | E | 2044-04-11T02:58:28.869 | | 72.80 | -14.34 | 47624.76 | 11.77 | | |
| delta | E | 2044-04-11T02:59:26.109 | | 72.89 | -14.53 | 48300.35 | 11.83 | | |
| lambda | E | 2044-04-11T03:01:51.092 | | 73.10 | -15.01 | 50026.71 | 11.98 | | |
| epsilon | E | 2044-04-11T03:02:50.796 | | 73.18 | -15.21 | 50743.55 | 12.03 | | |

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2044-04-11T02:12:45.710
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 631016599423739776
 2Mass ID (if available) : 09203704+1617112
 ICRS Star Coord at Epoch: 09h 20m 37.07038s +16:17:10.93425s
 RUWE (>1.4 is poor) : 3.39
 K magnitude : 13.337
 G magnitude : 16.434
 RP magnitude : 15.391
 BP magnitude : 17.296
 DUPflag : 0
 Distance (au) : 17.928
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -6.52
 Sun-Target sep (deg) : 116.24
 Sun-Moon sep (deg) : 49.11
 B (ring opening deg) : 29.75
 PA of pole (deg) : 98.46
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.914
 C/A sky separation (km) : 24881.8
 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 | 2044-04-11T01:14:05.778 | 61.96 | 0.66x | 51352.29 | -12.05 | | |
| lambda | I | 2044-04-11T01:15:55.811 | 62.32 | 0.27x | 50026.71 | -12.00 | | |
| delta | I | 2044-04-11T01:18:20.575 | 62.79 | -0.24x | 48300.35 | -11.85 | | |
| gamma | I | 2044-04-11T01:19:17.154 | 62.97 | -0.44x | 47631.50 | -11.79 | | |
| eta | I | 2044-04-11T01:19:55.846 | 63.10 | -0.58x | 47176.12 | -11.75 | | |
| beta | I | 2044-04-11T01:22:06.408 | 63.52 | -1.04x | 45657.68 | -11.60 | | |
| alpha | I | 2044-04-11T01:23:25.885 | 63.77 | -1.32x | 44747.03 | -11.50 | | |
| 4 | I | 2044-04-11T01:26:42.024 | 64.39 | -2.01x | 42536.17 | -11.22 | | |
| 5 | I | 2044-04-11T01:27:02.464 | 64.46 | -2.08x | 42224.89 | -11.13 | | |
| 6 | I | 2044-04-11T01:27:34.106 | 64.56 | -2.19x | 41873.98 | -11.11 | | |
| Uranus | I | 2044-04-11T01:58:43.092 | 70.02 | -8.72 | 25556.79 | | -6.18 | -6.47 |
| Uranus | E | 2044-04-11T02:26:40.174 | 73.78 | -14.47 | 25543.61 | | 16.49 | 17.22 |
| 6 | E | 2044-04-11T02:48:16.439 | 75.38 | -18.81 | 41847.33 | 11.11 | | |
| 5 | E | 2044-04-11T02:48:48.149 | 75.40 | -18.92 | 42161.86 | 11.13 | | |
