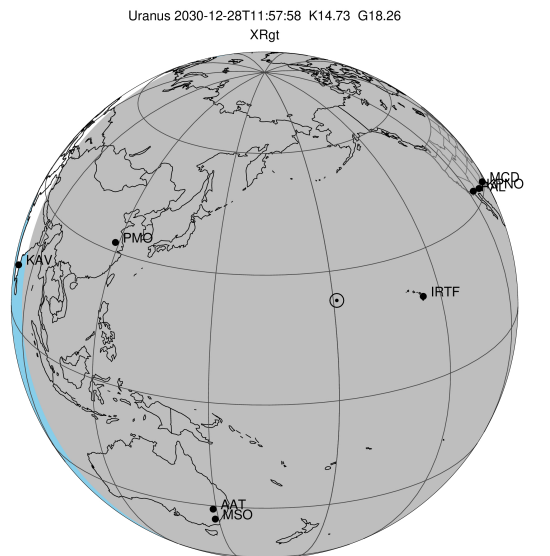


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-28T11:57:58.830
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3415551954503127808
 2Mass ID (if available) : 05152526+2308116

ICRS Star Coord at Epoch: 05h 15m 25.28805s +23:08:11.48269s

RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.728
 G magnitude : 18.262
 RP magnitude : 17.230
 BP magnitude : 19.244
 DUPflag : 0
 Distance (au) : 18.208
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.22
 Sun-Target sep (deg) : 163.41
 Sun-Moon sep (deg) : 111.27
 B (ring opening deg) : 81.91
 PA of pole (deg) : 10.65

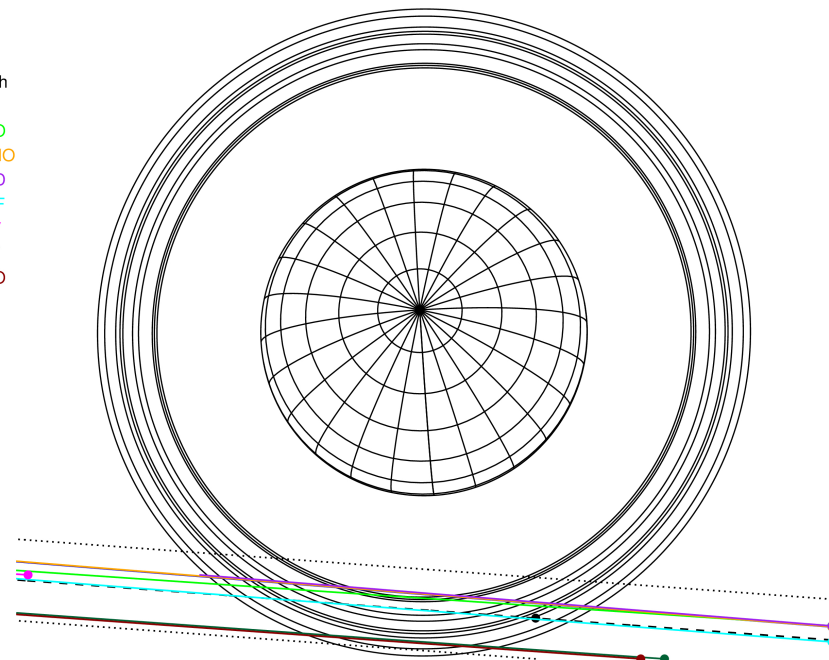
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2030-12-28T11:57:58.8300 α: 05 15 25.2881 δ: +23 08 11.483 C/A 3.275° PA 355.79 deg v_sky -22.22 km/s D 18.21 AU
 Credit: Styled after SORA/Lucky Star

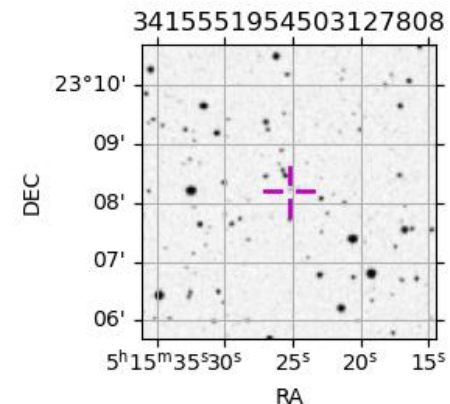
Uranus 2030-12-28T11:57:58 K14.73 G18.26 XRgt

Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 KAV
 AAT
 MSO

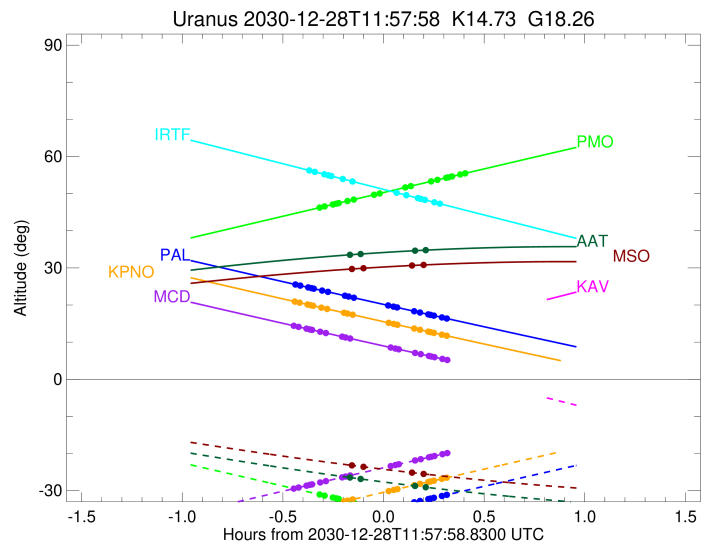
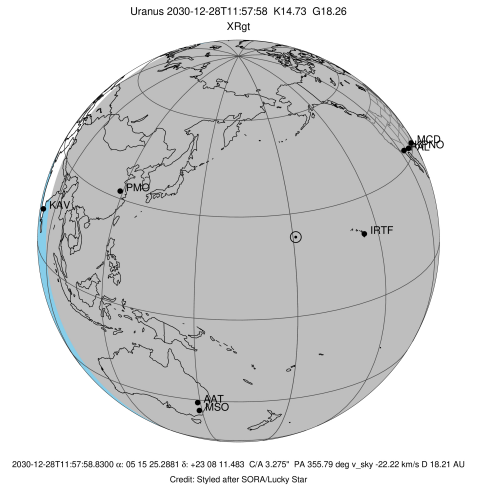


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1	+++++		+++++	DEC 28 11:31 - DEC 28 12:17	PnnRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++		+++++	DEC 28 11:39 - DEC 28 12:22	PnnRie
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++		+++++	DEC 28 11:31 - DEC 28 12:17	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++		+++++	DEC 28 11:31 - DEC 28 12:17	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++		+++++	DEC 28 11:36 - DEC 28 12:15	PnnRie
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	++		++	DEC 28 11:48 - DEC 28 12:11	PnnRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	++		++	DEC 28 11:48 - DEC 28 12:10	PnnRie



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-28T11:54:06.540
 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 : 3415551954503127808
 2Mass ID (if available) : 05152526+2308116
 ICRS Star Coord at Epoch: 05h 15m 25.28805s +23:08:11.48269s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.728
 G magnitude : 18.262
 RP magnitude : 17.230
 BP magnitude : 19.244
 DUPflag : 0
 Distance (au) : 18.208
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.22
 Sun-Target sep (deg) : 163.41
 Sun-Moon sep (deg) : 111.30
 B (ring opening deg) : 81.91
 PA of pole (deg) : 10.65
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.096
 C/A sky separation (km) : 40890.4
 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_itrfr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

