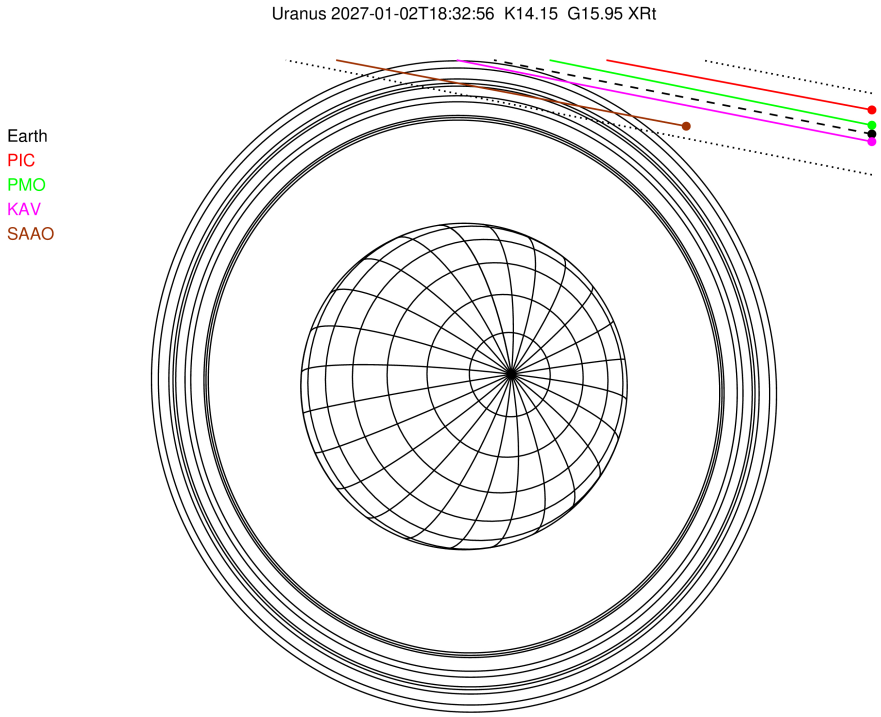
Stellar occultation prediction by rfrench@wellesley.edu Sat Jun 24 23:24:55 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2027-01-02T18:32:56.670
Event type : XRt
: No Uranus occs
: Ring occs: topocentric, not geoecetric
Gaia source ID : 51377674402813568
2Mass ID (if available) : 03591083+2023422

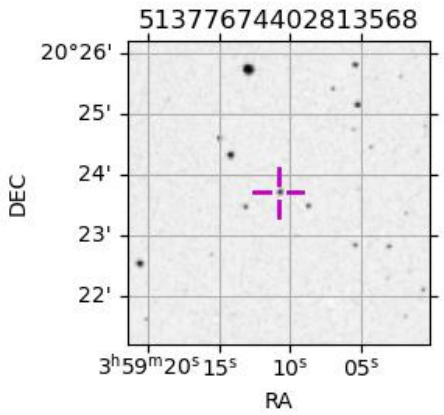
ICRS Star Coord at Epoch: 03h 59m 10.83550s +20:23:42.22232s
RUWE (>1.4 is poor) : 0.99
K magnitude : 14.146
G magnitude : 15.954
RP magnitude : 15.351
BP magnitude : 16.385
DUPflag : 0
Distance (au) : 18.659
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -16.54
Sun-Target sep (deg) : 140.11
Sun-Moon sep (deg) : 163.55
B (ring opening deg) : 72.54
PA of pole (deg) : -75.45

