

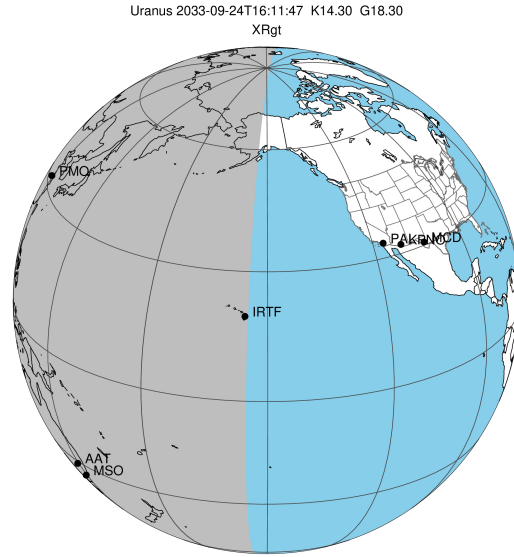
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-09-24T16:11:47.860  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3377381725448071936  
 2Mass ID (if available) : 06240148+2334028

ICRS Star Coord at Epoch: 06h 24m 01.48699s +23:34:02.84434s

RUWE (>1.4 is poor) : 1.04  
 K magnitude : 14.305  
 G magnitude : 18.305  
 RP magnitude : 17.184  
 BP magnitude : 19.540  
 DUPflag : 0  
 Distance (au) : 19.014  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 8.49  
 Sun-Target sep (deg) : 85.96  
 Sun-Moon sep (deg) : 97.93  
 B (ring opening deg) : 70.50  
 PA of pole (deg) : 67.90

# a(km) ring

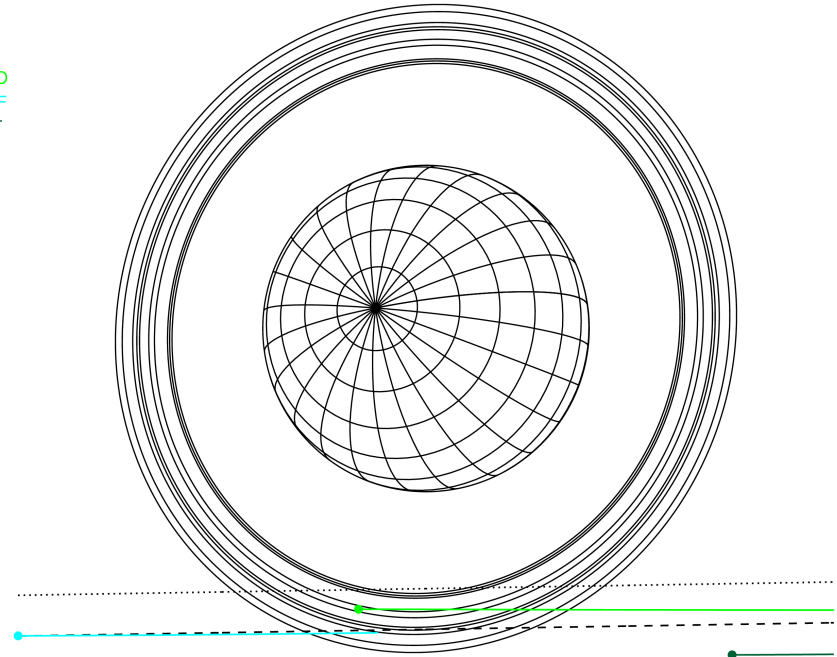
- 1 41837.2 6
- 2 42235.0 5
- 3 42571.2 4
- 4 44718.5 alpha
- 5 45661.1 beta
- 6 47176.1 eta
- 7 47626.3 gamma
- 8 48300.3 delta
- 9 50026.7 lambda
- 10 51149.4 epsilon



2033-09-24T16:11:47.8600 a: 06 24 01.4870 δ: +23 34 02.844 C/A 3.414° PA 0.93 deg v\_sky + 8.48 km/s D 19.01 AU  
 Credit: Styled after SORA/Lucky Star