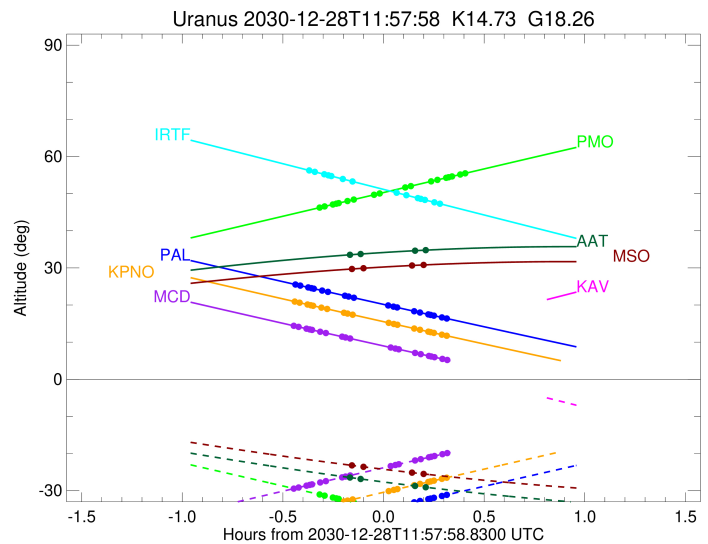
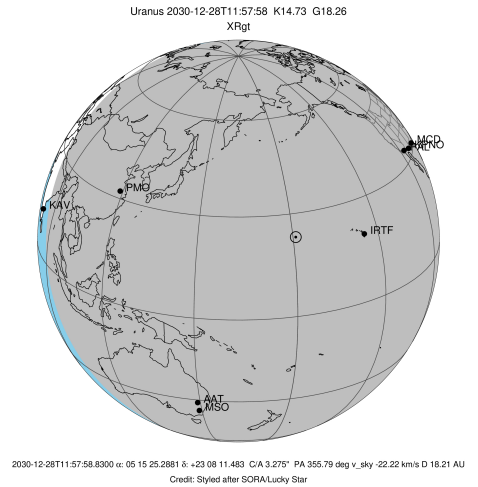


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-12-28T11:31:57.194		25.48	-40.47	50978.03	-13.24		
lambda	I	2030-12-28T11:33:11.135		25.22	-40.21	50026.71	-12.62		
delta	I	2030-12-28T11:35:33.631		24.74	-39.71	48300.35	-11.59		
gamma	I	2030-12-28T11:36:33.167		24.53	-39.51	47623.70	-11.14		
eta	I	2030-12-28T11:37:13.964		24.40	-39.36	47176.12	-10.81		
beta	I	2030-12-28T11:39:41.697		23.89	-38.85	45670.83	-9.54		
alpha	I	2030-12-28T11:41:23.248		23.55	-38.50	44747.18	-8.62		
4	I	2030-12-28T11:46:25.383		22.52	-37.45	42606.73	-5.52		
5	I	2030-12-28T11:47:21.328		22.33	-37.25	42313.92	-4.87		
6	I	2030-12-28T11:49:10.087		21.96	-36.88	41856.76	-3.62		

No planet occultations

6	E	2030-12-28T11:59:18.682		19.90	-34.77	41843.62	3.62		
5	E	2030-12-28T12:01:07.469		19.53	-34.39	42300.17	4.87		
4	E	2030-12-28T12:02:08.741		19.33	-34.18	42615.91	5.51		
alpha	E	2030-12-28T12:07:09.792		18.31	-33.14	44751.54	8.60		
beta	E	2030-12-28T12:08:49.327		17.98	-32.80	45653.68	9.52		
eta	E	2030-12-28T12:11:19.270		17.48	-32.28	47176.12	10.78		
gamma	E	2030-12-28T12:12:00.654		17.34	-32.14	47629.00	11.11		
delta	E	2030-12-28T12:12:59.882		17.14	-31.93	48300.35	11.56		
lambda	E	2030-12-28T12:15:22.819		16.66	-31.44	50026.71	12.58		
epsilon	E	2030-12-28T12:17:12.818		16.29	-31.06	51449.85	13.19		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-28T12:00:30.250
 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 : 3415551954503127808
 2Mass ID (if available) : 05152526+2308116
 ICRS Star Coord at Epoch: 05h 15m 25.28805s +23:08:11.48269s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.728
 G magnitude : 18.262
 RP magnitude : 17.230
 BP magnitude : 19.244
 DUPflag : 0
 Distance (au) : 18.208
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.22
 Sun-Target sep (deg) : 163.41
 Sun-Moon sep (deg) : 112.19
 B (ring opening deg) : 81.91
 PA of pole (deg) : 10.65
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.145
 C/A sky separation (km) : 41528.9
 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



