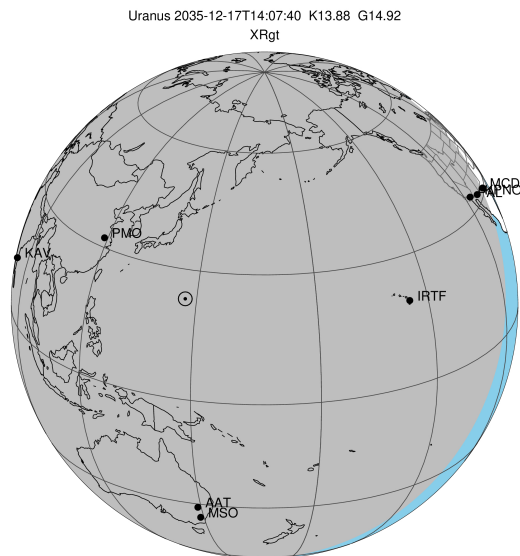


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2035-12-17T14:07:40.360  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3380166238643957120  
 2Mass ID (if available) : 06574751+2309457

ICRS Star Coord at Epoch: 06h 57m 47.51404s +23:09:45.64035s

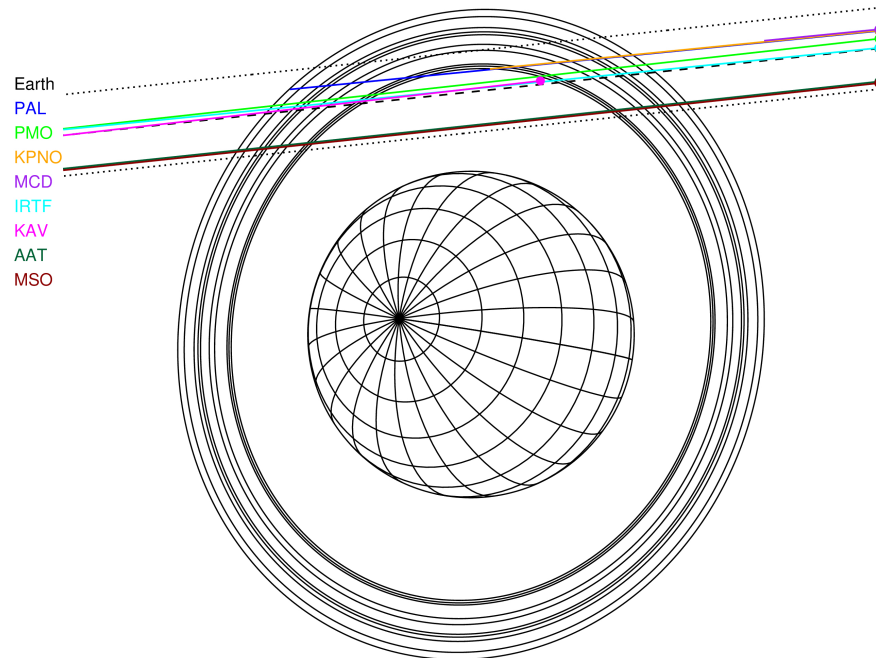
RUWE (>1.4 is poor) : 1.00  
 K magnitude : 13.876  
 G magnitude : 14.916  
 RP magnitude : 14.563  
 BP magnitude : 15.133  
 DUPflag : 0  
 Distance (au) : 17.892  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -21.82  
 Sun-Target sep (deg) : 161.69  
 Sun-Moon sep (deg) : 18.15  
 B (ring opening deg) : 63.20  
 PA of pole (deg) : 77.55

#	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



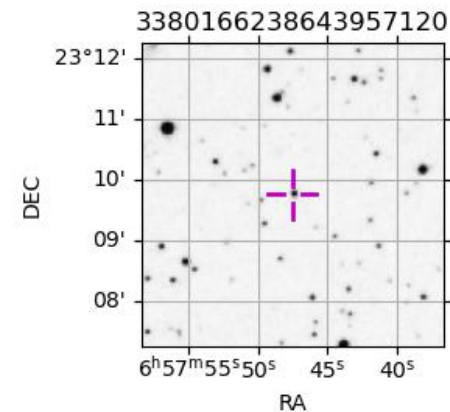
2035-12-17T14:07:40.3600 ra: 06 57 47.5140 s: +23 09 45.640 C/A 2.920" PA 186.08 deg v\_sky -21.82 km/s D 17.89 AU  
 Credit: Styled after SORA/Lucky Star

