

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-13T17:46:02.280
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 865649975611318784
 2Mass ID (if available) : 07332959+2212154

ICRS Star Coord at Epoch: 07h 33m 29.60359s +22:12:15.28451s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 12.938
 G magnitude : 14.723
 RP magnitude : 14.122
 BP magnitude : 15.164
 DUPflag : 0
 Distance (au) : 17.720
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.28
 Sun-Target sep (deg) : 178.36
 Sun-Moon sep (deg) : 86.15
 B (ring opening deg) : 55.21
 PA of pole (deg) : 84.72

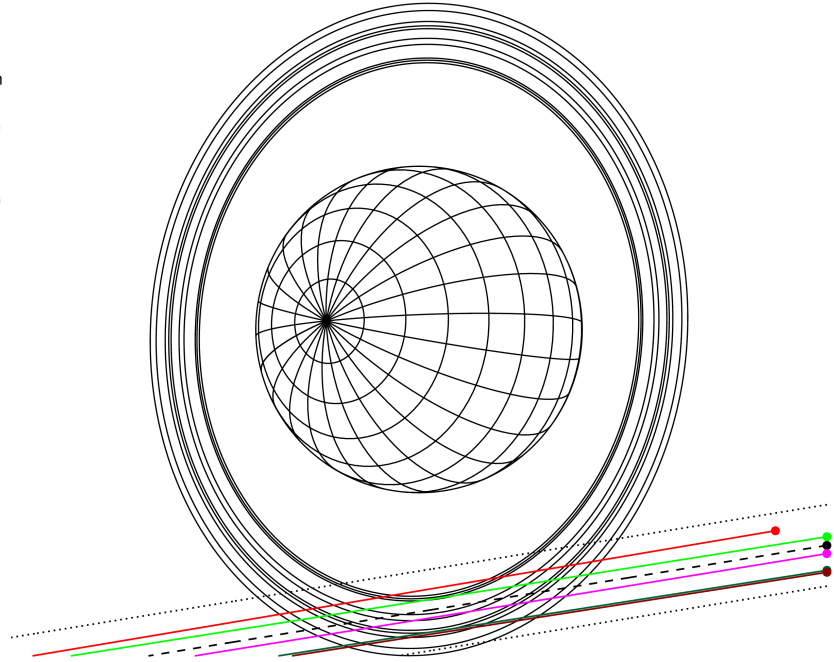
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2038-01-13T17:46:02.2800 a: 07 33 29.6036 & +22 12 15.285 C/A 3.387" PA 9.25 deg v_sky -23.28 km/s D 17.72 AU
 Credit: Styled after SORA/Lucky Star

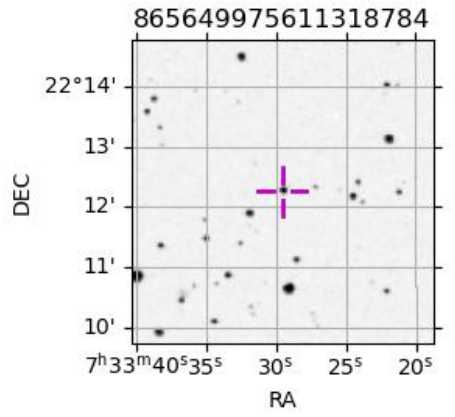
Uranus 2038-01-13T17:46:02 K12.94 G14.72 XRgt

