

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-10T09:51:55.020
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3415599684476588288
 2Mass ID (if available) : 05184323+2311301

ICRS Star Coord at Epoch: 05h 18m 43.23564s +23:11:30.22291s

RUWE (>1.4 is poor) : 1.11
 K magnitude : 13.651
 G magnitude : 16.572
 RP magnitude : 15.674
 BP magnitude : 17.379
 DUPflag : 0
 Distance (au) : 18.172
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.41
 Sun-Target sep (deg) : 177.42
 Sun-Moon sep (deg) : 2.89
 B (ring opening deg) : 81.68
 PA of pole (deg) : 16.00

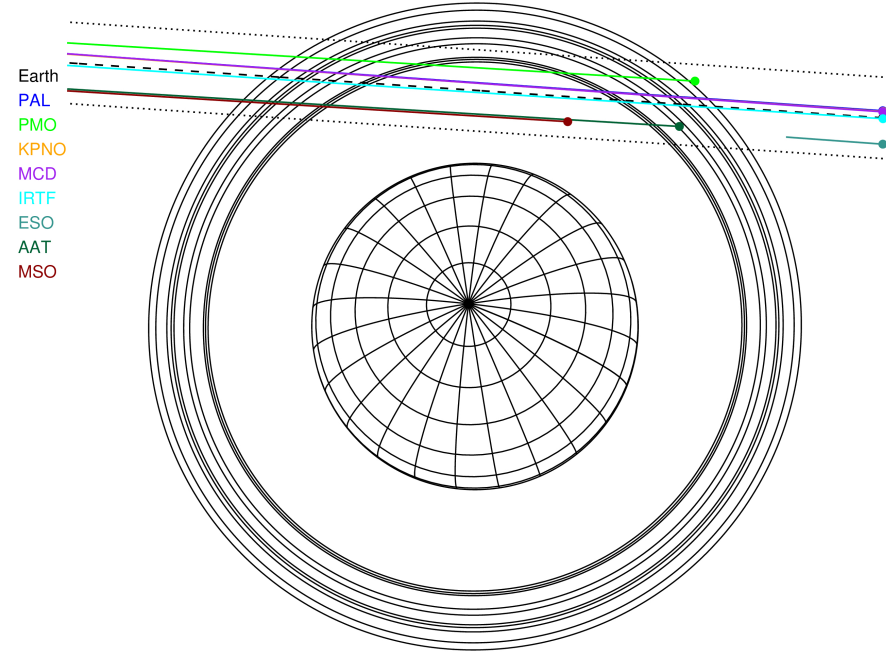
a(km) ring

- 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



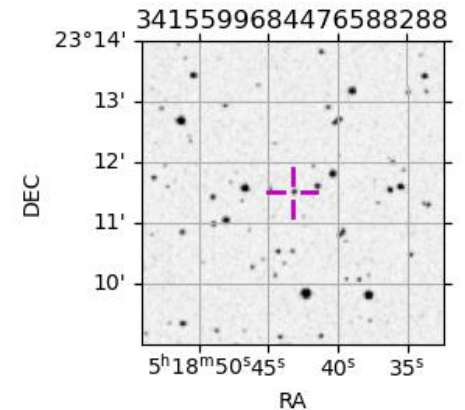
2030-12-10T09:51:55.0200 ra: 05 18 43.2356 s: +23 11 30.2223 C/A 2.806" PA 176.14 deg v_sky -23.41 km/s D 18.17 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2030-12-10T09:51:55 K13.65 G16.57 XRgt

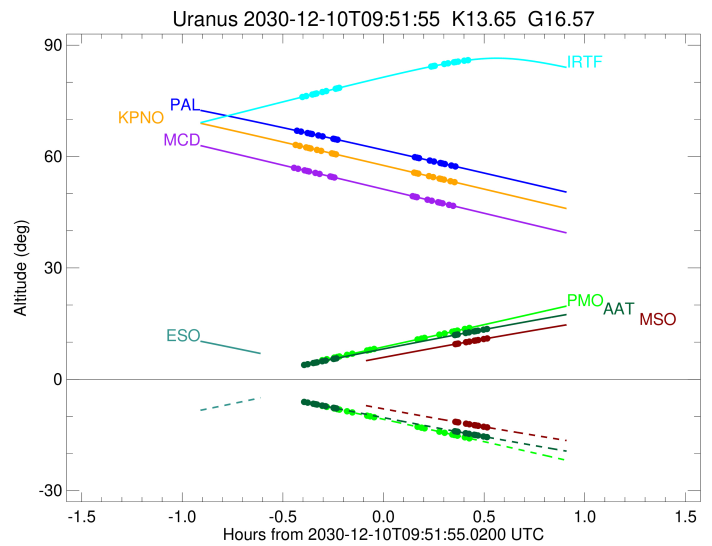
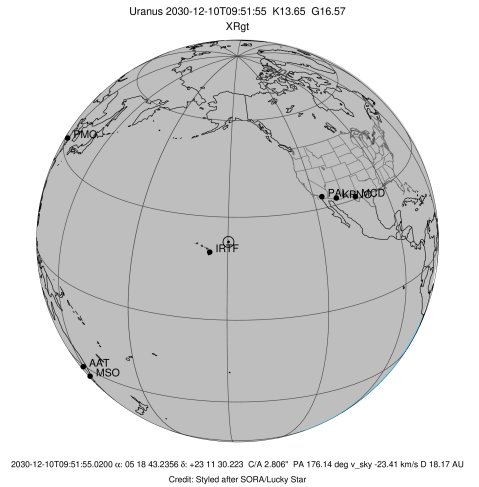


