

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2027-12-08T21:57:21.030
Event type : XRgt
: No Uranus occs
: Ring occs: geocentric, topocentric
Gaia source ID : 145522842134567296
2Mass ID (if available) : 04212937+2125034

ICRS Star Coord at Epoch: 04h 21m 29.37463s +21:25:03.37388s

RUWE (>1.4 is poor) : 1.00
K magnitude : 11.090
G magnitude : 14.687
RP magnitude : 13.675
BP magnitude : 15.740
DUPflag : 0
Distance (au) : 18.388
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -23.08
Sun-Target sep (deg) : 170.98
Sun-Moon sep (deg) : 50.95
B (ring opening deg) : 77.07
PA of pole (deg) : -63.14

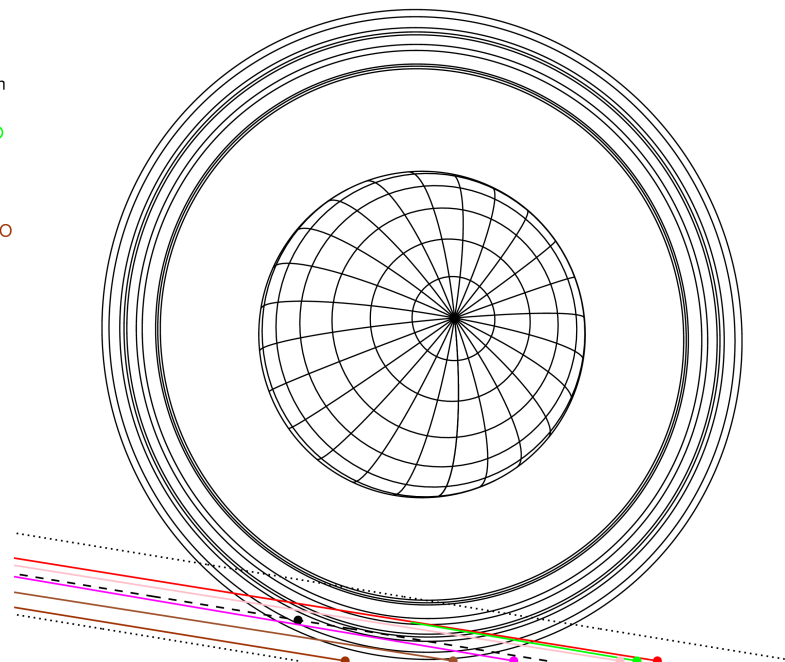
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2027-12-08T21:57:21.030000 cc: 04 21 29.3746 s; +21 25 03.374 C/A 3.5411 PA 350.70 deg v_sky -23.08 km/s D 18.39 AU
Credit: Styled after SORA/Lucky Star

