

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-02-06T19:02:10.970
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3427676101721701376
 2Mass ID (if available) : 05484933+2337504

ICRS Star Coord at Epoch: 05h 48m 49.32729s +23:37:50.37661s

RUWE (>1.4 is poor) : 1.06
 K magnitude : 13.528
 G magnitude : 16.094
 RP magnitude : 15.269
 BP magnitude : 16.768
 DUPflag : 0
 Distance (au) : 18.367
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.62
 Sun-Target sep (deg) : 129.59
 Sun-Moon sep (deg) : 36.82
 B (ring opening deg) : 77.42
 PA of pole (deg) : 49.57

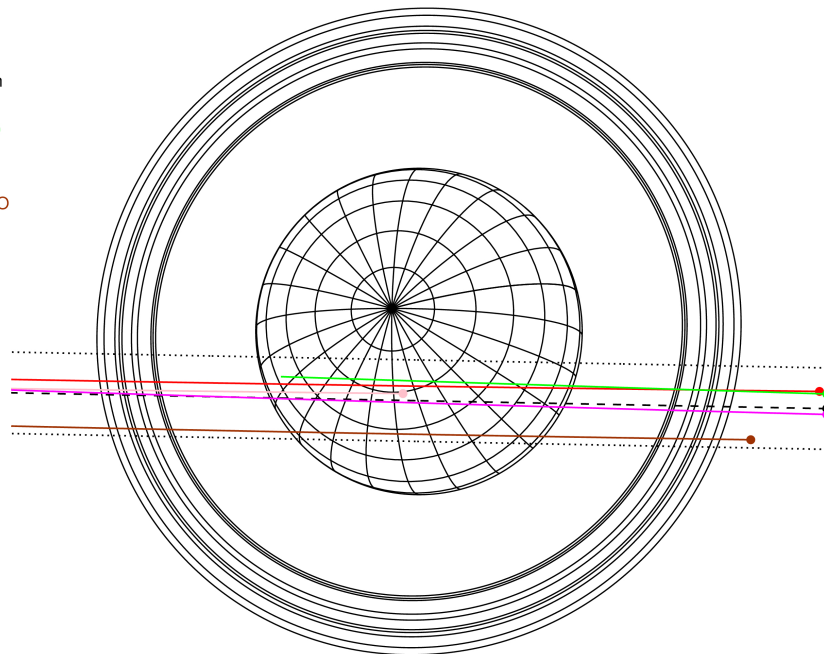
| # | a(km) | ring |
|----|---------|---------|
| 1 | 41837.2 | 6 |
| 2 | 42235.0 | 5 |
| 3 | 42571.2 | 4 |
| 4 | 44718.5 | alpha |
| 5 | 45661.1 | beta |
| 6 | 47176.1 | eta |
| 7 | 47626.3 | gamma |
| 8 | 48300.3 | delta |
| 9 | 50026.7 | lambda |
| 10 | 51149.4 | epsilon |



2033-02-06T19:02:10.9700 ra: 05 48 49.32729 s: +23 37 50.377 C/A 0.8077 PA 358.89 deg v_sky -12.62 km/s D 18.37 AU
 Credit: Styled after SORA/Lucky Star

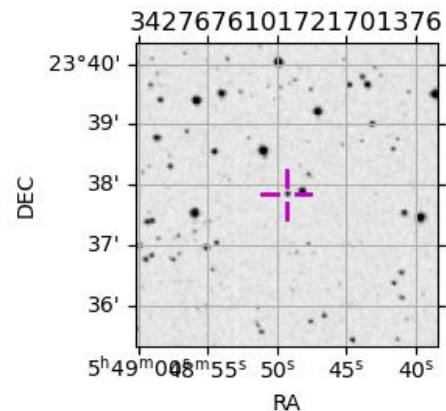
Uranus 2033-02-06T19:02:10 K13.53 G16.09 PgtRgt