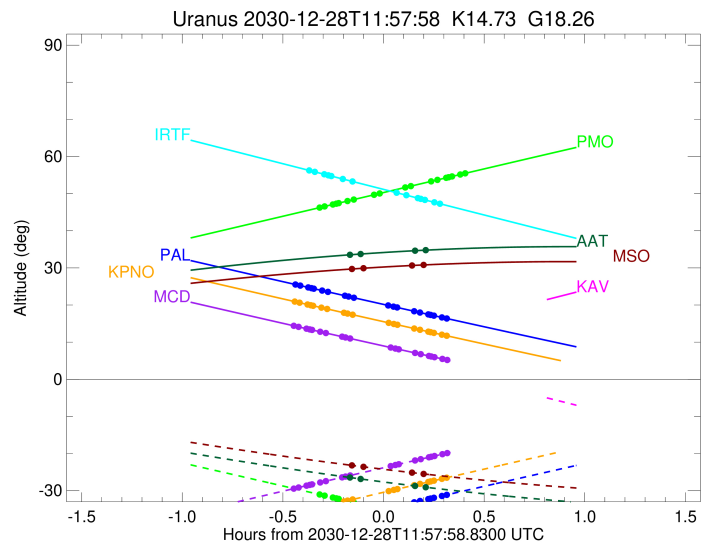
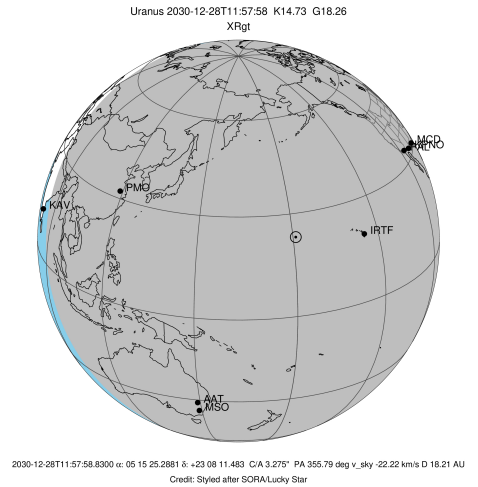
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-12-28T11:39:10.508		46.29	-31.09	50981.60	-12.92		
lambda	I	2030-12-28T11:40:26.758		46.56	-31.35	50026.71	-12.26		
delta	I	2030-12-28T11:42:54.105		47.08	-31.87	48300.35	-11.15		
gamma	I	2030-12-28T11:43:56.135		47.30	-32.08	47623.77	-10.66		
eta	I	2030-12-28T11:44:38.856		47.46	-32.23	47176.12	-10.30		
beta	I	2030-12-28T11:47:15.432		48.01	-32.78	45670.43	-8.90		
alpha	I	2030-12-28T11:49:05.366		48.40	-33.17	44747.67	-7.85		
4	I	2030-12-28T11:55:04.876		49.68	-34.42	42608.34	-3.99		
5	I	2030-12-28T11:56:29.283		49.98	-34.72	42312.60	-2.98		

No planet occultations

5	E	2030-12-28T12:04:46.102		51.74	-36.46	42304.50	2.98		
4	E	2030-12-28T12:06:15.665		52.06	-36.78	42615.10	3.99		
alpha	E	2030-12-28T12:12:13.307		53.32	-38.03	44751.89	7.86		
beta	E	2030-12-28T12:14:00.863		53.70	-38.41	45654.56	8.91		
eta	E	2030-12-28T12:16:39.044		54.26	-38.97	47176.12	10.32		
gamma	E	2030-12-28T12:17:22.170		54.42	-39.12	47628.81	10.68		
delta	E	2030-12-28T12:18:23.624		54.63	-39.34	48300.35	11.17		
lambda	E	2030-12-28T12:20:50.702		55.15	-39.85	50026.71	12.28		
epsilon	E	2030-12-28T12:22:42.289		55.55	-40.25	51440.43	12.94		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2030-12-28T11:54:00.080
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      : 3415551954503127808
2Mass ID (if available) : 05152526+2308116
ICRS Star Coord at Epoch: 05h 15m 25.28805s +23:08:11.48269s
RUWE (>1.4 is poor) : 1.04
K magnitude          : 14.728
G magnitude          : 18.262
RP magnitude         : 17.230
BP magnitude         : 19.244
DUPflag             : 0
Distance (au)       : 18.208
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -22.22
Sun-Target sep (deg) : 163.41
Sun-Moon sep (deg)  : 111.22
B (ring opening deg) : 81.91
PA of pole (deg)    : 10.65
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.092
C/A sky separation (km) : 40834.0
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_itrff93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
    
