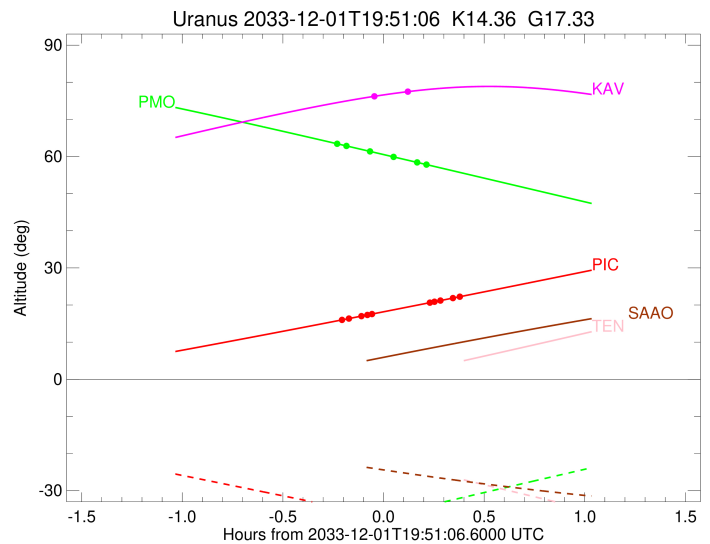
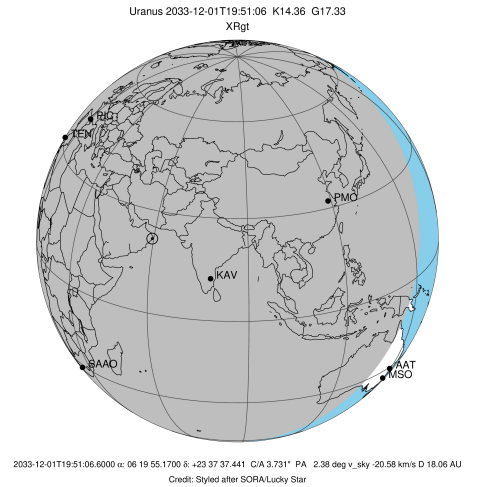



```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-12-01T19:54:46.970
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      : 3377538130977156096
2Mass ID (if available) : 06195517+2337378
ICRS Star Coord at Epoch: 06h 19m 55.17001s +23:37:37.44083s
RUWE (>1.4 is poor) : 1.00
K magnitude         : 14.360
G magnitude         : 17.333
RP magnitude        : 16.435
BP magnitude        : 18.196
DUPflag            : 0
Distance (au)       : 18.060
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -20.58
Sun-Target sep (deg) : 154.90
Sun-Moon sep (deg)  : 86.73
B (ring opening deg) : 71.34
PA of pole (deg)    : 66.28
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.464
C/A sky separation (km) : 45370.1
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_itrfr93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
  
```



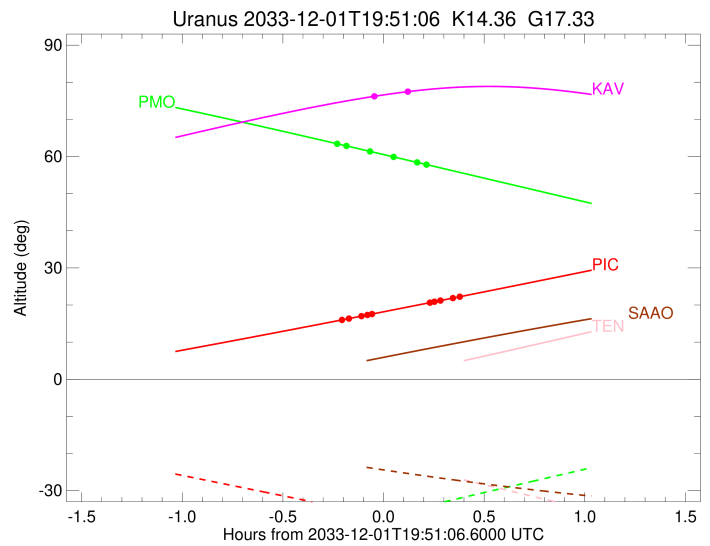
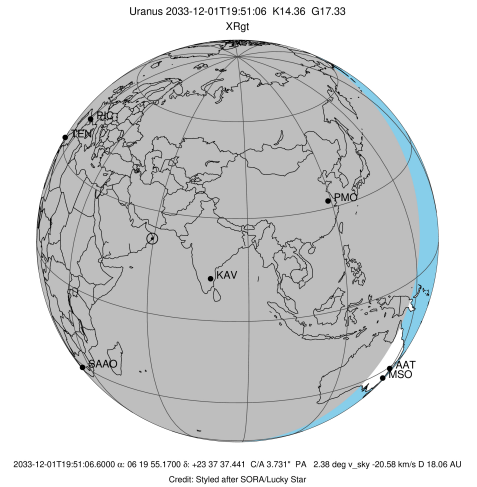
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-12-01T19:38:44.671		15.99	-34.64	51161.36	-9.69		
lambda	I	2033-12-01T19:40:49.692		16.36	-35.02	50026.71	-8.60		
delta	I	2033-12-01T19:44:33.971		17.02	-35.70	48300.35	-6.76		
gamma	I	2033-12-01T19:46:20.339		17.33	-36.03	47630.73	-5.82		
eta	I	2033-12-01T19:47:43.863		17.58	-36.28	47176.12	-5.06		