Uranus 2035-12-17T14:07:40 K13.88 G14.92 XRgt

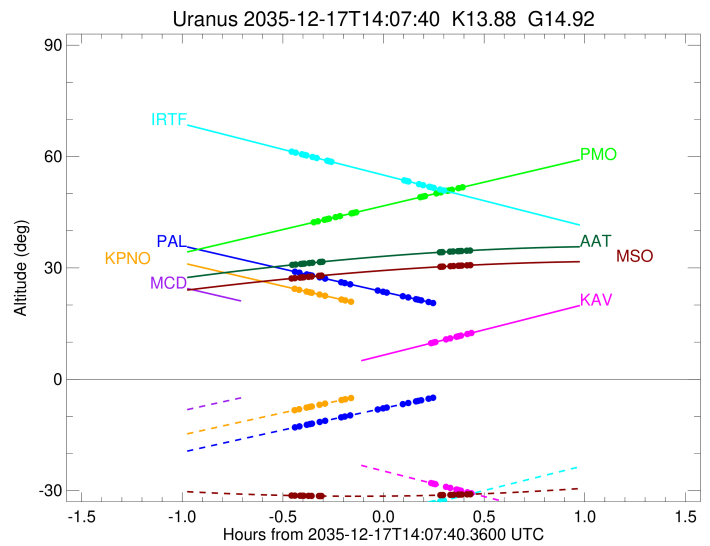
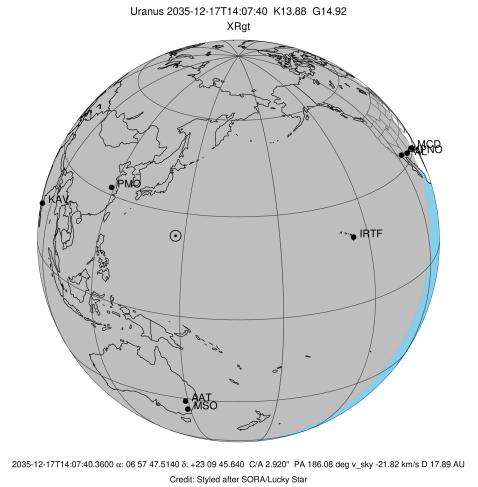


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++		+++++	DEC 17 13:41 - DEC 17 14:21	PnnRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++		+++++	DEC 17 13:46 - DEC 17 14:31	PnnRie
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++		+++++	DEC 17 13:41 - DEC 17 13:58	PnnRin
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	+++++		+++++	DEC 17 13:40 - DEC 17 14:26	PnnRie
KAV	Kavalur Observatory	12.6	78.8			+++++	DEC 17 14:21 - DEC 17 14:34	PnnRne
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	+++++		+++++	DEC 17 13:40 - DEC 17 14:33	PnnRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++		+++++	DEC 17 13:40 - DEC 17 14:33	PnnRie



target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2035-12-17T14:03:45.430  
 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 : 3380166238643957120  
 2Mass ID (if available) : 06574751+2309457  
 ICRS Star Coord at Epoch: 06h 57m 47.51404s +23:09:45.64035s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 13.876  
 G magnitude : 14.916  
 RP magnitude : 14.563  
 BP magnitude : 15.133  
 DUPflag : 0  
 Distance (au) : 17.892  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -21.82  
 Sun-Target sep (deg) : 161.69  
 Sun-Moon sep (deg) : 17.62  
 B (ring opening deg) : 63.20  
 PA of pole (deg) : 77.55  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 3.159  
 C/A sky separation (km) : 40997.2  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ural11.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ural11.bsp  
 ural61.bsp  
 vgr2.ural61.bsp  
 peph.ural60.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	2035-12-17T13:41:18.289		28.97	-12.95	51131.83	-14.43		
lambda	I	2035-12-17T13:42:37.444		28.70	-12.69	50026.71	-13.65		
delta	I	2035-12-17T13:44:49.321		28.24	-12.26	48300.35	-12.51		
gamma	I	2035-12-17T13:45:44.062		28.05	-12.08	47628.96	-12.01		
eta	I	2035-12-17T13:46:22.347		27.92	-11.95	47176.12	-11.64		
beta	I	2035-12-17T13:48:38.837		27.45	-11.51	45680.30	-10.26		
alpha	I	2035-12-17T13:50:21.329		27.10	-11.17	44686.45	-9.12		
4	I	2035-12-17T13:55:14.205		26.10	-10.22	42530.08	-5.50		
5	I	2035-12-17T13:55:56.353		25.95	-10.08	42308.28	-4.98		
6	I	2035-12-17T13:57:56.979		25.54	-9.69	41811.70	-3.28		

