

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2029-01-17T20:01:42.740  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 145002670055408000  
 2Mass ID (if available) : 04341040+2157058

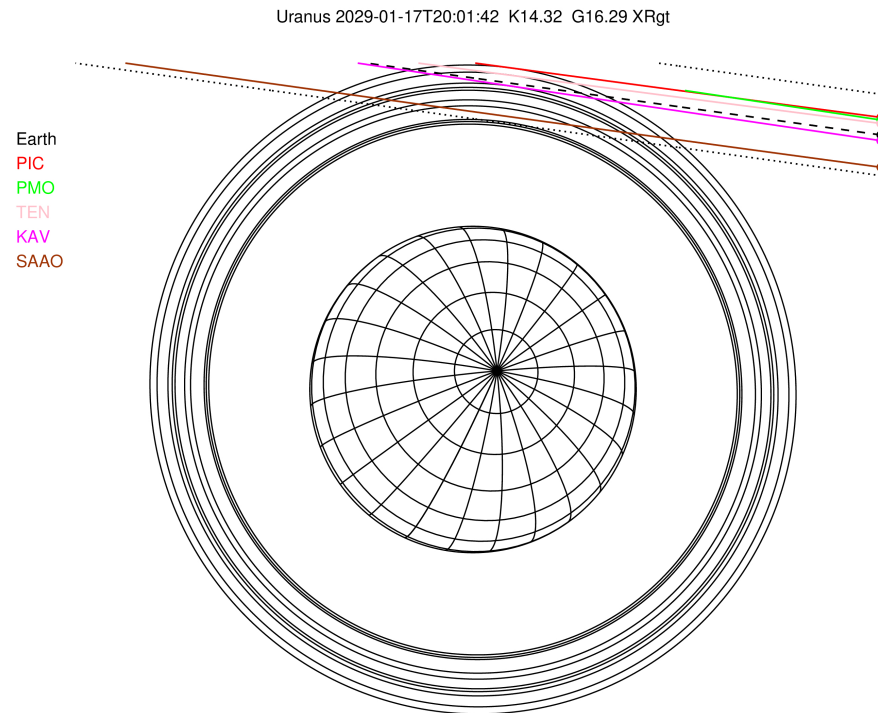
ICRS Star Coord at Epoch: 04h 34m 10.40777s +21:57:05.73555s

RUWE (>1.4 is poor) : 0.98  
 K magnitude : 14.324  
 G magnitude : 16.288  
 RP magnitude : 15.600  
 BP magnitude : 16.808  
 DUPflag : 0  
 Distance (au) : 18.606  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -13.83  
 Sun-Target sep (deg) : 132.57  
 Sun-Moon sep (deg) : 96.88  
 B (ring opening deg) : 79.28  
 PA of pole (deg) : -52.28

#	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

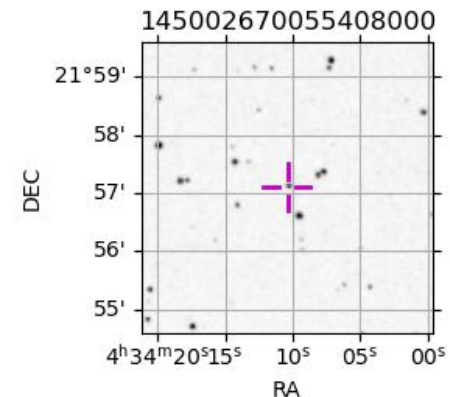


2029-01-17T20:01:42.7400 ra: 04 34 10.40778 s: +21 57 05.736 C/A 3.586° PA 172.04 deg v\_sky -13.83 km/s D 18.61 AU  
 Credit: Styled after SORA/Lucky Star



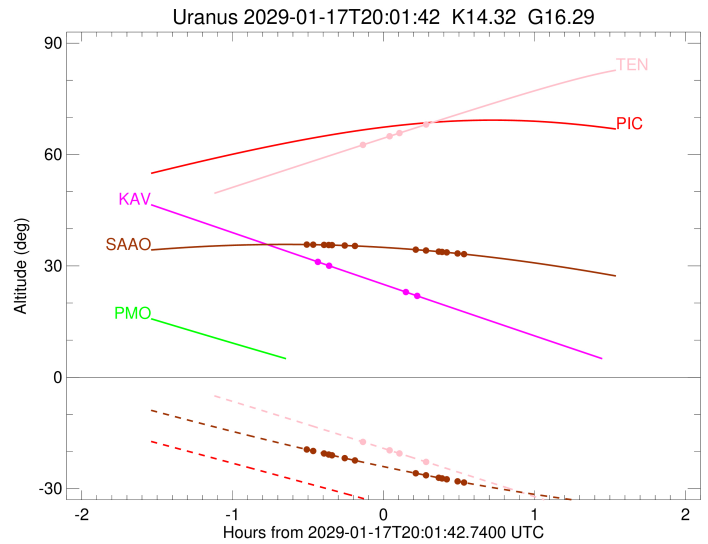
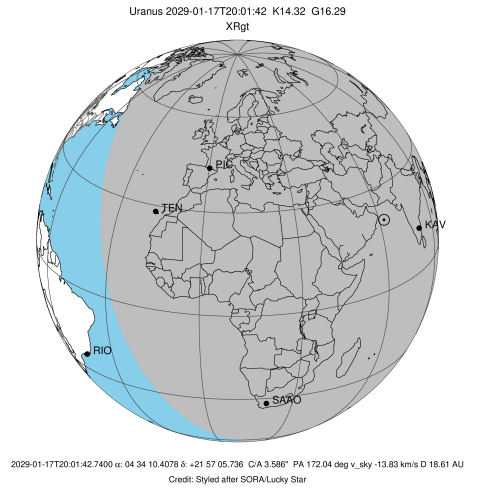
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	++		++	JAN 17 19:55 - JAN 17 20:16	PnnRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	++		++	JAN 17 19:36 - JAN 17 20:13	PnnRie
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	+++++++		+++++++	JAN 17 19:31 - JAN 17 20:32	PnnRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