Earth
 PIC
 PMO
 KAV
 AAT
 MSO

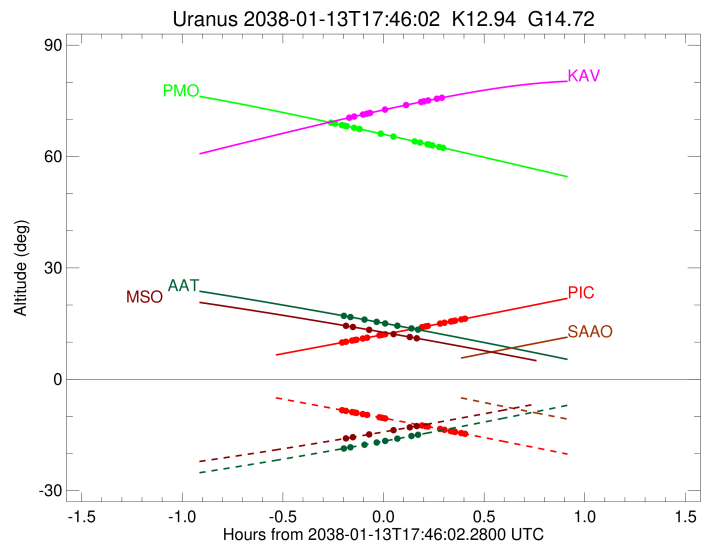
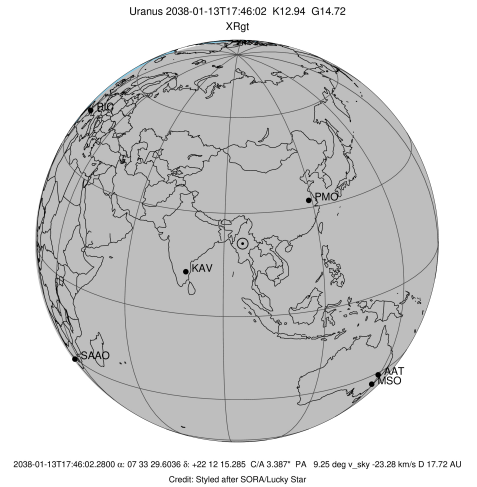


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++		+++++	JAN 13 17:34 - JAN 13 18:10	PnnRie
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++		+++++	JAN 13 17:30 - JAN 13 18:03	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					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++		+++++	JAN 13 17:36 - JAN 13 18:03	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	++++		++++	JAN 13 17:34 - JAN 13 17:55	PnnRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++		+++	JAN 13 17:35 - JAN 13 17:55	PnnRie



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-13T17:49:39.540
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 865649975611318784
 2Mass ID (if available) : 07332959+2212154
 ICRS Star Coord at Epoch: 07h 33m 29.60359s +22:12:15.28451s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 12.938
 G magnitude : 14.723
 RP magnitude : 14.122
 BP magnitude : 15.164
 DUPflag : 0
 Distance (au) : 17.720
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.28
 Sun-Target sep (deg) : 178.36
 Sun-Moon sep (deg) : 86.29
 B (ring opening deg) : 55.21
 PA of pole (deg) : 84.72
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.141
 C/A sky separation (km) : 40364.7
 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

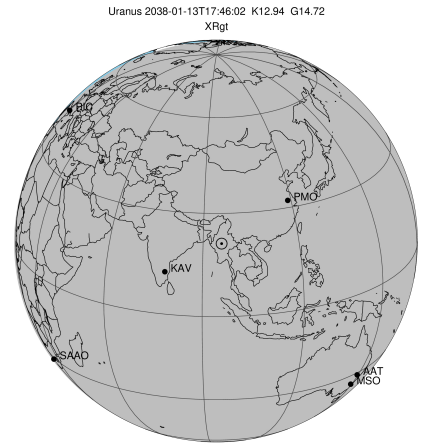


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-13T17:34:04.569		9.97	-8.39	50787.16	-16.59		
lambda	I	2038-01-13T17:34:50.839		10.10	-8.53	50026.71	-16.18		
delta	I	2038-01-13T17:36:41.511		10.42	-8.84	48300.35	-14.98		
gamma	I	2038-01-13T17:37:27.189		10.55	-8.97	47628.39	-14.44		
eta	I	2038-01-13T17:37:58.941		10.64	-9.06	47176.12	-14.05		
beta	I	2038-01-13T17:39:53.461		10.97	-9.39	45652.75	-12.56		
alpha	I	2038-01-13T17:41:14.552		11.21	-9.62	44685.07	-11.40		
4	I	2038-01-13T17:44:56.392		11.85	-10.26	42527.52	-7.86		
5	I	2038-01-13T17:45:26.789		11.94	-10.35	42294.36	-7.30		
6	I	2038-01-13T17:46:28.642		12.12	-10.53	41872.51	-6.28		

