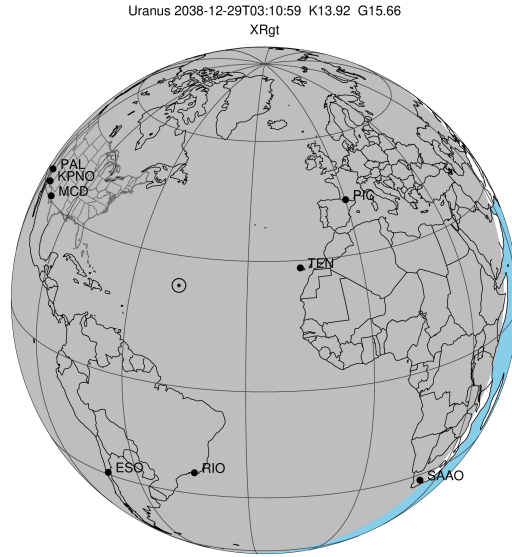


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-12-29T03:10:59.190
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 673929301307536384
 2Mass ID (if available) : 07563849+2117229

ICRS Star Coord at Epoch: 07h 56m 38.47736s +21:17:22.89023s

RUWE (>1.4 is poor) : 0.99
 K magnitude : 13.918
 G magnitude : 15.659
 RP magnitude : 15.078
 BP magnitude : 16.074
 DUPflag : 0
 Distance (au) : 17.721
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.46
 Sun-Target sep (deg) : 159.94
 Sun-Moon sep (deg) : 159.08
 B (ring opening deg) : 49.90
 PA of pole (deg) : 88.48

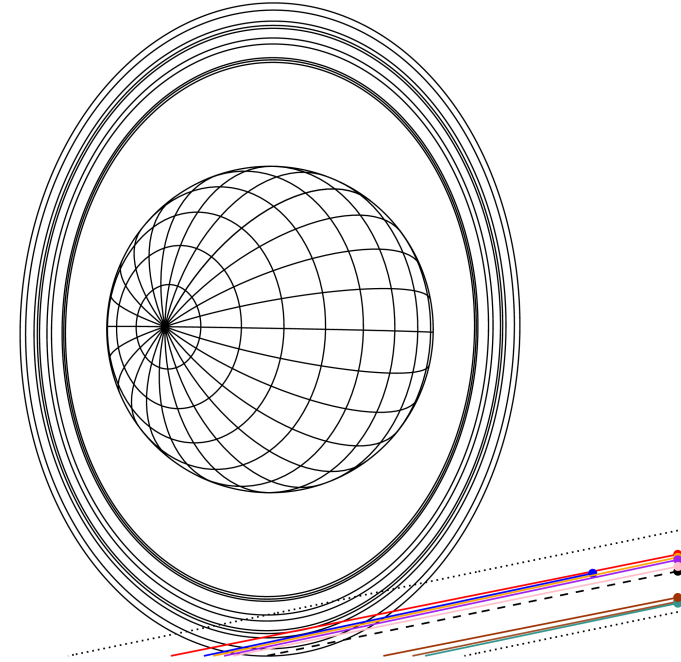
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2038-12-29T03:10:59.1900 α: 07 56 38.4774 δ: +21 17 22.890 C/A 3.876° PA 11.62 deg v_sky -21.46 km/s D 17.72 AU
 Credit: Styled after SORA/Lucky Star

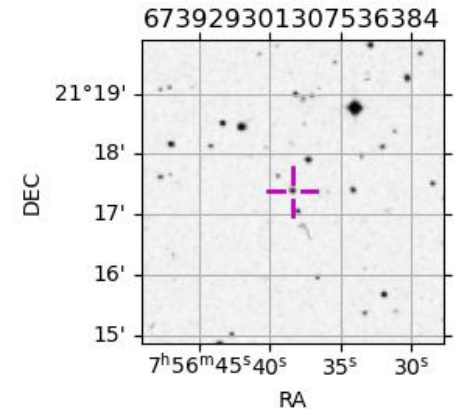
Uranus 2038-12-29T03:10:59 K13.92 G15.66 XRgt

Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 RIO
 ESO
 SAAO

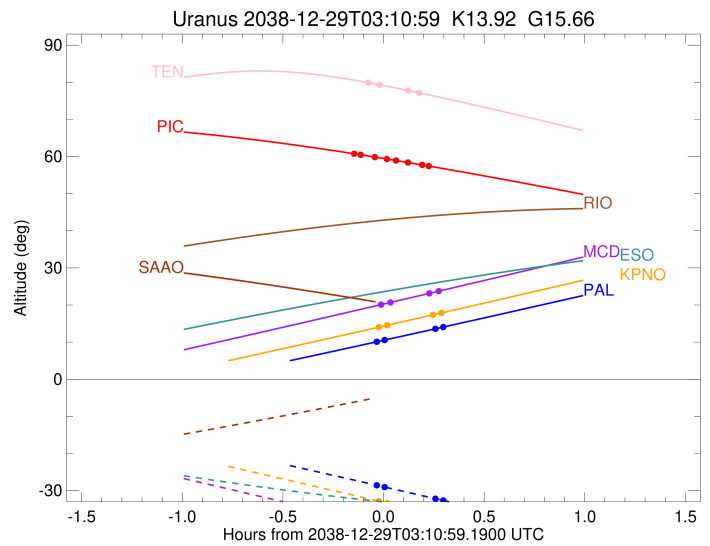
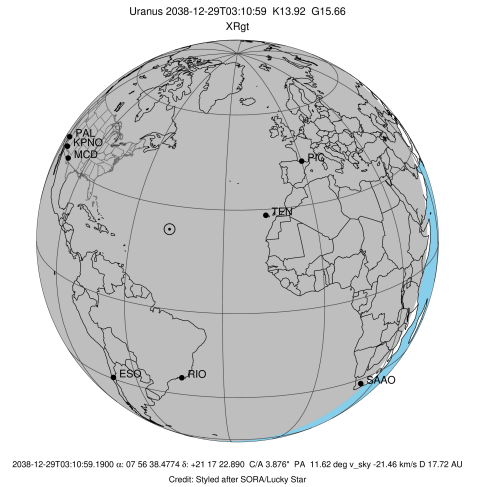


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	++++		++++	DEC 29 03:02 - DEC 29 03:25	PnnRie
PAL	Palomar Mt (200")	33.4	243.1	++		++	DEC 29 03:08 - DEC 29 03:29	PnnRie
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	++		++	DEC 29 03:09 - DEC 29 03:28	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	++		++	DEC 29 03:10 - DEC 29 03:28	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5	++		++	DEC 29 03:06 - DEC 29 03:22	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					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 : 2038-12-29T03:10:02.480
 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 : 673929301307536384
 2Mass ID (if available) : 07563849+2117229
 ICRS Star Coord at Epoch: 07h 56m 38.47736s +21:17:22.89023s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 13.918
 G magnitude : 15.659
 RP magnitude : 15.078
 BP magnitude : 16.074
 DUPflag : 0
 Distance (au) : 17.721
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.46
 Sun-Target sep (deg) : 159.94
 Sun-Moon sep (deg) : 159.10
 B (ring opening deg) : 49.90
 PA of pole (deg) : 88.48
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.663
 C/A sky separation (km) : 47080.6
 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_itrfr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



