

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-08-19T10:59:43.590  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3377543727317135744  
 2Mass ID (if available) : 06192574+2335472

ICRS Star Coord at Epoch: 06h 19m 25.74627s +23:35:47.26529s

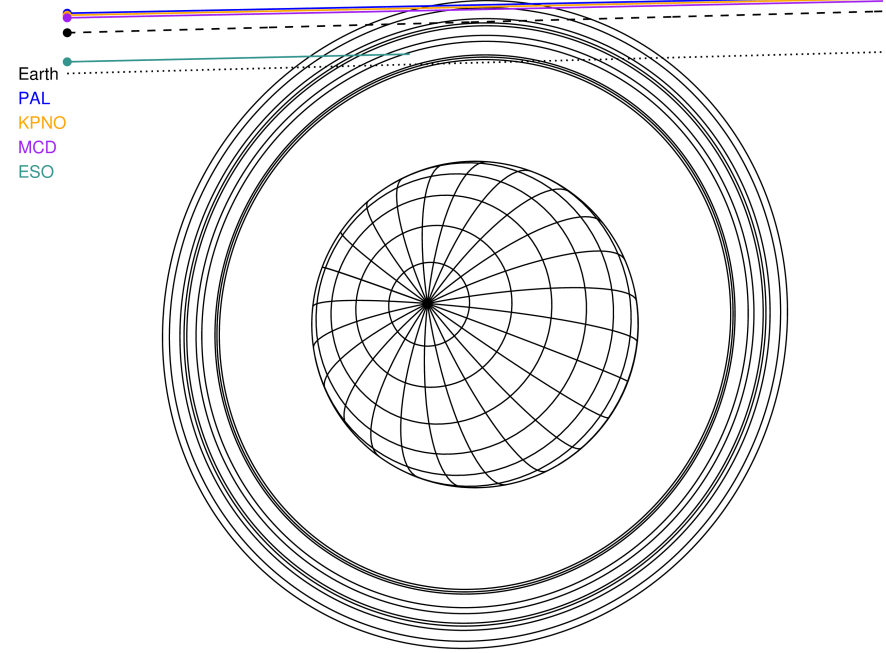
RUWE (>1.4 is poor) : 1.03  
 K magnitude : 14.635  
 G magnitude : 17.310  
 RP magnitude : 16.461  
 BP magnitude : 18.091  
 DUPflag : 0  
 Distance (au) : 19.584  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 24.79  
 Sun-Target sep (deg) : 51.87  
 Sun-Moon sep (deg) : 13.20  
 B (ring opening deg) : 71.45  
 PA of pole (deg) : 66.18

#	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



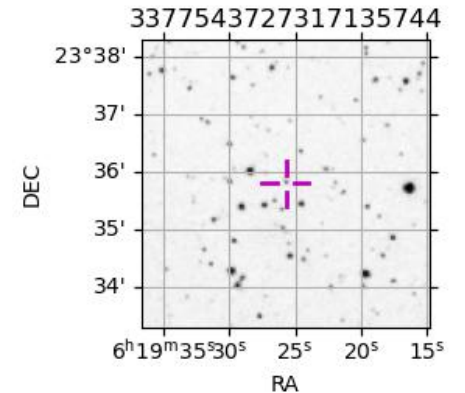
2033-08-19T10:59:43.5900 ex: 06 19 25.7463 R: +23 35 47.265 C/A 3.339° PA 181.51 deg v\_sky +24.79 km/s D 19.58 AU  
 Credit: Styled after SORA/Lucky Star