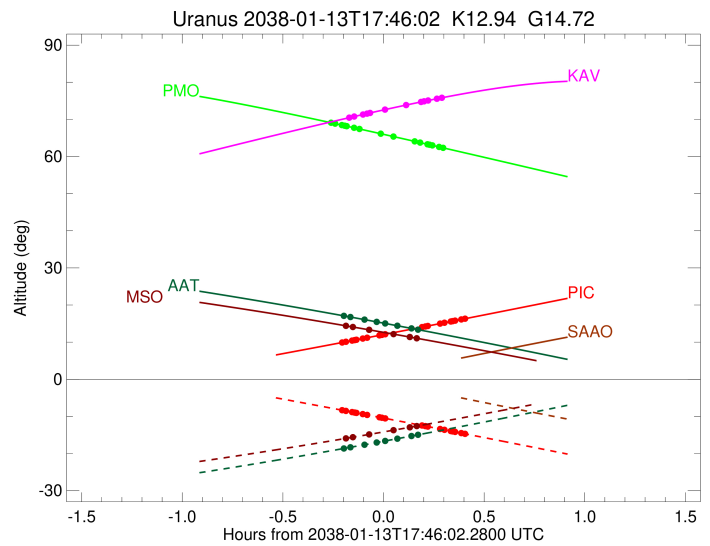
No planet occultations

6	E	2038-01-13T17:57:36.032		14.06	-12.46	41879.33	6.29		
5	E	2038-01-13T17:58:32.184		14.23	-12.62	42259.08	7.31		
4	E	2038-01-13T17:59:07.697		14.33	-12.73	42528.00	7.87		
alpha	E	2038-01-13T18:02:51.779		14.99	-13.38	44700.28	11.42		
beta	E	2038-01-13T18:04:12.372		15.23	-13.62	45670.76	12.58		
eta	E	2038-01-13T18:06:05.199		15.56	-13.95	47176.12	14.07		
gamma	E	2038-01-13T18:06:36.516		15.65	-14.04	47622.96	14.46		
delta	E	2038-01-13T18:07:22.481		15.79	-14.18	48300.35	15.01		
lambda	E	2038-01-13T18:09:12.922		16.11	-14.50	50026.71	16.23		
epsilon	E	2038-01-13T18:10:03.843		16.26	-14.65	50866.72	16.63		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-13T17:44:45.640
 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 : 865649975611318784
 2Mass ID (if available) : 07332959+2212154
 ICRS Star Coord at Epoch: 07h 33m 29.60359s +22:12:15.28451s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 12.938
 G magnitude : 14.723
 RP magnitude : 14.122
 BP magnitude : 15.164
 DUPflag : 0
 Distance (au) : 17.720
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.28
 Sun-Target sep (deg) : 178.36
 Sun-Moon sep (deg) : 86.99
 B (ring opening deg) : 55.21
 PA of pole (deg) : 84.72
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.270
 C/A sky separation (km) : 42027.8
 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



2038-01-13T17:46:02.2800 u: 07 33 29.6036 s: +22 12 15.285 C/A 3.387" PA 9.25 deg v_sky -23.28 km/s D 17.72 AU
 Credit: Styled after SORA/Lucky Star