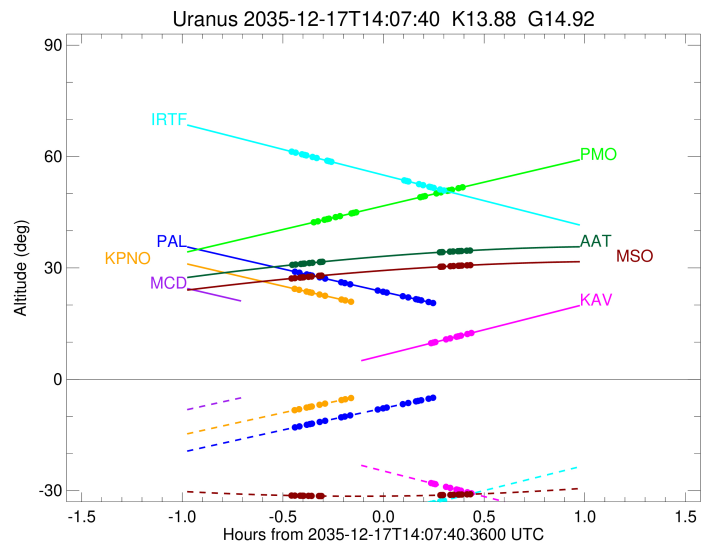
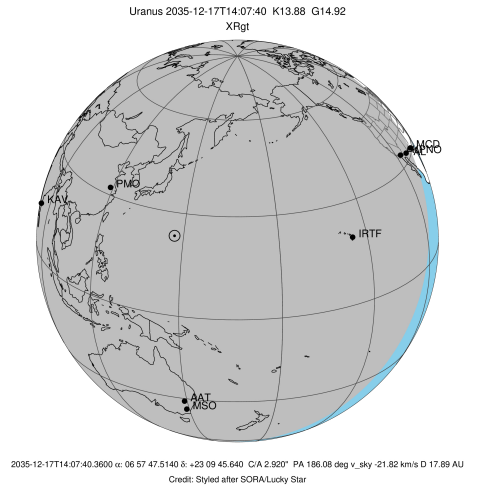
No planet occultations

6	E	2035-12-17T14:05:40.844		23.96	-8.19	41803.56	3.28		
5	E	2035-12-17T14:07:46.913		23.53	-7.79	42315.25	4.97		
4	E	2035-12-17T14:08:25.883		23.39	-7.66	42525.95	5.49		
alpha	E	2035-12-17T14:13:21.245		22.39	-6.72	44687.81	9.11		
beta	E	2035-12-17T14:15:03.286		22.04	-6.39	45678.12	10.24		
eta	E	2035-12-17T14:17:20.132		21.58	-5.96	47176.12	11.62		
gamma	E	2035-12-17T14:17:58.723		21.45	-5.83	47631.58	11.98		
delta	E	2035-12-17T14:18:53.379		21.26	-5.66	48300.35	12.48		
lambda	E	2035-12-17T14:21:05.602		20.81	-5.24	50026.71	13.61		
epsilon	E	2035-12-17T14:22:52.856		20.45	-4.90x	51531.28	14.38		



```

target                : Uranus
target radius (km)    : 25559.00
C/A epoch             : 2035-12-17T14:03:37.090
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        : 3380166238643957120
2Mass ID (if available) : 06574751+2309457
ICRS Star Coord at Epoch: 06h 57m 47.51404s +23:09:45.64035s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 13.876
G magnitude           : 14.916
RP magnitude          : 14.563
BP magnitude          : 15.133
DUPflag               : 0
Distance (au)         : 17.892
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -21.82
Sun-Target sep (deg)  : 161.69
Sun-Moon sep (deg)    : 17.58
B (ring opening deg) : 63.20
PA of pole (deg)     : 77.55
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.166
C/A sky separation (km) : 41078.9
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_itr93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
    
```