| 4 | E | 2044-04-11T02:49:18.730 | 75.42 | -19.02 | 42554.56 | 11.21 | | |
| alpha | E | 2044-04-11T02:52:30.753 | 75.51 | -19.65 | 44724.94 | 11.50 | | |
| beta | E | 2044-04-11T02:53:54.977 | 75.54 | -19.93 | 45680.68 | 11.59 | | |
| eta | E | 2044-04-11T02:56:03.191 | 75.58 | -20.35 | 47176.12 | 11.74 | | |
| gamma | E | 2044-04-11T02:56:41.325 | 75.58 | -20.48 | 47624.77 | 11.79 | | |
| delta | E | 2044-04-11T02:57:38.496 | 75.59 | -20.67 | 48300.35 | 11.85 | | |
| lambda | E | 2044-04-11T03:00:03.313 | 75.59 | -21.14 | 50026.71 | 11.99 | | |
| epsilon | E | 2044-04-11T03:01:02.951 | 75.59 | -21.34 | 50743.55 | 12.05 | | |

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2044-04-11T01:56:42.470
 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 : 631016599423739776
 2Mass ID (if available) : 09203704+1617112
 ICRS Star Coord at Epoch: 09h 20m 37.07038s +16:17:10.93425s
 RUWE (>1.4 is poor) : 3.39
 K magnitude : 13.337
 G magnitude : 16.434
 RP magnitude : 15.391
 BP magnitude : 17.296
 DUPflag : 0
 Distance (au) : 17.928
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -6.52
 Sun-Target sep (deg) : 116.24
 Sun-Moon sep (deg) : 48.11
 B (ring opening deg) : 29.75
 PA of pole (deg) : 98.46
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.104
 C/A sky separation (km) : 27351.6
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

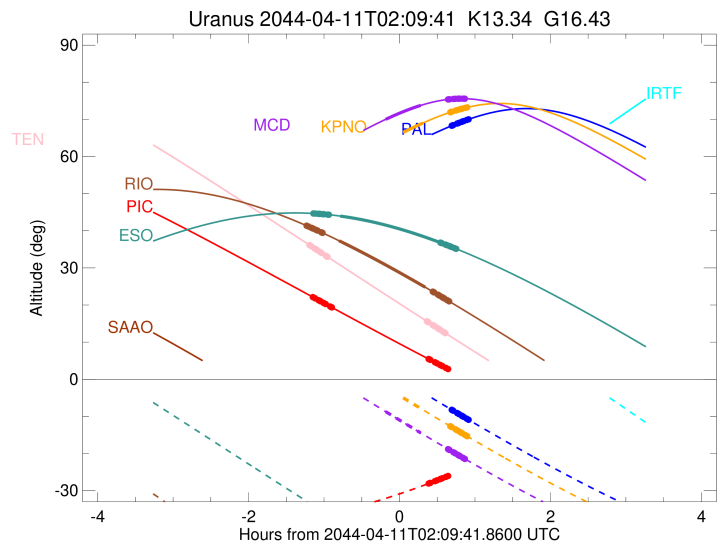
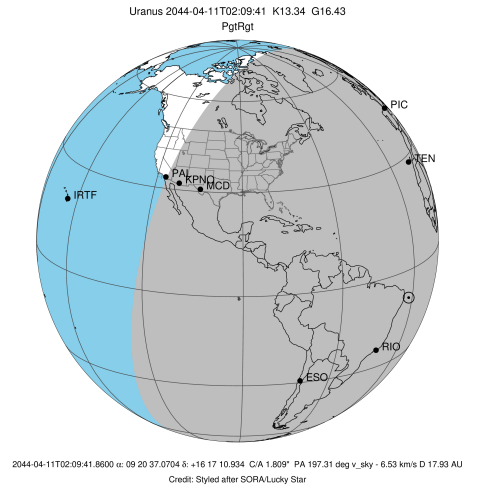


| Ring | I/E | UTC | b? | alt | alt-sun | radius | r-dot | lat-geo | lat-geodetic |
|---------|-----|-------------------------|----|-------|---------|----------|--------|---------|--------------|
| epsilon | I | 2044-04-11T00:57:52.591 | | 36.20 | -53.31 | 51334.40 | -11.38 | | |
| lambda | I | 2044-04-11T00:59:47.653 | | 35.78 | -53.33 | 50026.71 | -11.30 | | |
| delta | I | 2044-04-11T01:02:21.674 | | 35.21 | -53.36 | 48300.35 | -11.11 | | |
| gamma | I | 2044-04-11T01:03:22.065 | | 34.99 | -53.36 | 47631.54 | -11.04 | | |
| eta | I | 2044-04-11T01:04:03.438 | | 34.84 | -53.37 | 47176.12 | -10.98 | | |
| beta | I | 2044-04-11T01:06:23.350 | | 34.32 | -53.37 | 45658.88 | -10.79 | | |