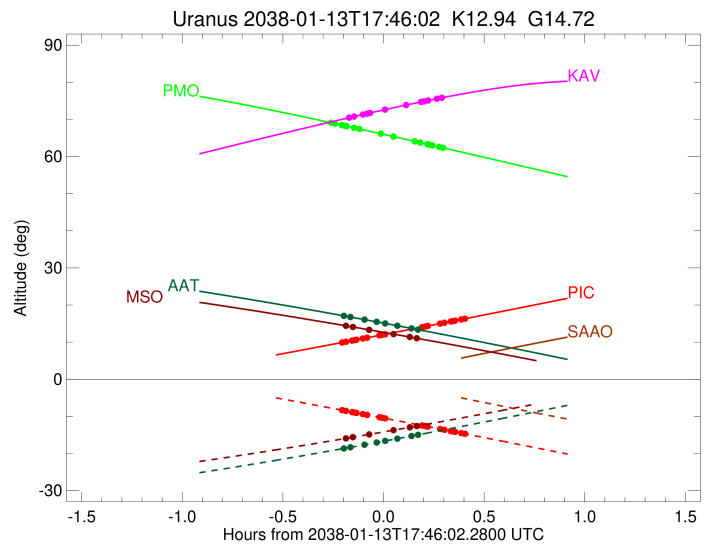
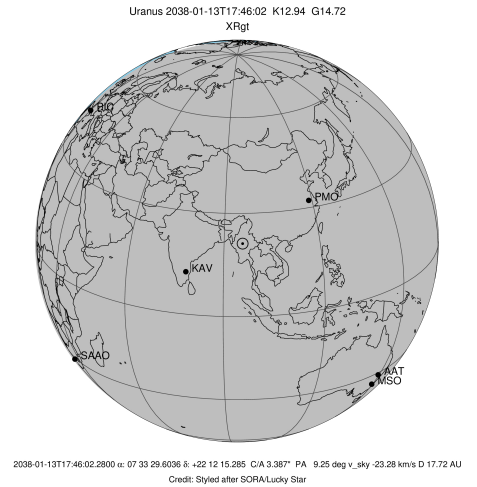
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-13T17:30:49.187		69.02	-69.81	50775.98	-15.54		
lambda	I	2038-01-13T17:31:38.025		68.86	-69.65	50026.71	-15.06		
delta	I	2038-01-13T17:33:38.491		68.47	-69.27	48300.35	-13.57		
gamma	I	2038-01-13T17:34:29.274		68.30	-69.11	47628.00	-12.90		
eta	I	2038-01-13T17:35:04.977		68.18	-68.99	47176.12	-12.41		
beta	I	2038-01-13T17:37:17.922		67.74	-68.57	45654.55	-10.47		
alpha	I	2038-01-13T17:38:58.441		67.41	-68.24	44685.89	-8.87		
4	I	2038-01-13T17:45:44.647		66.04	-66.91	42526.12	-1.56		

No planet occultations

4	E	2038-01-13T17:48:27.942		65.49	-66.38	42526.28	1.56		
alpha	E	2038-01-13T17:55:16.754		64.10	-65.01	44697.69	8.87		
beta	E	2038-01-13T17:56:56.917		63.76	-64.68	45669.33	10.47		
eta	E	2038-01-13T17:59:08.474		63.30	-64.23	47176.12	12.40		
gamma	E	2038-01-13T17:59:43.835		63.18	-64.11	47623.23	12.89		
delta	E	2038-01-13T18:00:35.028		63.01	-63.94	48300.35	13.56		
lambda	E	2038-01-13T18:02:35.605		62.59	-63.53	50026.71	15.05		
epsilon	E	2038-01-13T18:03:29.429		62.41	-63.35	50853.17	15.53		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-13T17:47:05.950
 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 : 865649975611318784
 2Mass ID (if available) : 07332959+2212154
 ICRS Star Coord at Epoch: 07h 33m 29.60359s +22:12:15.28451s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 12.938
 G magnitude : 14.723
 RP magnitude : 14.122
 BP magnitude : 15.164
 DUPflag : 0
 Distance (au) : 17.720
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.28
 Sun-Target sep (deg) : 178.36
 Sun-Moon sep (deg) : 87.00
 B (ring opening deg) : 55.21
 PA of pole (deg) : 84.72
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.492
 C/A sky separation (km) : 44878.8
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