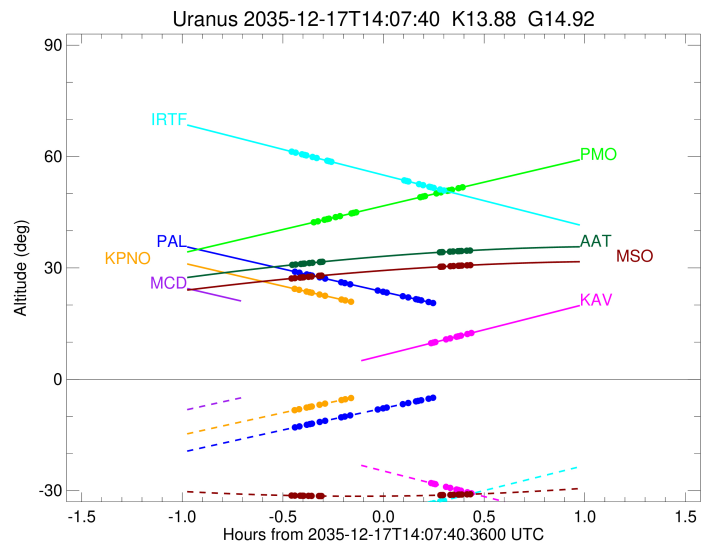
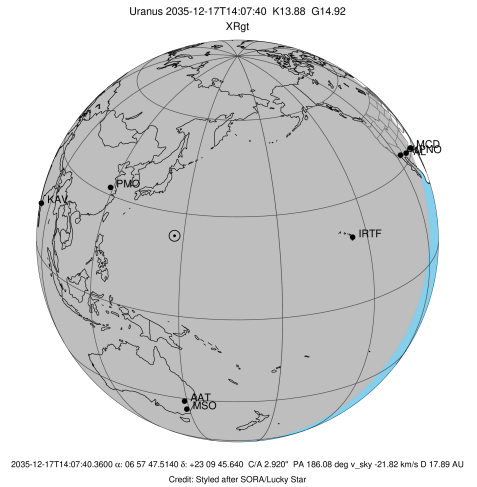
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-12-17T13:41:12.268		24.36	-8.33	51132.89	-14.35		
lambda	I	2035-12-17T13:42:31.942		24.09	-8.07	50026.71	-13.57		
delta	I	2035-12-17T13:44:44.672		23.63	-7.63	48300.35	-12.43		
gamma	I	2035-12-17T13:45:39.820		23.44	-7.45	47628.98	-11.92		
eta	I	2035-12-17T13:46:18.413		23.30	-7.33	47176.12	-11.55		
beta	I	2035-12-17T13:48:36.197		22.83	-6.88	45680.33	-10.15		
alpha	I	2035-12-17T13:50:19.959		22.47	-6.54	44686.40	-8.99		
4	I	2035-12-17T13:55:19.751		21.44	-5.57	42529.92	-5.28		
5	I	2035-12-17T13:56:03.686		21.29	-5.43	42308.59	-4.74		
6	I	2035-12-17T13:58:14.318		20.84	-5.01	41811.19	-2.90		

No planet occultations

6	E	2035-12-17T14:05:06.030		19.43	-3.68x	41803.97	2.90		
5	E	2035-12-17T14:07:22.120		18.96	-3.25x	42315.24	4.73		
4	E	2035-12-17T14:08:02.871		18.82	-3.12x	42525.94	5.28		
alpha	E	2035-12-17T14:13:05.170		17.79	-2.16x	44687.74	8.98		
beta	E	2035-12-17T14:14:48.488		17.44	-1.83x	45678.16	10.13		
eta	E	2035-12-17T14:17:06.639		16.97	-1.39x	47176.12	11.52		
gamma	E	2035-12-17T14:17:45.543		16.84	-1.27x	47631.58	11.89		
delta	E	2035-12-17T14:18:40.610		16.65	-1.10x	48300.35	12.40		
lambda	E	2035-12-17T14:20:53.702		16.20	-0.68x	50026.71	13.53		
epsilon	E	2035-12-17T14:22:41.533		15.84	-0.34x	51530.90	14.31		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2035-12-17T14:04:45.900
Event type          : XRgt
: No Uranus occs
: Ring occs: geocentric, topocentric
Observer code       : IRTF
Location            : Mauna Kea/IRTF
Latitude (deg)      : 19.82622
E. Longitude (deg)  : 204.52800
Altitude (km)       : 4.168
Gaia source ID      : 3380166238643957120
2Mass ID (if available) : 06574751+2309457
ICRS Star Coord at Epoch: 06h 57m 47.51404s +23:09:45.64035s
RUWE (>1.4 is poor) : 1.00
K magnitude         : 13.876
G magnitude         : 14.916
RP magnitude        : 14.563
BP magnitude        : 15.133
DUPflag            : 0
Distance (au)       : 17.892
f0 (km)            : 0.000
g0 (km)            : 0.000
skyplane vel. (km/s) : -21.82
Sun-Target sep (deg) : 161.69
Sun-Moon sep (deg)  : 17.87
B (ring opening deg) : 63.20
PA of pole (deg)    : 77.55
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.948
C/A sky separation (km) : 38260.9
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_itr93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
    