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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 10 09:26 - DEC 10 10:13	PnnRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++		+++++	DEC 10 09:33 - DEC 10 10:17	PnnRie
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++		+++++	DEC 10 09:25 - DEC 10 10:13	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++		+++++	DEC 10 09:25 - DEC 10 10:13	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++		+++++	DEC 10 09:27 - DEC 10 10:17	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 10 09:34 - DEC 10 10:23	PnnRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0			+++++	DEC 10 10:13 - DEC 10 10:23	PnnRne



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-10T09:49:55.070
 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 : 3415599684476588288
 2Mass ID (if available) : 05184323+2311301
 ICRS Star Coord at Epoch: 05h 18m 43.23564s +23:11:30.22291s
 RUWE (>1.4 is poor) : 1.11
 K magnitude : 13.651
 G magnitude : 16.572
 RP magnitude : 15.674
 BP magnitude : 17.379
 DUPflag : 0
 Distance (au) : 18.172
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.41
 Sun-Target sep (deg) : 177.42
 Sun-Moon sep (deg) : 2.72
 B (ring opening deg) : 81.68
 PA of pole (deg) : 16.00
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.892
 C/A sky separation (km) : 38110.0
 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

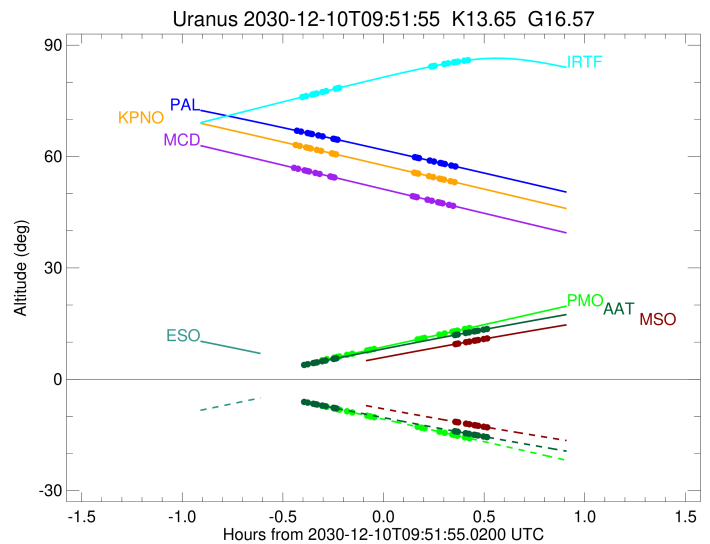
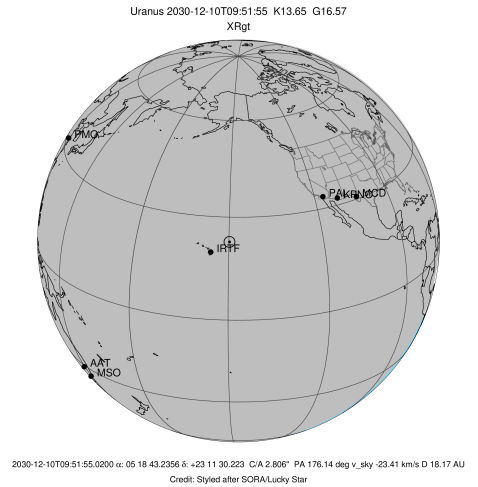


