

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2047-01-09T02:26:01.340
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3882209707515598720
 2Mass ID (if available) : 10295535+1016317

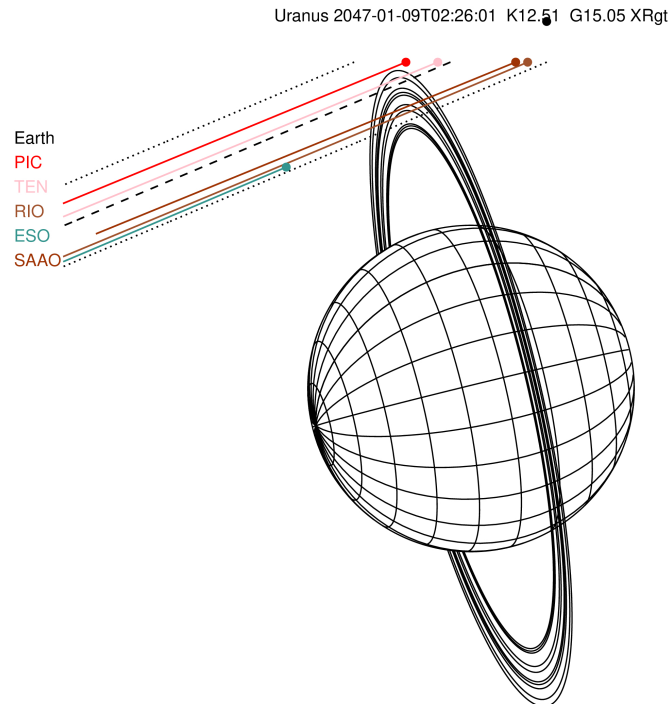
ICRS Star Coord at Epoch: 10h 29m 55.35947s +10:16:31.82738s

RUWE (>1.4 is poor) : 1.04
 K magnitude : 12.510
 G magnitude : 15.049
 RP magnitude : 14.282
 BP magnitude : 15.678
 DUPflag : 0
 Distance (au) : 17.636
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -13.40
 Sun-Target sep (deg) : 132.69
 Sun-Moon sep (deg) : 83.06
 B (ring opening deg) : 12.05
 PA of pole (deg) : 103.49

#	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

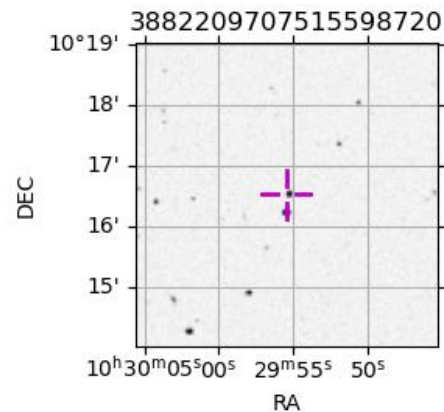


2047-01-09T02:26:01.3400 cc: 10 29 55.3595 s; +10 16 31.827 C/A 3.793° PA 202.92 deg v_sky -13.40 km/s D 17.64 AU
 Credit: Styled after SORA/Lucky Star

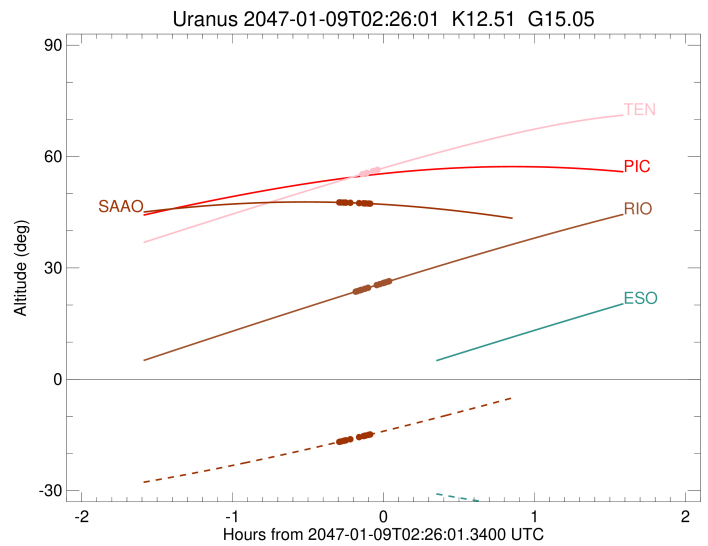
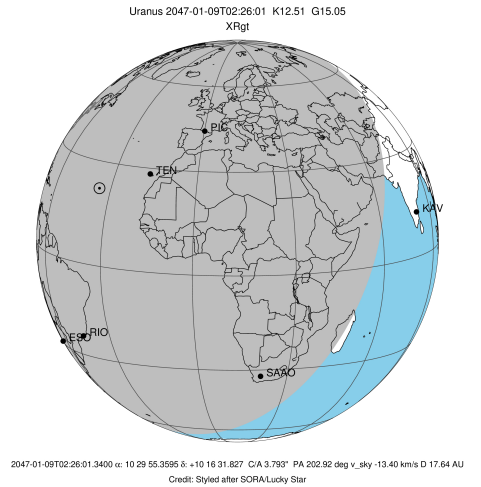


