

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-08-04T05:06:42.090
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3404410465739479168
 2Mass ID (if available) : 05394565+2328381

ICRS Star Coord at Epoch: 05h 39m 45.67025s +23:28:37.29139s

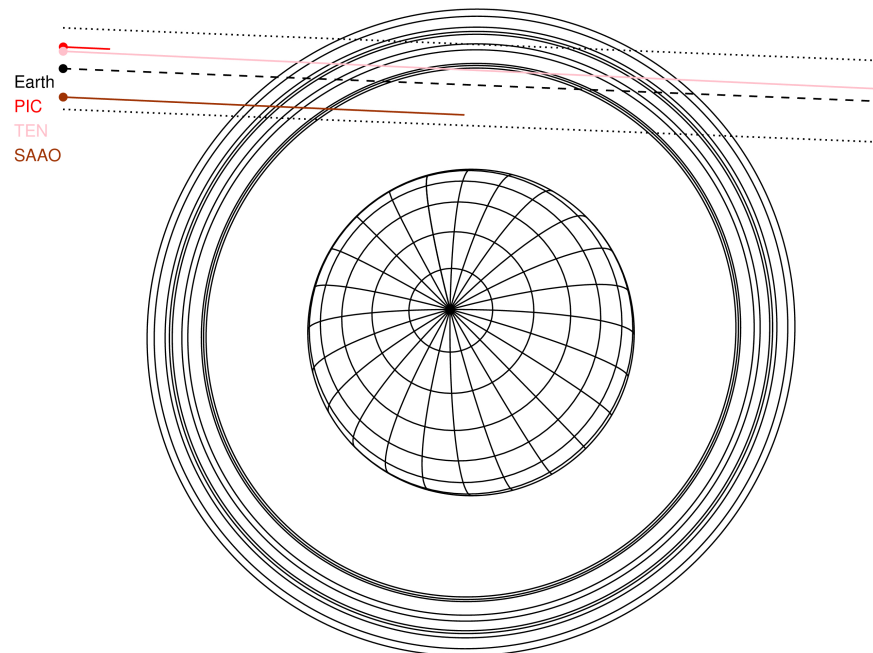
RUWE (>1.4 is poor) : 1.00
 K magnitude : 13.629
 G magnitude : 17.810
 RP magnitude : 16.508
 BP magnitude : 19.845
 DUPflag : 0
 Distance (au) : 19.804
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 27.08
 Sun-Target sep (deg) : 45.87
 Sun-Moon sep (deg) : 117.90
 B (ring opening deg) : 79.02
 PA of pole (deg) : 42.27

#	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



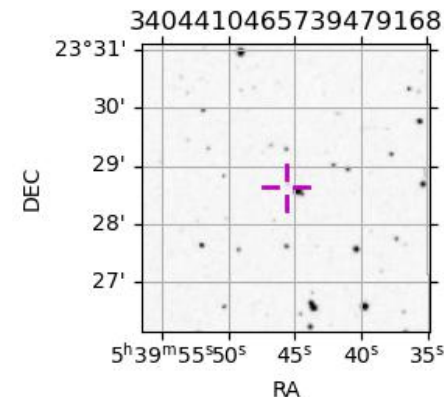
2031-08-04T05:06:42.0900 ex: 05 39 45.6703 s: +23 28 37.291 C/A 2.702° PA 177.70 deg v_sky +27.08 km/s D 19.80 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2031-08-04T05:06:42 K13.63 G17.81 XRgt

