

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-01-10T02:51:40.530  
 Event type : XRT  
 : No Uranus occs  
 : Ring occs: topocentric, not geocentric  
 Gaia source ID : 3427497499800840192  
 2Mass ID (if available) : 05523992+2338420

ICRS Star Coord at Epoch: 05h 52m 39.91996s +23:38:41.97486s

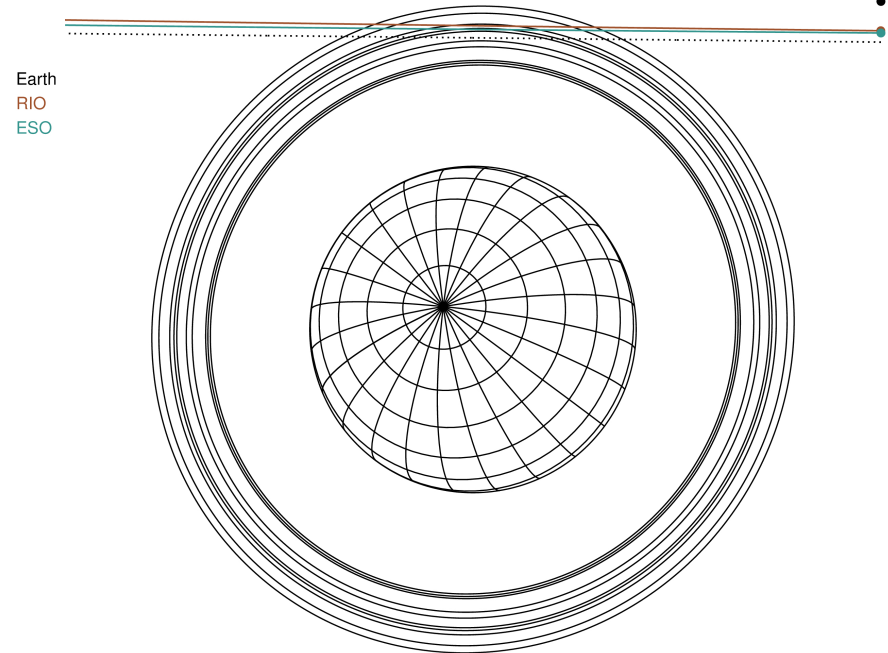
RUWE (>1.4 is poor) : 1.02  
 K magnitude : 14.104  
 G magnitude : 17.607  
 RP magnitude : 16.593  
 BP magnitude : 18.631  
 DUPflag : 0  
 Distance (au) : 18.097  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -21.37  
 Sun-Target sep (deg) : 158.61  
 Sun-Moon sep (deg) : 43.66  
 B (ring opening deg) : 76.72  
 PA of pole (deg) : 52.32

#	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



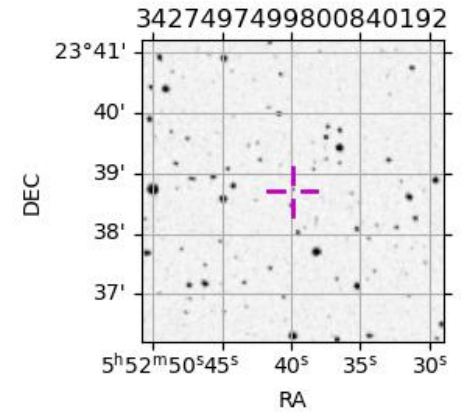
2033-01-10T02:51:40.5300 ra: 05 52 39.9200 s: +23 38 41.975 C/A 3.973° PA 179.39 deg v\_sky -21.37 km/s D 18.10 AU  
 Credit: Styled after SORA/Lucky Star

Uranus 2033-01-10T02:51:40 K14.10 G17.61 XRT



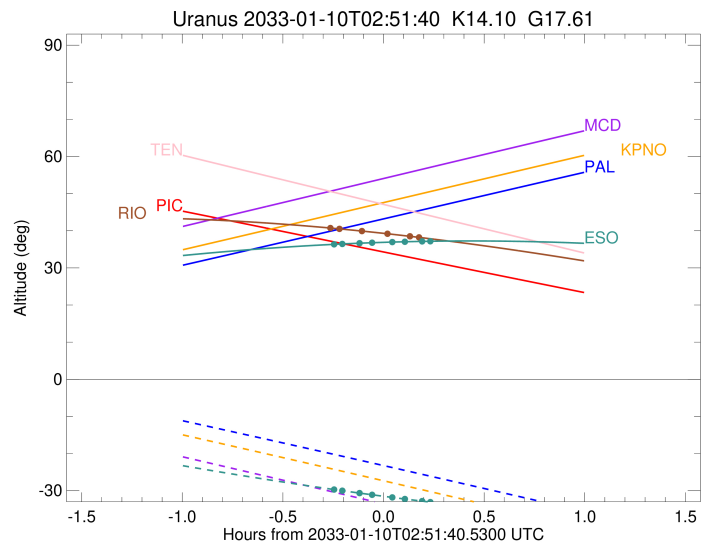
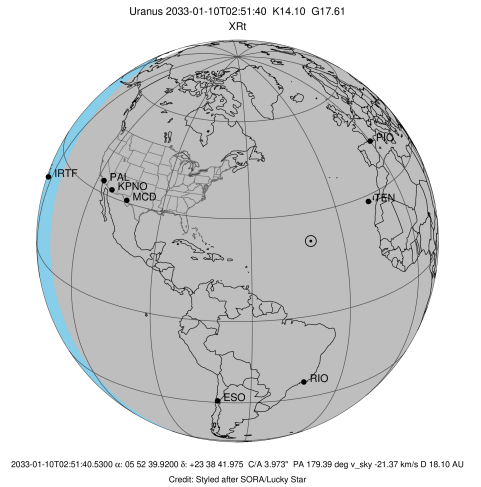
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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					PnnRnn
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++		+++	JAN 10 02:35 - JAN 10 03:03	PnnRie
ESO	European Southern Obs	-29.3	289.3	++++		++++	JAN 10 02:36 - JAN 10 03:06	PnnRie
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