Earth
 PIC
 PMO
 TEN
 KAV
 SAAO

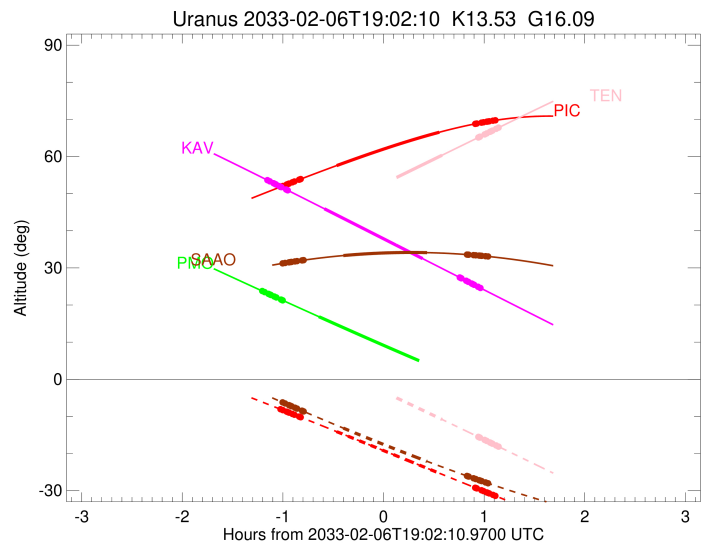
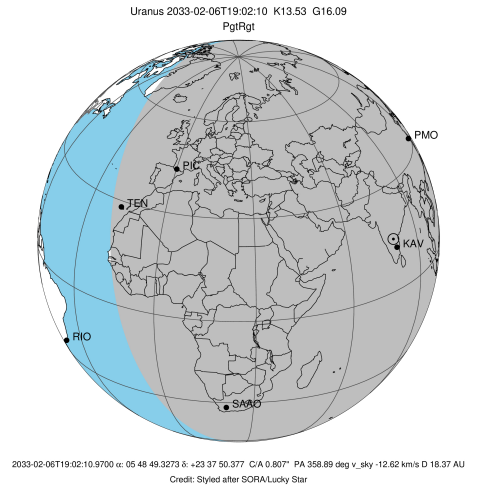


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

| Obs | Location | lat | Elon | Rings I | Planet | Rings E | Observed Events Interval | OEcode |
|------|-----------------------|-------|-------|---------|--------|---------|-----------------------------|--------|
| PIC | Pic du Midi | 42.9 | 0.1 | +++++ | + + | +++++ | FEB 06 18:01 - FEB 06 20:09 | PieRie |
| PAL | Palomar Mt (200") | 33.4 | 243.1 | | | | | PnnRnn |
| PMO | Purple Mtn Obs. Nanki | 32.1 | 118.8 | +++++ | + | | FEB 06 17:50 - FEB 06 18:23 | PinRin |
| 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 | | + | +++++ | FEB 06 19:37 - FEB 06 20:11 | PneRne |
| IRTF | Mauna Kea/IRTF | 19.8 | 204.5 | | | | | PnnRnn |
| KAV | Kavalur Observatory | 12.6 | 78.8 | +++++ | + + | +++++ | FEB 06 17:53 - FEB 06 20:00 | PieRie |
| RIO | Rio de Janeiro | -22.9 | 316.8 | | | | | PnnRnn |
| 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 | +++++ | + + | +++++ | FEB 06 18:02 - FEB 06 20:04 | PieRie |
| MSO | Mt. Stromlo Observato | -35.3 | 149.0 | | | | | PnnRnn |

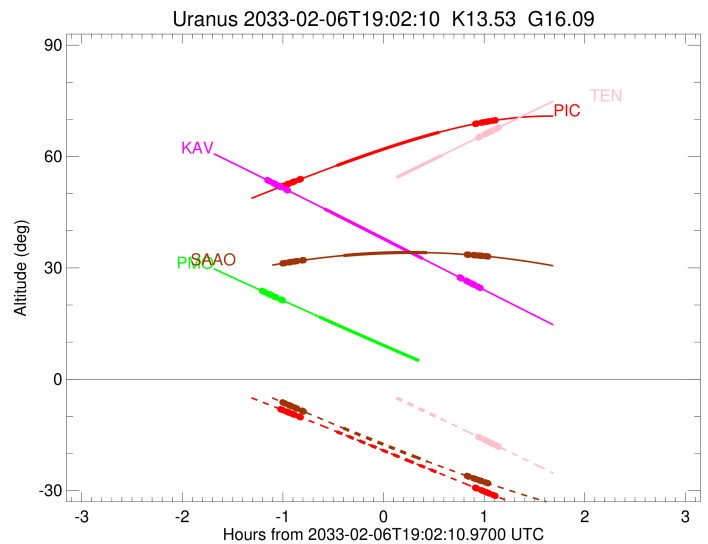
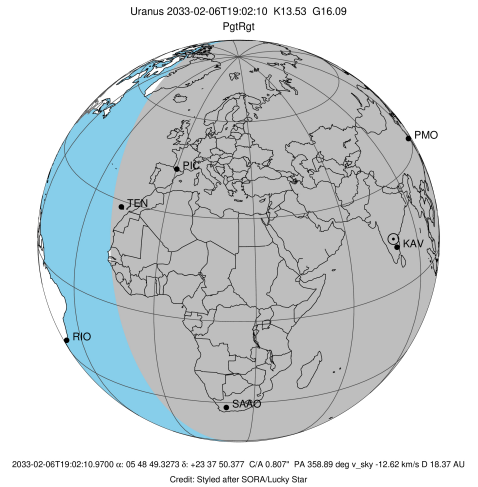


