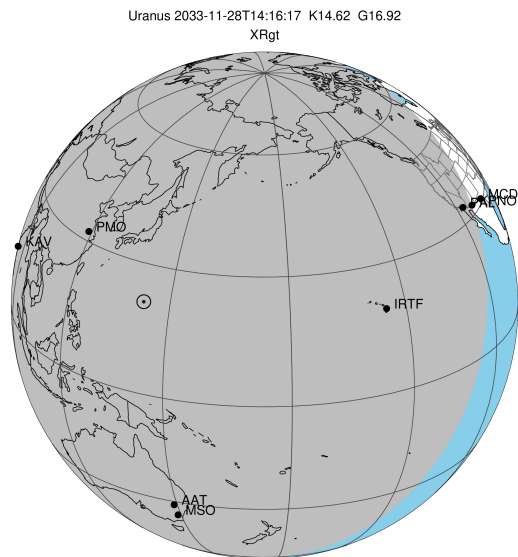


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-11-28T14:16:17.170
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3377534695003286016
 2Mass ID (if available) : 06202647+2337268

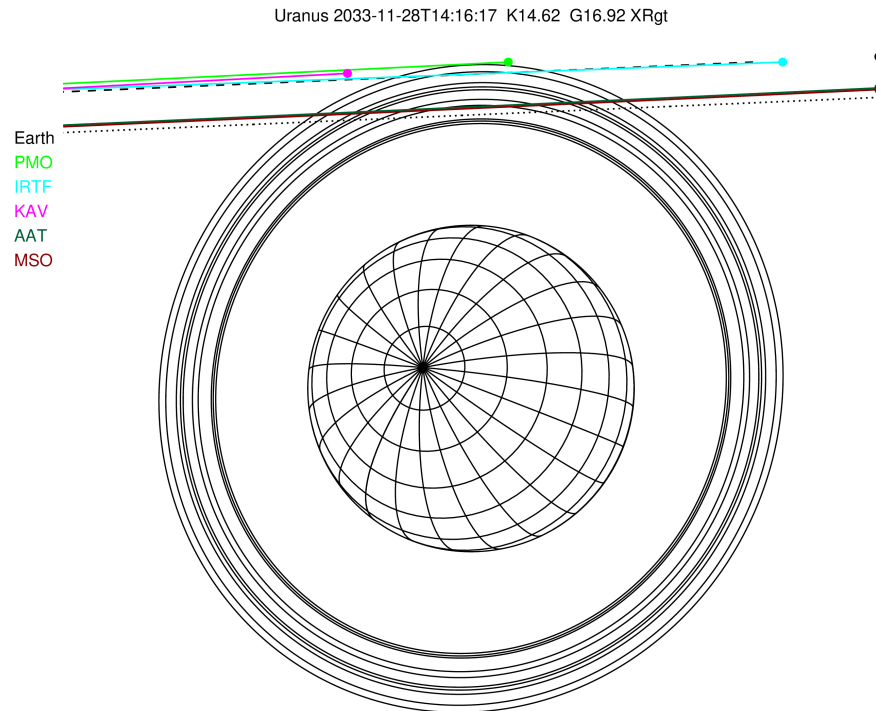
ICRS Star Coord at Epoch: 06h 20m 26.48308s +23:37:26.70296s

RUWE (>1.4 is poor) : 0.94
 K magnitude : 14.617
 G magnitude : 16.918
 RP magnitude : 16.182
 BP magnitude : 17.494
 DUPflag : 0
 Distance (au) : 18.085
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.80
 Sun-Target sep (deg) : 151.51
 Sun-Moon sep (deg) : 131.50
 B (ring opening deg) : 71.23
 PA of pole (deg) : 66.48

#	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

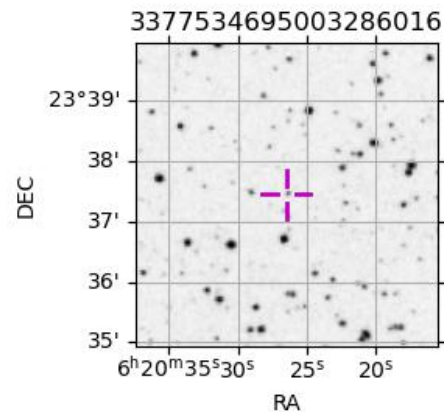


2033-11-28T14:16:17.1700 ra: 06 20 26.4831 s: +23 37 26.703 C/A 3.756" PA 182.47 deg v_sky -19.80 km/s D 18.09 AU
 Credit: Styled after SORA/Lucky Star