| # | 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 |

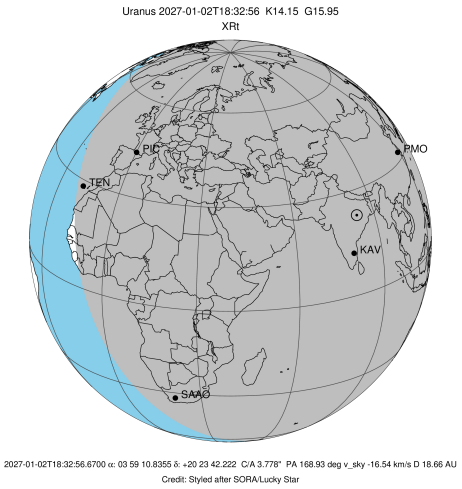

Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

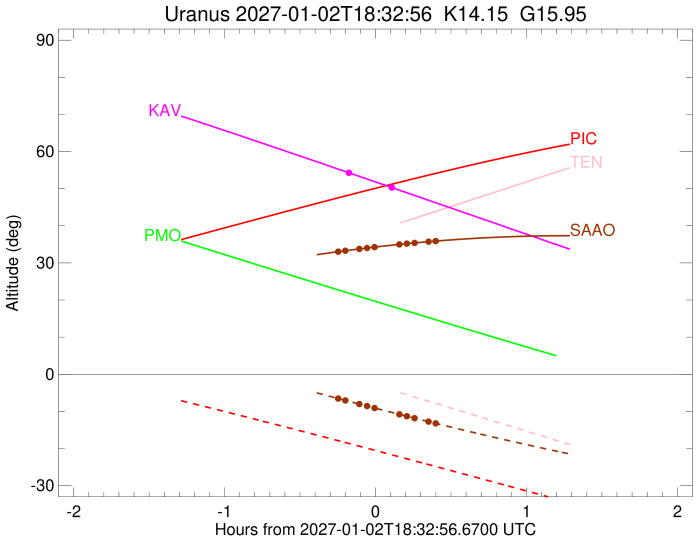
| Obs | Location | lat | Elon | Rings I | Planet | Rings E | Observed Events Interval | OEcode |
|---|---|---|---|---|---|---|---|---|
| PIC | Pic du Midi | 42.9 | 0.1 | | | | | PnnRnn |
| PAL | Palomar Mt (200") | 33.4 | 243.1 | | | | | PnnRnn |
| PMO | Purple Mtn Obs. Nanki | 32.1 | 118.8 | | | | | PnnRnn |
| KPNO | Kitt Peak Natl Obs | 32.0 | 248.4 | | | | | PnnRnn |
| MCD | McDonald Obs. 2.7m | 30.7 | 256.0 | | | | | PnnRnn |
| TEN | Teide Obs./Tenerife | 28.3 | 343.5 | | | | | PnnRnn |
| IRTF | Mauna Kea/IRTF | 19.8 | 204.5 | | | | | PnnRnn |
| KAV | Kavalur Observatory | 12.6 | 78.8 | + | | + | JAN 02 18:21 - JAN 02 18:39 | PnnRie |
| 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 | +++++ | | +++++ | JAN 02 18:17 - JAN 02 18:56 | PnnRie |
| MSO | Mt. Stromlo Observato | -35.3 | 149.0 | | | | | PnnRnn |



Uranus_2027-01-02T18_32_56.6700_KAV.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:30:21 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2027-01-02T18:29:08.330
Event type : XRt
: No Uranus occs
: Ring occs: topocentric, not geoecetric
Observer code : KAV
Location : Kavalur Observatory
Latitude (deg) : 12.57556
E. Longitude (deg) : 78.83167
Altitude (km) : 0.722
Gaia source ID : 51377674402813568
2Mass ID (if available) : 03591083+2023422
ICRS Star Coord at Epoch: 03h 59m 10.83550s +20:23:42.22232s
RUWE (>1.4 is poor) : 0.99
K magnitude : 14.146
G magnitude : 15.954
RP magnitude : 15.351
BP magnitude : 16.385
DUPflag : 0
Distance (au) : 18.659
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -16.54
Sun-Target sep (deg) : 140.11
Sun-Moon sep (deg) : 164.29
B (ring opening deg) : 72.54
PA of pole (deg) : -75.45
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.689
C/A sky separation (km) : 49923.3
NAIF SPICE kernels : RAJobs_U111+rgf15.spk
URKALLv1.spk
ura111.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.ura111.bsp
ura161.bsp
vgr2.ura161.bsp
peph.ura160.bsp
earthstns_itrf93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk




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

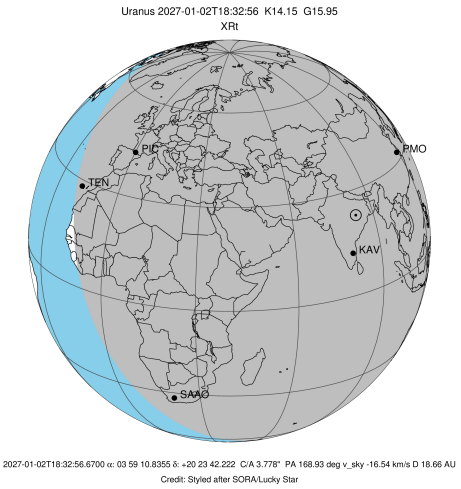
| Ring | I/E | UTC | b? | alt | alt-sun | radius | r-dot | lat-geo | lat-geodetic |
|---|---|---|---|---|---|---|---|---|---|
| epsilon | I | 2027-01-02T18:21:51.171 | | 54.40 | -77.80 | 51263.94 | -3.15 | | |