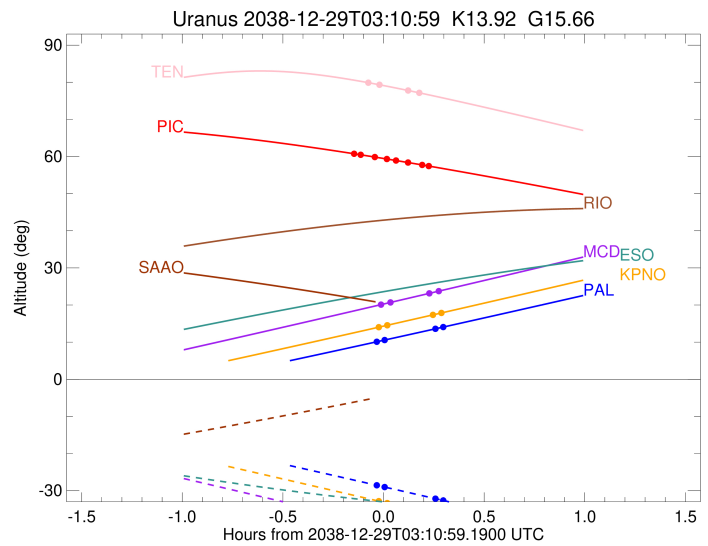
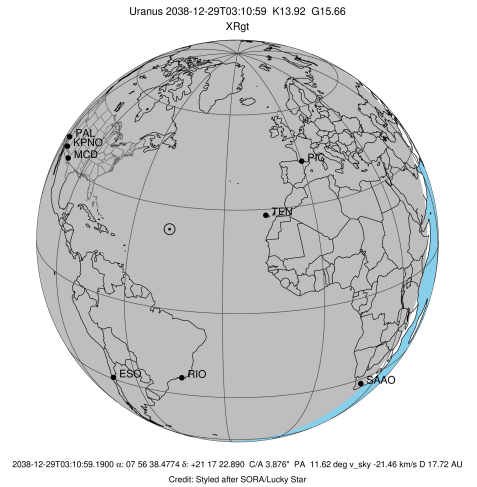
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-12-29T03:02:05.321	60.76	-47.99	51247.62	-10.65		
lambda	I	2038-12-29T03:04:12.764	60.46	-47.61	50026.71	-8.69		
delta	I	2038-12-29T03:08:26.979	59.85	-46.85	48300.35	-4.83		
gamma	I	2038-12-29T03:12:06.446	59.32	-46.19	47631.45	-1.24		

No planet occultations

gamma	E	2038-12-29T03:14:36.119	58.94	-45.74	47631.53	1.25		
delta	E	2038-12-29T03:18:15.553	58.39	-45.08	48300.35	4.83		
lambda	E	2038-12-29T03:22:29.860	57.74	-44.31	50026.71	8.68		
epsilon	E	2038-12-29T03:25:00.756	57.35	-43.86	51495.53	10.65		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-12-29T03:15:19.220
 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 : 673929301307536384
 2Mass ID (if available) : 07563849+2117229
 ICRS Star Coord at Epoch: 07h 56m 38.47736s +21:17:22.89023s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 13.918
 G magnitude : 15.659
 RP magnitude : 15.078
 BP magnitude : 16.074
 DUPflag : 0
 Distance (au) : 17.721
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.46
 Sun-Target sep (deg) : 159.94
 Sun-Moon sep (deg) : 159.91
 B (ring opening deg) : 49.90
 PA of pole (deg) : 88.48
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.724
 C/A sky separation (km) : 47857.2
 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_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



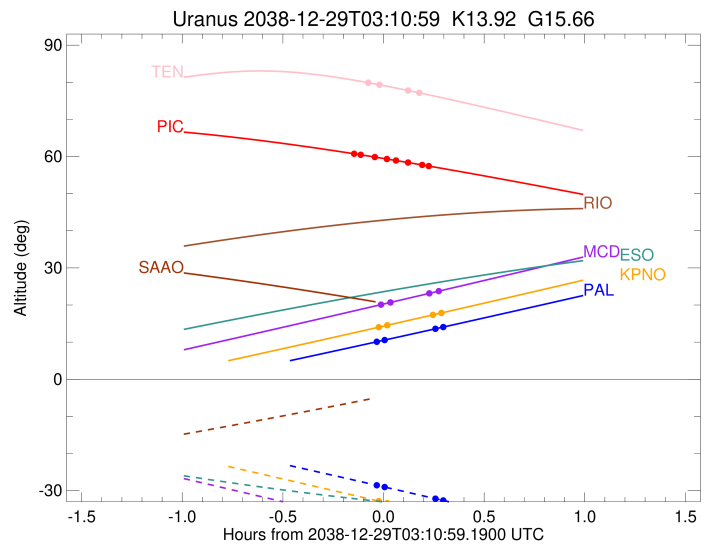
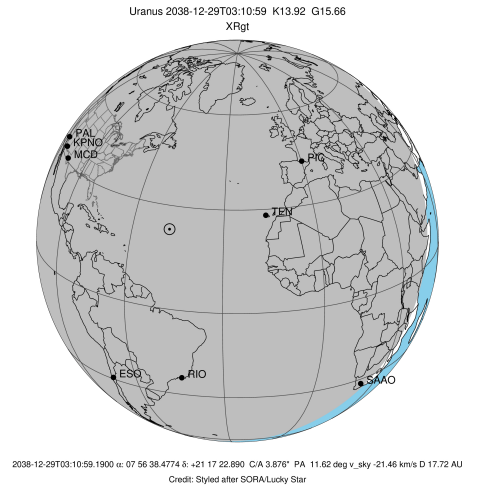
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-12-29T03:08:48.308		10.06	-28.52	51262.13	-9.31		
lambda	I	2038-12-29T03:11:21.648		10.57	-29.05	50026.71	-6.97		