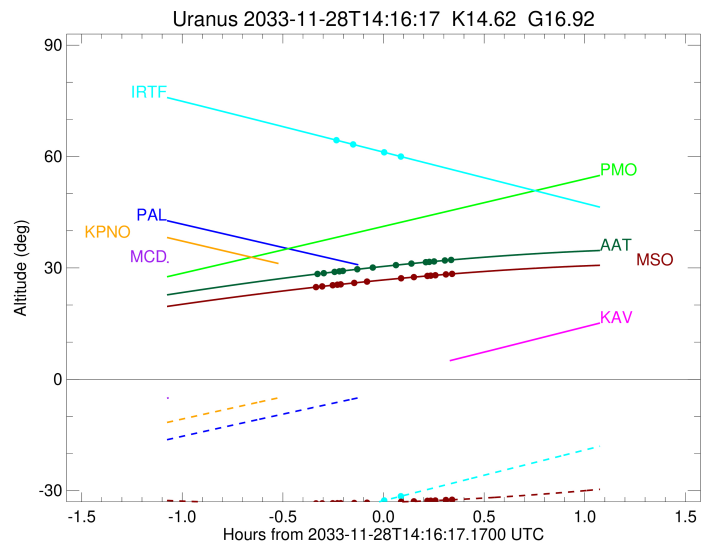
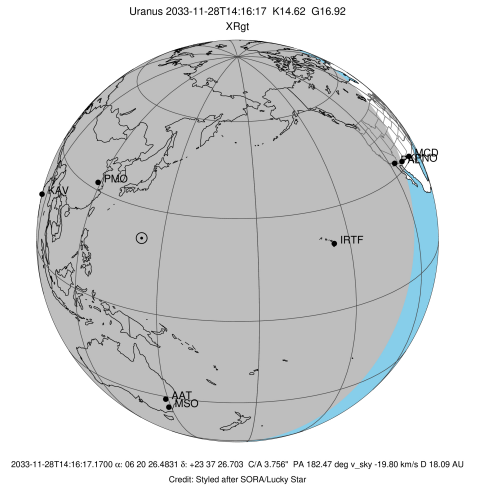
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	++		++	NOV 28 14:03 - NOV 28 14:21	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					PnnRnn
AAT	Siding Spring (AAT)	-31.3	149.1	+++++++		+++++++	NOV 28 13:57 - NOV 28 14:36	PnnRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++++		+++++++	NOV 28 13:56 - NOV 28 14:36	PnnRie



```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-11-28T14:13:31.990
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      : 3377534695003286016
2Mass ID (if available) : 06202647+2337268
ICRS Star Coord at Epoch: 06h 20m 26.48308s +23:37:26.70296s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 14.617
G magnitude          : 16.918
RP magnitude         : 16.182
BP magnitude         : 17.494
DUPflag             : 0
Distance (au)       : 18.085
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -19.80
Sun-Target sep (deg) : 151.51
Sun-Moon sep (deg)  : 131.82
B (ring opening deg) : 71.23
PA of pole (deg)    : 66.48
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.751
C/A sky separation (km) : 49195.6
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
    
```