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target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-01-10T02:49:59.500
Event type          : XRt
                    : No Uranus occs
                    : Ring occs: topocentric, not geocentric
Observer code       : RIO
Location            : Rio de Janeiro
Latitude (deg)      : -22.89506
E. Longitude (deg)  : 316.77708
Altitude (km)       : 0.033
Gaia source ID      : 3427497499800840192
2Mass ID (if available) : 05523992+2338420
ICRS Star Coord at Epoch: 05h 52m 39.91996s +23:38:41.97486s
RUWE (>1.4 is poor) : 1.02
K magnitude         : 14.104
G magnitude         : 17.607
RP magnitude        : 16.593
BP magnitude        : 18.631
DUPflag            : 0
Distance (au)       : 18.097
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -21.37
Sun-Target sep (deg) : 158.61
Sun-Moon sep (deg)  : 44.29
B (ring opening deg) : 76.72
PA of pole (deg)    : 52.32
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.625
C/A sky separation (km) : 47574.8
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_itr93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
  
```

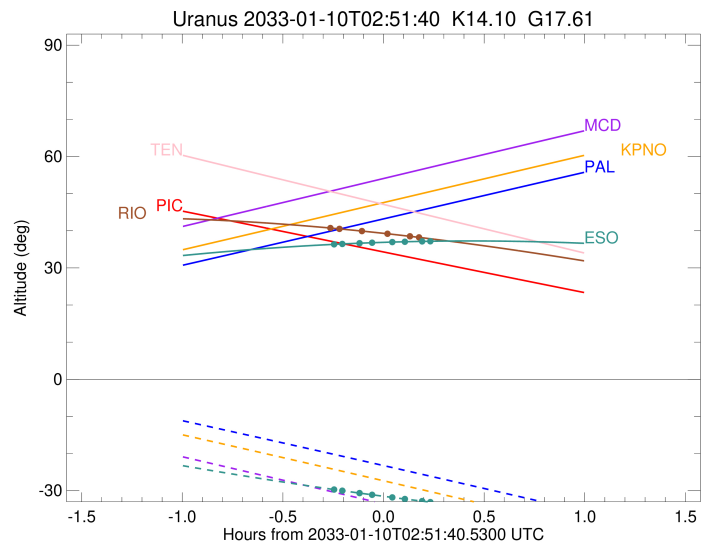
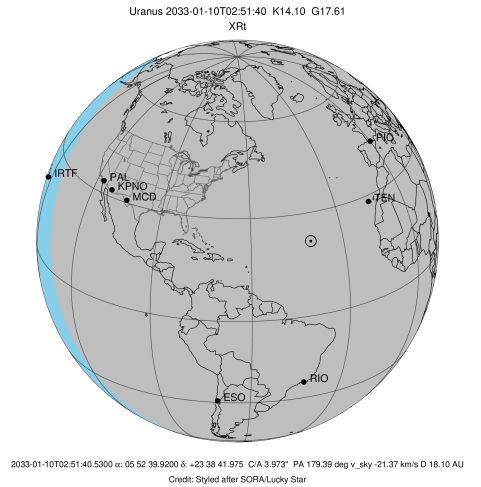


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-01-10T02:35:22.899		40.78	-44.91	51374.99	-7.99		
lambda	I	2033-01-10T02:38:34.885		40.51	-45.01	50026.71	-6.17		
delta	I	2033-01-10T02:45:21.019		39.91	-45.18	48300.35	-2.26		

No planet occultations

delta	E	2033-01-10T02:52:45.205		39.21	-45.29	48300.35	2.26		
lambda	E	2033-01-10T02:59:31.548		38.51	-45.33	50026.71	6.17		
epsilon	E	2033-01-10T03:03:04.904		38.13	-45.32	51543.14	7.98		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-01-10T02:52:13.340  
 Event type : XRt  
 : No Uranus occs  
 : Ring occs: topocentric, not geocentric  
 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 : 3427497499800840192  
 2Mass ID (if available) : 05523992+2338420  
 ICRS Star Coord at Epoch: 05h 52m 39.91996s +23:38:41.97486s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 14.104  
 G magnitude : 17.607  
 RP magnitude : 16.593  
 BP magnitude : 18.631  
 DUPflag : 0  
 Distance (au) : 18.097  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -21.37  
 Sun-Target sep (deg) : 158.61  
 Sun-Moon sep (deg) : 43.97  
 B (ring opening deg) : 76.72  
 PA of pole (deg) : 52.32  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 3.581  
 C/A sky separation (km) : 46999.7  
 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



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	2033-01-10T02:36:32.441		36.33	-29.66	51365.94	-8.60		
lambda	I	2033-01-10T02:39:25.533		36.45	-30.02	50026.71	-6.99		
delta	I	2033-01-10T02:44:35.824		36.66	-30.67	48300.35	-4.08		
gamma	I	2033-01-10T02:48:22.922		36.78	-31.13	47630.20	-1.80		

No planet occultations

gamma	E	2033-01-10T02:54:11.712		36.95	-31.82	47629.57	1.80		
delta	E	2033-01-10T02:57:59.152		37.04	-32.25	48300.35	4.09		
lambda	E	2033-01-10T03:03:09.421		37.14	-32.82	50026.71	6.99		
epsilon	E	2033-01-10T03:06:23.581		37.19	-33.17	51546.24	8.60		