No planet occultations

lambda	E	2038-12-29T03:26:26.176		13.59	-32.16	50026.71	6.99		
epsilon	E	2038-12-29T03:29:23.105		14.18	-32.77	51483.33	9.33		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2038-12-29T03:15:19.690
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      : 673929301307536384
2Mass ID (if available) : 07563849+2117229
ICRS Star Coord at Epoch: 07h 56m 38.47736s +21:17:22.89023s
RUWE (>1.4 is poor) : 0.99
K magnitude          : 13.918
G magnitude          : 15.659
RP magnitude         : 15.078
BP magnitude         : 16.074
DUPflag             : 0
Distance (au)       : 17.721
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -21.46
Sun-Target sep (deg) : 159.94
Sun-Moon sep (deg)  : 159.95
B (ring opening deg) : 49.90
PA of pole (deg)    : 88.48
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.747
C/A sky separation (km) : 48164.1
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_itrf93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
    
```



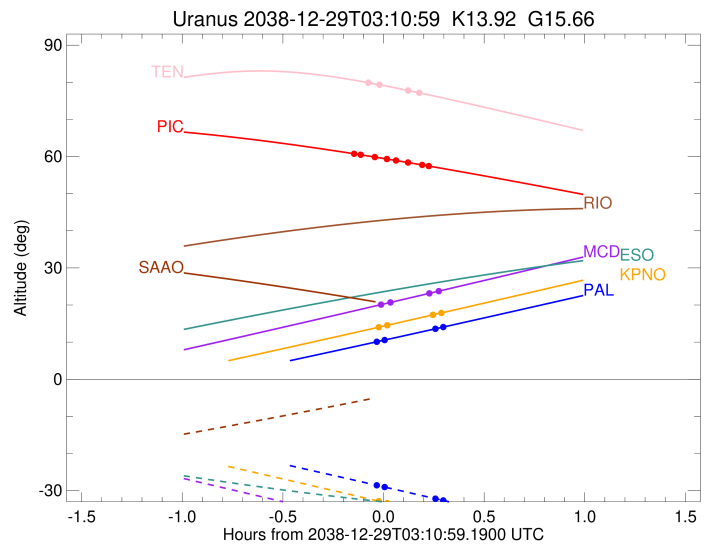
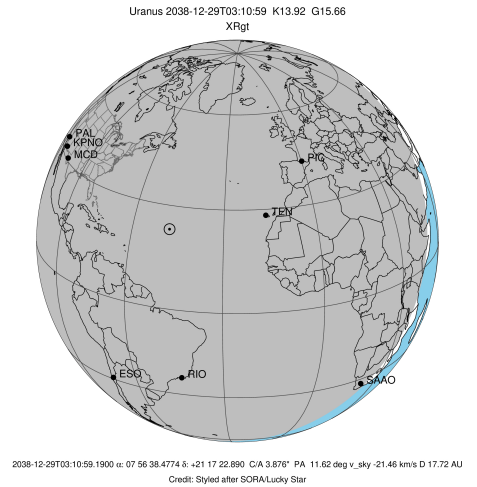
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-12-29T03:09:22.696		13.99	-32.79	51269.41	-8.84		
lambda	I	2038-12-29T03:12:08.845		14.56	-33.37	50026.71	-6.29		

No planet occultations

lambda	E	2038-12-29T03:25:41.535		17.34	-36.22	50026.71	6.30		
epsilon	E	2038-12-29T03:28:51.230		17.99	-36.89	51479.06	8.86		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2038-12-29T03:15:15.500
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       : 673929301307536384
2Mass ID (if available) : 07563849+2117229
ICRS Star Coord at Epoch: 07h 56m 38.47736s +21:17:22.89023s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 13.918
G magnitude           : 15.659
RP magnitude          : 15.078
BP magnitude          : 16.074
DUPflag              : 0
Distance (au)         : 17.721
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -21.46
Sun-Target sep (deg) : 159.94
Sun-Moon sep (deg)   : 159.97
B (ring opening deg) : 49.90
PA of pole (deg)     : 88.48
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.775
C/A sky separation (km) : 48523.1
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_itr93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
  