```

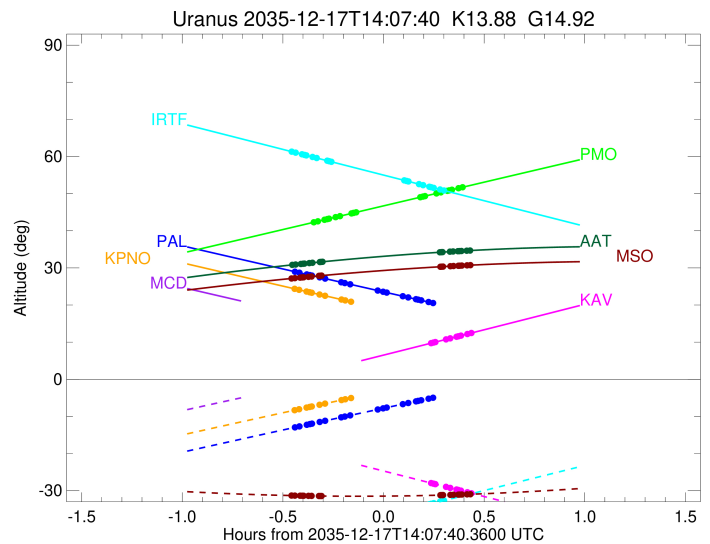
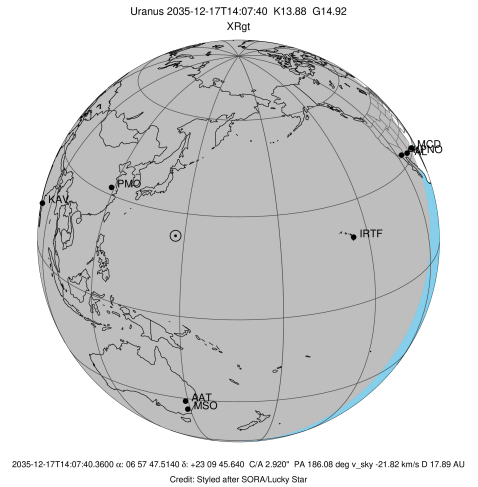


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-12-17T13:40:22.028		61.30	-43.00	51097.42	-16.24		
lambda	I	2035-12-17T13:41:29.537		61.04	-42.74	50026.71	-15.62		
delta	I	2035-12-17T13:43:23.157		60.61	-42.31	48300.35	-14.75		
gamma	I	2035-12-17T13:44:09.289		60.43	-42.13	47628.46	-14.38		
eta	I	2035-12-17T13:44:41.056		60.31	-42.01	47176.12	-14.10		
beta	I	2035-12-17T13:46:31.043		59.89	-41.59	45679.39	-13.11		
alpha	I	2035-12-17T13:47:48.907		59.59	-41.30	44688.30	-12.33		
4	I	2035-12-17T13:50:58.999		58.86	-40.58	42534.67	-10.24		
5	I	2035-12-17T13:51:22.464		58.77	-40.49	42299.75	-10.01		
6	I	2035-12-17T13:52:11.685		58.58	-40.30	41821.05	-9.36		

No planet occultations

6	E	2035-12-17T14:13:44.822		53.61	-35.40	41798.11	9.35		
5	E	2035-12-17T14:14:39.287		53.40	-35.19	42313.57	10.00		
4	E	2035-12-17T14:14:59.681		53.32	-35.11	42527.09	10.23		
alpha	E	2035-12-17T14:18:12.027		52.58	-34.39	44690.14	12.32		
beta	E	2035-12-17T14:19:29.401		52.28	-34.09	45676.62	13.09		
eta	E	2035-12-17T14:21:19.659		51.86	-33.68	47176.12	14.08		
gamma	E	2035-12-17T14:21:51.700		51.74	-33.56	47631.55	14.35		
delta	E	2035-12-17T14:22:37.705		51.56	-33.38	48300.35	14.72		
lambda	E	2035-12-17T14:24:31.555		51.12	-32.95	50026.71	15.59		
epsilon	E	2035-12-17T14:26:06.724		50.76	-32.59	51541.76	16.20		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2035-12-17T14:12:43.210  
 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 : 3380166238643957120  
 2Mass ID (if available) : 06574751+2309457  
 ICRS Star Coord at Epoch: 06h 57m 47.51404s +23:09:45.64035s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 13.876  
 G magnitude : 14.916  
 RP magnitude : 14.563  
 BP magnitude : 15.133  
 DUPflag : 0  
 Distance (au) : 17.892  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -21.82  
 Sun-Target sep (deg) : 161.69  