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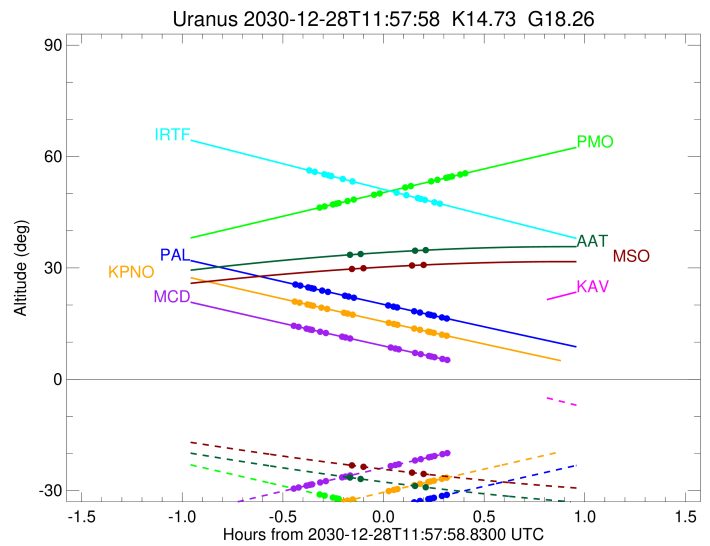
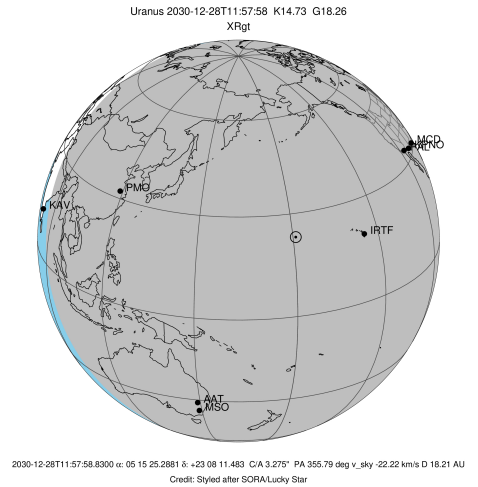


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-12-28T11:31:45.308		20.88	-35.96	50977.46	-13.25		
lambda	I	2030-12-28T11:32:59.106		20.62	-35.70	50026.71	-12.64		
delta	I	2030-12-28T11:35:21.334		20.14	-35.20	48300.35	-11.62		
gamma	I	2030-12-28T11:36:20.722		19.93	-34.99	47623.69	-11.17		
eta	I	2030-12-28T11:37:01.400		19.79	-34.85	47176.12	-10.84		
beta	I	2030-12-28T11:39:28.566		19.29	-34.33	45670.88	-9.58		
alpha	I	2030-12-28T11:41:09.571		18.95	-33.98	44747.13	-8.67		
4	I	2030-12-28T11:46:08.317		17.93	-32.93	42606.58	-5.63		
5	I	2030-12-28T11:47:02.982		17.74	-32.74	42314.00	-5.00		
6	I	2030-12-28T11:48:48.011		17.38	-32.37	41857.06	-3.80		

No planet occultations

6	E	2030-12-28T11:59:27.879		15.22	-30.14	41843.26	3.80		
5	E	2030-12-28T12:01:12.939		14.86	-29.77	42299.87	4.99		
4	E	2030-12-28T12:02:12.941		14.66	-29.56	42615.95	5.62		
alpha	E	2030-12-28T12:07:10.617		13.66	-28.53	44751.51	8.66		
beta	E	2030-12-28T12:08:49.612		13.33	-28.19	45653.62	9.56		
eta	E	2030-12-28T12:11:19.003		12.83	-27.67	47176.12	10.81		
gamma	E	2030-12-28T12:12:00.273		12.69	-27.52	47629.01	11.13		
delta	E	2030-12-28T12:12:59.357		12.49	-27.32	48300.35	11.59		
lambda	E	2030-12-28T12:15:22.042		12.01	-26.82	50026.71	12.60		
epsilon	E	2030-12-28T12:17:11.957		11.65	-26.44	51450.44	13.21		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-28T11:53:55.800
 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 : 3415551954503127808
 2Mass ID (if available) : 05152526+2308116
 ICRS Star Coord at Epoch: 05h 15m 25.28805s +23:08:11.48269s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.728
 G magnitude : 18.262
 RP magnitude : 17.230
 BP magnitude : 19.244
 DUPflag : 0
 Distance (au) : 18.208
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.22
 Sun-Target sep (deg) : 163.41
 Sun-Moon sep (deg) : 111.12
 B (ring opening deg) : 81.91
 PA of pole (deg) : 10.65
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.080
 C/A sky separation (km) : 40671.6
 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_itrff93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



