

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-09T03:12:13.560
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3427497362361880064
 2Mass ID (if available) : 05525006+2338420

ICRS Star Coord at Epoch: 05h 52m 50.05863s +23:38:42.00652s

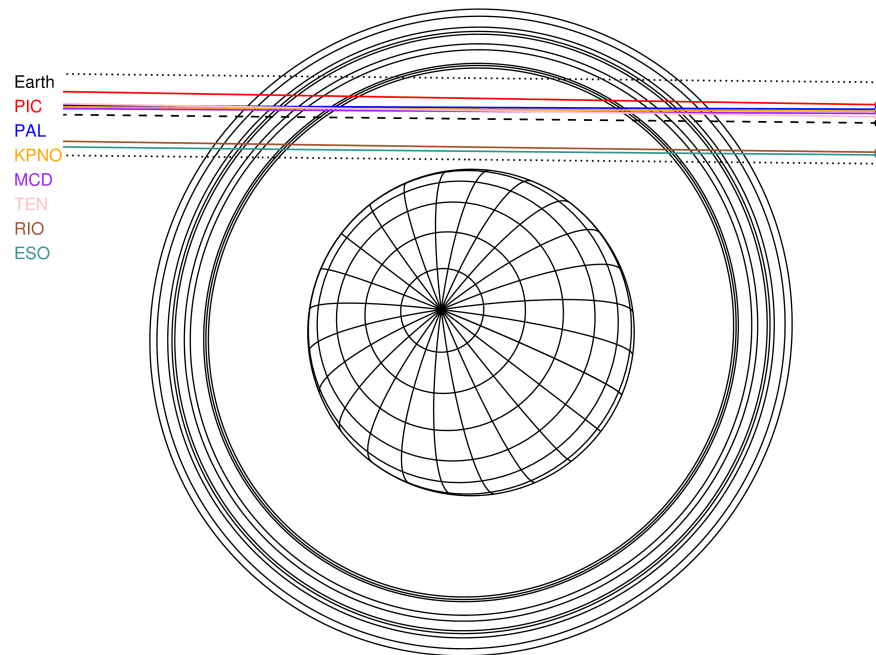
RUWE (>1.4 is poor) : 1.07
 K magnitude : 11.470
 G magnitude : 12.407
 RP magnitude : 12.084
 BP magnitude : 12.593
 DUPflag : 0
 Distance (au) : 18.091
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.56
 Sun-Target sep (deg) : 159.65
 Sun-Moon sep (deg) : 57.07
 B (ring opening deg) : 76.69
 PA of pole (deg) : 52.44

| # | 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 |



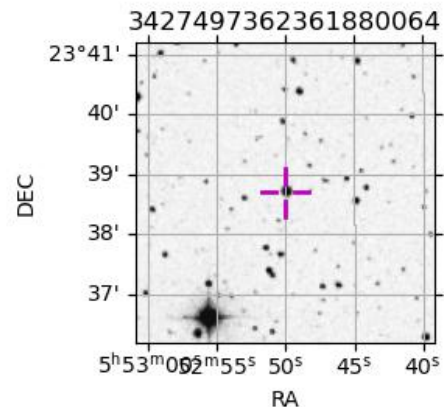
2033-01-09T03:12:13.5600 ra: 05 52 50.0586 s: +23 38 42.007 C/A 2.557 PA 179.41 deg v_sky -21.56 km/s D 18.09 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2033-01-09T03:12:13 K11.47 G12.41 XRgt

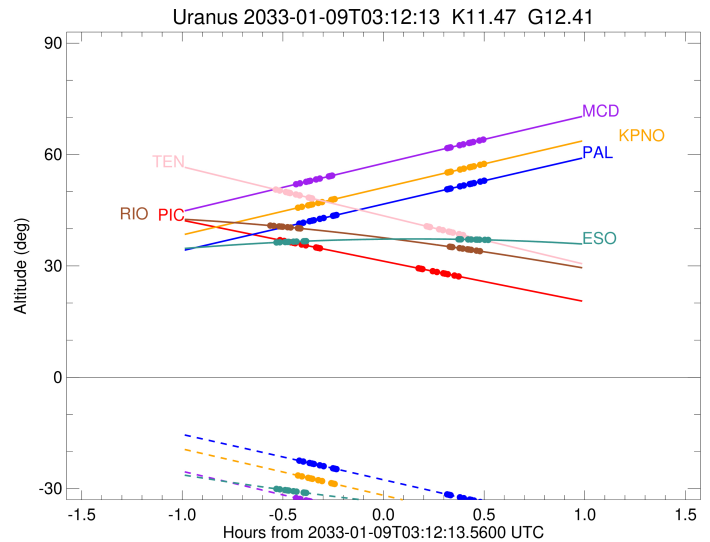
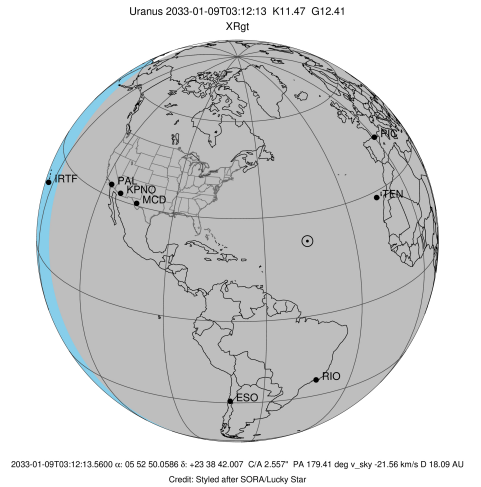