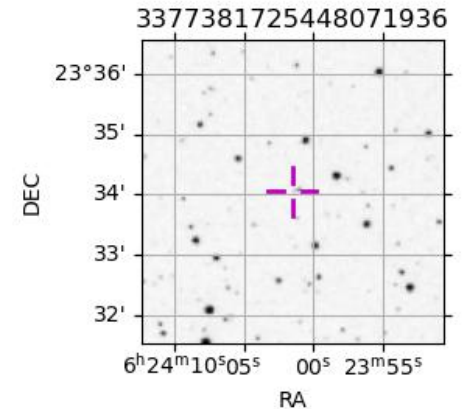
Uranus 2033-09-24T16:11:47 K14.30 G18.30 XRgt

PMO  
 IRTF  
 AAT

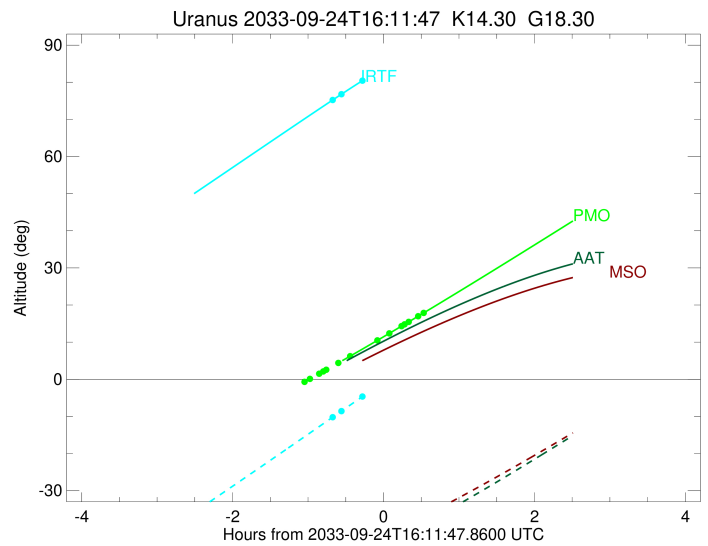
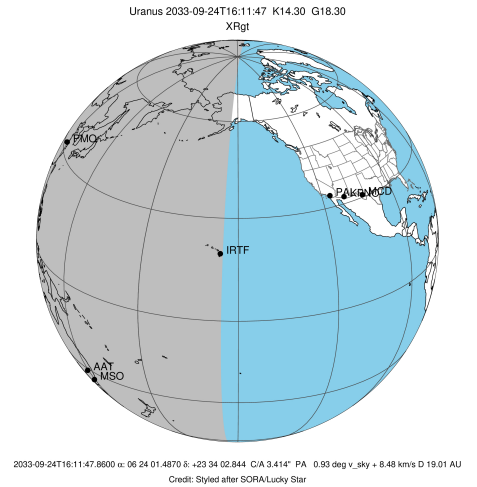


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+		++++++	SEP 24 15:45 - SEP 24 16:42	PnnRie
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	++			SEP 24 15:33 - SEP 24 15:38	PnnRin
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 : 2033-09-24T15:59:28.660  
 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 : 3377381725448071936  
 2Mass ID (if available) : 06240148+2334028  
 ICRS Star Coord at Epoch: 06h 24m 01.48699s +23:34:02.84434s  
 RUWE (>1.4 is poor) : 1.04  
 K magnitude : 14.305  
 G magnitude : 18.305  
 RP magnitude : 17.184  
 BP magnitude : 19.540  
 DUPflag : 0  
 Distance (au) : 19.014  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 8.49  
 Sun-Target sep (deg) : 85.96  
 Sun-Moon sep (deg) : 97.99  
 B (ring opening deg) : 70.50  
 PA of pole (deg) : 67.90  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 3.190  
 C/A sky separation (km) : 43989.6  
 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