| alpha | I | 2044-04-11T01:07:48.859 | | 34.01 | -53.37 | 44748.12 | -10.66 | | |
| 4 | I | 2044-04-11T01:11:21.638 | | 33.22 | -53.36 | 42534.30 | -10.29 | | |
| 5 | I | 2044-04-11T01:11:44.902 | | 33.14 | -53.35 | 42219.42 | -10.20 | | |
| 6 | I | 2044-04-11T01:12:18.545 | | 33.01 | -53.35 | 41875.39 | -10.17 | | |

No planet occultations

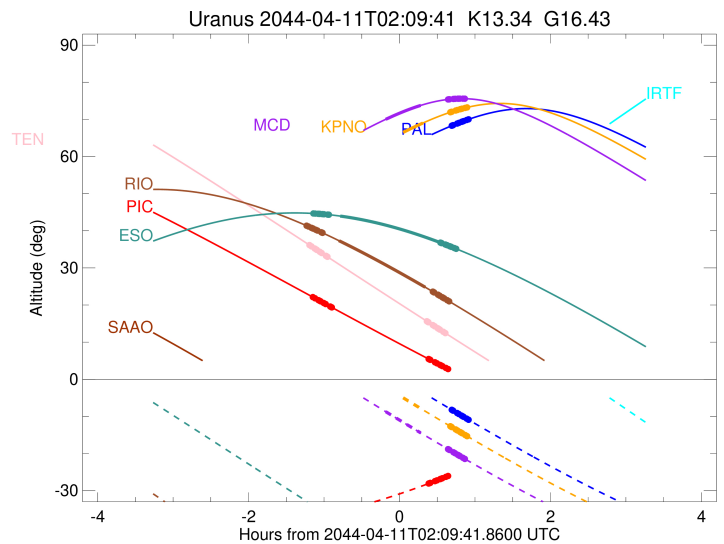
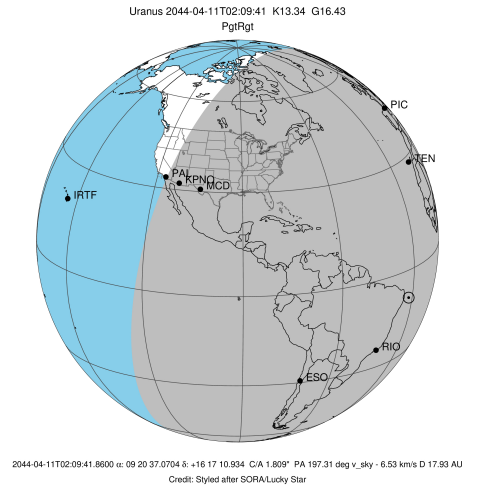
| | | | | | | | | | |
|---------|---|-------------------------|--|-------|--------|----------|-------|--|--|
| 6 | E | 2044-04-11T02:31:24.197 | | 15.64 | -48.05 | 41850.53 | 9.92 | | |
| 5 | E | 2044-04-11T02:31:58.975 | | 15.51 | -47.98 | 42159.54 | 9.96 | | |
| 4 | E | 2044-04-11T02:32:33.916 | | 15.38 | -47.91 | 42551.39 | 10.04 | | |
| alpha | E | 2044-04-11T02:36:07.821 | | 14.61 | -47.48 | 44727.29 | 10.38 | | |
| beta | E | 2044-04-11T02:37:40.745 | | 14.27 | -47.29 | 45680.95 | 10.49 | | |
| eta | E | 2044-04-11T02:40:02.121 | | 13.76 | -46.99 | 47176.12 | 10.66 | | |
| gamma | E | 2044-04-11T02:40:44.129 | | 13.61 | -46.90 | 47625.10 | 10.71 | | |
| delta | E | 2044-04-11T02:41:46.956 | | 13.38 | -46.77 | 48300.35 | 10.78 | | |
| lambda | E | 2044-04-11T02:44:25.833 | | 12.81 | -46.43 | 50026.71 | 10.95 | | |
| epsilon | E | 2044-04-11T02:45:31.169 | | 12.57 | -46.28 | 50743.95 | 11.01 | | |

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2044-04-11T01:55:48.090
 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 : 631016599423739776
 2Mass ID (if available) : 09203704+1617112
 ICRS Star Coord at Epoch: 09h 20m 37.07038s +16:17:10.93425s
 RUWE (>1.4 is poor) : 3.39
 K magnitude : 13.337
 G magnitude : 16.434
 RP magnitude : 15.391
 BP magnitude : 17.296
 DUPflag : 0
 Distance (au) : 17.928
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -6.52
 Sun-Target sep (deg) : 116.24
 Sun-Moon sep (deg) : 48.09
 B (ring opening deg) : 29.75
 PA of pole (deg) : 98.46
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.640
 C/A sky separation (km) : 21320.7
 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 | 2044-04-11T00:55:34.205 | | 41.41 | -58.26 | 51381.68 | -12.54 | | |