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

| Obs | Location | lat | Elon | Rings I | Planet | Rings E | Observed Events Interval | OEncode |
|------|-----------------------|-------|-------|---------|--------|---------|-----------------------------|---------|
| PIC | Pic du Midi | 42.9 | 0.1 | +++++ | | +++++ | JAN 09 02:41 - JAN 09 03:35 | PnnRie |
| PAL | Palomar Mt (200") | 33.4 | 243.1 | +++++ | | +++++ | JAN 09 02:47 - JAN 09 03:42 | PnnRie |
| PNO | Purple Mtn Obs. Nanki | 32.1 | 118.8 | | | | | PnnRnn |
| KPNO | Kitt Peak Natl Obs | 32.0 | 248.4 | +++++ | | +++++ | JAN 09 02:46 - JAN 09 03:42 | PnnRie |
| MCD | McDonald Obs. 2.7m | 30.7 | 256.0 | +++++ | | +++++ | JAN 09 02:46 - JAN 09 03:42 | PnnRie |
| TEN | Teide Obs./Tenerife | 28.3 | 343.5 | +++++ | | +++++ | JAN 09 02:40 - JAN 09 03:36 | 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 | +++++ | | +++++ | JAN 09 02:38 - JAN 09 03:41 | PnnRie |
| ESO | European Southern Obs | -29.3 | 289.3 | +++++ | | +++++ | JAN 09 02:40 - JAN 09 03:43 | 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 : 2033-01-09T03:08:42.100
 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 : 3427497362361880064
 2Mass ID (if available) : 05525006+2338420
 ICRS Star Coord at Epoch: 05h 52m 50.05863s +23:38:42.00652s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 11.470
 G magnitude : 12.407
 RP magnitude : 12.084
 BP magnitude : 12.593
 DUPflag : 0
 Distance (au) : 18.091
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.56
 Sun-Target sep (deg) : 159.65
 Sun-Moon sep (deg) : 57.86
 B (ring opening deg) : 76.69
 PA of pole (deg) : 52.44
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.795
 C/A sky separation (km) : 36675.7
 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

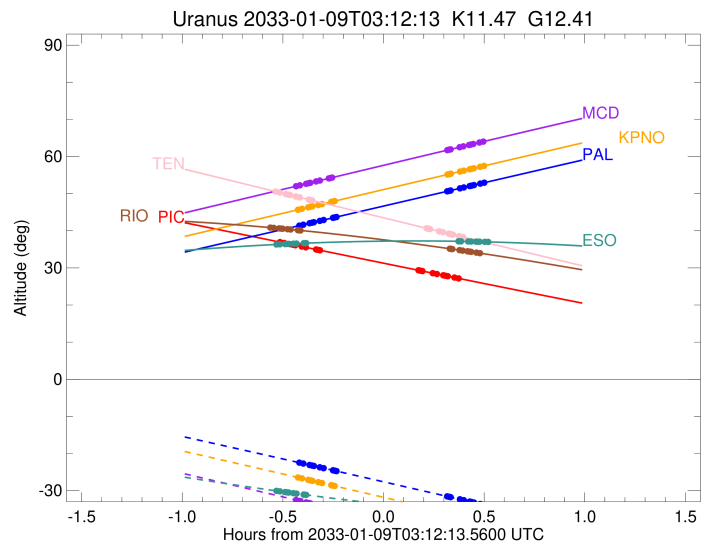
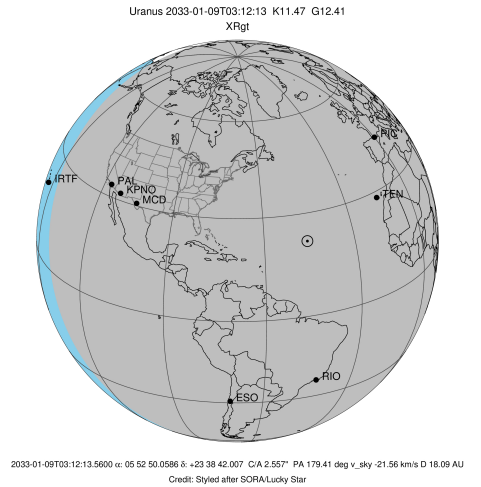


| Ring | I/E | UTC | b? | alt | alt-sun | radius | r-dot | lat-geo | lat-geodetic |
|---------|-----|-------------------------|----|-------|---------|----------|--------|---------|--------------|
| epsilon | I | 2033-01-09T02:41:17.980 | | 36.96 | -51.82 | 51233.20 | -15.41 | | |
| lambda | I | 2033-01-09T02:42:38.009 | | 36.72 | -51.59 | 50026.71 | -14.87 | | |
| delta | I | 2033-01-09T02:44:36.788 | | 36.35 | -51.25 | 48300.35 | -14.19 | | |
| gamma | I | 2033-01-09T02:45:24.403 | | 36.20 | -51.11 | 47631.51 | -13.90 | | |
| eta | I | 2033-01-09T02:45:57.410 | | 36.10 | -51.02 | 47176.12 | -13.69 | | |
| beta | I | 2033-01-09T02:47:49.662 | | 35.76 | -50.69 | 45680.90 | -12.94 | | |
| alpha | I | 2033-01-09T02:49:03.239 | | 35.53 | -50.48 | 44748.61 | -12.41 | | |
| 4 | I | 2033-01-09T02:52:07.045 | | 34.97 | -49.95 | 42603.21 | -10.90 | | |
| 5 | I | 2033-01-09T02:52:36.919 | | 34.88 | -49.86 | 42279.85 | -10.68 | | |
| 6 | I | 2033-01-09T02:53:23.244 | | 34.74 | -49.72 | 41795.29 | -10.24 | | |