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target                : Uranus
target radius (km)    : 25559.00
C/A epoch             : 2029-01-17T20:05:04.540
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        : 145002670055408000
2Mass ID (if available) : 04341040+2157058
ICRS Star Coord at Epoch: 04h 34m 10.40777s +21:57:05.73555s
RUWE (>1.4 is poor)  : 0.98
K magnitude           : 14.324
G magnitude           : 16.288
RP magnitude          : 15.600
BP magnitude          : 16.808
DUPflag              : 0
Distance (au)         : 18.606
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s)  : -13.83
Sun-Target sep (deg)  : 132.57
Sun-Moon sep (deg)    : 97.75
B (ring opening deg)  : 79.28
PA of pole (deg)      : -52.28
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.673
C/A sky separation (km) : 49561.0
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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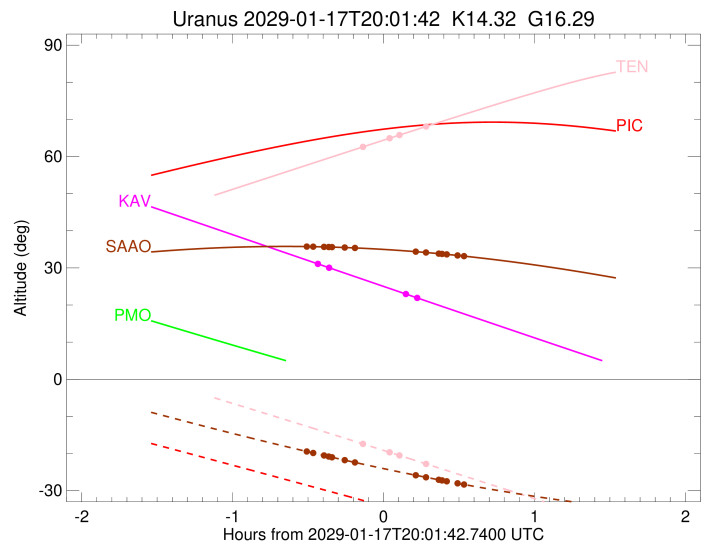
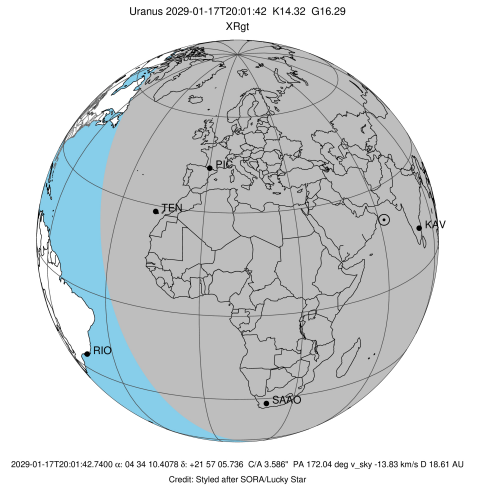


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-01-17T19:55:24.178		63.01	-17.81	50851.90	-2.51		
lambda	I	2029-01-17T20:04:47.908		65.07	-19.82	50026.79	-0.32		

No planet occultations

lambda	E	2029-01-17T20:07:24.099		65.64	-20.38	50026.79	0.32		
epsilon	E	2029-01-17T20:16:17.133		67.58	-22.29	50775.16	2.51		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2029-01-17T19:54:20.390  
 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 : 145002670055408000  
 2Mass ID (if available) : 04341040+2157058  
 ICRS Star Coord at Epoch: 04h 34m 10.40777s +21:57:05.73555s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 14.324  
 G magnitude : 16.288  
 RP magnitude : 15.600  
 BP magnitude : 16.808  
 DUPflag : 0  
 Distance (au) : 18.606  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -13.83  
 Sun-Target sep (deg) : 132.57  
 Sun-Moon sep (deg) : 97.16  
 B (ring opening deg) : 79.28  
 PA of pole (deg) : -52.28  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 3.548  
 C/A sky separation (km) : 47878.1  
 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