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-02-06T19:04:36.790
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 3427676101721701376
 2Mass ID (if available) : 05484933+2337504
 ICRS Star Coord at Epoch: 05h 48m 49.32729s +23:37:50.37661s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 13.528
 G magnitude : 16.094
 RP magnitude : 15.269
 BP magnitude : 16.768
 DUPflag : 0
 Distance (au) : 18.367
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.62
 Sun-Target sep (deg) : 129.59
 Sun-Moon sep (deg) : 37.13
 B (ring opening deg) : 77.42
 PA of pole (deg) : 49.57
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.643
 C/A sky separation (km) : 8560.1
 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



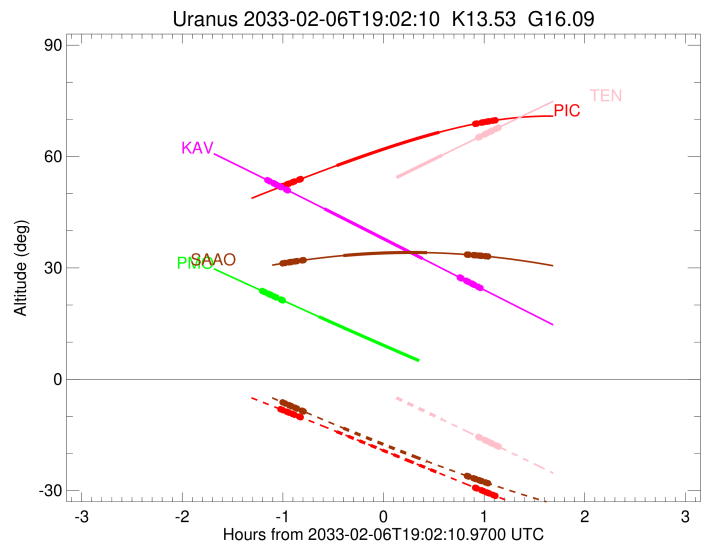
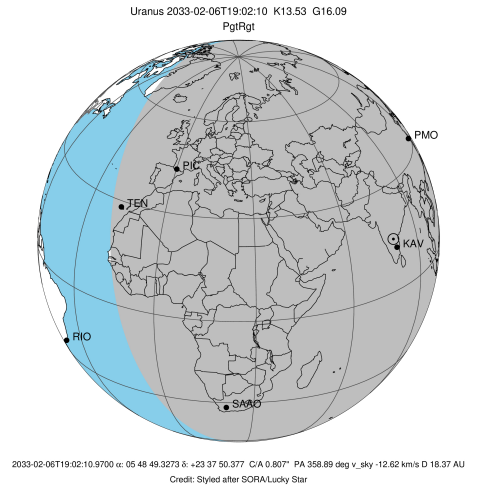
| Ring | I/E | UTC | b? | alt | alt-sun | radius | r-dot | lat-geo | lat-geodetic |
|---------|-----|-------------------------|----|-------|---------|----------|--------|---------|--------------|
| epsilon | I | 2033-02-06T18:01:17.057 | | 51.91 | -8.16 | 50747.15 | -12.89 | | |
| lambda | I | 2033-02-06T18:02:12.966 | | 52.08 | -8.33 | 50026.71 | -12.88 | | |
| delta | I | 2033-02-06T18:04:27.032 | | 52.47 | -8.73 | 48300.35 | -12.87 | | |
| gamma | I | 2033-02-06T18:05:19.503 | | 52.62 | -8.89 | 47625.18 | -12.86 | | |
| eta | I | 2033-02-06T18:05:54.415 | | 52.72 | -8.99 | 47176.12 | -12.86 | | |
| beta | I | 2033-02-06T18:07:53.385 | | 53.07 | -9.35 | 45647.39 | -12.85 | | |
| alpha | I | 2033-02-06T18:09:08.075 | | 53.29 | -9.57 | 44687.41 | -12.84 | | |
| 4 | I | 2033-02-06T18:11:53.442 | | 53.77 | -10.06 | 42562.62 | -12.81 | | |
| 5 | I | 2033-02-06T18:12:25.354 | | 53.86 | -10.16 | 42162.28 | -12.81 | | |
| 6 | I | 2033-02-06T18:12:48.415 | | 53.92 | -10.23 | 41871.48 | -12.81 | | |
| Uranus | I | 2033-02-06T18:34:13.777 | | 57.56 | -14.10 | 25062.40 | | -11.84 | -12.38 |
| Uranus | E | 2033-02-06T19:35:26.913 | | 66.54 | -25.30 | 25409.46 | | 6.40 | 6.70 |
| 6 | E | 2033-02-06T19:56:48.370 | | 68.80 | -29.21 | 41815.86 | 12.84 | | |
| 5 | E | 2033-02-06T19:57:27.588 | | 68.86 | -29.33 | 42315.22 | 12.85 | | |
| 4 | E | 2033-02-06T19:57:47.005 | | 68.89 | -29.39 | 42561.61 | 12.84 | | |
| alpha | E | 2033-02-06T20:00:36.440 | | 69.13 | -29.90 | 44742.29 | 12.87 | | |
| beta | E | 2033-02-06T20:01:48.247 | | 69.23 | -30.12 | 45668.55 | 12.88 | | |
| eta | E | 2033-02-06T20:03:45.217 | | 69.38 | -30.47 | 47176.12 | 12.90 | | |
| gamma | E | 2033-02-06T20:04:20.042 | | 69.43 | -30.58 | 47625.45 | 12.90 | | |
| delta | E | 2033-02-06T20:05:12.329 | | 69.49 | -30.74 | 48300.35 | 12.91 | | |
| lambda | E | 2033-02-06T20:07:25.968 | | 69.66 | -31.14 | 50026.71 | 12.93 | | |
| epsilon | E | 2033-02-06T20:09:20.720 | | 69.79 | -31.49 | 51510.59 | 12.93 | | |