No planet occultations

| | | | | | | | | | |
|---------|---|-------------------------|--|-------|--------|----------|-------|--|--|
| 6 | E | 2033-01-09T03:22:37.486 | | 29.37 | -44.52 | 41818.83 | 10.22 | | |
| 5 | E | 2033-01-09T03:23:24.298 | | 29.22 | -44.38 | 42315.22 | 10.66 | | |
| 4 | E | 2033-01-09T03:23:47.300 | | 29.15 | -44.31 | 42560.16 | 10.87 | | |
| alpha | E | 2033-01-09T03:26:54.998 | | 28.58 | -43.75 | 44744.22 | 12.37 | | |
| beta | E | 2033-01-09T03:28:08.633 | | 28.36 | -43.53 | 45670.86 | 12.90 | | |
| eta | E | 2033-01-09T03:30:01.936 | | 28.01 | -43.18 | 47176.12 | 13.65 | | |
| gamma | E | 2033-01-09T03:30:34.688 | | 27.91 | -43.09 | 47626.53 | 13.86 | | |
| delta | E | 2033-01-09T03:31:22.817 | | 27.76 | -42.94 | 48300.35 | 14.14 | | |
| lambda | E | 2033-01-09T03:33:22.005 | | 27.40 | -42.58 | 50026.71 | 14.81 | | |
| epsilon | E | 2033-01-09T03:35:03.001 | | 27.10 | -42.27 | 51548.97 | 15.35 | | |

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-09T03:15:24.880
 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 : 3427497362361880064
 2Mass ID (if available) : 05525006+2338420
 ICRS Star Coord at Epoch: 05h 52m 50.05863s +23:38:42.00652s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 11.470
 G magnitude : 12.407
 RP magnitude : 12.084
 BP magnitude : 12.593
 DUPflag : 0
 Distance (au) : 18.091
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.56
 Sun-Target sep (deg) : 159.65
 Sun-Moon sep (deg) : 57.34
 B (ring opening deg) : 76.69
 PA of pole (deg) : 52.44
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.686
 C/A sky separation (km) : 35241.5
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

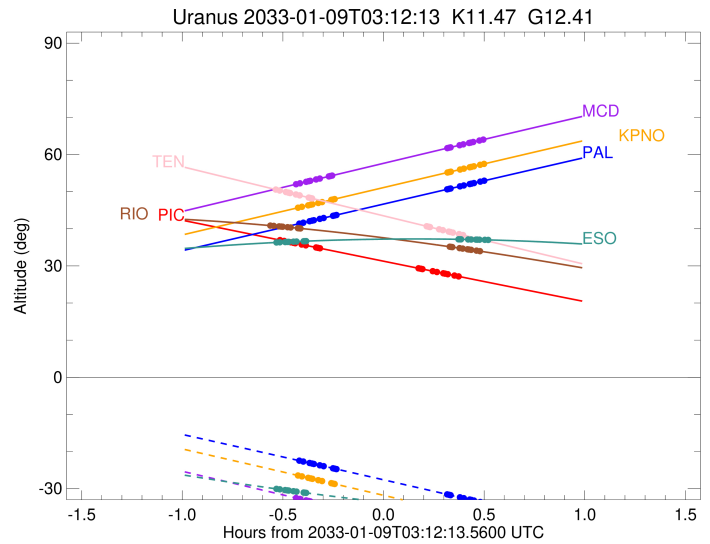
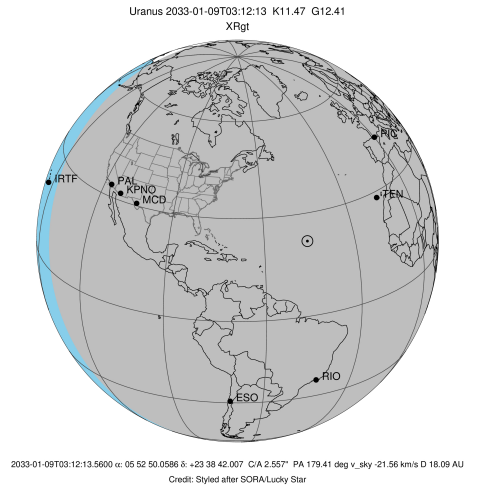


| Ring | I/E | UTC | b? | alt | alt-sun | radius | r-dot | lat-geo | lat-geodetic |
|---------|-----|-------------------------|----|-------|---------|----------|--------|---------|--------------|
| epsilon | I | 2033-01-09T02:47:04.362 | | 41.38 | -22.46 | 51221.83 | -16.06 | | |
| lambda | I | 2033-01-09T02:48:20.198 | | 41.64 | -22.71 | 50026.71 | -15.57 | | |
| delta | I | 2033-01-09T02:50:13.147 | | 42.04 | -23.10 | 48300.35 | -14.98 | | |
| gamma | I | 2033-01-09T02:50:58.163 | | 42.19 | -23.25 | 47631.53 | -14.73 | | |
| eta | I | 2033-01-09T02:51:29.273 | | 42.30 | -23.36 | 47176.12 | -14.55 | | |
| beta | I | 2033-01-09T02:53:14.395 | | 42.67 | -23.72 | 45680.73 | -13.89 | | |
| alpha | I | 2033-01-09T02:54:22.658 | | 42.91 | -23.95 | 44747.89 | -13.44 | | |
| 4 | I | 2033-01-09T02:57:09.829 | | 43.49 | -24.52 | 42604.90 | -12.16 | | |
| 5 | I | 2033-01-09T02:57:37.017 | | 43.59 | -24.61 | 42276.08 | -11.99 | | |
| 6 | I | 2033-01-09T02:58:17.795 | | 43.73 | -24.75 | 41794.97 | -11.62 | | |

