

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-12-16T09:36:10.680
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3424837987331506944
 2Mass ID (if available) : 05571128+2339031

ICRS Star Coord at Epoch: 05h 57m 11.29152s +23:39:02.86417s

RUWE (>1.4 is poor) : 0.95
 K magnitude : 12.663
 G magnitude : 14.234
 RP magnitude : 13.679
 BP magnitude : 14.611
 DUPflag : 0
 Distance (au) : 18.039
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.30
 Sun-Target sep (deg) : 175.16
 Sun-Moon sep (deg) : 11.31
 B (ring opening deg) : 75.88
 PA of pole (deg) : 55.27

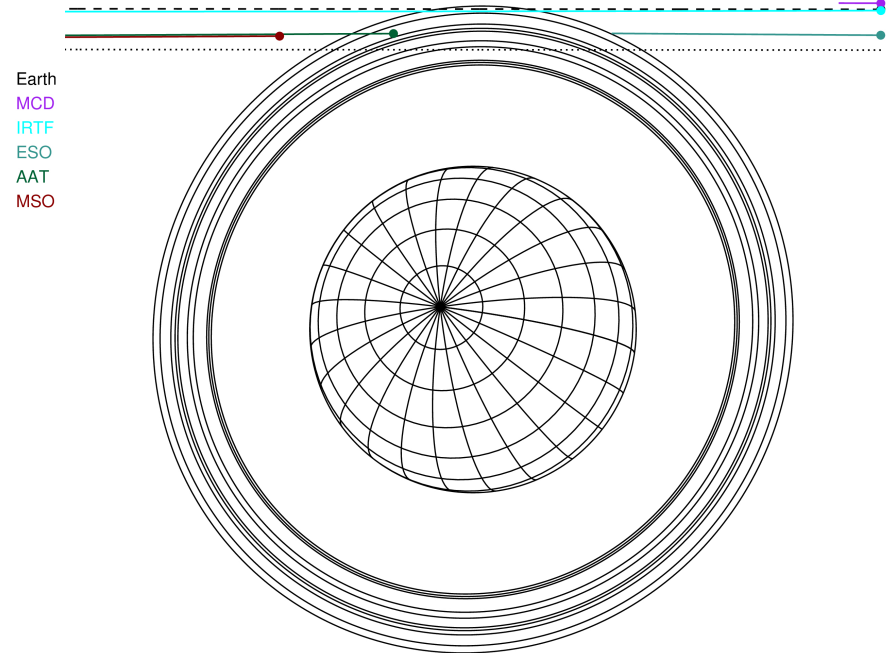
a(km) ring

- 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



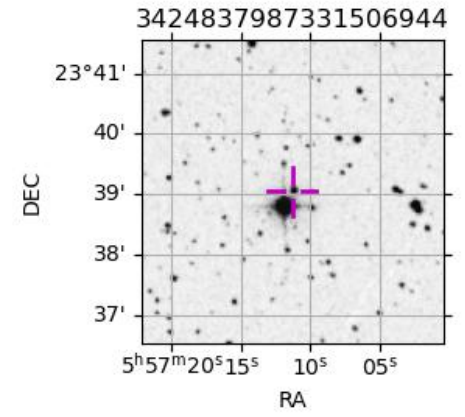
2032-12-16T09:36:10.6800 ra: 05 57 11.2915 s: +23 39 02.864 C/A 3.843° PA 179.96 deg v_sky -23.30 km/s D 18.04 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2032-12-16T09:36:10 K12.66 G14.23 XRgt



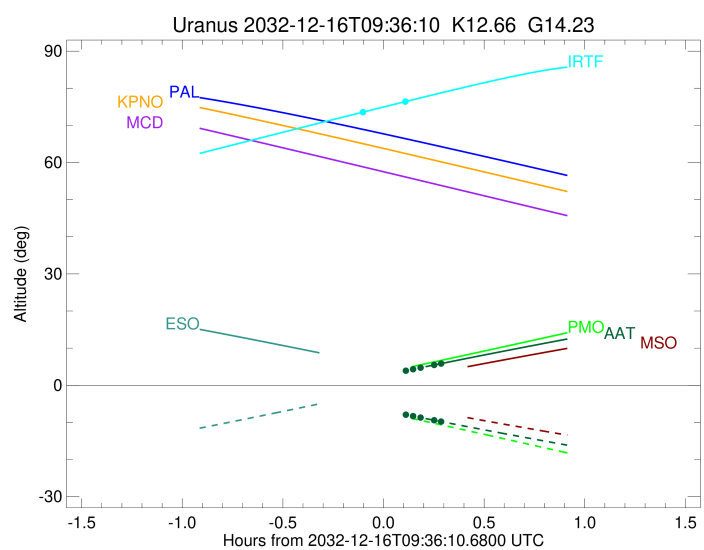
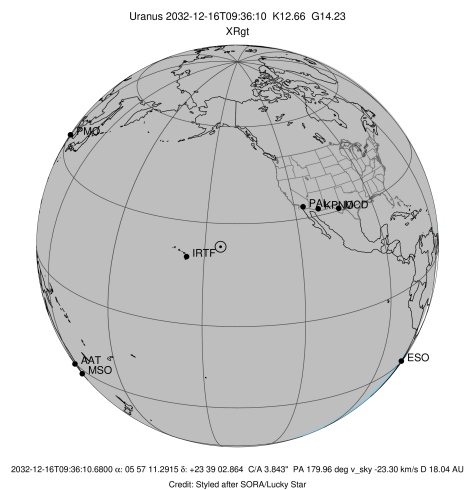
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					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	+		+	DEC 16 09:28 - DEC 16 09:44	PnnRie
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	+			DEC 16 09:16 - DEC 16 09:16	PnnRin
AAT	Siding Spring (AAT)	-31.3	149.1			++	DEC 16 09:51 - DEC 16 09:53	PnnRne
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