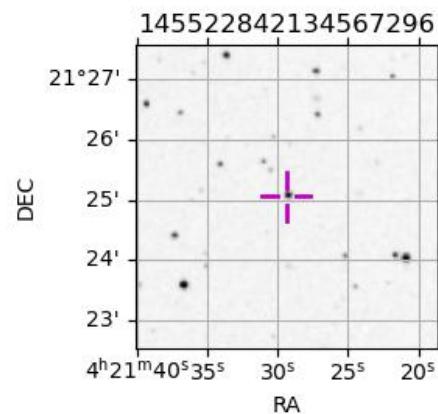
Earth
PIC
PMO
TEN
KAV
RIO
SAAO

Uranus 2027-12-08T21:57:21 K11.09 G14.69 XRgt

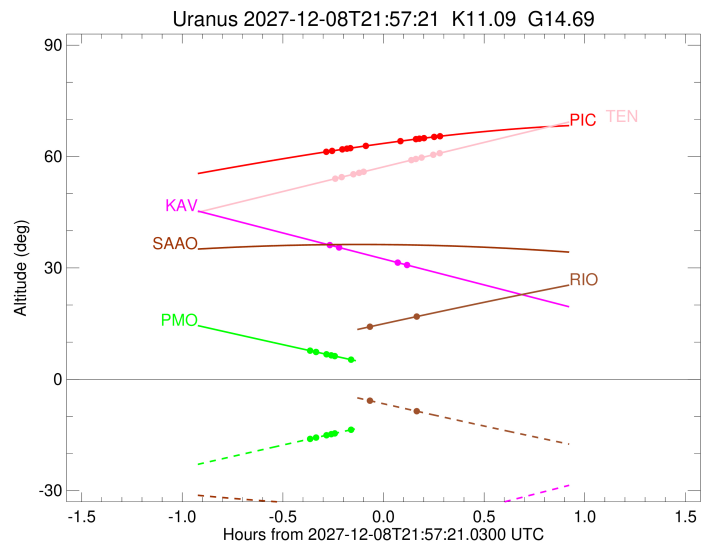
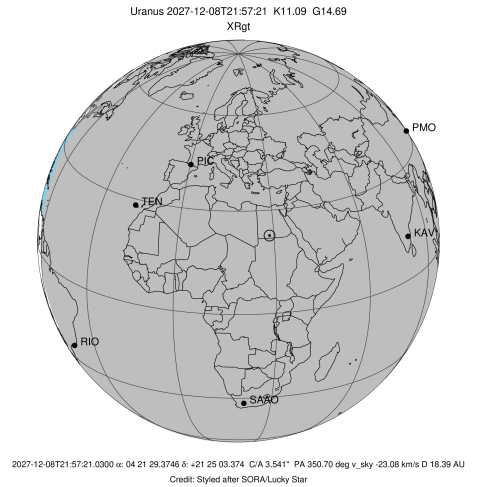


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++		+++++	DEC 08 21:40 - DEC 08 22:13	PnnRie
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++			DEC 08 21:36 - DEC 08 21:47	PnnRin
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	+++++		+++++	DEC 08 21:43 - DEC 08 22:13	PnnRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	++		++	DEC 08 21:42 - DEC 08 22:03	PnnRie
RIO	Rio de Janeiro	-22.9	316.8	+		+	DEC 08 21:55 - DEC 08 22:05	PnnRie
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 : 2027-12-08T21:58:01.170
 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 : 145522842134567296
 2Mass ID (if available) : 04212937+2125034
 ICRS Star Coord at Epoch: 04h 21m 29.37463s +21:25:03.37388s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 11.090
 G magnitude : 14.687
 RP magnitude : 13.675
 BP magnitude : 15.740
 DUPflag : 0
 Distance (au) : 18.388
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.08
 Sun-Target sep (deg) : 170.98
 Sun-Moon sep (deg) : 51.47
 B (ring opening deg) : 77.07
 PA of pole (deg) : -63.14
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.350
 C/A sky separation (km) : 44673.1
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

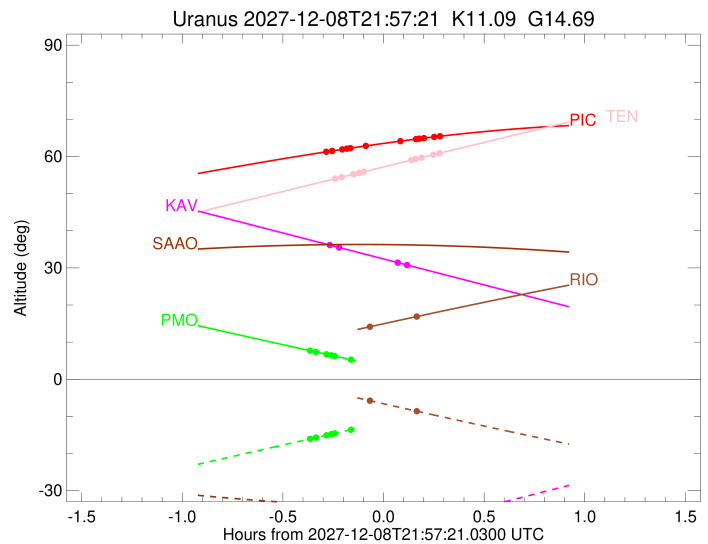
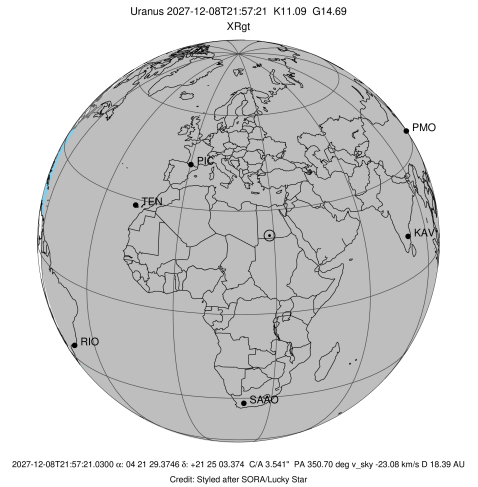