No planet occultations

| | | | | | | | | | |
|---------|---|-------------------------|--|-------|--------|----------|-------|--|--|
| 6 | E | 2033-01-09T03:31:10.069 | | 50.62 | -31.54 | 41821.96 | 11.64 | | |
| 5 | E | 2033-01-09T03:31:51.086 | | 50.77 | -31.68 | 42314.80 | 12.01 | | |
| 4 | E | 2033-01-09T03:32:11.408 | | 50.84 | -31.75 | 42556.88 | 12.19 | | |
| alpha | E | 2033-01-09T03:35:01.635 | | 51.43 | -32.34 | 44742.70 | 13.47 | | |
| beta | E | 2033-01-09T03:36:09.607 | | 51.67 | -32.58 | 45669.73 | 13.93 | | |
| eta | E | 2033-01-09T03:37:55.213 | | 52.04 | -32.94 | 47176.12 | 14.58 | | |
| gamma | E | 2033-01-09T03:38:25.887 | | 52.15 | -33.05 | 47626.22 | 14.77 | | |
| delta | E | 2033-01-09T03:39:11.148 | | 52.30 | -33.20 | 48300.35 | 15.02 | | |
| lambda | E | 2033-01-09T03:41:03.795 | | 52.70 | -33.59 | 50026.71 | 15.62 | | |
| epsilon | E | 2033-01-09T03:42:39.565 | | 53.03 | -33.93 | 51544.86 | 16.11 | | |

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-09T03:15:11.050
 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 : 3427497362361880064
 2Mass ID (if available) : 05525006+2338420
 ICRS Star Coord at Epoch: 05h 52m 50.05863s +23:38:42.00652s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 11.470
 G magnitude : 12.407
 RP magnitude : 12.084
 BP magnitude : 12.593
 DUPflag : 0
 Distance (au) : 18.091
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.56
 Sun-Target sep (deg) : 159.65
 Sun-Moon sep (deg) : 57.41
 B (ring opening deg) : 76.69
 PA of pole (deg) : 52.44
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.664
 C/A sky separation (km) : 34958.1
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

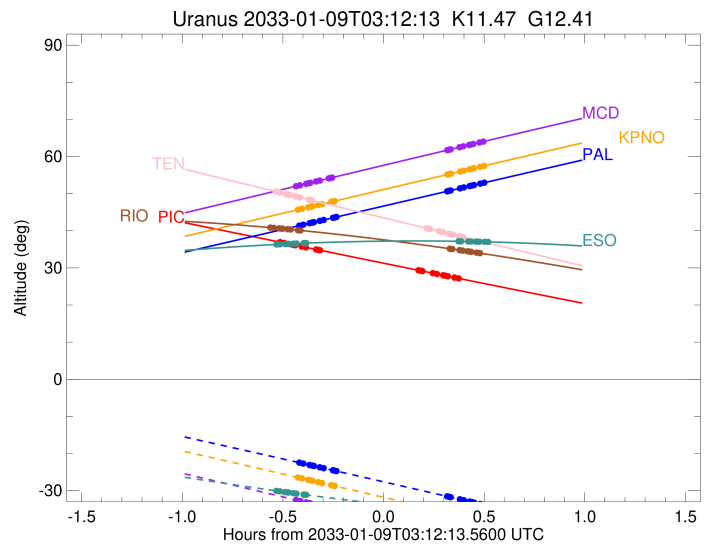
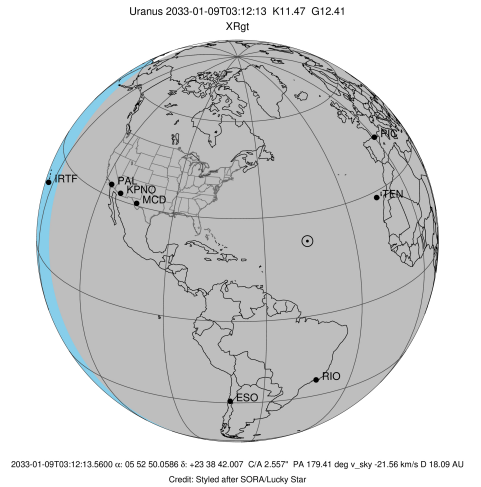


| Ring | I/E | UTC | b? | alt | alt-sun | radius | r-dot | lat-geo | lat-geodetic |
|---------|-----|-------------------------|----|-------|---------|----------|--------|---------|--------------|
| epsilon | I | 2033-01-09T02:46:41.168 | | 45.66 | -26.45 | 51218.62 | -16.20 | | |
| lambda | I | 2033-01-09T02:47:56.104 | | 45.92 | -26.71 | 50026.71 | -15.73 | | |
| delta | I | 2033-01-09T02:49:47.899 | | 46.32 | -27.10 | 48300.35 | -15.15 | | |
| gamma | I | 2033-01-09T02:50:32.412 | | 46.48 | -27.25 | 47631.54 | -14.90 | | |
| eta | I | 2033-01-09T02:51:03.159 | | 46.59 | -27.36 | 47176.12 | -14.72 | | |
| beta | I | 2033-01-09T02:52:46.946 | | 46.96 | -27.72 | 45680.68 | -14.09 | | |
| alpha | I | 2033-01-09T02:53:54.242 | | 47.19 | -27.96 | 44747.70 | -13.64 | | |
| 4 | I | 2033-01-09T02:56:38.507 | | 47.78 | -28.53 | 42605.27 | -12.41 | | |
| 5 | I | 2033-01-09T02:57:05.266 | | 47.87 | -28.62 | 42275.20 | -12.24 | | |
| 6 | I | 2033-01-09T02:57:45.118 | | 48.01 | -28.76 | 41794.91 | -11.88 | | |