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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 09 02:18 - JAN 09 02:23	PnnRie
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 09 02:15 - JAN 09 02:28	PnnRie
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 09 02:08 - JAN 09 02:20	PnnRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2047-01-09T02:29:38.260
 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 : 3882209707515598720
 2Mass ID (if available) : 10295535+1016317
 ICRS Star Coord at Epoch: 10h 29m 55.35947s +10:16:31.82738s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 12.510
 G magnitude : 15.049
 RP magnitude : 14.282
 BP magnitude : 15.678
 DUPflag : 0
 Distance (au) : 17.636
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -13.40
 Sun-Target sep (deg) : 132.69
 Sun-Moon sep (deg) : 83.78
 B (ring opening deg) : 12.05
 PA of pole (deg) : 103.49
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.847
 C/A sky separation (km) : 49209.7
 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



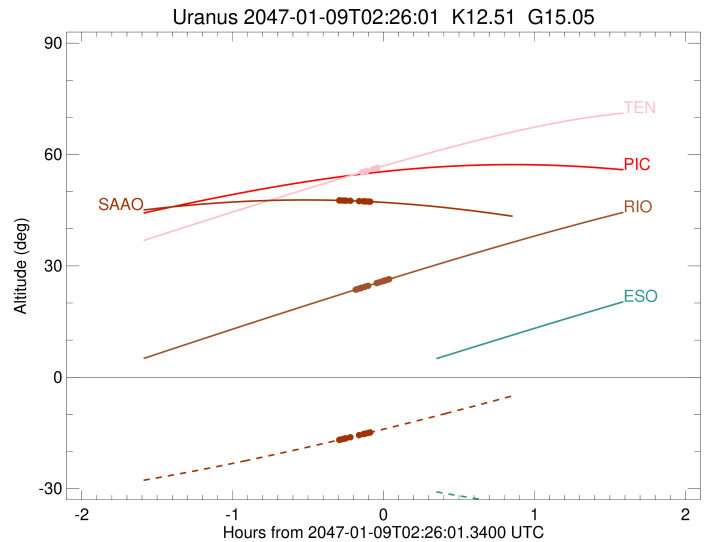
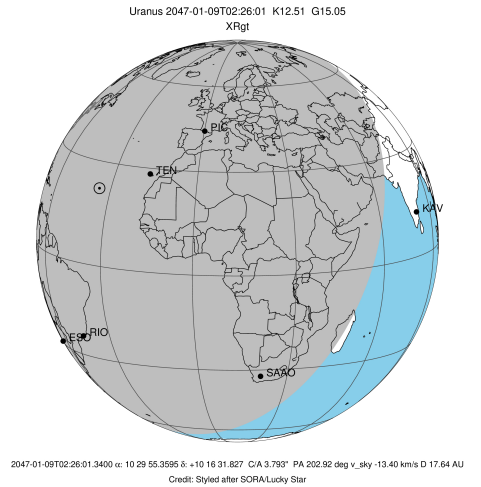
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2047-01-09T02:18:08.875		55.36	-74.04	50744.50	-12.46		
lambda	I	2047-01-09T02:19:26.252		55.62	-73.77	50026.71	-6.07		

No planet occultations

lambda	E	2047-01-09T02:21:49.894		56.09	-73.27	50026.71	6.08		
epsilon	E	2047-01-09T02:23:10.354		56.36	-72.99	50783.45	12.47		