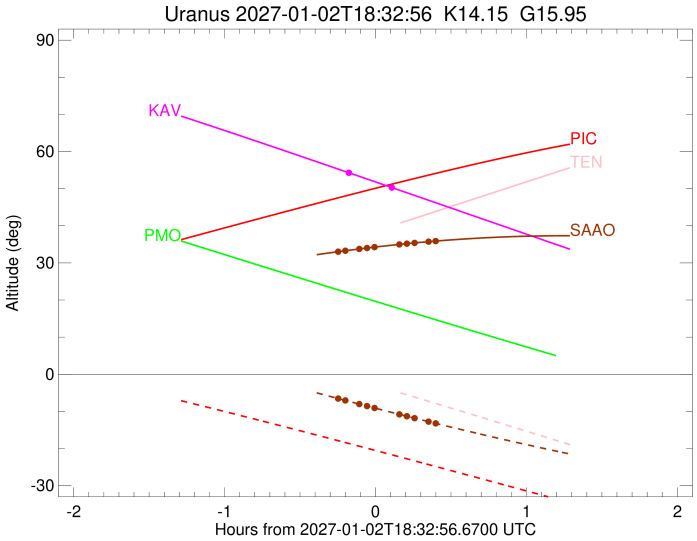
No planet occultations

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| epsilon | E | 2027-01-02T18:39:11.172 | | 50.35 | -79.37 | 51119.83 | 3.14 | | |

Uranus_2027-01-02T18_32_56.6700_SAAO.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:38:56 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2027-01-02T18:35:52.760
Event type : XRt
: No Uranus occs
: Ring occs: topocentric, not geoecetric
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 : 51377674402813568
2Mass ID (if available) : 03591083+2023422
ICRS Star Coord at Epoch: 03h 59m 10.83550s +20:23:42.22232s
RUWE (>1.4 is poor) : 0.99
K magnitude : 14.146
G magnitude : 15.954
RP magnitude : 15.351
BP magnitude : 16.385
DUPflag : 0
Distance (au) : 18.660
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -16.54
Sun-Target sep (deg) : 140.11
Sun-Moon sep (deg) : 163.53
B (ring opening deg) : 72.54
PA of pole (deg) : -75.45
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.436
C/A sky separation (km) : 46502.9
NAIF SPICE kernels : RAJobs_U111+rgf15.spk
URKALLv1.spk
ura111.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.ura111.bsp
ura161.bsp
vgr2.ura161.bsp
peph.ura160.bsp
earthstns_itrf93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk




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 | 2027-01-02T18:17:40.751 | | 32.98 | -6.46 | 51347.64 | -7.04 | | |
| lambda | I | 2027-01-02T18:20:59.811 | | 33.28 | -7.05 | 50026.71 | -6.11 | | |
| delta | I | 2027-01-02T18:26:33.789 | | 33.76 | -8.04 | 48300.35 | -4.19 | | |
| gamma | I | 2027-01-02T18:29:39.119 | | 34.02 | -8.58 | 47628.04 | -3.05 | | |
| eta | I | 2027-01-02T18:32:41.956 | | 34.26 | -9.12 | 47176.12 | -1.88 | | |

No planet occultations

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| eta | E | 2027-01-02T18:42:17.795 | | 34.97 | -10.77 | 47176.12 | 1.89 | | |
| gamma | E | 2027-01-02T18:45:21.101 | | 35.18 | -11.29 | 47629.64 | 3.06 | | |
| delta | E | 2027-01-02T18:48:25.821 | | 35.38 | -11.82 | 48300.35 | 4.20 | | |
| lambda | E | 2027-01-02T18:53:59.574 | | 35.72 | -12.75 | 50026.71 | 6.11 | | |
| epsilon | E | 2027-01-02T18:56:32.529 | | 35.86 | -13.18 | 51024.35 | 7.04 | | |