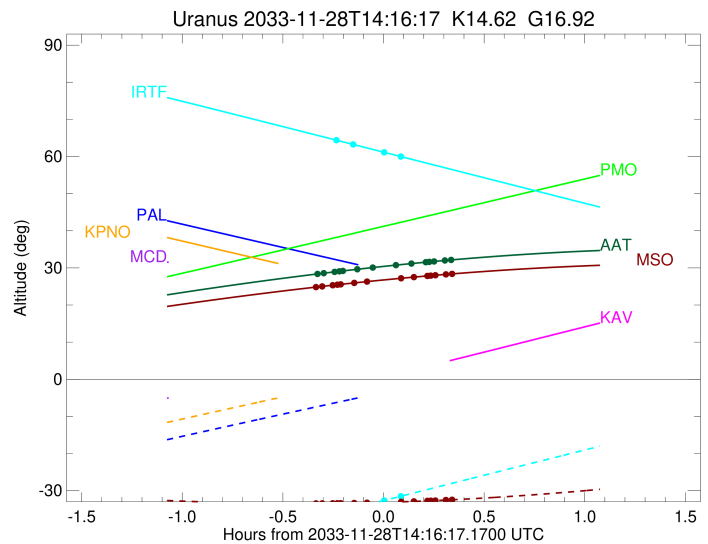
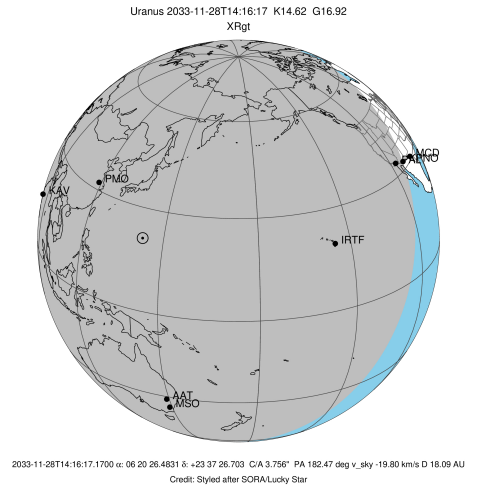


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-11-28T14:03:09.730		64.20	-35.70	50902.12	-4.70		
lambda	I	2033-11-28T14:07:19.363		63.24	-34.75	50026.71	-2.42		

No planet occultations

lambda	E	2033-11-28T14:16:23.578		61.16	-32.67	50026.71	2.42		
epsilon	E	2033-11-28T14:21:08.147		60.07	-31.59	51066.08	4.70		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-11-28T14:18:03.720
 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 : 3377534695003286016
 2Mass ID (if available) : 06202647+2337268
 ICRS Star Coord at Epoch: 06h 20m 26.48308s +23:37:26.70296s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 14.617
 G magnitude : 16.918
 RP magnitude : 16.182
 BP magnitude : 17.494
 DUPflag : 0
 Distance (au) : 18.085
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.80
 Sun-Target sep (deg) : 151.51
 Sun-Moon sep (deg) : 132.02
 B (ring opening deg) : 71.23
 PA of pole (deg) : 66.48
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.359
 C/A sky separation (km) : 44055.2
 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

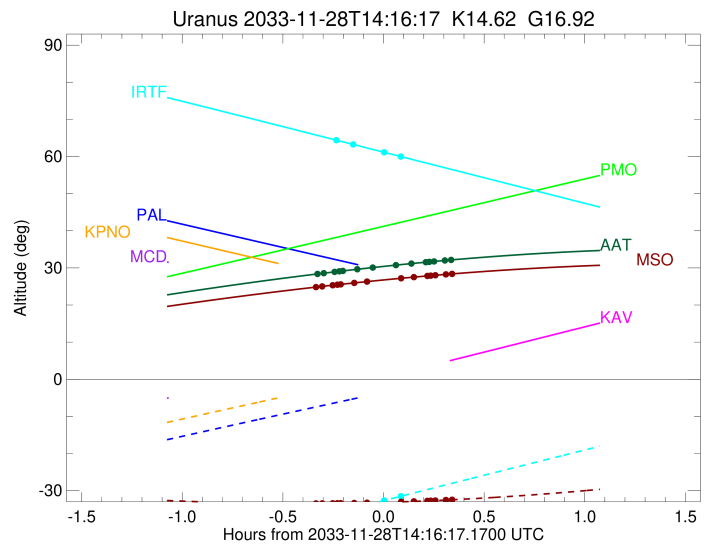
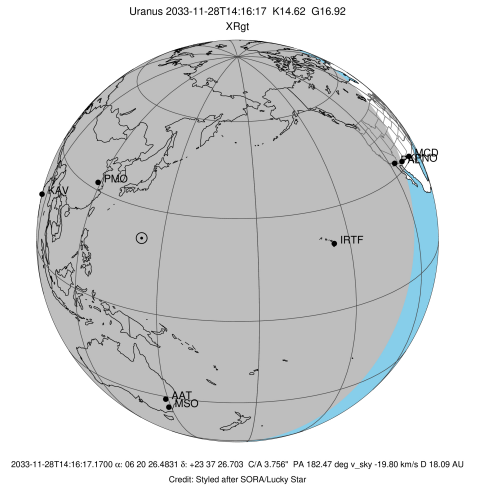