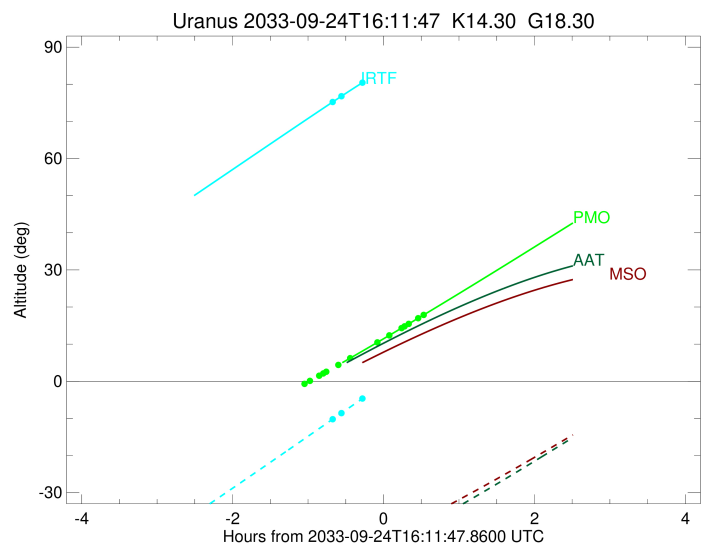
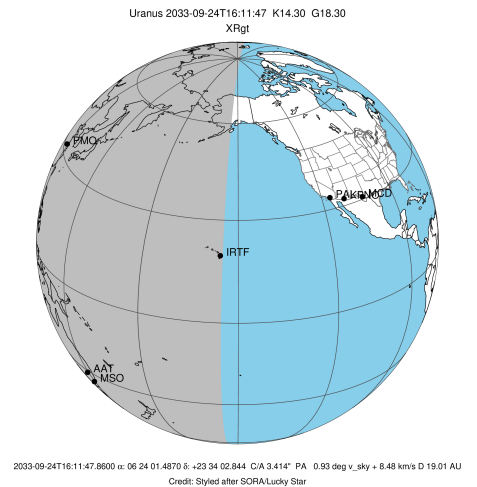
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-09-24T15:09:52.080	-0.54x	-56.97	50932.58	-4.41			
lambda	I	2033-09-24T15:13:21.282	0.11x	-57.23	50026.71	-4.20			
delta	I	2033-09-24T15:20:44.502	1.51x	-57.74	48300.35	-3.58			
gamma	I	2033-09-24T15:24:00.994	2.13x	-57.93	47624.28	-3.29			
eta	I	2033-09-24T15:26:21.566	2.58x	-58.06	47176.12	-3.08			
beta	I	2033-09-24T15:35:51.588	4.40x	-58.49	45679.46	-2.16			
alpha	I	2033-09-24T15:45:05.151	6.18	-58.75	44748.40	-1.20			

No planet occultations

alpha	E	2033-09-24T16:07:11.892	10.53	-58.78	44751.57	1.19			
beta	E	2033-09-24T16:16:23.168	12.36	-58.53	45673.56	2.13			
eta	E	2033-09-24T16:26:03.516	14.30	-58.11	47176.12	3.03			
gamma	E	2033-09-24T16:28:25.436	14.77	-57.99	47621.47	3.24			
delta	E	2033-09-24T16:31:46.176	15.45	-57.79	48300.35	3.52			
lambda	E	2033-09-24T16:39:18.233	16.97	-57.29	50026.71	4.11			
epsilon	E	2033-09-24T16:42:08.572	17.55	-57.08	50743.52	4.31			

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-09-24T16:10:34.900
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      : 3377381725448071936
2Mass ID (if available) : 06240148+2334028
ICRS Star Coord at Epoch: 06h 24m 01.48699s +23:34:02.84434s
RUWE (>1.4 is poor) : 1.04
K magnitude         : 14.305
G magnitude         : 18.305
RP magnitude        : 17.184
BP magnitude        : 19.540
DUPflag            : 0
Distance (au)       : 19.014
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : 8.49
Sun-Target sep (deg) : 85.96
Sun-Moon sep (deg)  : 98.80
B (ring opening deg) : 70.50
PA of pole (deg)    : 67.90
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.447
C/A sky separation (km) : 47540.1
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	2033-09-24T15:33:04.849		75.61	-9.82	50872.44	-2.77		
lambda	I	2033-09-24T15:38:28.505		76.81	-8.56	50026.71	-2.40		
delta	I	2033-09-24T15:55:17.772		80.49	-4.60x	48300.35	-0.99		

No planet occultations

delta	E	2033-09-24T16:17:47.034		84.83	0.69x	48300.35	0.99		
lambda	E	2033-09-24T16:34:39.283		86.13	4.66x	50026.71	2.39		
epsilon	E	2033-09-24T16:39:19.661		85.85	5.76x	50748.07	2.76		