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target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2032-12-16T09:37:22.870
Event type          : XRgt
: No Uranus occs
: Ring occs: geocentric, topocentric
Observer code       : IRTF
Location            : Mauna Kea/IRTF
Latitude (deg)      : 19.82622
E. Longitude (deg)  : 204.52800
Altitude (km)       : 4.168
Gaia source ID      : 3424837987331506944
2Mass ID (if available) : 05571128+2339031
ICRS Star Coord at Epoch: 05h 57m 11.29152s +23:39:02.86417s
RUWE (>1.4 is poor) : 0.95
K magnitude         : 12.663
G magnitude         : 14.234
RP magnitude        : 13.679
BP magnitude        : 14.611
DUPflag            : 0
Distance (au)       : 18.039
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -23.30
Sun-Target sep (deg) : 175.16
Sun-Moon sep (deg)  : 11.25
B (ring opening deg) : 75.88
PA of pole (deg)    : 55.27
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.808
C/A sky separation (km) : 49824.7
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
    
```



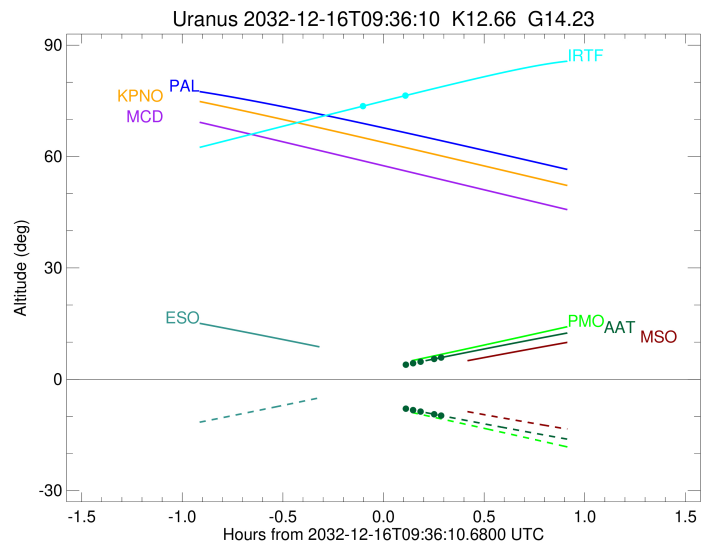
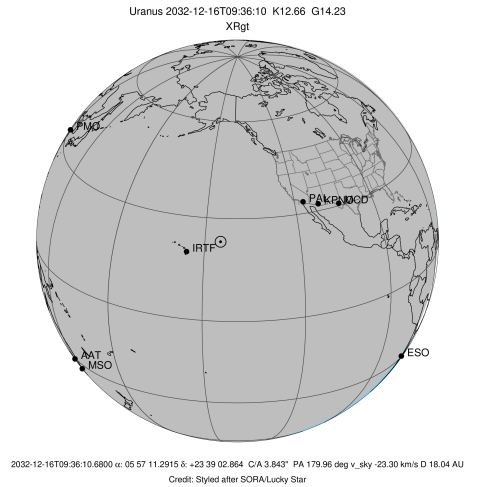
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b: ring blocked by planet  x: target alt < 5.0 deg or sun > -5.0 deg
Ring      I/E      UTC      b? alt  alt-sun  radius  r-dot  lat-geo lat-geodetic
-----
epsilon   I  2032-12-16T09:28:44.158  73.28 -78.06  51544.18  -5.28

No planet occultations

epsilon   E  2032-12-16T09:44:02.812  76.71 -81.38  51547.52   5.28
    
```

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-12-16T09:32:15.500
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 3424837987331506944
 2Mass ID (if available) : 05571128+2339031
 ICRS Star Coord at Epoch: 05h 57m 11.29152s +23:39:02.86417s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 12.663
 G magnitude : 14.234
 RP magnitude : 13.679
 BP magnitude : 14.611
 DUPflag : 0
 Distance (au) : 18.039
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.30
 Sun-Target sep (deg) : 175.16
 Sun-Moon sep (deg) : 11.87
 B (ring opening deg) : 75.88
 PA of pole (deg) : 55.27
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.556
 C/A sky separation (km) : 46525.2
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