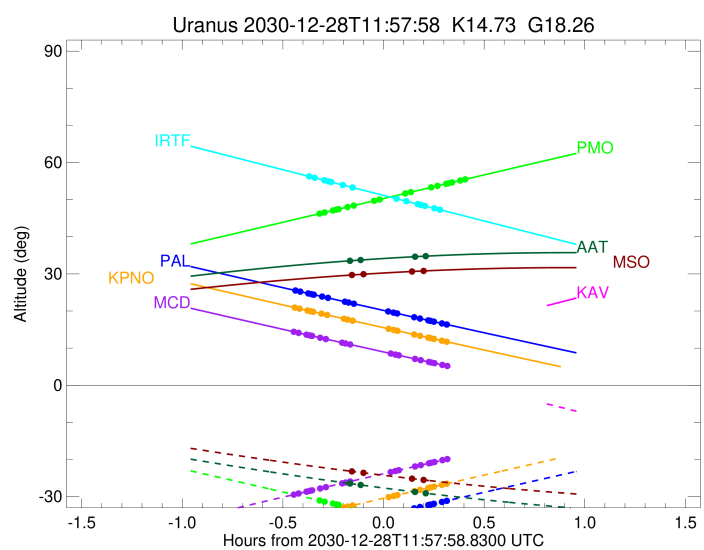
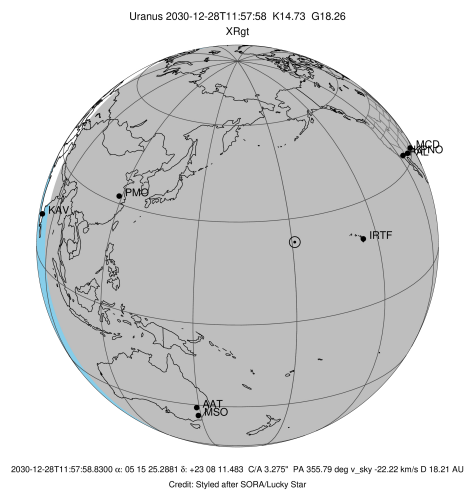
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-12-28T11:31:28.067		14.36	-29.41	50975.61	-13.32		
lambda	I	2030-12-28T11:32:41.306		14.11	-29.15	50026.71	-12.71		
delta	I	2030-12-28T11:35:02.519		13.63	-28.66	48300.35	-11.72		
gamma	I	2030-12-28T11:36:01.383		13.43	-28.45	47623.66	-11.27		
eta	I	2030-12-28T11:36:41.654		13.29	-28.31	47176.12	-10.95		
beta	I	2030-12-28T11:39:06.971		12.80	-27.80	45671.01	-9.73		
alpha	I	2030-12-28T11:40:46.292		12.46	-27.45	44746.96	-8.84		
4	I	2030-12-28T11:45:35.524		11.48	-26.44	42606.17	-5.93		
5	I	2030-12-28T11:46:26.875		11.31	-26.26	42314.22	-5.35		
6	I	2030-12-28T11:48:02.955		10.98	-25.92	41857.86	-4.26		