 Sun-Moon sep (deg) : 19.14  
 B (ring opening deg) : 63.20  
 PA of pole (deg) : 77.55  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.946  
 C/A sky separation (km) : 38227.8  
 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

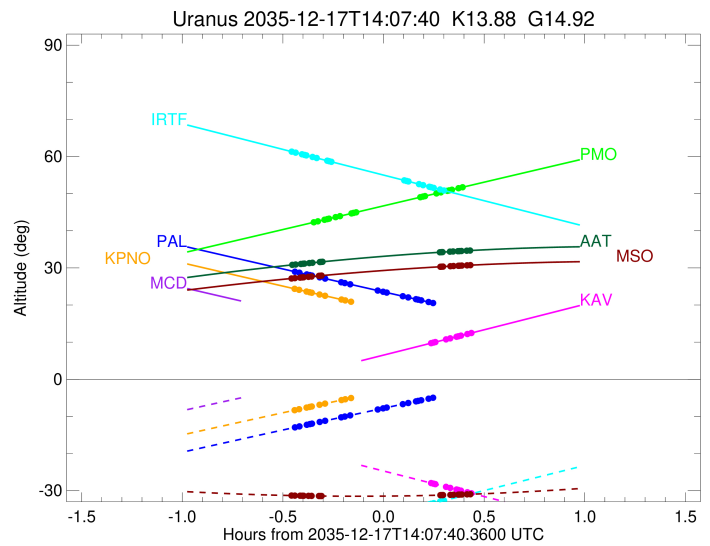
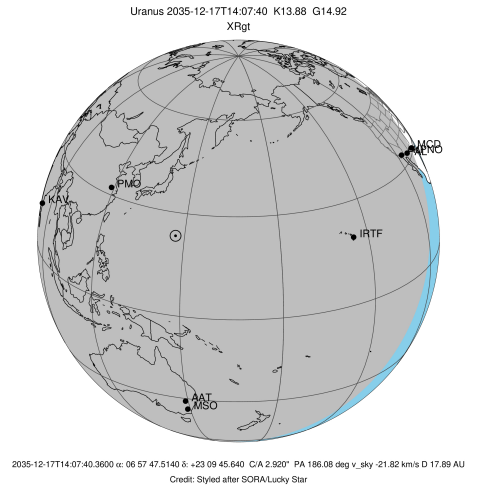


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-12-17T13:47:51.202		2.03x	-20.18	51102.54	-15.96		
lambda	I	2035-12-17T13:49:00.246		2.29x	-20.44	50026.71	-15.35		
delta	I	2035-12-17T13:50:55.879		2.72x	-20.88	48300.35	-14.50		
gamma	I	2035-12-17T13:51:42.816		2.90x	-21.06	47628.52	-14.13		
eta	I	2035-12-17T13:52:15.143		3.02x	-21.18	47176.12	-13.86		
beta	I	2035-12-17T13:54:07.021		3.44x	-21.61	45679.50	-12.89		
alpha	I	2035-12-17T13:55:26.240		3.74x	-21.91	44688.11	-12.13		
4	I	2035-12-17T13:58:39.544		4.47x	-22.65	42534.33	-10.07		
5	I	2035-12-17T13:59:03.278		4.56x	-22.74	42300.35	-9.85		
6	I	2035-12-17T13:59:53.447		4.74x	-22.93	41820.55	-9.21		

No planet occultations

6	E	2035-12-17T14:21:45.198	9.70	-27.94	41797.90	9.23
5	E	2035-12-17T14:22:40.395	9.91	-28.15	42313.36	9.87
4	E	2035-12-17T14:23:01.093	9.99	-28.23	42527.22	10.10
alpha	E	2035-12-17T14:26:15.917	10.73	-28.97	44690.38	12.16
beta	E	2035-12-17T14:27:34.210	11.02	-29.27	45676.45	12.93
eta	E	2035-12-17T14:29:25.816	11.45	-29.70	47176.12	13.91
gamma	E	2035-12-17T14:29:58.239	11.57	-29.82	47631.54	14.18
delta	E	2035-12-17T14:30:44.788	11.75	-30.00	48300.35	14.55
lambda	E	2035-12-17T14:32:39.960	12.19	-30.44	50026.71	15.41
epsilon	E	2035-12-17T14:34:16.290	12.55	-30.81	51543.08	16.03

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2035-12-17T14:08:31.050  
 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 : 3380166238643957120  
 2Mass ID (if available) : 06574751+2309457  
 ICRS Star Coord at Epoch: 06h 57m 47.5140s +23:09:45.64035s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 13.876  