No planet occultations

| | | | | | | | | | |
|---------|---|-------------------------|--|-------|--------|----------|-------|--|--|
| 6 | E | 2033-01-09T03:31:15.936 | | 55.15 | -35.82 | 41822.46 | 11.90 | | |
| 5 | E | 2033-01-09T03:31:56.040 | | 55.29 | -35.96 | 42314.69 | 12.26 | | |
| 4 | E | 2033-01-09T03:32:15.941 | | 55.37 | -36.03 | 42556.38 | 12.43 | | |
| alpha | E | 2033-01-09T03:35:03.287 | | 55.96 | -36.62 | 44742.46 | 13.67 | | |
| beta | E | 2033-01-09T03:36:10.302 | | 56.20 | -36.85 | 45669.56 | 14.12 | | |
| eta | E | 2033-01-09T03:37:54.592 | | 56.56 | -37.22 | 47176.12 | 14.76 | | |
| gamma | E | 2033-01-09T03:38:24.910 | | 56.67 | -37.33 | 47626.18 | 14.93 | | |
| delta | E | 2033-01-09T03:39:09.677 | | 56.83 | -37.49 | 48300.35 | 15.18 | | |
| lambda | E | 2033-01-09T03:41:01.195 | | 57.22 | -37.88 | 50026.71 | 15.77 | | |
| epsilon | E | 2033-01-09T03:42:36.067 | | 57.56 | -38.22 | 51544.19 | 16.24 | | |

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-09T03:14:46.440
 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 : 3427497362361880064
 2Mass ID (if available) : 05525006+2338420
 ICRS Star Coord at Epoch: 05h 52m 50.05863s +23:38:42.00652s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 11.470
 G magnitude : 12.407
 RP magnitude : 12.084
 BP magnitude : 12.593
 DUPflag : 0
 Distance (au) : 18.091
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.56
 Sun-Target sep (deg) : 159.65
 Sun-Moon sep (deg) : 57.50
 B (ring opening deg) : 76.69
 PA of pole (deg) : 52.44
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.640
 C/A sky separation (km) : 34640.5
 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

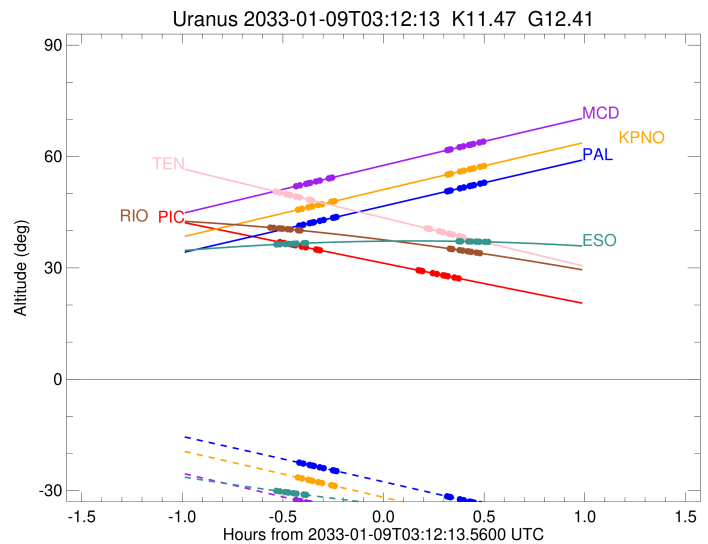
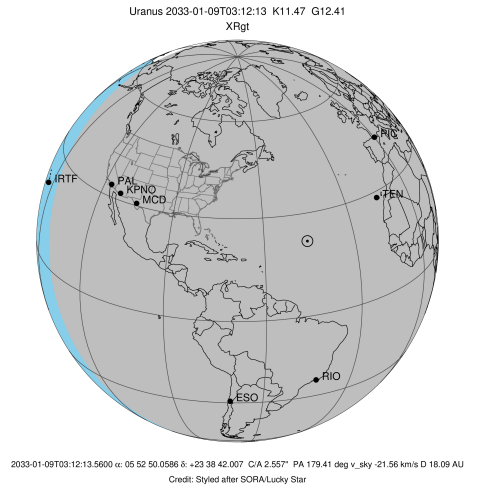


| Ring | I/E | UTC | b? | alt | alt-sun | radius | r-dot | lat-geo | lat-geodetic |
|---------|-----|-------------------------|----|-------|---------|----------|--------|---------|--------------|
| epsilon | I | 2033-01-09T02:46:06.686 | | 51.99 | -32.52 | 51214.94 | -16.36 | | |
| lambda | I | 2033-01-09T02:47:20.616 | | 52.26 | -32.78 | 50026.71 | -15.90 | | |
| delta | I | 2033-01-09T02:49:11.133 | | 52.65 | -33.17 | 48300.35 | -15.33 | | |
| gamma | I | 2033-01-09T02:49:55.092 | | 52.81 | -33.33 | 47631.55 | -15.09 | | |
| eta | I | 2033-01-09T02:50:25.440 | | 52.92 | -33.44 | 47176.12 | -14.92 | | |
| beta | I | 2033-01-09T02:52:07.767 | | 53.29 | -33.80 | 45680.63 | -14.30 | | |
| alpha | I | 2033-01-09T02:53:14.013 | | 53.53 | -34.03 | 44747.49 | -13.87 | | |
| 4 | I | 2033-01-09T02:55:55.159 | | 54.11 | -34.61 | 42605.69 | -12.67 | | |
| 5 | I | 2033-01-09T02:56:21.465 | | 54.20 | -34.70 | 42274.20 | -12.51 | | |
| 6 | I | 2033-01-09T02:57:00.334 | | 54.34 | -34.84 | 41794.86 | -12.17 | | |