No planet occultations

6	E	2030-12-28T12:00:04.377		8.56	-23.40	41842.33	4.26		
5	E	2030-12-28T12:01:40.492		8.24	-23.07	42299.06	5.34		
4	E	2030-12-28T12:02:37.191		8.05	-22.87	42616.06	5.93		
alpha	E	2030-12-28T12:07:25.366		7.09	-21.87	44751.44	8.83		
beta	E	2030-12-28T12:09:02.677		6.77	-21.53	45653.46	9.71		
eta	E	2030-12-28T12:11:30.233		6.28	-21.02	47176.12	10.92		
gamma	E	2030-12-28T12:12:11.101		6.15	-20.88	47629.04	11.24		
delta	E	2030-12-28T12:13:09.665		5.95	-20.68	48300.35	11.68		
lambda	E	2030-12-28T12:15:31.346		5.49	-20.19	50026.71	12.67		
epsilon	E	2030-12-28T12:17:20.789		5.12	-19.81	51451.97	13.27		


```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2030-12-28T11:55:09.090
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      : 3415551954503127808
2Mass ID (if available) : 05152526+2308116
ICRS Star Coord at Epoch: 05h 15m 25.28805s +23:08:11.48269s
RUWE (>1.4 is poor) : 1.04
K magnitude         : 14.728
G magnitude         : 18.262
RP magnitude        : 17.230
BP magnitude        : 19.244
DUPflag            : 0
Distance (au)       : 18.208
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -22.22
Sun-Target sep (deg) : 163.41
Sun-Moon sep (deg)  : 111.76
B (ring opening deg) : 81.91
PA of pole (deg)    : 10.65
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.288
C/A sky separation (km) : 43416.6
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall1.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall1.bsp
ural161.bsp
vgr2.ural161.bsp
peph.ural160.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

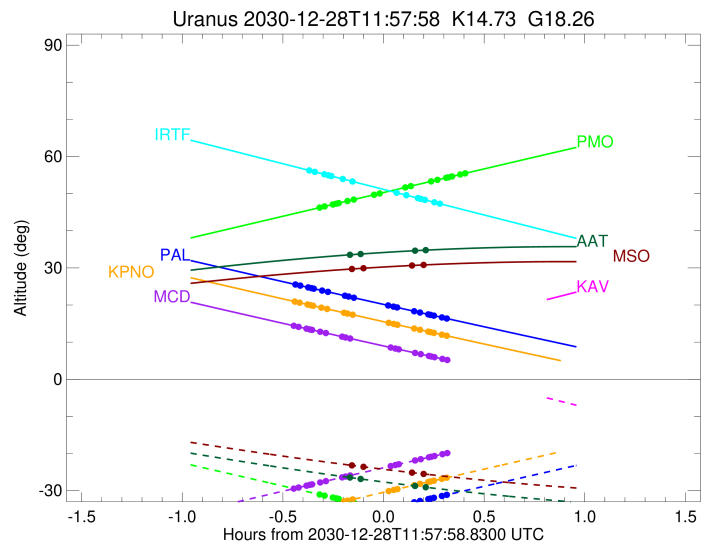
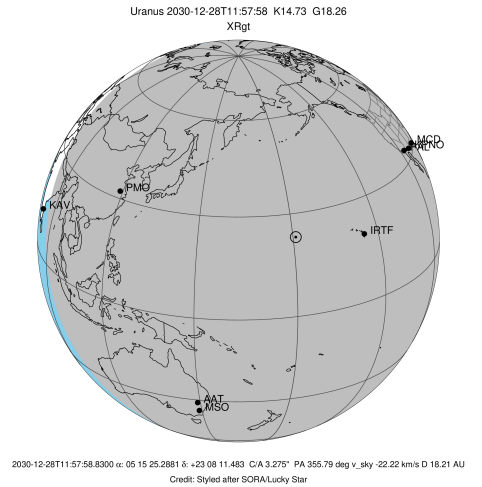
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-12-28T11:36:03.532		56.20	-72.75	51010.72	-11.69		
lambda	I	2030-12-28T11:37:31.263		55.87	-72.41	50026.71	-10.88		
delta	I	2030-12-28T11:40:20.673		55.22	-71.77	48300.35	-9.48		
gamma	I	2030-12-28T11:41:34.551		54.93	-71.49	47624.26	-8.82		
eta	I	2030-12-28T11:42:26.774		54.73	-71.29	47176.12	-8.34		
beta	I	2030-12-28T11:45:51.982		53.94	-70.51	45667.99	-6.31		
alpha	I	2030-12-28T11:48:40.578		53.30	-69.87	44750.11	-4.54		

No planet occultations

alpha	E	2030-12-28T12:01:57.710		50.24	-66.83	44752.41	4.54		
beta	E	2030-12-28T12:04:44.251		49.60	-66.20	45656.76	6.31		
eta	E	2030-12-28T12:08:11.551		48.80	-65.41	47176.12	8.33		
gamma	E	2030-12-28T12:09:04.326		48.60	-65.20	47628.42	8.81		
delta	E	2030-12-28T12:10:17.854		48.32	-64.92	48300.35	9.46		
lambda	E	2030-12-28T12:13:07.583		47.67	-64.28	50026.71	10.86		
epsilon	E	2030-12-28T12:15:10.925		47.20	-63.80	51423.43	11.67		