 G magnitude : 14.916  
 RP magnitude : 14.563  
 BP magnitude : 15.133  
 DUPflag : 0  
 Distance (au) : 17.892  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -21.82  
 Sun-Target sep (deg) : 161.69  
 Sun-Moon sep (deg) : 18.40  
 B (ring opening deg) : 63.20  
 PA of pole (deg) : 77.55  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.509  
 C/A sky separation (km) : 32556.4  
 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

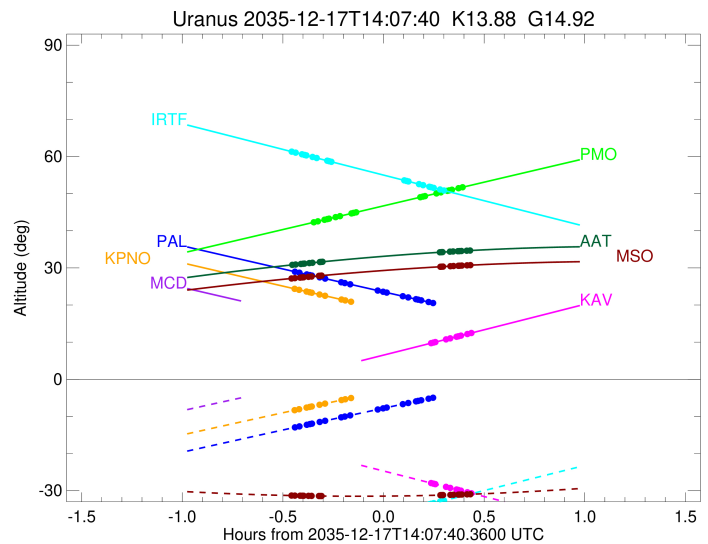
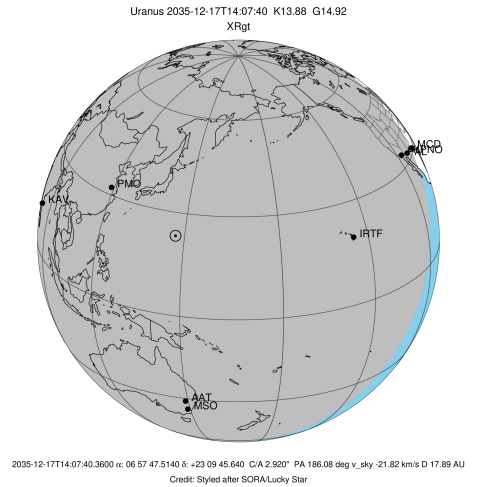


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-12-17T13:40:35.062		30.83	-35.35	51037.51	-18.93		
lambda	I	2035-12-17T13:41:29.205		30.91	-35.37	50026.71	-18.53		
delta	I	2035-12-17T13:43:03.674		31.06	-35.40	48300.35	-18.01		
gamma	I	2035-12-17T13:43:41.262		31.12	-35.41	47627.57	-17.79		
eta	I	2035-12-17T13:44:06.756		31.16	-35.41	47176.12	-17.63		
beta	I	2035-12-17T13:45:33.175		31.29	-35.44	45677.38	-17.07		
alpha	I	2035-12-17T13:46:31.586		31.38	-35.45	44692.19	-16.64		
4	I	2035-12-17T13:48:44.820		31.58	-35.48	42542.42	-15.58		
5	I	2035-12-17T13:49:01.816		31.61	-35.48	42285.70	-15.49		
6	I	2035-12-17T13:49:31.099		31.65	-35.49	41832.02	-15.18		

No planet occultations

6	E	2035-12-17T14:24:23.648		34.20	-35.22	41795.06	15.19		
5	E	2035-12-17T14:24:57.825		34.24	-35.21	42306.48	15.50		
4	E	2035-12-17T14:25:11.929		34.25	-35.20	42531.22	15.59		
alpha	E	2035-12-17T14:27:26.856		34.37	-35.14	44694.94	16.66		
beta	E	2035-12-17T14:28:24.599		34.42	-35.11	45673.60	17.09		
eta	E	2035-12-17T14:29:51.027		34.50	-35.06	47176.12	17.65		
gamma	E	2035-12-17T14:30:16.702		34.52	-35.05	47631.35	17.81		
delta	E	2035-12-17T14:30:54.030		34.55	-35.03	48300.35	18.03		
lambda	E	2035-12-17T14:32:28.373		34.63	-34.98	50026.71	18.56		
epsilon	E	2035-12-17T14:33:49.738		34.69	-34.93	51553.42	18.95		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2035-12-17T14:08:26.660  