No planet occultations

| | | | | | | | | | |
|---------|---|-------------------------|--|-------|--------|----------|-------|--|--|
| 6 | E | 2033-01-09T03:31:12.515 | | 61.71 | -42.17 | 41823.00 | 12.19 | | |
| 5 | E | 2033-01-09T03:31:51.658 | | 61.85 | -42.31 | 42314.56 | 12.53 | | |
| 4 | E | 2033-01-09T03:32:11.115 | | 61.92 | -42.38 | 42555.83 | 12.69 | | |
| alpha | E | 2033-01-09T03:34:55.388 | | 62.51 | -42.97 | 44742.20 | 13.90 | | |
| beta | E | 2033-01-09T03:36:01.372 | | 62.75 | -43.21 | 45669.37 | 14.33 | | |
| eta | E | 2033-01-09T03:37:44.236 | | 63.11 | -43.58 | 47176.12 | 14.95 | | |
| gamma | E | 2033-01-09T03:38:14.166 | | 63.22 | -43.69 | 47626.13 | 15.12 | | |
| delta | E | 2033-01-09T03:38:58.395 | | 63.38 | -43.84 | 48300.35 | 15.37 | | |
| lambda | E | 2033-01-09T03:40:48.678 | | 63.77 | -44.24 | 50026.71 | 15.93 | | |
| epsilon | E | 2033-01-09T03:42:22.564 | | 64.11 | -44.58 | 51543.43 | 16.40 | | |

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-09T03:08:41.350
 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 : 3427497362361880064
 2Mass ID (if available) : 05525006+2338420
 ICRS Star Coord at Epoch: 05h 52m 50.05863s +23:38:42.00652s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 11.470
 G magnitude : 12.407
 RP magnitude : 12.084
 BP magnitude : 12.593
 DUPflag : 0
 Distance (au) : 18.091
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.56
 Sun-Target sep (deg) : 159.65
 Sun-Moon sep (deg) : 58.00
 B (ring opening deg) : 76.69
 PA of pole (deg) : 52.44
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.649
 C/A sky separation (km) : 34762.6
 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

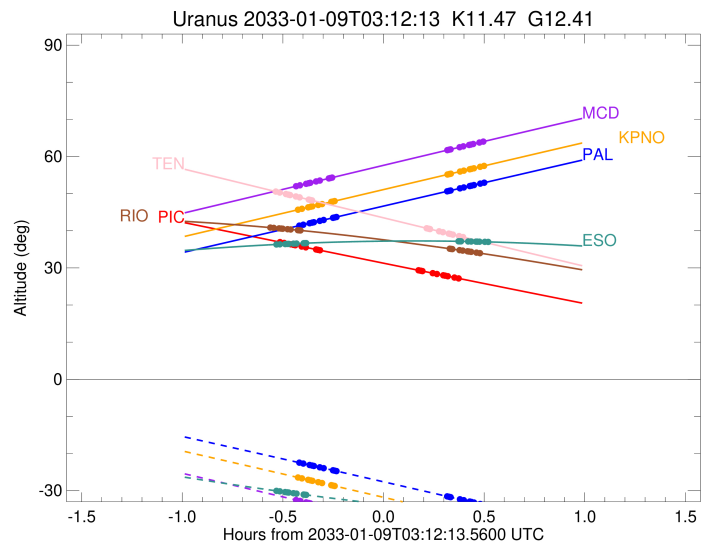
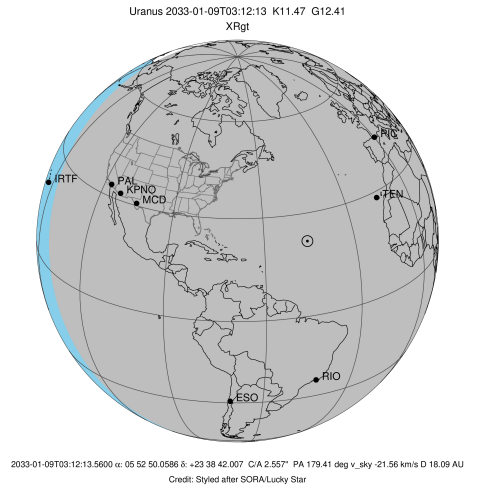


| Ring | I/E | UTC | b? | alt | alt-sun | radius | r-dot | lat-geo | lat-geodetic |
|---------|-----|-------------------------|----|-------|---------|----------|--------|---------|--------------|
| epsilon | I | 2033-01-09T02:40:04.592 | | 50.57 | -69.42 | 51212.20 | -16.32 | | |
| lambda | I | 2033-01-09T02:41:18.557 | | 50.30 | -69.15 | 50026.71 | -15.85 | | |
| delta | I | 2033-01-09T02:43:09.438 | | 49.89 | -68.75 | 48300.35 | -15.28 | | |
| gamma | I | 2033-01-09T02:43:53.564 | | 49.73 | -68.59 | 47631.55 | -15.03 | | |
| eta | I | 2033-01-09T02:44:24.036 | | 49.62 | -68.49 | 47176.12 | -14.86 | | |
| beta | I | 2033-01-09T02:46:06.836 | | 49.24 | -68.11 | 45680.60 | -14.23 | | |
| alpha | I | 2033-01-09T02:47:13.442 | | 49.00 | -67.87 | 44747.39 | -13.79 | | |
| 4 | I | 2033-01-09T02:49:55.631 | | 48.40 | -67.29 | 42605.84 | -12.58 | | |
| 5 | I | 2033-01-09T02:50:22.188 | | 48.30 | -67.19 | 42273.86 | -12.41 | | |
| 6 | I | 2033-01-09T02:51:01.357 | | 48.16 | -67.05 | 41794.85 | -12.06 | | |