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-11-28T13:57:09.707		28.43	-37.47	50823.73	-10.25		
lambda	I	2033-11-28T13:58:30.292		28.58	-37.46	50026.71	-9.61		
delta	I	2033-11-28T14:01:44.141		28.93	-37.43	48300.35	-8.17		
gamma	I	2033-11-28T14:03:10.903		29.08	-37.41	47620.96	-7.48		
eta	I	2033-11-28T14:04:12.442		29.19	-37.40	47176.12	-6.97		
beta	I	2033-11-28T14:08:30.521		29.63	-37.33	45665.90	-4.68		
alpha	I	2033-11-28T14:12:57.506		30.08	-37.23	44751.32	-2.13		

No planet occultations

alpha	E	2033-11-28T14:20:05.976		30.76	-37.04	44748.92	2.13		
beta	E	2033-11-28T14:24:32.461		31.16	-36.89	45656.98	4.69		
eta	E	2033-11-28T14:28:52.132		31.53	-36.73	47176.12	6.98		
gamma	E	2033-11-28T14:29:53.794		31.62	-36.69	47622.40	7.49		
delta	E	2033-11-28T14:31:20.257		31.74	-36.63	48300.35	8.19		
lambda	E	2033-11-28T14:34:33.827		32.00	-36.48	50026.71	9.63		
epsilon	E	2033-11-28T14:36:29.205		32.15	-36.39	51183.42	10.27		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-11-28T14:17:58.120
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : MSO
 Location : Mt. Stromlo Observatory
 Latitude (deg) : -35.32000
 E. Longitude (deg) : 149.00833
 Altitude (km) : 0.770
 Gaia source ID : 3377534695003286016
 2Mass ID (if available) : 06202647+2337268
 ICRS Star Coord at Epoch: 06h 20m 26.48308s +23:37:26.70296s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 14.617
 G magnitude : 16.918
 RP magnitude : 16.182
 BP magnitude : 17.494
 DUPflag : 0
 Distance (au) : 18.085
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.80
 Sun-Target sep (deg) : 151.51
 Sun-Moon sep (deg) : 131.97
 B (ring opening deg) : 71.23
 PA of pole (deg) : 66.48
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.340
 C/A sky separation (km) : 43807.9
 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



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	2033-11-28T13:56:42.508		24.88	-33.44	50821.31	-10.43		
lambda	I	2033-11-28T13:58:01.373		25.02	-33.43	50026.71	-9.81		
delta	I	2033-11-28T14:01:10.539		25.33	-33.41	48300.35	-8.42		
gamma	I	2033-11-28T14:02:34.484		25.47	-33.39	47620.96	-7.76		
eta	I	2033-11-28T14:03:33.637		25.57	-33.38	47176.12	-7.28		
beta	I	2033-11-28T14:07:35.566		25.96	-33.33	45666.35	-5.16		
alpha	I	2033-11-28T14:11:16.887		26.30	-33.26	44751.68	-3.07		

No planet occultations

alpha	E	2033-11-28T14:21:36.245		27.21	-33.01	44748.22	3.08		
beta	E	2033-11-28T14:25:17.067		27.51	-32.90	45656.52	5.16		
eta	E	2033-11-28T14:29:20.597		27.83	-32.76	47176.12	7.29		
gamma	E	2033-11-28T14:30:19.876		27.91	-32.72	47622.45	7.77		
delta	E	2033-11-28T14:31:43.525		28.02	-32.67	48300.35	8.43		
lambda	E	2033-11-28T14:34:52.422		28.25	-32.54	50026.71	9.82		
epsilon	E	2033-11-28T14:36:46.115		28.39	-32.46	51187.41	10.44		