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-12-08T21:40:55.046		61.36	-56.41	50747.05	-10.90		
lambda	I	2027-12-08T21:42:02.887		61.52	-56.59	50026.71	-10.31		
delta	I	2027-12-08T21:45:05.749		61.94	-57.09	48300.35	-8.54		
gamma	I	2027-12-08T21:46:28.968		62.12	-57.32	47625.55	-7.67		
eta	I	2027-12-08T21:47:30.170		62.26	-57.48	47176.12	-7.01		
beta	I	2027-12-08T21:52:04.949		62.86	-58.22	45678.72	-3.84		

No planet occultations

beta	E	2027-12-08T22:02:25.266		64.15	-59.84	45680.91	3.84		
eta	E	2027-12-08T22:06:59.461		64.68	-60.54	47176.12	7.01		
gamma	E	2027-12-08T22:08:00.239		64.80	-60.70	47622.49	7.67		
delta	E	2027-12-08T22:09:23.821		64.95	-60.91	48300.35	8.54		
lambda	E	2027-12-08T22:12:26.586		65.28	-61.36	50026.71	10.32		
epsilon	E	2027-12-08T22:13:45.847		65.42	-61.55	50872.87	10.91		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2027-12-08T21:53:21.340
 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 : 145522842134567296
 2Mass ID (if available) : 04212937+2125034
 ICRS Star Coord at Epoch: 04h 21m 29.37463s +21:25:03.37388s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 11.090
 G magnitude : 14.687
 RP magnitude : 13.675
 BP magnitude : 15.740
 DUPflag : 0
 Distance (au) : 18.388
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.08
 Sun-Target sep (deg) : 170.98
 Sun-Moon sep (deg) : 51.49
 B (ring opening deg) : 77.07
 PA of pole (deg) : -63.14
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.355
 C/A sky separation (km) : 44739.7
 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

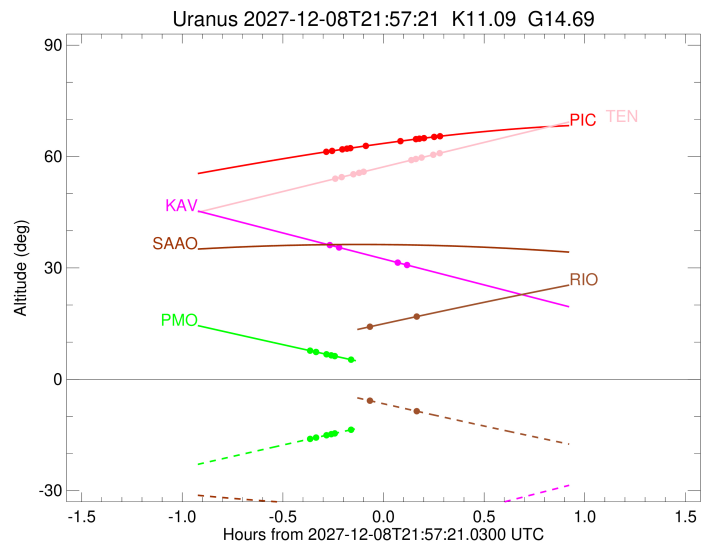
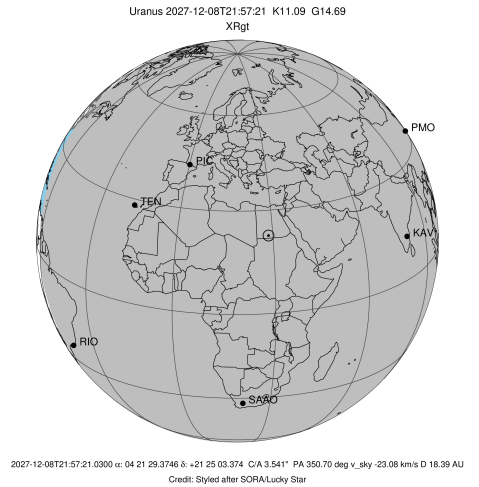