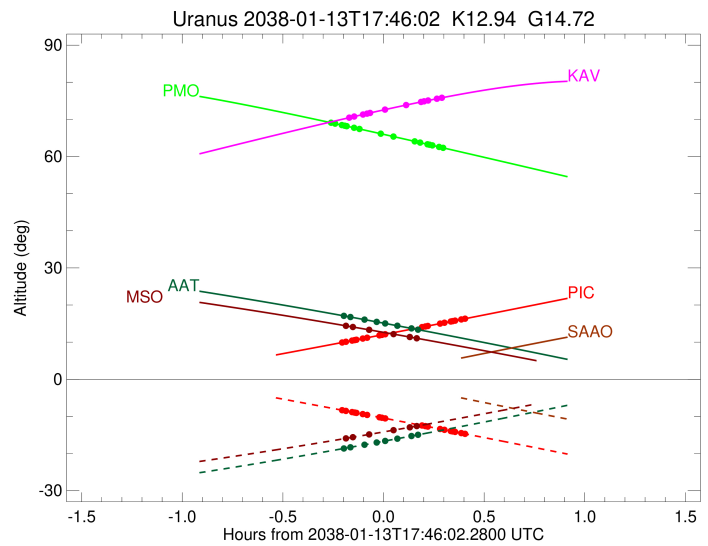
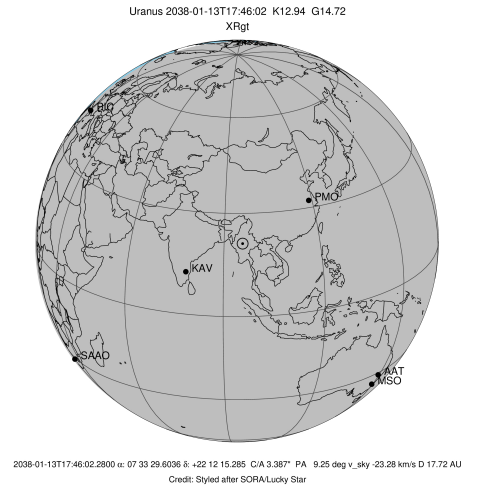


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-13T17:36:20.549		70.58	-69.57	50760.70	-12.77		
lambda	I	2038-01-13T17:37:19.529		70.78	-69.78	50026.71	-12.05		
delta	I	2038-01-13T17:39:57.059		71.32	-70.35	48300.35	-9.82		
gamma	I	2038-01-13T17:41:09.635		71.57	-70.60	47627.19	-8.71		
eta	I	2038-01-13T17:42:04.036		71.75	-70.79	47176.12	-7.86		
beta	I	2038-01-13T17:46:34.324		72.66	-71.74	45659.61	-3.30		

No planet occultations

beta	E	2038-01-13T17:52:43.370		73.86	-73.01	45664.25	3.30		
eta	E	2038-01-13T17:57:12.122		74.70	-73.91	47176.12	7.86		
gamma	E	2038-01-13T17:58:06.138		74.87	-74.09	47623.98	8.72		
delta	E	2038-01-13T17:59:19.058		75.09	-74.33	48300.35	9.83		
lambda	E	2038-01-13T18:01:56.522		75.57	-74.84	50026.71	12.06		
epsilon	E	2038-01-13T18:03:00.300		75.75	-75.05	50822.81	12.78		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-01-13T17:42:38.540
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 865649975611318784
 2Mass ID (if available) : 07332959+2212154
 ICRS Star Coord at Epoch: 07h 33m 29.60359s +22:12:15.28451s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 12.938
 G magnitude : 14.723
 RP magnitude : 14.122
 BP magnitude : 15.164
 DUPflag : 0
 Distance (au) : 17.720
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.28
 Sun-Target sep (deg) : 178.36
 Sun-Moon sep (deg) : 86.42
 B (ring opening deg) : 55.21
 PA of pole (deg) : 84.72
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.666
 C/A sky separation (km) : 47113.1
 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