```

target                : Uranus
target radius (km)    : 25559.00
C/A epoch             : 2030-12-28T11:59:05.970
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        : 3415551954503127808
2Mass ID (if available) : 05152526+2308116
ICRS Star Coord at Epoch: 05h 15m 25.28805s +23:08:11.48269s
RUWE (>1.4 is poor) : 1.04
K magnitude           : 14.728
G magnitude           : 18.262
RP magnitude          : 17.230
BP magnitude          : 19.244
DUPflag              : 0
Distance (au)         : 18.208
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -22.22
Sun-Target sep (deg) : 163.41
Sun-Moon sep (deg)   : 111.85
B (ring opening deg) : 81.91
PA of pole (deg)     : 10.65
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.661
C/A sky separation (km) : 48346.6
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_itrfr93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
  
```

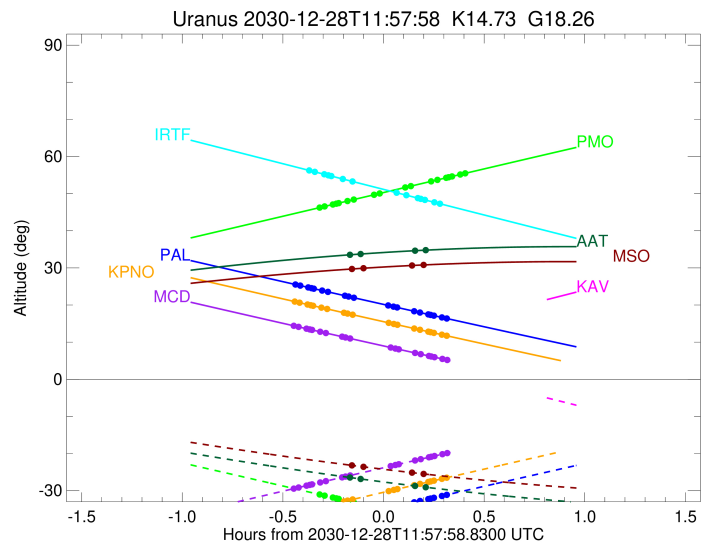
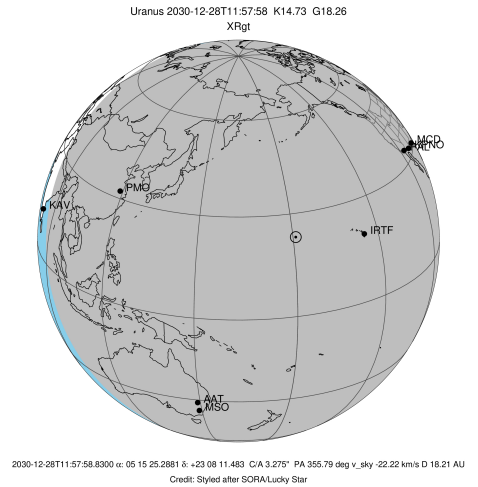


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-12-28T11:48:08.081		33.54	-26.48	51101.18	-6.85		
lambda	I	2030-12-28T11:51:12.629		33.74	-26.86	50026.71	-4.94		

No planet occultations

lambda	E	2030-12-28T12:07:20.510		34.63	-28.74	50026.71	4.94		
epsilon	E	2030-12-28T12:11:00.368		34.80	-29.13	51343.28	6.86		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-28T11:59:04.660
 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 : 3415551954503127808
 2Mass ID (if available) : 05152526+2308116
 ICRS Star Coord at Epoch: 05h 15m 25.28805s +23:08:11.48269s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.728
 G magnitude : 18.262
 RP magnitude : 17.230
 BP magnitude : 19.244
 DUPflag : 0
 Distance (au) : 18.208
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.22
 Sun-Target sep (deg) : 163.41
 Sun-Moon sep (deg) : 111.79
 B (ring opening deg) : 81.91
 PA of pole (deg) : 10.65
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.680
 C/A sky separation (km) : 48599.2
 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	2030-12-28T11:48:42.843		29.72	-23.21	51108.05	-6.48		
lambda	I	2030-12-28T11:52:04.436		29.92	-23.60	50026.71	-4.39		

No planet occultations

lambda	E	2030-12-28T12:06:26.225		30.65	-25.14	50026.71	4.40		
epsilon	E	2030-12-28T12:10:23.156		30.81	-25.55	51337.27	6.49		