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-12-08T21:36:06.635		7.57	-15.94	50746.35	-10.68		
lambda	I	2027-12-08T21:37:15.821		7.34	-15.71	50026.71	-10.09		
delta	I	2027-12-08T21:40:22.980		6.72	-15.07	48300.35	-8.32		
gamma	I	2027-12-08T21:41:48.523		6.44	-14.79	47625.47	-7.45		
eta	I	2027-12-08T21:42:51.637		6.23	-14.57	47176.12	-6.78		
beta	I	2027-12-08T21:47:40.583		5.28	-13.60	45678.92	-3.53		

No planet occultations

beta	E	2027-12-08T21:57:27.927		3.36x	-11.64	45680.90	3.53		
eta	E	2027-12-08T22:02:16.696		2.42x	-10.68	47176.12	6.78		
gamma	E	2027-12-08T22:03:19.504		2.22x	-10.47	47622.47	7.44		
delta	E	2027-12-08T22:04:45.600		1.94x	-10.19	48300.35	8.31		
lambda	E	2027-12-08T22:07:53.150		1.33x	-9.57	50026.71	10.07		
epsilon	E	2027-12-08T22:09:14.486		1.07x	-9.30	50874.91	10.66		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2027-12-08T21:59:19.680
 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 : 145522842134567296
 2Mass ID (if available) : 04212937+2125034
 ICRS Star Coord at Epoch: 04h 21m 29.37463s +21:25:03.37388s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 11.090
 G magnitude : 14.687
 RP magnitude : 13.675
 BP magnitude : 15.740
 DUPflag : 0
 Distance (au) : 18.388
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.08
 Sun-Target sep (deg) : 170.98
 Sun-Moon sep (deg) : 51.27
 B (ring opening deg) : 77.07
 PA of pole (deg) : -63.14
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.425
 C/A sky separation (km) : 45672.9
 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



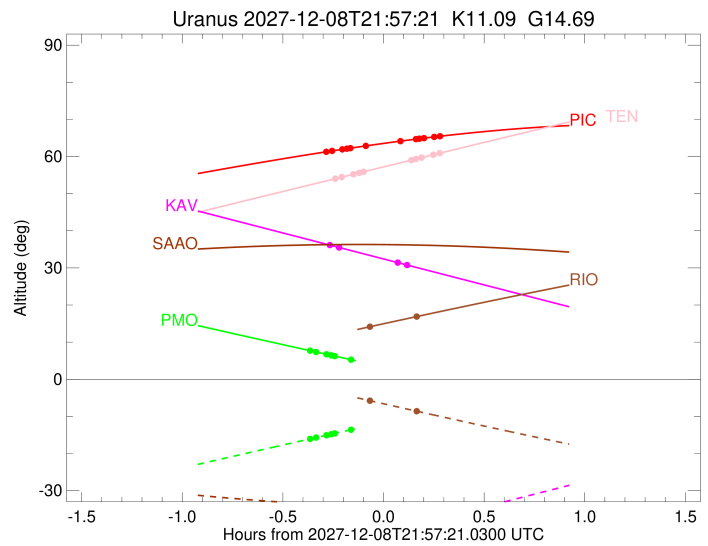
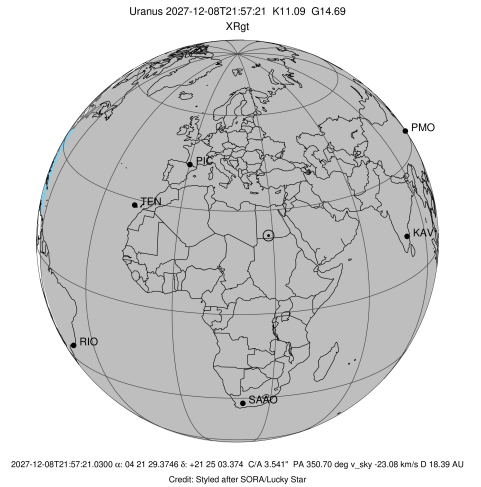
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-12-08T21:43:39.369		54.18	-46.09	50745.13	-9.94		
lambda	I	2027-12-08T21:44:54.149		54.46	-46.37	50026.71	-9.25		
delta	I	2027-12-08T21:48:24.509		55.23	-47.14	48300.35	-7.12		
gamma	I	2027-12-08T21:50:07.334		55.61	-47.52	47625.18	-6.00		
eta	I	2027-12-08T21:51:28.279		55.91	-47.81	47176.12	-5.09		