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-02-06T18:55:06.370
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3427676101721701376
 2Mass ID (if available) : 05484933+2337504
 ICRS Star Coord at Epoch: 05h 48m 49.32729s +23:37:50.37661s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 13.528
 G magnitude : 16.094
 RP magnitude : 15.269
 BP magnitude : 16.768
 DUPflag : 0
 Distance (au) : 18.367
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.62
 Sun-Target sep (deg) : 129.59
 Sun-Moon sep (deg) : 37.60
 B (ring opening deg) : 77.42
 PA of pole (deg) : 49.57
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.583
 C/A sky separation (km) : 7762.7
 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_itrfr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



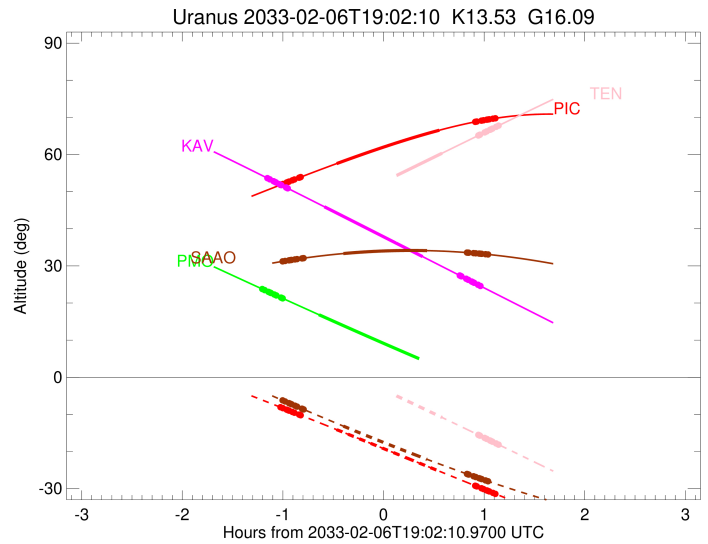
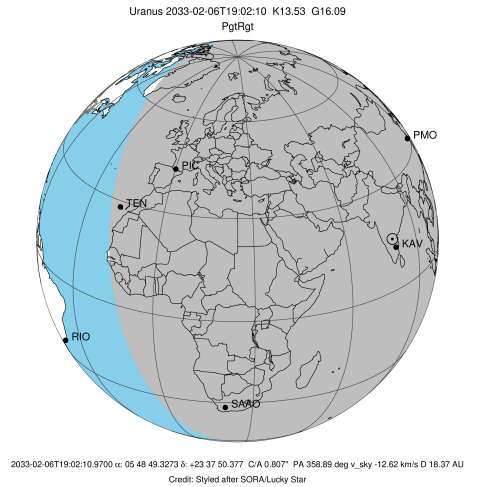
| Ring | I/E | UTC | b? | alt | alt-sun | radius | r-dot | lat-geo | lat-geodetic |
|---------|-----|-------------------------|----|--------|---------|----------|--------|---------|--------------|
| epsilon | I | 2033-02-06T17:50:25.215 | | 23.66 | -63.38 | 50747.05 | -12.77 | | |
| lambda | I | 2033-02-06T17:51:21.626 | | 23.47 | -63.21 | 50026.71 | -12.77 | | |
| delta | I | 2033-02-06T17:53:36.942 | | 23.00 | -62.81 | 48300.35 | -12.75 | | |
| gamma | I | 2033-02-06T17:54:29.912 | | 22.82 | -62.65 | 47625.18 | -12.74 | | |