Uranus 2033-08-19T10:59:43 K14.63 G17.31 XRgt

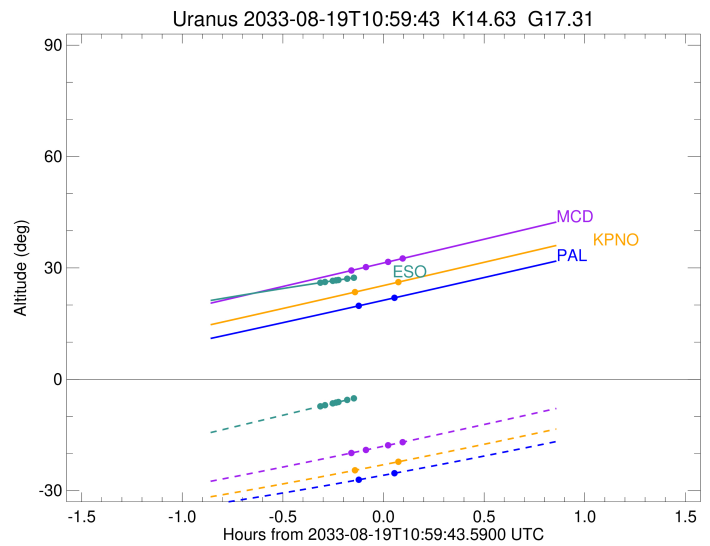
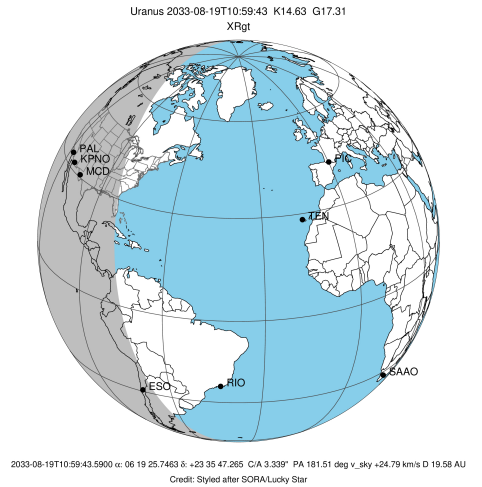


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+			+ AUG 19 10:51 - AUG 19 11:04	PnnRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+			+ AUG 19 10:50 - AUG 19 11:05	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	++			++ AUG 19 10:49 - AUG 19 11:06	PnnRie
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					PnnRnn
ESO	European Southern Obs	-29.3	289.3	+++++++			AUG 19 10:40 - AUG 19 10:50	PnnRin
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 : 2033-08-19T10:56:20.680  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Observer code : PAL  
 Location : Palomar Mt (200")  
 Latitude (deg) : 33.35622  
 E. Longitude (deg) : 243.13601  
 Altitude (km) : 1.706  
 Gaia source ID : 3377543727317135744  
 2Mass ID (if available) : 06192574+2335472  
 ICRS Star Coord at Epoch: 06h 19m 25.74627s +23:35:47.26529s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 14.635  
 G magnitude : 17.310  
 RP magnitude : 16.461  
 BP magnitude : 18.091  
 DUPflag : 0  
 Distance (au) : 19.584  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 24.79  
 Sun-Target sep (deg) : 51.87  
 Sun-Moon sep (deg) : 12.72  
 B (ring opening deg) : 71.45  
 PA of pole (deg) : 66.18  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 3.522  
 C/A sky separation (km) : 50022.7  
 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

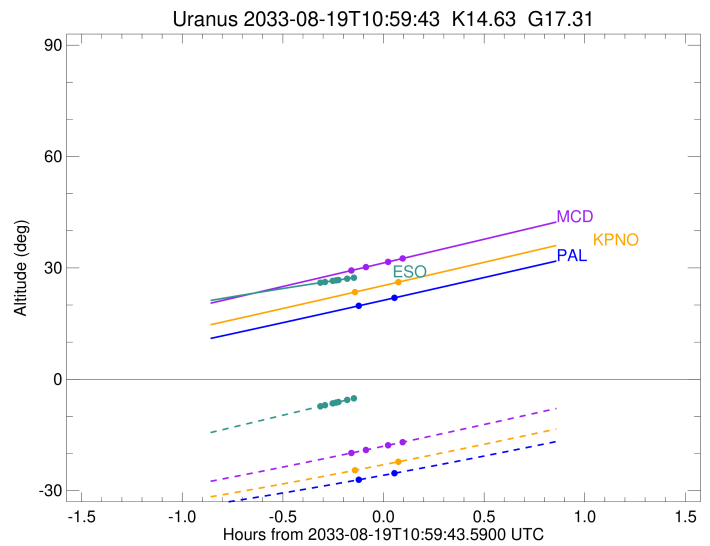
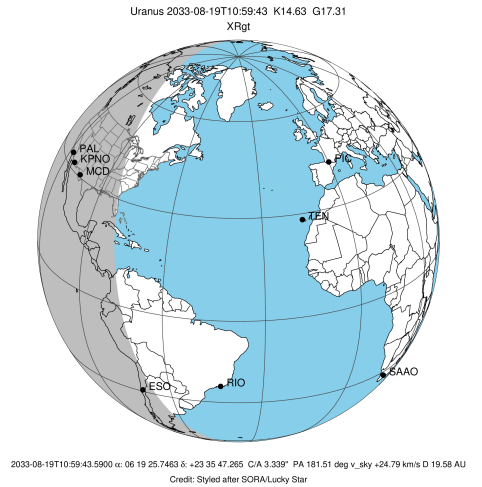


b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-08-19T10:51:11.504	19.55	-27.26	51486.79	-5.16		
No planet occultations								
epsilon	E	2033-08-19T11:04:21.779	22.22	-25.08	51548.76	5.16		