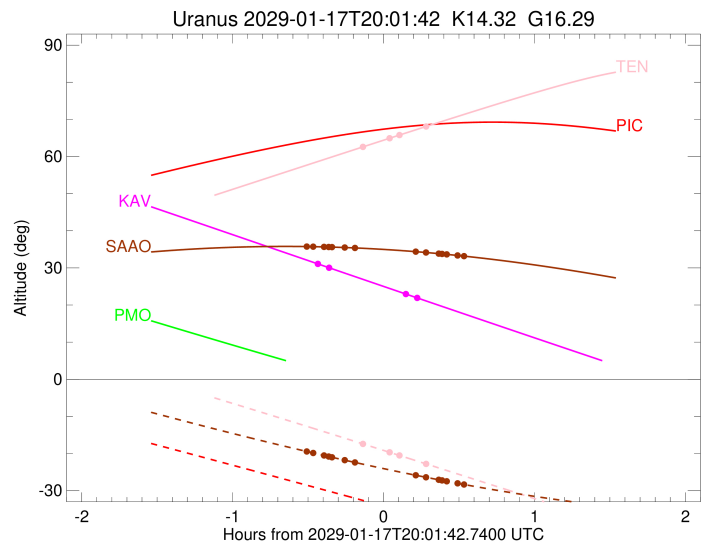
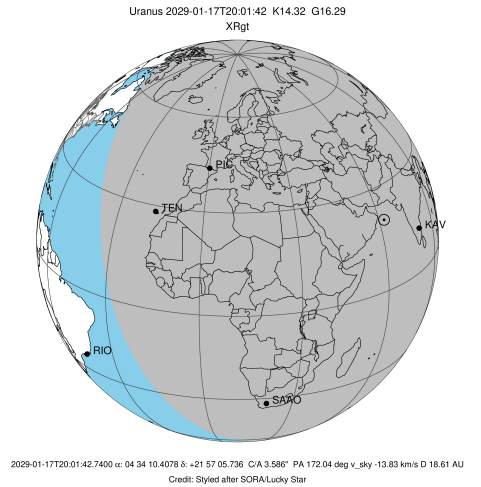


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-01-17T19:36:35.636		30.85	-77.18	50897.45	-4.37		
lambda	I	2029-01-17T19:40:09.853		30.02	-76.51	50026.71	-3.67		

No planet occultations

lambda	E	2029-01-17T20:10:32.780		22.97	-70.20	50026.71	3.65		
epsilon	E	2029-01-17T20:13:36.423		22.26	-69.53	50758.98	4.35		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2029-01-17T20:01:33.810  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Observer code : SAAO  
 Location : So. Afr. Astro. Obs. (Sutherland)  
 Latitude (deg) : -32.37953  
 E. Longitude (deg) : 20.81070  
 Altitude (km) : 1.768  
 Gaia source ID : 145002670055408000  
 2Mass ID (if available) : 04341040+2157058  
 ICRS Star Coord at Epoch: 04h 34m 10.40777s +21:57:05.73555s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 14.324  
 G magnitude : 16.288  
 RP magnitude : 15.600  
 BP magnitude : 16.808  
 DUPflag : 0  
 Distance (au) : 18.606  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -13.83  
 Sun-Target sep (deg) : 132.57  
 Sun-Moon sep (deg) : 97.39  
 B (ring opening deg) : 79.28  
 PA of pole (deg) : -52.28  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 3.194  
 C/A sky separation (km) : 43103.7  
 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\_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	2029-01-17T19:31:38.209		35.74	-19.52	50971.78	-7.40		
lambda	I	2029-01-17T19:33:47.801		35.72	-19.86	50026.71	-7.09		
delta	I	2029-01-17T19:38:06.430		35.66	-20.54	48300.35	-6.24		
gamma	I	2029-01-17T19:39:57.339		35.63	-20.82	47629.78	-5.85		
eta	I	2029-01-17T19:41:16.889		35.60	-21.03	47176.12	-5.56		
beta	I	2029-01-17T19:46:20.826		35.49	-21.80	45665.40	-4.36		
alpha	I	2029-01-17T19:50:24.259		35.38	-22.41	44728.80	-3.34		

No planet occultations

alpha	E	2029-01-17T20:14:34.508		34.37	-25.86	44742.30	3.34		
beta	E	2029-01-17T20:18:31.102		34.15	-26.39	45653.29	4.36		
eta	E	2029-01-17T20:23:38.153		33.85	-27.07	47176.12	5.55		
gamma	E	2029-01-17T20:24:57.114		33.76	-27.24	47625.66	5.84		
delta	E	2029-01-17T20:26:48.904		33.64	-27.48	48300.35	6.23		
lambda	E	2029-01-17T20:31:07.996		33.35	-28.03	50026.71	7.08		
epsilon	E	2029-01-17T20:32:47.154		33.24	-28.23	50743.81	7.39		