| eta | I | 2033-02-06T17:55:05.158 | | 22.70 | -62.54 | 47176.12 | -12.74 | | |
| beta | I | 2033-02-06T17:57:05.281 | | 22.29 | -62.18 | 45647.39 | -12.72 | | |
| alpha | I | 2033-02-06T17:58:20.707 | | 22.03 | -61.95 | 44687.42 | -12.71 | | |
| 4 | I | 2033-02-06T18:01:07.724 | | 21.46 | -61.44 | 42562.70 | -12.68 | | |
| 5 | I | 2033-02-06T18:01:39.969 | | 21.35 | -61.34 | 42162.22 | -12.68 | | |
| 6 | I | 2033-02-06T18:02:03.263 | | 21.27 | -61.27 | 41871.43 | -12.68 | | |
| Uranus | I | 2033-02-06T18:23:40.978 | | 16.85 | -57.13 | 25067.99 | | -11.77 | -12.31 |
| Uranus | E | 2033-02-06T19:27:07.679 | | 4.29x | -44.20 | 25384.26 | | 6.92 | 7.25 |
| 6 | E | 2033-02-06T19:49:01.356 | | 0.13x | -39.60 | 41814.57 | 12.47 | | |
| 5 | E | 2033-02-06T19:49:41.859 | | 0.00x | -39.46 | 42315.09 | 12.47 | | |
| 4 | E | 2033-02-06T19:50:02.034 | | -0.06x | -39.39 | 42563.17 | 12.47 | | |
| alpha | E | 2033-02-06T19:52:56.611 | | -0.61x | -38.77 | 44743.10 | 12.48 | | |
| beta | E | 2033-02-06T19:54:10.659 | | -0.84x | -38.51 | 45669.18 | 12.49 | | |
| eta | E | 2033-02-06T19:56:11.304 | | -1.21x | -38.09 | 47176.12 | 12.50 | | |
| gamma | E | 2033-02-06T19:56:47.264 | | -1.32x | -37.96 | 47625.62 | 12.50 | | |
| delta | E | 2033-02-06T19:57:41.230 | | -1.49x | -37.77 | 48300.35 | 12.50 | | |
| lambda | E | 2033-02-06T19:59:59.250 | | -1.92x | -37.28 | 50026.71 | 12.51 | | |
| epsilon | E | 2033-02-06T20:01:58.278 | | -2.28x | -36.86 | 51516.28 | 12.51 | | |