No planet occultations

eta	E	2033-12-01T20:04:53.453		20.63	-39.43	47176.12	5.07		
gamma	E	2033-12-01T20:06:16.998		20.88	-39.68	47631.58	5.83		
delta	E	2033-12-01T20:08:03.039		21.19	-40.00	48300.35	6.77		
lambda	E	2033-12-01T20:11:46.834		21.86	-40.68	50026.71	8.62		
epsilon	E	2033-12-01T20:14:24.748		22.34	-41.16	51483.14	9.72		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-12-01T19:49:02.650
 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 : 3377538130977156096
 2Mass ID (if available) : 06195517+2337378
 ICRS Star Coord at Epoch: 06h 19m 55.17001s +23:37:37.44083s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.360
 G magnitude : 17.333
 RP magnitude : 16.435
 BP magnitude : 18.196
 DUPflag : 0
 Distance (au) : 18.060
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.58
 Sun-Target sep (deg) : 154.90
 Sun-Moon sep (deg) : 87.34
 B (ring opening deg) : 71.34
 PA of pole (deg) : 66.28
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.635
 C/A sky separation (km) : 47610.3
 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



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

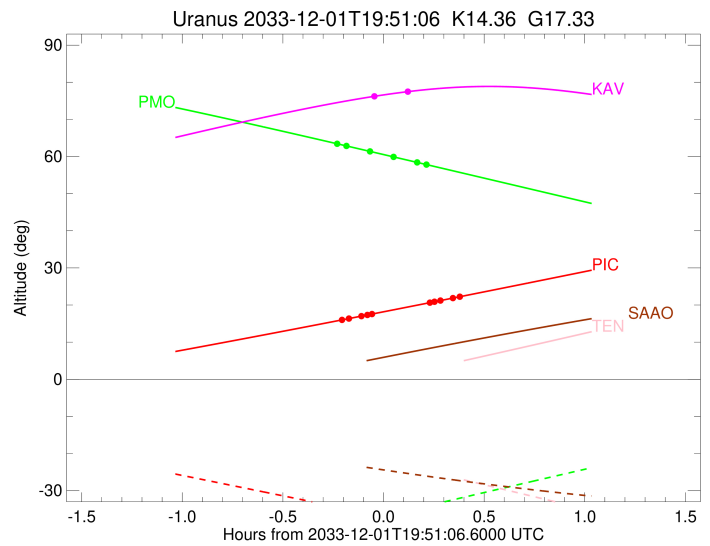
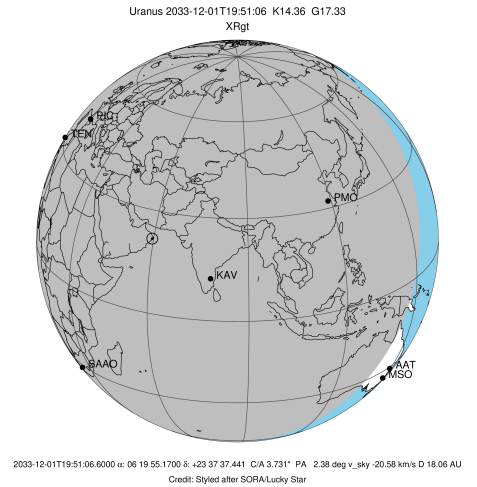
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-12-01T19:37:11.274		63.46	-39.79	51209.75	-7.67		
lambda	I	2033-12-01T19:40:06.011		62.85	-39.17	50026.71	-6.02		
delta	I	2033-12-01T19:47:12.287		61.36	-37.66	48300.35	-2.01		

No planet occultations

delta	E	2033-12-01T19:53:59.774		59.93	-36.23	48300.35	2.01		
lambda	E	2033-12-01T20:01:06.253		58.43	-34.73	50026.71	6.01		
epsilon	E	2033-12-01T20:04:33.768		57.70	-34.00	51458.88	7.66		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-12-01T19:51:44.180
Event type          : XRgt
: No Uranus occs
: 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      : 3377538130977156096
2Mass ID (if available) : 06195517+2337378
ICRS Star Coord at Epoch: 06h 19m 55.17001s +23:37:37.44083s
RUWE (>1.4 is poor) : 1.00
K magnitude         : 14.360
G magnitude         : 17.333
RP magnitude        : 16.435
BP magnitude        : 18.196
DUPflag            : 0
Distance (au)       : 18.060
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -20.58
Sun-Target sep (deg) : 154.90
Sun-Moon sep (deg)  : 87.42
B (ring opening deg) : 71.34
PA of pole (deg)    : 66.28
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.834
C/A sky separation (km) : 50218.7
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall1.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall1.bsp
ural61.bsp
vgr2.ural61.bsp
peph.ural60.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  2033-12-01T19:47:41.898  76.13 -70.04  51288.32  -3.37
  
```

No planet occultations

```

epsilon   E  2033-12-01T19:59:36.466  77.61 -67.50  51397.99  3.37
  
```