| lambda | I | 2044-04-11T00:57:22.228 | | 41.14 | -58.65 | 50026.71 | -12.50 | | |
| delta | I | 2044-04-11T00:59:40.878 | | 40.80 | -59.14 | 48300.35 | -12.40 | | |
| gamma | I | 2044-04-11T01:00:34.940 | | 40.66 | -59.33 | 47631.39 | -12.35 | | |
| eta | I | 2044-04-11T01:01:11.848 | | 40.57 | -59.46 | 47176.12 | -12.32 | | |
| beta | I | 2044-04-11T01:03:16.274 | | 40.25 | -59.90 | 45655.76 | -12.21 | | |
| alpha | I | 2044-04-11T01:04:31.818 | | 40.06 | -60.16 | 44745.05 | -12.14 | | |
| 4 | I | 2044-04-11T01:07:36.588 | | 39.58 | -60.81 | 42539.43 | -11.94 | | |
| 5 | I | 2044-04-11T01:07:54.572 | | 39.53 | -60.87 | 42233.55 | -11.87 | | |
| 6 | I | 2044-04-11T01:08:25.559 | | 39.45 | -60.98 | 41871.43 | -11.86 | | |
| Uranus | I | 2044-04-11T01:21:32.725 | | 37.34 | -63.67 | 25527.31 | | -24.04 | -25.04 |
| Uranus | E | 2044-04-11T02:30:15.022 | | 24.77 | -74.68 | 25502.94 | | 32.83 | 34.04 |
| 6 | E | 2044-04-11T02:36:08.163 | | 23.61 | -75.15 | 41843.22 | 11.61 | | |
| 5 | E | 2044-04-11T02:36:39.282 | | 23.51 | -75.18 | 42165.39 | 11.61 | | |
| 4 | E | 2044-04-11T02:37:07.765 | | 23.41 | -75.21 | 42558.68 | 11.68 | | |
| alpha | E | 2044-04-11T02:40:12.641 | | 22.80 | -75.40 | 44721.95 | 11.86 | | |
| beta | E | 2044-04-11T02:41:34.710 | | 22.52 | -75.47 | 45680.20 | 11.92 | | |
| eta | E | 2044-04-11T02:43:39.835 | | 22.11 | -75.56 | 47176.12 | 12.01 | | |
| gamma | E | 2044-04-11T02:44:17.106 | | 21.98 | -75.58 | 47624.36 | 12.04 | | |
| delta | E | 2044-04-11T02:45:13.160 | | 21.79 | -75.62 | 48300.35 | 12.08 | | |
| lambda | E | 2044-04-11T02:47:35.536 | | 21.32 | -75.69 | 50026.71 | 12.17 | | |
| epsilon | E | 2044-04-11T02:48:34.475 | | 21.12 | -75.71 | 50745.05 | 12.20 | | |

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2044-04-11T02:01:16.340
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 631016599423739776
 2Mass ID (if available) : 09203704+1617112
 ICRS Star Coord at Epoch: 09h 20m 37.07038s +16:17:10.93425s
 RUWE (>1.4 is poor) : 3.39
 K magnitude : 13.337
 G magnitude : 16.434
 RP magnitude : 15.391
 BP magnitude : 17.296
 DUPflag : 0
 Distance (au) : 17.928