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-02-06T19:06:50.920
 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 : 3427676101721701376
 2Mass ID (if available) : 05484933+2337504
 ICRS Star Coord at Epoch: 05h 48m 49.32729s +23:37:50.37661s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 13.528
 G magnitude : 16.094
 RP magnitude : 15.269
 BP magnitude : 16.768
 DUPflag : 0
 Distance (au) : 18.367
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.62
 Sun-Target sep (deg) : 129.59
 Sun-Moon sep (deg) : 36.85
 B (ring opening deg) : 77.42
 PA of pole (deg) : 49.57
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.732
 C/A sky separation (km) : 9749.6
 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



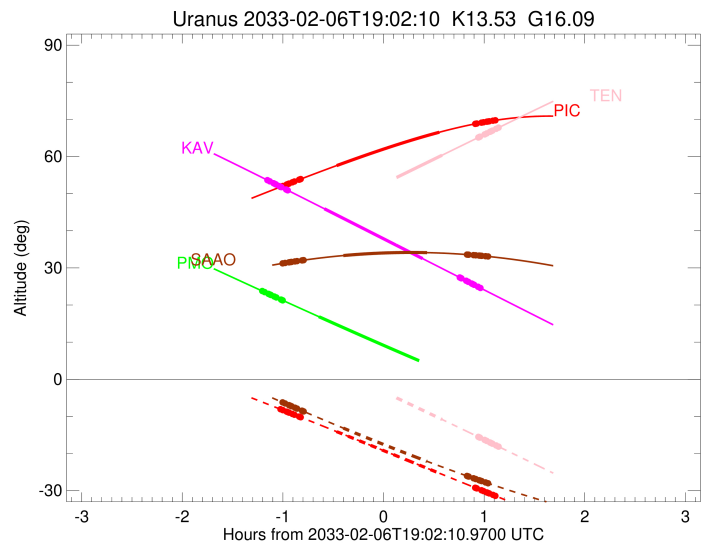
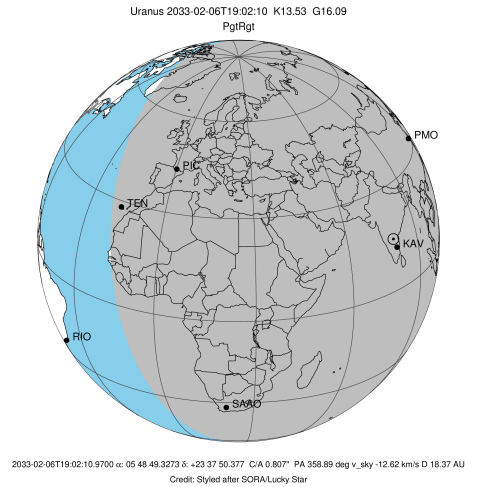
| Ring | I/E | UTC | b? | alt | alt-sun | radius | r-dot | lat-geo | lat-geodetic |
|---------|-----|-------------------------|----|-------|---------|----------|--------|---------|--------------|
| epsilon | I | 2033-02-06T18:03:45.230 | | 39.79 | 8.80x | 50746.14 | -12.79 | | |
| lambda | I | 2033-02-06T18:04:41.465 | | 39.99 | 8.61x | 50026.71 | -12.79 | | |
| delta | I | 2033-02-06T18:06:56.524 | | 40.48 | 8.15x | 48300.35 | -12.77 | | |
| gamma | I | 2033-02-06T18:07:49.402 | | 40.68 | 7.97x | 47625.07 | -12.77 | | |
| eta | I | 2033-02-06T18:08:24.574 | | 40.80 | 7.85x | 47176.12 | -12.76 | | |
| beta | I | 2033-02-06T18:10:24.505 | | 41.24 | 7.45x | 45647.05 | -12.74 | | |
| alpha | I | 2033-02-06T18:11:39.804 | | 41.52 | 7.19x | 44687.10 | -12.73 | | |
| 4 | I | 2033-02-06T18:14:26.623 | | 42.13 | 6.62x | 42561.51 | -12.70 | | |
| 5 | I | 2033-02-06T18:14:58.684 | | 42.24 | 6.51x | 42163.16 | -12.70 | | |
| 6 | I | 2033-02-06T18:15:21.965 | | 42.33 | 6.43x | 41872.12 | -12.69 | | |
| Uranus | I | 2033-02-06T18:37:04.258 | | 47.10 | 1.93x | 25047.06 | | -12.03 | -12.58 |
| Uranus | E | 2033-02-06T19:37:06.521 | | 60.35 | -10.83 | 25435.40 | | 5.81 | 6.08 |
| 6 | E | 2033-02-06T19:58:41.069 | | 65.12 | -15.51 | 41817.09 | 12.78 | | |
| 5 | E | 2033-02-06T19:59:20.361 | | 65.26 | -15.65 | 42315.25 | 12.79 | | |
| 4 | E | 2033-02-06T19:59:39.718 | | 65.33 | -15.72 | 42560.17 | 12.79 | | |
| alpha | E | 2033-02-06T20:02:29.890 | | 65.96 | -16.34 | 44741.52 | 12.83 | | |
| beta | E | 2033-02-06T20:03:41.960 | | 66.22 | -16.60 | 45667.98 | 12.84 | | |
| eta | E | 2033-02-06T20:05:39.333 | | 66.65 | -17.02 | 47176.12 | 12.86 | | |
| gamma | E | 2033-02-06T20:06:14.243 | | 66.78 | -17.15 | 47625.29 | 12.87 | | |
| delta | E | 2033-02-06T20:07:06.680 | | 66.98 | -17.34 | 48300.35 | 12.88 | | |
| lambda | E | 2033-02-06T20:09:20.628 | | 67.47 | -17.83 | 50026.71 | 12.90 | | |
| epsilon | E | 2033-02-06T20:11:15.193 | | 67.89 | -18.24 | 51505.32 | 12.90 | | |