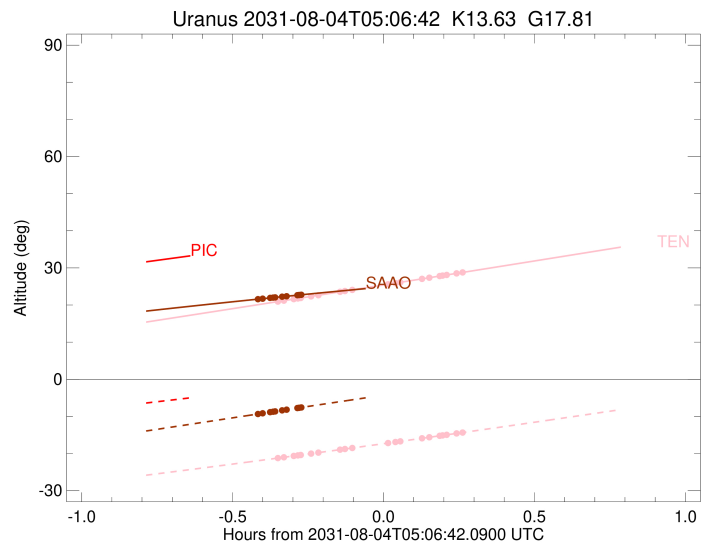
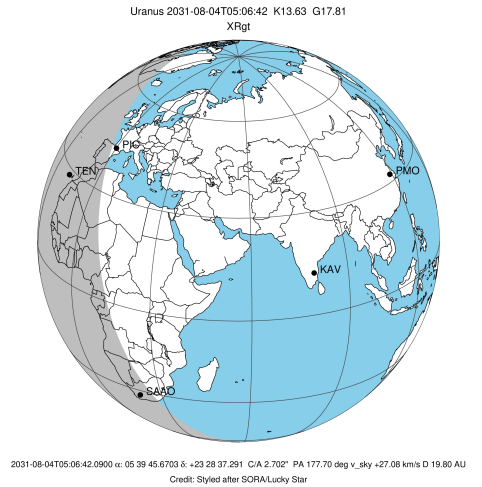


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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					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	+++++		+++++	AUG 04 04:45 - AUG 04 05:22	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					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	+++++			AUG 04 04:41 - AUG 04 04:50	PnnRin
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-08-04T05:03:35.140
 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 : 3404410465739479168
 2Mass ID (if available) : 05394565+2328381
 ICRS Star Coord at Epoch: 05h 39m 45.67025s +23:28:37.29139s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 13.629
 G magnitude : 17.810
 RP magnitude : 16.508
 BP magnitude : 19.845
 DUPflag : 0
 Distance (au) : 19.804
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 27.08
 Sun-Target sep (deg) : 45.87
 Sun-Moon sep (deg) : 118.70
 B (ring opening deg) : 79.02
 PA of pole (deg) : 42.27
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.858
 C/A sky separation (km) : 41053.1
 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_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



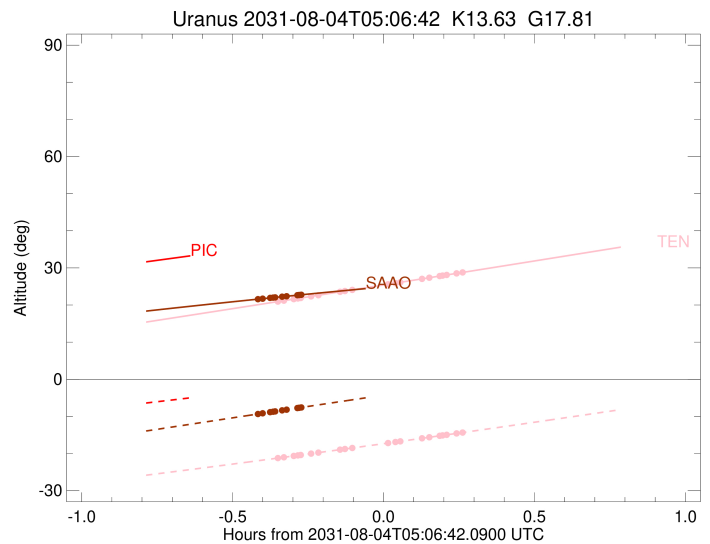
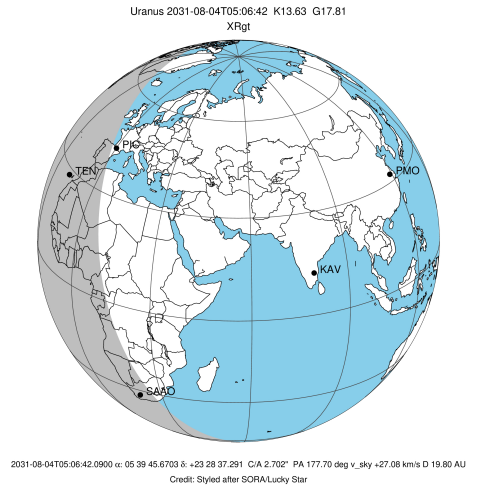
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2031-08-04T04:45:18.213		20.84	-21.30	51554.51	-16.20		
lambda	I	2031-08-04T04:46:55.262		21.18	-21.01	50026.71	-15.26		
delta	I	2031-08-04T04:48:53.210		21.60	-20.65	48300.35	-13.99		
gamma	I	2031-08-04T04:49:42.352		21.78	-20.50	47626.73	-13.42		
eta	I	2031-08-04T04:50:16.445		21.90	-20.40	47176.12	-13.01		
beta	I	2031-08-04T04:52:18.783		22.33	-20.03	45677.84	-11.45		
alpha	I	2031-08-04T04:53:47.539		22.64	-19.75	44716.59	-10.24		
4	I	2031-08-04T04:57:59.595		23.54	-18.98	42616.02	-6.33		
5	I	2031-08-04T04:58:58.647		23.75	-18.80	42279.19	-5.31		
6	I	2031-08-04T05:00:41.271		24.12	-18.48	41810.48	-3.56		