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target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-08-19T10:56:21.900
Event type           : XRgt
: No Uranus occs
: Ring occs: geocentric, topocentric
Observer code        : KPNO
Location             : Kitt Peak Natl Obs
Latitude (deg)       : 31.96333
E. Longitude (deg)   : 248.40000
Altitude (km)        : 2.120
Gaia source ID       : 3377543727317135744
2Mass ID (if available) : 06192574+2335472
ICRS Star Coord at Epoch: 06h 19m 25.74627s +23:35:47.26529s
RUWE (>1.4 is poor) : 1.03
K magnitude          : 14.635
G magnitude          : 17.310
RP magnitude         : 16.461
BP magnitude         : 18.091
DUPflag             : 0
Distance (au)        : 19.584
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : 24.79
Sun-Target sep (deg) : 51.87
Sun-Moon sep (deg)   : 12.71
B (ring opening deg) : 71.45
PA of pole (deg)     : 66.18
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.499
C/A sky separation (km) : 49704.3
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall1.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall1.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
  
```



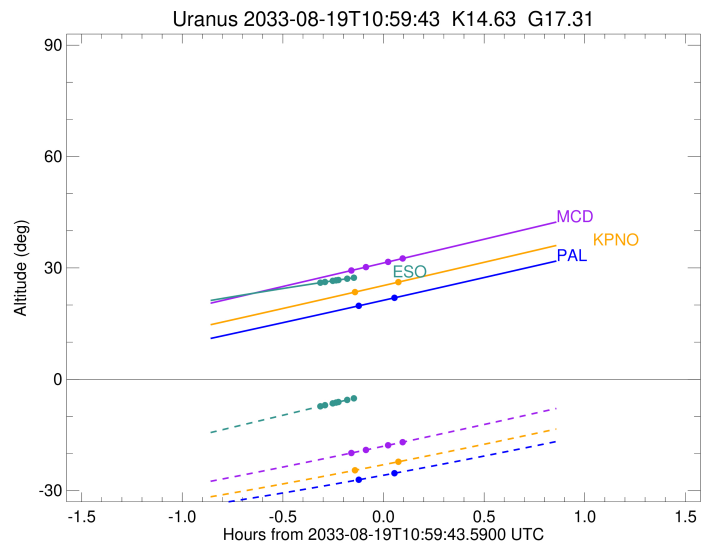
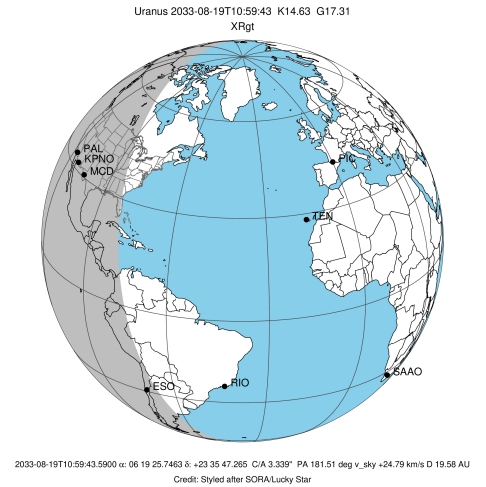
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-08-19T10:50:15.010		23.28	-24.69	51479.77	-5.89		

No planet occultations

epsilon	E	2033-08-19T11:05:20.039		26.41	-22.01	51550.38	5.89		
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target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-08-19T10:56:28.490
Event type          : XRgt
                    : No Uranus occs
                    : Ring occs: geocentric, topocentric
Observer code       : MCD
Location            : McDonald Obs. 2.7m
Latitude (deg)      : 30.67158
E. Longitude (deg)  : 255.97844
Altitude (km)       : 2.075
Gaia source ID      : 3377543727317135744
2Mass ID (if available) : 06192574+2335472
ICRS Star Coord at Epoch: 06h 19m 25.74627s +23:35:47.26529s
RUWE (>1.4 is poor) : 1.03
K magnitude         : 14.635
G magnitude         : 17.310
RP magnitude        : 16.461
BP magnitude        : 18.091
DUPflag            : 0
Distance (au)       : 19.584
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : 24.79
Sun-Target sep (deg) : 51.87
Sun-Moon sep (deg)  : 12.74
B (ring opening deg) : 71.45
PA of pole (deg)    : 66.18
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.472
C/A sky separation (km) : 49313.9
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
  