No planet occultations

| | | | | | | | | | |
|---------|---|-------------------------|--|-------|--------|----------|-------|--|--|
| 6 | E | 2033-01-09T03:25:03.340 | | 40.68 | -59.60 | 41822.41 | 12.04 | | |
| 5 | E | 2033-01-09T03:25:43.024 | | 40.54 | -59.46 | 42314.70 | 12.38 | | |
| 4 | E | 2033-01-09T03:26:02.732 | | 40.47 | -59.39 | 42556.45 | 12.55 | | |
| alpha | E | 2033-01-09T03:28:48.793 | | 39.86 | -58.78 | 44742.54 | 13.75 | | |
| beta | E | 2033-01-09T03:29:55.439 | | 39.62 | -58.53 | 45669.62 | 14.19 | | |
| eta | E | 2033-01-09T03:31:39.284 | | 39.24 | -58.15 | 47176.12 | 14.81 | | |
| gamma | E | 2033-01-09T03:32:09.501 | | 39.13 | -58.04 | 47626.20 | 14.98 | | |
| delta | E | 2033-01-09T03:32:54.136 | | 38.97 | -57.88 | 48300.35 | 15.23 | | |
| lambda | E | 2033-01-09T03:34:45.419 | | 38.56 | -57.47 | 50026.71 | 15.79 | | |
| epsilon | E | 2033-01-09T03:36:20.211 | | 38.22 | -57.12 | 51544.66 | 16.26 | | |

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-09T03:10:17.120
 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 : 3427497362361880064
 2Mass ID (if available) : 05525006+2338420
 ICRS Star Coord at Epoch: 05h 52m 50.05863s +23:38:42.00652s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 11.470
 G magnitude : 12.407
 RP magnitude : 12.084
 BP magnitude : 12.593
 DUPflag : 0
 Distance (au) : 18.091
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.56
 Sun-Target sep (deg) : 159.65
 Sun-Moon sep (deg) : 57.77
 B (ring opening deg) : 76.69
 PA of pole (deg) : 52.44
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.213
 C/A sky separation (km) : 29039.8
 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

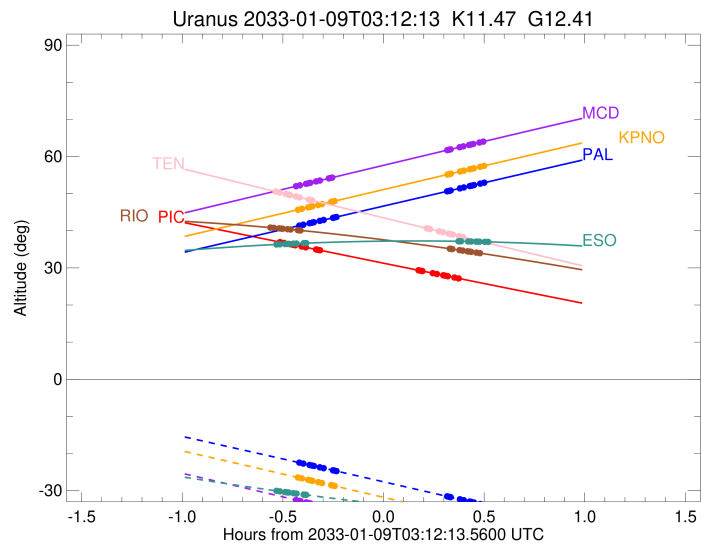
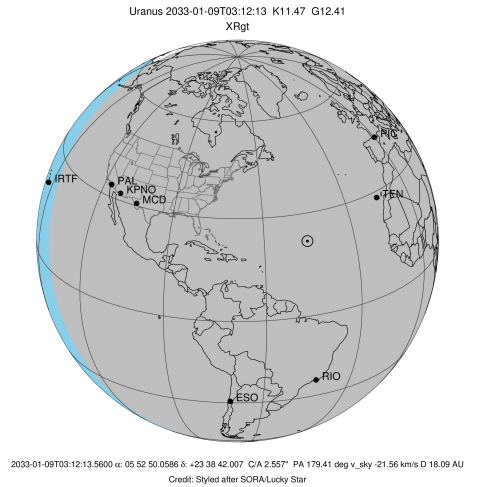


| Ring | I/E | UTC | b? | alt | alt-sun | radius | r-dot | lat-geo | lat-geodetic |
|---------|-----|-------------------------|----|-------|---------|----------|--------|---------|--------------|
| epsilon | I | 2033-01-09T02:38:29.668 | | 40.86 | -44.88 | 51154.81 | -18.43 | | |
| lambda | I | 2033-01-09T02:39:31.569 | | 40.77 | -44.90 | 50026.71 | -18.12 | | |
| delta | I | 2033-01-09T02:41:07.758 | | 40.64 | -44.95 | 48300.35 | -17.77 | | |
| gamma | I | 2033-01-09T02:41:45.550 | | 40.59 | -44.96 | 47631.57 | -17.62 | | |
| eta | I | 2033-01-09T02:42:11.473 | | 40.55 | -44.97 | 47176.12 | -17.52 | | |
| beta | I | 2033-01-09T02:43:37.830 | | 40.43 | -45.00 | 45679.42 | -17.15 | | |
| alpha | I | 2033-01-09T02:44:32.819 | | 40.35 | -45.02 | 44743.63 | -16.89 | | |
| 4 | I | 2033-01-09T02:46:41.530 | | 40.16 | -45.06 | 42611.11 | -16.21 | | |
| 5 | I | 2033-01-09T02:47:03.508 | | 40.13 | -45.07 | 42258.35 | -16.13 | | |
| 6 | I | 2033-01-09T02:47:32.461 | | 40.09 | -45.08 | 41795.21 | -15.93 | | |