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-02-06T18:55:50.520
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 3427676101721701376
 2Mass ID (if available) : 05484933+2337504
 ICRS Star Coord at Epoch: 05h 48m 49.32729s +23:37:50.37661s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 13.528
 G magnitude : 16.094
 RP magnitude : 15.269
 BP magnitude : 16.768
 DUPflag : 0
 Distance (au) : 18.367
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.62
 Sun-Target sep (deg) : 129.59
 Sun-Moon sep (deg) : 37.78
 B (ring opening deg) : 77.42
 PA of pole (deg) : 49.57
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.839
 C/A sky separation (km) : 11181.5
 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 | 2033-02-06T17:53:28.888 | | 53.52 | -73.92 | 50744.40 | -12.86 | | |
| lambda | I | 2033-02-06T17:54:24.712 | | 53.31 | -74.14 | 50026.71 | -12.85 | | |
| delta | I | 2033-02-06T17:56:39.199 | | 52.81 | -74.67 | 48300.35 | -12.82 | | |
| gamma | I | 2033-02-06T17:57:31.908 | | 52.61 | -74.88 | 47624.81 | -12.81 | | |
| eta | I | 2033-02-06T17:58:06.946 | | 52.47 | -75.02 | 47176.12 | -12.80 | | |
| beta | I | 2033-02-06T18:00:06.612 | | 52.02 | -75.50 | 45646.34 | -12.77 | | |
| alpha | I | 2033-02-06T18:01:21.774 | | 51.74 | -75.80 | 44686.48 | -12.75 | | |
| 4 | I | 2033-02-06T18:04:08.562 | | 51.11 | -76.45 | 42559.14 | -12.70 | | |
| 5 | I | 2033-02-06T18:04:40.331 | | 50.99 | -76.58 | 42165.19 | -12.70 | | |
| 6 | I | 2033-02-06T18:05:03.664 | | 50.90 | -76.67 | 41873.39 | -12.69 | | |
| Uranus | I | 2033-02-06T18:26:58.259 | | 45.92 | -81.79 | 25025.25 | | -12.30 | -12.86 |
| Uranus | E | 2033-02-06T19:25:27.173 | | 32.52 | -82.92 | 25454.50 | | 5.34 | 5.59 |
| 6 | E | 2033-02-06T19:47:36.467 | | 27.43 | -77.81 | 41817.72 | 12.51 | | |
| 5 | E | 2033-02-06T19:48:16.564 | | 27.27 | -77.65 | 42315.24 | 12.51 | | |
| 4 | E | 2033-02-06T19:48:36.275 | | 27.20 | -77.57 | 42559.46 | 12.51 | | |
| alpha | E | 2033-02-06T19:51:30.173 | | 26.53 | -76.89 | 44741.16 | 12.56 | | |
| beta | E | 2033-02-06T19:52:43.799 | | 26.25 | -76.60 | 45667.72 | 12.57 | | |
| eta | E | 2033-02-06T19:54:43.702 | | 25.79 | -76.12 | 47176.12 | 12.59 | | |
| gamma | E | 2033-02-06T19:55:19.351 | | 25.66 | -75.98 | 47625.23 | 12.60 | | |
| delta | E | 2033-02-06T19:56:12.909 | | 25.45 | -75.77 | 48300.35 | 12.61 | | |
| lambda | E | 2033-02-06T19:58:29.705 | | 24.93 | -75.23 | 50026.71 | 12.63 | | |
| epsilon | E | 2033-02-06T20:00:26.552 | | 24.48 | -74.76 | 51503.39 | 12.63 | | |