No planet occultations

eta	E	2027-12-08T22:05:36.515		59.03	-50.92	47176.12	5.09		
gamma	E	2027-12-08T22:06:57.008		59.32	-51.22	47622.78	6.00		
delta	E	2027-12-08T22:08:40.152		59.70	-51.60	48300.35	7.13		
lambda	E	2027-12-08T22:12:10.300		60.47	-52.37	50026.71	9.26		
epsilon	E	2027-12-08T22:13:36.379		60.79	-52.69	50859.24	9.95		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2027-12-08T21:53:41.460
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       : 145522842134567296
2Mass ID (if available) : 04212937+2125034
ICRS Star Coord at Epoch: 04h 21m 29.37463s +21:25:03.37388s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 11.090
G magnitude           : 14.687
RP magnitude          : 13.675
BP magnitude          : 15.740
DUPflag              : 0
Distance (au)        : 18.388
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -23.08
Sun-Target sep (deg) : 170.98
Sun-Moon sep (deg)   : 51.83
B (ring opening deg) : 77.07
PA of pole (deg)     : -63.14
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.601
C/A sky separation (km) : 48024.8
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
  
```

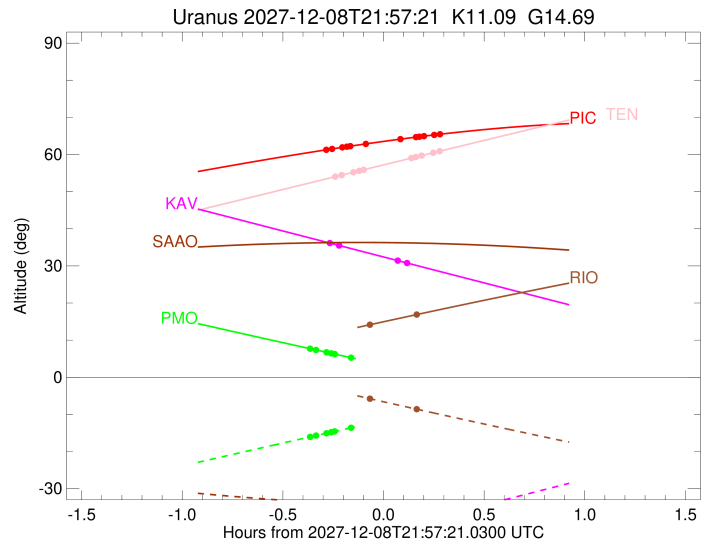
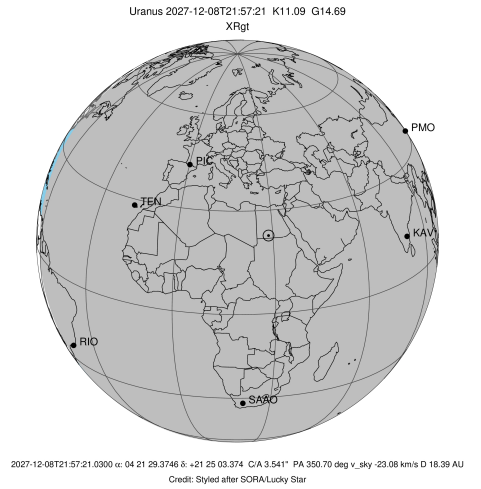


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-12-08T21:42:18.198		35.92	-44.78	50744.07	-7.04		
lambda	I	2027-12-08T21:44:09.296		35.49	-44.36	50026.71	-5.88		

No planet occultations

lambda	E	2027-12-08T22:01:33.568		31.43	-40.35	50026.71	5.87		
epsilon	E	2027-12-08T22:03:36.584		30.95	-39.88	50827.31	7.03		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2027-12-08T22:01:08.850
 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 : 145522842134567296
 2Mass ID (if available) : 04212937+2125034
 ICRS Star Coord at Epoch: 04h 21m 29.37463s +21:25:03.37388s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 11.090
 G magnitude : 14.687
 RP magnitude : 13.675
 BP magnitude : 15.740
 DUPflag : 0
 Distance (au) : 18.388
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.08
 Sun-Target sep (deg) : 170.98
 Sun-Moon sep (deg) : 50.64
 B (ring opening deg) : 77.07
 PA of pole (deg) : -63.14
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.730
 C/A sky separation (km) : 49750.2
 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	2027-12-08T21:55:00.570		14.49	-6.12	50751.65	-3.53		

No planet occultations

epsilon	E	2027-12-08T22:05:45.041		16.60	-8.30	50791.98	3.53		
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