No planet occultations

| | | | | | | | | | |
|---------|---|-------------------------|--|-------|--------|----------|-------|--|--|
| 6 | E | 2033-01-09T03:31:57.463 | | 35.17 | -44.51 | 41831.52 | 15.90 | | |
| 5 | E | 2033-01-09T03:32:26.959 | | 35.11 | -44.49 | 42310.86 | 16.10 | | |
| 4 | E | 2033-01-09T03:32:42.071 | | 35.07 | -44.48 | 42547.78 | 16.18 | | |
| alpha | E | 2033-01-09T03:34:54.463 | | 34.78 | -44.38 | 44737.59 | 16.86 | | |
| beta | E | 2033-01-09T03:35:49.370 | | 34.66 | -44.34 | 45666.19 | 17.11 | | |
| eta | E | 2033-01-09T03:37:16.642 | | 34.47 | -44.27 | 47176.12 | 17.48 | | |
| gamma | E | 2033-01-09T03:37:42.268 | | 34.41 | -44.25 | 47625.31 | 17.58 | | |
| delta | E | 2033-01-09T03:38:20.505 | | 34.33 | -44.22 | 48300.35 | 17.73 | | |
| lambda | E | 2033-01-09T03:39:56.925 | | 34.11 | -44.14 | 50026.71 | 18.08 | | |
| epsilon | E | 2033-01-09T03:41:19.299 | | 33.92 | -44.07 | 51526.85 | 18.38 | | |

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-09T03:12:26.290
 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 : 3427497362361880064
 2Mass ID (if available) : 05525006+2338420
 ICRS Star Coord at Epoch: 05h 52m 50.05863s +23:38:42.00652s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 11.470
 G magnitude : 12.407
 RP magnitude : 12.084
 BP magnitude : 12.593
 DUPflag : 0
 Distance (au) : 18.091
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.56
 Sun-Target sep (deg) : 159.65
 Sun-Moon sep (deg) : 57.54
 B (ring opening deg) : 76.69
 PA of pole (deg) : 52.44
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.164
 C/A sky separation (km) : 28387.5
 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 | 2033-01-09T02:40:19.571 | | 36.32 | -30.07 | 51149.94 | -18.61 | | |
| lambda | I | 2033-01-09T02:41:20.566 | | 36.36 | -30.19 | 50026.71 | -18.32 | | |
| delta | I | 2033-01-09T02:42:55.653 | | 36.43 | -30.39 | 48300.35 | -17.99 | | |
| gamma | I | 2033-01-09T02:43:32.976 | | 36.45 | -30.47 | 47631.56 | -17.85 | | |
| eta | I | 2033-01-09T02:43:58.564 | | 36.47 | -30.52 | 47176.12 | -17.75 | | |
| beta | I | 2033-01-09T02:45:23.726 | | 36.53 | -30.69 | 45679.29 | -17.40 | | |
| alpha | I | 2033-01-09T02:46:17.888 | | 36.56 | -30.80 | 44743.27 | -17.17 | | |
| 4 | I | 2033-01-09T02:48:24.312 | | 36.64 | -31.06 | 42611.48 | -16.52 | | |
| 5 | I | 2033-01-09T02:48:45.986 | | 36.66 | -31.10 | 42256.98 | -16.45 | | |
| 6 | I | 2033-01-09T02:49:14.269 | | 36.67 | -31.15 | 41795.33 | -16.26 | | |

No planet occultations

| | | | | | | | | | |
|---------|---|-------------------------|--|-------|--------|----------|-------|--|--|
| 6 | E | 2033-01-09T03:34:34.282 | | 37.17 | -35.72 | 41832.58 | 16.26 | | |
| 5 | E | 2033-01-09T03:35:03.034 | | 37.16 | -35.75 | 42310.19 | 16.45 | | |
| 4 | E | 2033-01-09T03:35:17.832 | | 37.16 | -35.77 | 42546.83 | 16.52 | | |
| alpha | E | 2033-01-09T03:37:27.682 | | 37.12 | -35.94 | 44736.95 | 17.16 | | |
| beta | E | 2033-01-09T03:38:21.652 | | 37.11 | -36.01 | 45665.76 | 17.40 | | |
| eta | E | 2033-01-09T03:39:47.552 | | 37.08 | -36.12 | 47176.12 | 17.75 | | |
| gamma | E | 2033-01-09T03:40:12.786 | | 37.07 | -36.15 | 47625.20 | 17.85 | | |
| delta | E | 2033-01-09T03:40:50.469 | | 37.06 | -36.20 | 48300.35 | 17.99 | | |
| lambda | E | 2033-01-09T03:42:25.567 | | 37.02 | -36.32 | 50026.71 | 18.32 | | |
| epsilon | E | 2033-01-09T03:43:46.741 | | 36.99 | -36.42 | 51523.95 | 18.61 | | |