```



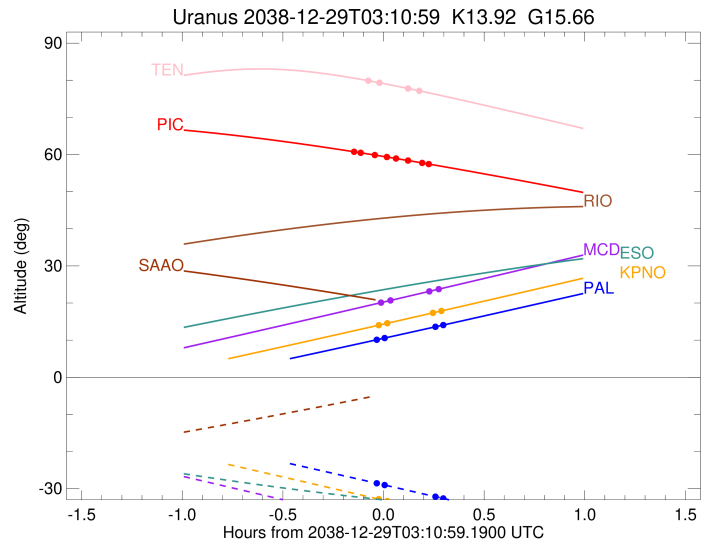
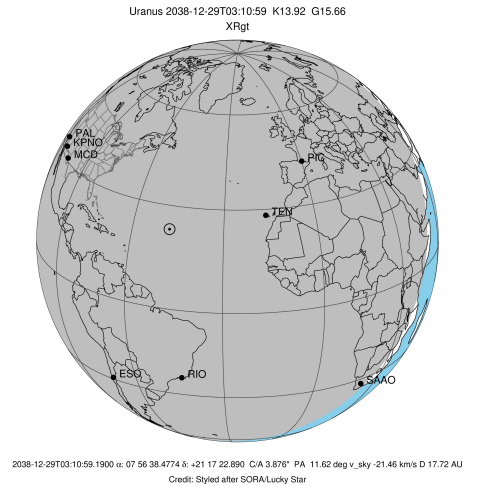
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-12-29T03:10:00.525		20.06	-39.18	51278.45	-8.25		
lambda	I	2038-12-29T03:13:06.612		20.71	-39.85	50026.71	-5.36		

No planet occultations

lambda	E	2038-12-29T03:24:36.666		23.13	-42.31	50026.71	5.37		
epsilon	E	2038-12-29T03:28:06.242		23.87	-43.06	51473.65	8.27		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-12-29T03:10:37.190
 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 : 673929301307536384
 2Mass ID (if available) : 07563849+2117229
 ICRS Star Coord at Epoch: 07h 56m 38.47736s +21:17:22.89023s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 13.918
 G magnitude : 15.659
 RP magnitude : 15.078
 BP magnitude : 16.074
 DUPflag : 0
 Distance (au) : 17.721
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.46
 Sun-Target sep (deg) : 159.94
 Sun-Moon sep (deg) : 159.30
 B (ring opening deg) : 49.90
 PA of pole (deg) : 88.48
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.811
 C/A sky separation (km) : 48986.6
 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	2038-12-29T03:06:09.641		79.94	-62.95	51292.58	-7.59		
lambda	I	2038-12-29T03:09:50.278		79.32	-62.14	50026.71	-4.05		

No planet occultations

lambda	E	2038-12-29T03:18:16.844		77.80	-60.28	50026.71	4.05		
epsilon	E	2038-12-29T03:22:20.796		77.03	-59.39	51468.50	7.59		