 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 : 3380166238643957120  
 2Mass ID (if available) : 06574751+2309457  
 ICRS Star Coord at Epoch: 06h 57m 47.5140s +23:09:45.64035s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 13.876  
 G magnitude : 14.916  
 RP magnitude : 14.563  
 BP magnitude : 15.133  
 DUPflag : 0  
 Distance (au) : 17.892  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -21.82  
 Sun-Target sep (deg) : 161.69  
 Sun-Moon sep (deg) : 18.36  
 B (ring opening deg) : 63.20  
 PA of pole (deg) : 77.55  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.490  
 C/A sky separation (km) : 32313.9  
 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	2035-12-17T13:40:21.815		27.17	-31.33	51035.08	-19.01		
lambda	I	2035-12-17T13:41:15.578		27.24	-31.34	50026.71	-18.62		
delta	I	2035-12-17T13:42:49.554		27.38	-31.37	48300.35	-18.11		
gamma	I	2035-12-17T13:43:26.928		27.44	-31.38	47627.53	-17.89		
eta	I	2035-12-17T13:43:52.266		27.47	-31.39	47176.12	-17.74		
beta	I	2035-12-17T13:45:18.116		27.60	-31.41	45677.29	-17.19		
alpha	I	2035-12-17T13:46:16.071		27.68	-31.42	44692.37	-16.77		
4	I	2035-12-17T13:48:28.108		27.86	-31.45	42542.74	-15.74		
5	I	2035-12-17T13:48:44.997		27.89	-31.45	42285.13	-15.65		
6	I	2035-12-17T13:49:13.898		27.92	-31.45	41832.42	-15.35		

No planet occultations

6	E	2035-12-17T14:24:33.295		30.30	-31.22	41795.01	15.36		
5	E	2035-12-17T14:25:07.088		30.33	-31.21	42306.15	15.66		
4	E	2035-12-17T14:25:21.088		30.35	-31.20	42531.41	15.75		
alpha	E	2035-12-17T14:27:34.817		30.46	-31.14	44695.14	16.79		
beta	E	2035-12-17T14:28:32.108		30.50	-31.12	45673.48	17.21		
eta	E	2035-12-17T14:29:57.971		30.57	-31.08	47176.12	17.76		
gamma	E	2035-12-17T14:30:23.490		30.59	-31.07	47631.34	17.92		
delta	E	2035-12-17T14:31:00.606		30.62	-31.05	48300.35	18.13		
lambda	E	2035-12-17T14:32:34.461		30.69	-31.00	50026.71	18.65		
epsilon	E	2035-12-17T14:33:55.471		30.75	-30.96	51553.65	19.04		