```

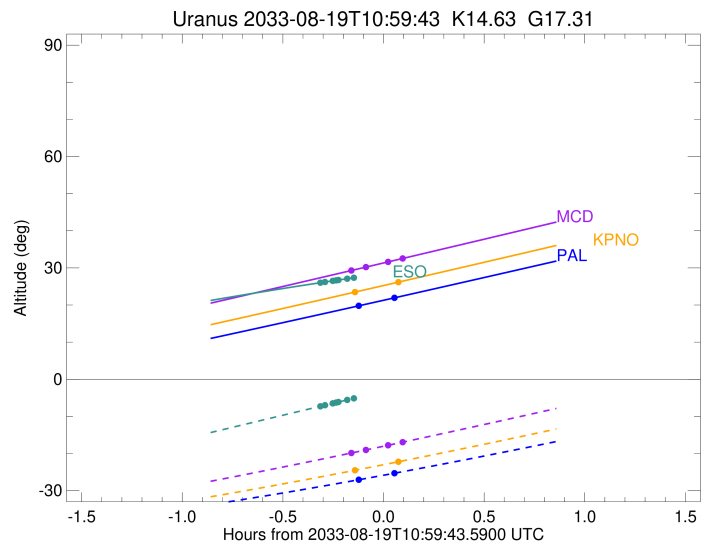
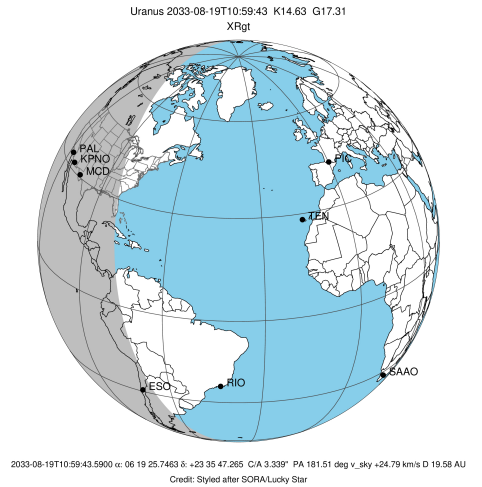


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-08-19T10:49:19.451		29.12	-20.02	51472.04	-6.67		
lambda	I	2033-08-19T10:54:35.177		30.24	-19.02	50026.71	-2.55		

No planet occultations

lambda	E	2033-08-19T11:00:59.898		31.60	-17.80	50026.71	2.55		
epsilon	E	2033-08-19T11:06:27.988		32.76	-16.75	51552.06	6.66		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-08-19T10:57:50.780  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 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 : 3377543727317135744  
 2Mass ID (if available) : 06192574+2335472  
 ICRS Star Coord at Epoch: 06h 19m 25.74627s +23:35:47.26529s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 14.635  
 G magnitude : 17.310  
 RP magnitude : 16.461  
 BP magnitude : 18.091  
 DUPflag : 0  
 Distance (au) : 19.584  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 24.79  
 Sun-Target sep (deg) : 51.87  
 Sun-Moon sep (deg) : 12.65  
 B (ring opening deg) : 71.45  
 PA of pole (deg) : 66.18  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.997  
 C/A sky separation (km) : 42563.8  
 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	2033-08-19T10:40:38.853		25.98	-7.34	51375.71	-14.16		
lambda	I	2033-08-19T10:42:18.318		26.20	-6.98	50026.71	-13.09		
delta	I	2033-08-19T10:44:37.577		26.52	-6.48	48300.35	-11.67		
gamma	I	2033-08-19T10:45:36.616		26.65	-6.27	47630.08	-11.03		
eta	I	2033-08-19T10:46:18.691		26.74	-6.12	47176.12	-10.55		
beta	I	2033-08-19T10:48:54.757		27.09	-5.56	45674.90	-8.65		
alpha	I	2033-08-19T10:50:57.299		27.36	-5.13	44710.53	-7.03		

No planet occultations

alpha	E	2033-08-19T11:07:00.093		29.36	-1.70x	44694.30	7.03		
beta	E	2033-08-19T11:09:03.714		29.61	-1.26x	45662.41	8.65		
eta	E	2033-08-19T11:11:41.377		29.91	-0.71x	47176.12	10.54		
gamma	E	2033-08-19T11:12:23.638		30.00	-0.56x	47631.54	11.01		
delta	E	2033-08-19T11:13:22.626		30.11	-0.35x	48300.35	11.66		
lambda	E	2033-08-19T11:15:42.100		30.37	0.14x	50026.71	13.07		
epsilon	E	2033-08-19T11:17:33.979		30.58	0.54x	51547.67	14.13		