

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-01-31T16:46:09.910  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3427672493949141504  
 2Mass ID (if available) : 05492926+2337577

ICRS Star Coord at Epoch: 05h 49m 29.26380s +23:37:57.57311s

RUWE (>1.4 is poor) : 1.06  
 K magnitude : 13.779  
 G magnitude : 15.679  
 RP magnitude : 15.037  
 BP magnitude : 16.155  
 DUPflag : 0  
 Distance (au) : 18.292  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -15.05  
 Sun-Target sep (deg) : 135.92  
 Sun-Moon sep (deg) : 124.85  
 B (ring opening deg) : 77.30  
 PA of pole (deg) : 50.07

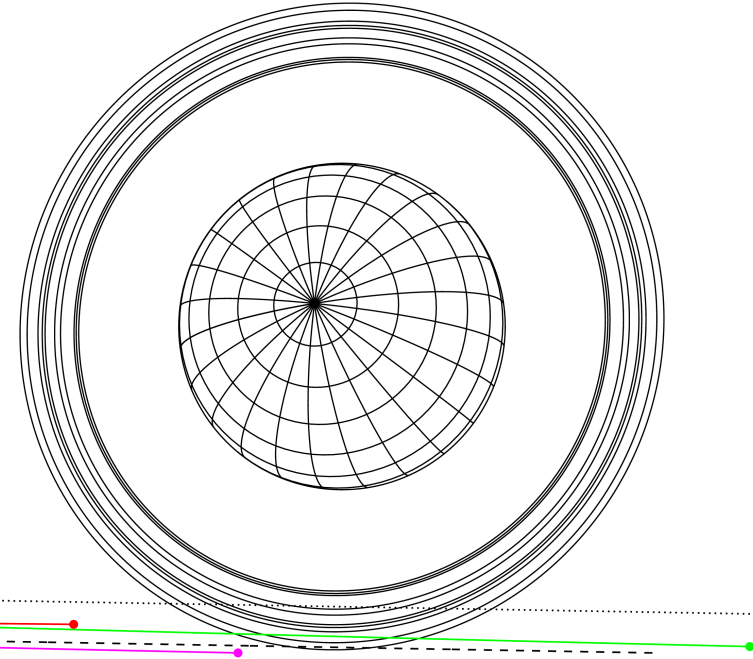
| #  | a(km)   | ring    |
|----|---------|---------|
| 1  | 41837.2 | 6       |
| 2  | 42235.0 | 5       |
| 3  | 42571.2 | 4       |
| 4  | 44718.5 | alpha   |
| 5  | 45661.1 | beta    |
| 6  | 47176.1 | eta     |
| 7  | 47626.3 | gamma   |
| 8  | 48300.3 | delta   |
| 9  | 50026.7 | lambda  |
| 10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



2033-01-31T16:46:09.9100 ex: 05 49 29.2638 s: +23 37 57.573 C/A 3.781" PA 358.99 deg v\_sky -15.05 km/s D 18.29 AU  
 Credit: Styled after SORA/Lucky Star

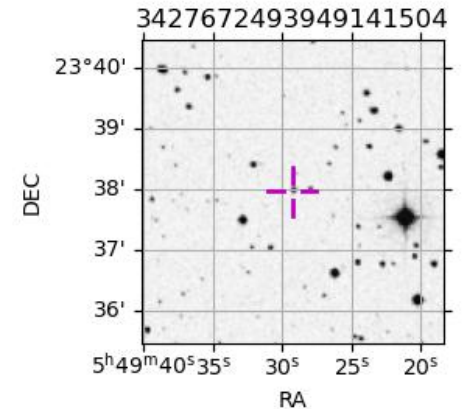
Uranus 2033-01-31T16:46:09 K13.78 G15.68 XRgt

PIC  
 PMO  
 KAV



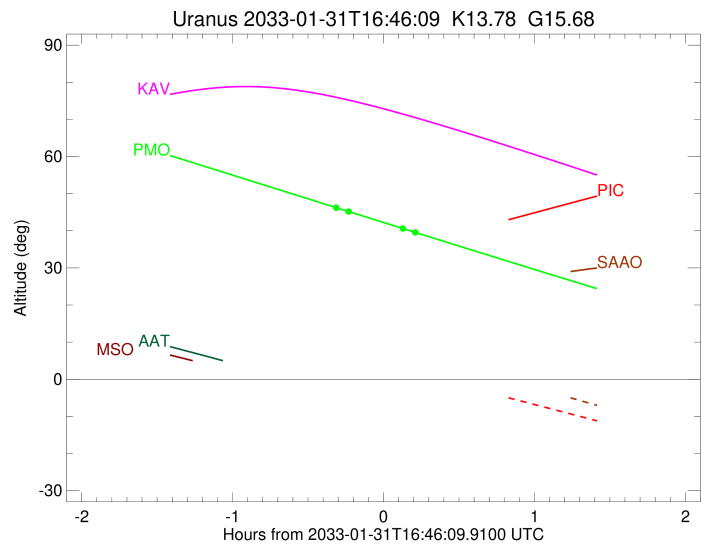
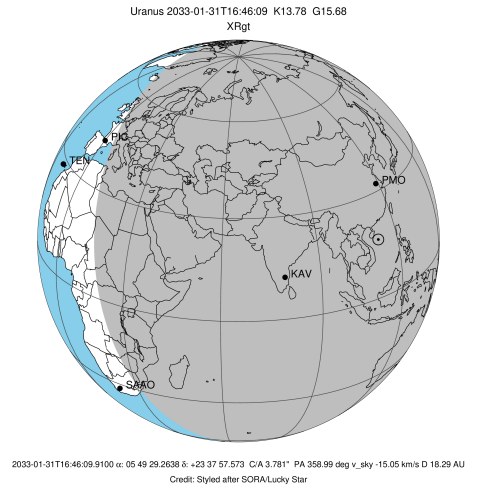
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

| 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 | ++      |        | ++      | JAN 31 16:28 - JAN 31 16:58 | PnnRie |
| 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  |         |        |         |                             | PnnRnn |
| 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  |         |        |         |                             | PnnRnn |
| MSO  | Mt. Stromlo Observato | -35.3 | 149.0 |         |        |         |                             | PnnRnn |



```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-01-31T16:41:48.480
Event type           : XRgt
: No Uranus occs
: 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       : 3427672493949141504
2Mass ID (if available) : 05492926+2337577
ICRS Star Coord at Epoch: 05h 49m 29.26380s +23:37:57.57311s
RUWE (>1.4 is poor) : 1.06
K magnitude           : 13.779
G magnitude           : 15.679
RP magnitude          : 15.037
BP magnitude          : 16.155
DUPflag              : 0
Distance (au)         : 18.292
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -15.05
Sun-Target sep (deg) : 135.92
Sun-Moon sep (deg)   : 125.02
B (ring opening deg) : 77.30
PA of pole (deg)     : 50.07
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.660
C/A sky separation (km) : 48548.4
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_itrf93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
  
```



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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 2033-01-31T16:28:27.047  46.00 -75.08  50883.38 -4.25
lambda    I 2033-01-31T16:32:22.798  45.16 -74.91  50026.71 -3.10
  
```

No planet occultations

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lambda    E 2033-01-31T16:53:47.530  40.62 -73.20  50026.71  3.09
epsilon   E 2033-01-31T16:58:31.304  39.61 -72.66  51085.05  4.24
  
```