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

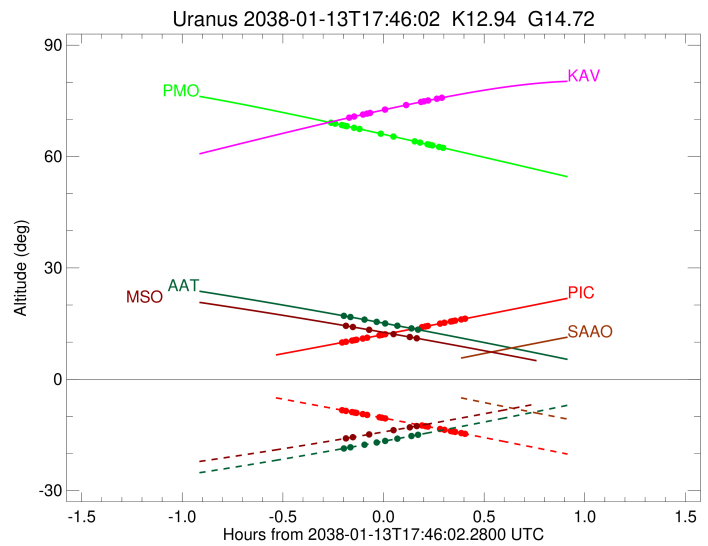
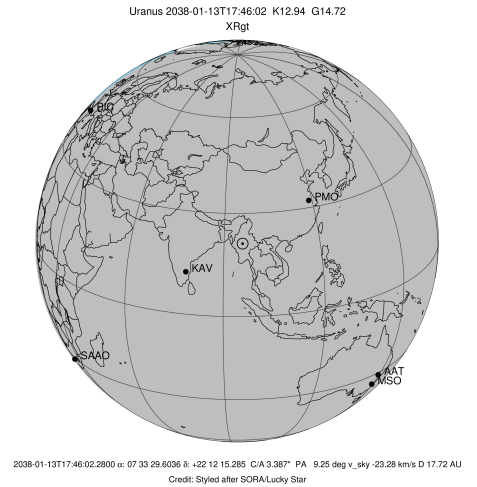
Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-01-13T17:34:54.284	16.97	-18.53	50749.87	-9.80		
lambda	I	2038-01-13T17:36:12.128	16.76	-18.32	50026.71	-8.73		
delta	I	2038-01-13T17:40:25.377	16.06	-17.63	48300.35	-4.83		
gamma	I	2038-01-13T17:44:13.035	15.43	-17.00	47625.73	-1.06		

No planet occultations

gamma	E	2038-01-13T17:46:19.342	15.07	-16.65	47625.34	1.06		
delta	E	2038-01-13T17:50:07.452	14.43	-16.01	48300.35	4.83		
lambda	E	2038-01-13T17:54:20.914	13.71	-15.30	50026.71	8.72		
epsilon	E	2038-01-13T17:55:43.849	13.47	-15.06	50799.17	9.79		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2038-01-13T17:42:44.480
Event type          : XRgt
: No Uranus occs
: Ring occs: geocentric, topocentric
Observer code       : MSO
Location            : Mt. Stromlo Observatory
Latitude (deg)      : -35.32000
E. Longitude (deg)  : 149.00833
Altitude (km)       : 0.770
Gaia source ID      : 865649975611318784
2Mass ID (if available) : 07332959+2212154
ICRS Star Coord at Epoch: 07h 33m 29.60359s +22:12:15.28451s
RUWE (>1.4 is poor) : 0.99
K magnitude         : 12.938
G magnitude         : 14.723
RP magnitude        : 14.122
BP magnitude        : 15.164
DUPflag            : 0
Distance (au)       : 17.720
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -23.28
Sun-Target sep (deg) : 178.36
Sun-Moon sep (deg)  : 86.38
B (ring opening deg) : 55.21
PA of pole (deg)    : 84.72
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.691
C/A sky separation (km) : 47435.6
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall1.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall1.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	2038-01-13T17:35:33.510		14.29	-15.82	50748.61	-9.29		
lambda	I	2038-01-13T17:36:56.158		14.07	-15.60	50026.71	-8.13		
delta	I	2038-01-13T17:41:49.583		13.31	-14.85	48300.35	-3.55		

No planet occultations

delta	E	2038-01-13T17:48:57.746		12.17	-13.73	48300.35	3.55		
lambda	E	2038-01-13T17:53:51.375		11.38	-12.95	50026.71	8.13		
epsilon	E	2038-01-13T17:55:19.103		11.15	-12.71	50795.30	9.28		