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target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2047-01-09T02:29:55.830
Event type          : XRgt
: No Uranus occs
: Ring occs: geocentric, topocentric
Observer code       : RIO
Location            : Rio de Janeiro
Latitude (deg)      : -22.89506
E. Longitude (deg)  : 316.77708
Altitude (km)       : 0.033
Gaia source ID      : 3882209707515598720
2Mass ID (if available) : 10295535+1016317
ICRS Star Coord at Epoch: 10h 29m 55.35947s +10:16:31.82738s
RUWE (>1.4 is poor) : 1.04
K magnitude          : 12.510
G magnitude          : 15.049
RP magnitude         : 14.282
BP magnitude         : 15.678
DUPflag             : 0
Distance (au)       : 17.636
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -13.40
Sun-Target sep (deg) : 132.69
Sun-Moon sep (deg)  : 83.41
B (ring opening deg) : 12.05
PA of pole (deg)    : 103.49
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.414
C/A sky separation (km) : 43666.7
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall11.bsp
ural61.bsp
vgr2.ural61.bsp
peph.ural60.bsp
earthstns_itrf93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
  
```

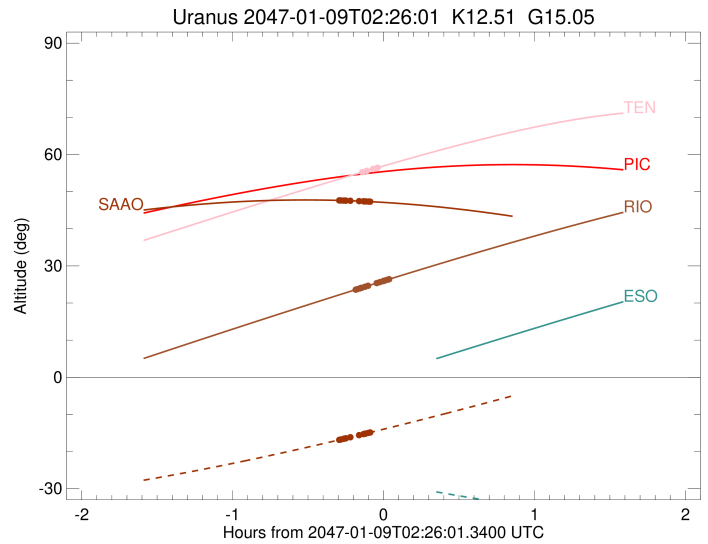
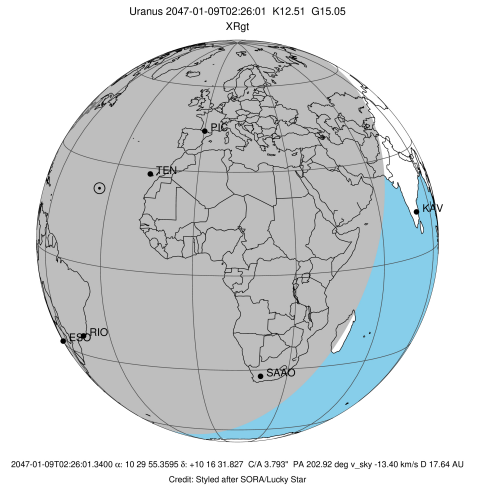


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2047-01-09T02:15:11.020		23.64	-43.83	50756.71	-31.49		
lambda	I	2047-01-09T02:15:34.676		23.73	-43.85	50026.71	-30.10		
delta	I	2047-01-09T02:16:36.263		23.95	-43.91	48300.35	-25.88		
gamma	I	2047-01-09T02:17:03.270		24.04	-43.94	47627.95	-23.89		
eta	I	2047-01-09T02:17:22.784		24.11	-43.95	47176.12	-22.40		
beta	I	2047-01-09T02:18:40.958		24.39	-44.02	45668.91	-15.99		
alpha	I	2047-01-09T02:19:51.622		24.64	-44.09	44751.17	-9.77		

No planet occultations

alpha	E	2047-01-09T02:23:21.351		25.38	-44.26	44752.41	9.78		
beta	E	2047-01-09T02:24:32.472		25.63	-44.31	45659.05	16.01		
eta	E	2047-01-09T02:25:51.120		25.90	-44.37	47176.12	22.44		
gamma	E	2047-01-09T02:26:10.447		25.97	-44.39	47624.02	23.92		
delta	E	2047-01-09T02:26:37.584		26.07	-44.41	48300.35	25.92		
lambda	E	2047-01-09T02:27:39.080		26.28	-44.45	50026.71	30.15		
epsilon	E	2047-01-09T02:28:05.841		26.38	-44.47	50856.59	31.55		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2047-01-09T02:22:32.920
 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 : 3882209707515598720
 2Mass ID (if available) : 10295535+1016317
 ICRS Star Coord at Epoch: 10h 29m 55.35947s +10:16:31.82738s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 12.510
 G magnitude : 15.049
 RP magnitude : 14.282
 BP magnitude : 15.678
 DUPflag : 0
 Distance (au) : 17.636
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -13.40
 Sun-Target sep (deg) : 132.69
 Sun-Moon sep (deg) : 83.78
 B (ring opening deg) : 12.05
 PA of pole (deg) : 103.49
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.491
 C/A sky separation (km) : 44648.6
 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



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	2047-01-09T02:08:39.692		47.63	-16.83	50753.20	-29.61		
lambda	I	2047-01-09T02:09:04.857		47.63	-16.76	50026.71	-28.01		
delta	I	2047-01-09T02:10:12.320		47.60	-16.58	48300.35	-23.08		
gamma	I	2047-01-09T02:10:43.058		47.59	-16.50	47627.67	-20.66		
eta	I	2047-01-09T02:11:05.930		47.58	-16.44	47176.12	-18.80		
beta	I	2047-01-09T02:12:51.583		47.54	-16.15	45666.99	-9.57		

No planet occultations

beta	E	2047-01-09T02:16:17.704		47.45	-15.60	45661.15	9.58		
eta	E	2047-01-09T02:18:03.899		47.40	-15.31	47176.12	18.81		
gamma	E	2047-01-09T02:18:26.606		47.39	-15.25	47624.30	20.67		
delta	E	2047-01-09T02:18:57.506		47.37	-15.16	48300.35	23.09		
lambda	E	2047-01-09T02:20:04.964		47.33	-14.98	50026.71	28.02		
epsilon	E	2047-01-09T02:20:33.222		47.32	-14.90	50845.46	29.62		