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-02-06T19:02:45.540
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 3427676101721701376
 2Mass ID (if available) : 05484933+2337504
 ICRS Star Coord at Epoch: 05h 48m 49.32729s +23:37:50.37661s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 13.528
 G magnitude : 16.094
 RP magnitude : 15.269
 BP magnitude : 16.768
 DUPflag : 0
 Distance (au) : 18.367
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.62
 Sun-Target sep (deg) : 129.59
 Sun-Moon sep (deg) : 37.05
 B (ring opening deg) : 77.42
 PA of pole (deg) : 49.57
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.209
 C/A sky separation (km) : 16102.9
 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 | 2033-02-06T18:02:33.757 | | 31.26 | -6.33 | 50743.62 | -12.49 | | |
| lambda | I | 2033-02-06T18:03:31.190 | | 31.33 | -6.52 | 50026.71 | -12.47 | | |
| delta | I | 2033-02-06T18:05:49.898 | | 31.50 | -6.97 | 48300.35 | -12.42 | | |
| gamma | I | 2033-02-06T18:06:44.383 | | 31.56 | -7.15 | 47624.33 | -12.40 | | |
| eta | I | 2033-02-06T18:07:20.562 | | 31.61 | -7.26 | 47176.12 | -12.38 | | |
| beta | I | 2033-02-06T18:09:24.542 | | 31.75 | -7.66 | 45645.03 | -12.32 | | |
| alpha | I | 2033-02-06T18:10:42.499 | | 31.84 | -7.92 | 44685.49 | -12.28 | | |
| 4 | I | 2033-02-06T18:13:36.234 | | 32.03 | -8.48 | 42554.35 | -12.18 | | |
| 5 | I | 2033-02-06T18:14:08.669 | | 32.06 | -8.58 | 42170.08 | -12.18 | | |
| 6 | I | 2033-02-06T18:14:33.188 | | 32.09 | -8.66 | 41875.70 | -12.16 | | |
| Uranus | I | 2033-02-06T18:38:15.106 | | 33.33 | -13.16 | 25001.20 | | -12.58 | -13.16 |
| Uranus | E | 2033-02-06T19:28:09.795 | | 34.11 | -22.11 | 25535.92 | | 2.50 | 2.62 |
| 6 | E | 2033-02-06T19:51:54.539 | | 33.59 | -26.04 | 41823.09 | 12.15 | | |
| 5 | E | 2033-02-06T19:52:35.240 | | 33.57 | -26.15 | 42314.26 | 12.16 | | |
| 4 | E | 2033-02-06T19:52:55.007 | | 33.56 | -26.20 | 42553.67 | 12.17 | | |
| alpha | E | 2033-02-06T19:55:53.614 | | 33.45 | -26.67 | 44737.74 | 12.27 | | |
| beta | E | 2033-02-06T19:57:08.968 | | 33.40 | -26.87 | 45665.28 | 12.31 | | |
| eta | E | 2033-02-06T19:59:11.454 | | 33.32 | -27.19 | 47176.12 | 12.37 | | |
| gamma | E | 2033-02-06T19:59:47.701 | | 33.29 | -27.28 | 47624.61 | 12.38 | | |
| delta | E | 2033-02-06T20:00:42.231 | | 33.25 | -27.43 | 48300.35 | 12.40 | | |
| lambda | E | 2033-02-06T20:03:01.118 | | 33.15 | -27.78 | 50026.71 | 12.46 | | |
| epsilon | E | 2033-02-06T20:04:57.508 | | 33.06 | -28.08 | 51478.80 | 12.48 | | |