No planet occultations

6	E	2031-08-04T05:07:23.091		25.55	-17.22	41802.83	3.56		
5	E	2031-08-04T05:09:03.161		25.91	-16.91	42250.20	5.31		
4	E	2031-08-04T05:10:06.574		26.13	-16.71	42614.35	6.33		
alpha	E	2031-08-04T05:14:21.947		27.05	-15.90	44740.74	10.23		
beta	E	2031-08-04T05:15:48.601		27.36	-15.62	45680.46	11.43		
eta	E	2031-08-04T05:17:50.966		27.80	-15.23	47176.12	12.99		
gamma	E	2031-08-04T05:18:24.772		27.92	-15.13	47621.97	13.39		
delta	E	2031-08-04T05:19:14.374		28.10	-14.97	48300.35	13.96		
lambda	E	2031-08-04T05:21:12.594		28.52	-14.59	50026.71	15.22		
epsilon	E	2031-08-04T05:22:30.580		28.80	-14.34	51244.03	16.16		

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target                : Uranus
target radius (km)    : 25559.00
C/A epoch             : 2031-08-04T05:04:43.810
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        : 3404410465739479168
2Mass ID (if available) : 05394565+2328381
ICRS Star Coord at Epoch: 05h 39m 45.67025s +23:28:37.29139s
RUWE (>1.4 is poor)  : 1.00
K magnitude           : 13.629
G magnitude           : 17.810
RP magnitude          : 16.508
BP magnitude          : 19.845
DUPflag              : 0
Distance (au)         : 19.804
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s)  : 27.08
Sun-Target sep (deg)  : 45.87
Sun-Moon sep (deg)    : 118.48
B (ring opening deg)  : 79.02
PA of pole (deg)      : 42.27
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.367
C/A sky separation (km) : 33999.2
NAIF SPICE kernels    : RAJobs_U111+rgf15.spk
URKALLvl1.spk
ural11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.ural11.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
    
```



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	2031-08-04T04:41:25.221		21.53	-9.42	51550.93	-20.20		
lambda	I	2031-08-04T04:42:41.698		21.71	-9.16	50026.71	-19.67		
delta	I	2031-08-04T04:44:10.894		21.92	-8.86	48300.35	-19.02		
gamma	I	2031-08-04T04:44:46.492		22.00	-8.74	47628.04	-18.74		
eta	I	2031-08-04T04:45:10.727		22.05	-8.65	47176.12	-18.55		
beta	I	2031-08-04T04:46:33.245		22.24	-8.37	45673.97	-17.84		
alpha	I	2031-08-04T04:47:28.373		22.37	-8.19	44706.27	-17.33		
4	I	2031-08-04T04:49:33.727		22.65	-7.76	42609.70	-16.02		
5	I	2031-08-04T04:49:53.756		22.69	-7.69	42303.05	-15.77		
6	I	2031-08-04T04:50:23.441		22.76	-7.59	41828.69	-15.43		

No planet occultations

6	E	2031-08-04T05:19:49.506		26.44	-1.65x	41795.24	15.41		
5	E	2031-08-04T05:20:16.484		26.49	-1.56x	42216.38	15.75		
4	E	2031-08-04T05:20:41.044		26.54	-1.48x	42605.55	16.00		
alpha	E	2031-08-04T05:22:49.565		26.78	-1.05x	44747.47	17.31		
beta	E	2031-08-04T05:23:42.549		26.88	-0.88x	45678.12	17.81		
eta	E	2031-08-04T05:25:05.008		27.03	-0.60x	47176.12	18.51		
gamma	E	2031-08-04T05:25:28.930		27.08	-0.53x	47621.33	18.71		
delta	E	2031-08-04T05:26:04.956		27.15	-0.41x	48300.35	18.99		
lambda	E	2031-08-04T05:27:34.333		27.31	-0.11x	50026.71	19.63		
epsilon	E	2031-08-04T05:28:31.590		27.41	0.08x	51161.82	20.16		