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -6.52
 Sun-Target sep (deg) : 116.24
 Sun-Moon sep (deg) : 48.40
 B (ring opening deg) : 29.75
 PA of pole (deg) : 98.46
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.524
 C/A sky separation (km) : 19809.6
 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_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 | 2044-04-11T01:00:55.464 | | 44.67 | -33.95 | 51391.53 | -12.80 | | |
| lambda | I | 2044-04-11T01:02:42.045 | | 44.63 | -34.33 | 50026.71 | -12.77 | | |
| delta | I | 2044-04-11T01:04:57.673 | | 44.58 | -34.82 | 48300.35 | -12.68 | | |
| gamma | I | 2044-04-11T01:05:50.500 | | 44.56 | -35.01 | 47631.34 | -12.65 | | |
| eta | I | 2044-04-11T01:06:26.537 | | 44.54 | -35.14 | 47176.12 | -12.62 | | |
| beta | I | 2044-04-11T01:08:27.964 | | 44.49 | -35.57 | 45655.10 | -12.53 | | |
| alpha | I | 2044-04-11T01:09:41.609 | | 44.45 | -35.84 | 44744.28 | -12.47 | | |
| 4 | I | 2044-04-11T01:12:41.086 | | 44.36 | -36.48 | 42540.69 | -12.30 | | |
| 5 | I | 2044-04-11T01:12:58.160 | | 44.35 | -36.54 | 42236.66 | -12.24 | | |
| 6 | I | 2044-04-11T01:13:28.684 | | 44.33 | -36.65 | 41870.41 | -12.23 | | |
| Uranus | I | 2044-04-11T01:22:30.522 | | 43.96 | -38.57 | 25515.35 | | -28.57 | -29.69 |
| Uranus | E | 2044-04-11T02:40:09.355 | | 37.07 | -54.43 | 25488.34 | | 37.51 | 38.79 |
| 6 | E | 2044-04-11T02:42:09.782 | | 36.81 | -54.81 | 41841.41 | 12.08 | | |
| 5 | E | 2044-04-11T02:42:39.981 | | 36.75 | -54.91 | 42167.14 | 12.08 | | |
| 4 | E | 2044-04-11T02:43:06.981 | | 36.69 | -54.99 | 42560.52 | 12.15 | | |
| alpha | E | 2044-04-11T02:46:04.720 | | 36.31 | -55.55 | 44720.62 | 12.31 | | |
| beta | E | 2044-04-11T02:47:23.940 | | 36.13 | -55.80 | 45679.94 | 12.36 | | |
| eta | E | 2044-04-11T02:49:24.723 | | 35.87 | -56.18 | 47176.12 | 12.44 | | |
| gamma | E | 2044-04-11T02:50:00.701 | | 35.79 | -56.29 | 47624.18 | 12.47 | | |
| delta | E | 2044-04-11T02:50:54.870 | | 35.67 | -56.46 | 48300.35 | 12.50 | | |
| lambda | E | 2044-04-11T02:53:12.529 | | 35.36 | -56.88 | 50026.71 | 12.58 | | |
| epsilon | E | 2044-04-11T02:54:09.670 | | 35.23 | -57.05 | 50746.47 | 12.61 | | |