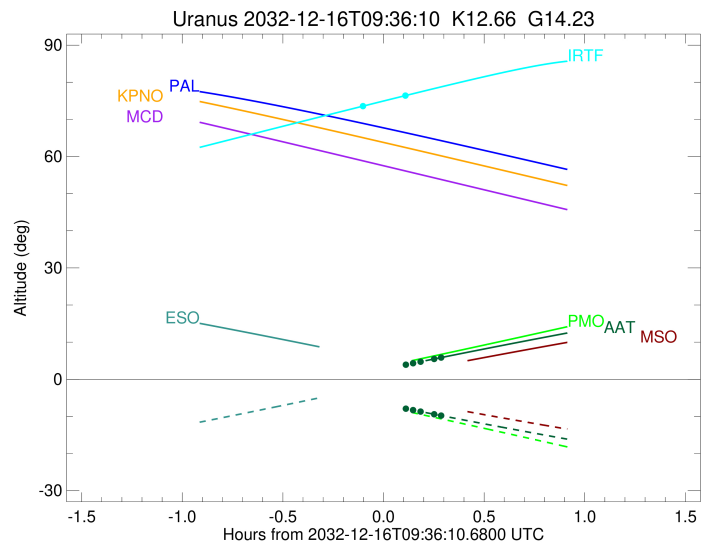
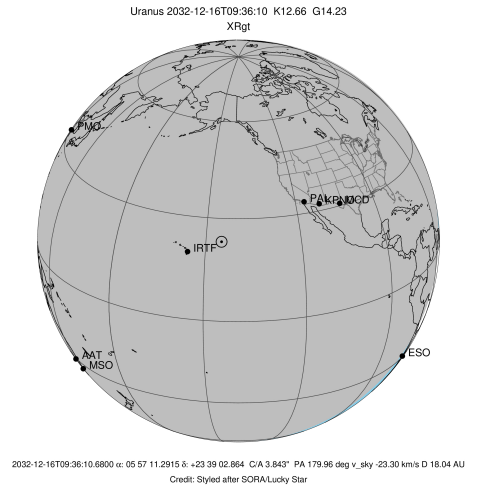


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-12-16T09:16:38.626		8.81	-5.08	51514.41	-9.91		
lambda	I	2032-12-16T09:19:23.099		8.31	-4.56x	50026.71	-8.23		
delta	I	2032-12-16T09:23:32.680		7.54	-3.77x	48300.35	-5.55		
gamma	I	2032-12-16T09:25:54.640		7.11	-3.32x	47627.14	-3.92		
eta	I	2032-12-16T09:28:23.144		6.65	-2.85x	47176.12	-2.15		

No planet occultations

eta	E	2032-12-16T09:34:15.869		5.55	-1.72x	47176.12	2.15		
gamma	E	2032-12-16T09:36:44.018		5.08	-1.24x	47625.41	3.91		
delta	E	2032-12-16T09:39:06.554		4.63x	-0.78x	48300.35	5.55		
lambda	E	2032-12-16T09:43:16.482		3.84x	0.02x	50026.71	8.22		
epsilon	E	2032-12-16T09:46:02.189		3.32x	0.56x	51523.48	9.89		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-12-16T09:40:03.170
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 3424837987331506944
 2Mass ID (if available) : 05571128+2339031
 ICRS Star Coord at Epoch: 05h 57m 11.29152s +23:39:02.86417s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 12.663
 G magnitude : 14.234
 RP magnitude : 13.679
 BP magnitude : 14.611
 DUPflag : 0
 Distance (au) : 18.039
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.30
 Sun-Target sep (deg) : 175.16
 Sun-Moon sep (deg) : 10.42
 B (ring opening deg) : 75.88
 PA of pole (deg) : 55.27
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.547
 C/A sky separation (km) : 46408.5
 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	2032-12-16T09:24:14.411		0.44x	-4.56x	51515.79	-9.98		
lambda	I	2032-12-16T09:26:57.420		0.96x	-5.05	50026.71	-8.34		
delta	I	2032-12-16T09:31:01.720		1.72x	-5.80	48300.35	-5.75		
gamma	I	2032-12-16T09:33:16.862		2.15x	-6.21	47627.14	-4.20		
eta	I	2032-12-16T09:35:28.290		2.55x	-6.60	47176.12	-2.65		

No planet occultations

eta	E	2032-12-16T09:42:44.978		3.90x	-7.91	47176.12	2.65		
gamma	E	2032-12-16T09:44:55.874		4.31x	-8.30	47625.28	4.21		
delta	E	2032-12-16T09:47:11.324		4.72x	-8.70	48300.35	5.75		
lambda	E	2032-12-16T09:51:15.270		5.46	-9.42	50026.71	8.36		
epsilon	E	2032-12-16T09:53:58.456		5.96	-9.90	51520.69	10.00		