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-12-10T09:26:20.470		66.91	-64.53	50960.18	-15.73		
lambda	I	2030-12-10T09:27:21.051		66.71	-64.33	50026.71	-15.21		
delta	I	2030-12-10T09:29:17.671		66.32	-63.94	48300.35	-14.38		
gamma	I	2030-12-10T09:30:05.162		66.17	-63.78	47625.79	-14.02		
eta	I	2030-12-10T09:30:37.525		66.06	-63.67	47176.12	-13.77		
beta	I	2030-12-10T09:32:31.714		65.68	-63.29	45658.34	-12.80		
alpha	I	2030-12-10T09:33:49.761		65.42	-63.02	44686.43	-12.10		
4	I	2030-12-10T09:37:02.188		64.77	-62.37	42539.86	-10.16		
5	I	2030-12-10T09:37:41.613		64.64	-62.24	42154.85	-9.71		
6	I	2030-12-10T09:38:17.670		64.52	-62.12	41807.05	-9.28		

No planet occultations

6	E	2030-12-10T10:01:08.888		59.86	-57.44	41794.75	9.27		
5	E	2030-12-10T10:01:49.828		59.72	-57.30	42183.00	9.70		
4	E	2030-12-10T10:02:29.715		59.58	-57.16	42576.49	10.15		
alpha	E	2030-12-10T10:05:41.155		58.92	-56.50	44712.57	12.09		
beta	E	2030-12-10T10:06:55.749		58.66	-56.24	45641.93	12.78		
eta	E	2030-12-10T10:08:51.329		58.26	-55.84	47176.12	13.75		
gamma	E	2030-12-10T10:09:24.117		58.15	-55.73	47631.16	14.01		
delta	E	2030-12-10T10:10:11.289		57.99	-55.57	48300.35	14.36		
lambda	E	2030-12-10T10:12:08.075		57.58	-55.16	50026.71	15.19		
epsilon	E	2030-12-10T10:13:41.981		57.26	-54.84	51481.39	15.71		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-10T09:55:47.870
 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 : 3415599684476588288
 2Mass ID (if available) : 05184323+2311301
 ICRS Star Coord at Epoch: 05h 18m 43.23564s +23:11:30.22291s
 RUWE (>1.4 is poor) : 1.11
 K magnitude : 13.651
 G magnitude : 16.572
 RP magnitude : 15.674
 BP magnitude : 17.379
 DUPflag : 0
 Distance (au) : 18.172
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.41
 Sun-Target sep (deg) : 177.42
 Sun-Moon sep (deg) : 3.79
 B (ring opening deg) : 81.68
 PA of pole (deg) : 16.00
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.070
 C/A sky separation (km) : 40458.0
 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

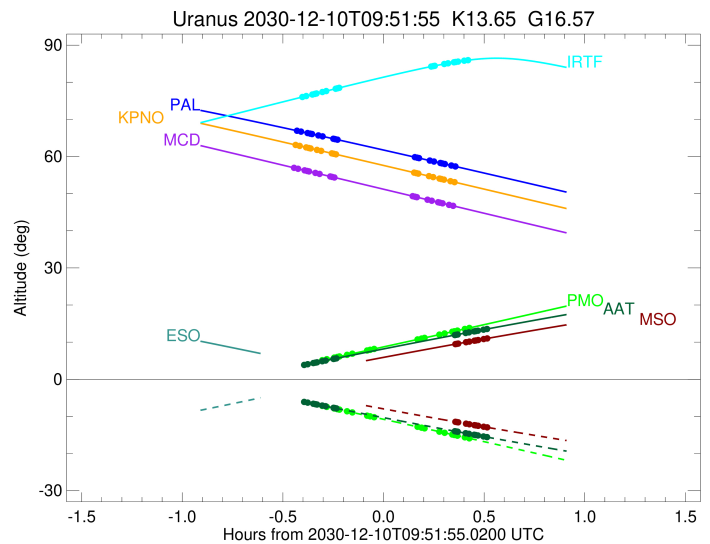
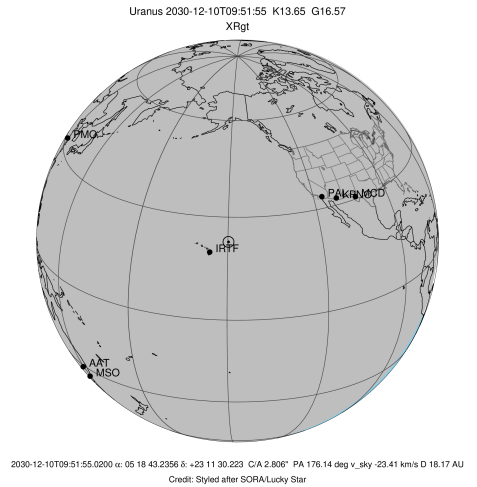


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-12-10T09:33:51.626		5.18	-7.21	50990.07	-14.12		
lambda	I	2030-12-10T09:35:01.772		5.41	-7.44	50026.71	-13.48		
delta	I	2030-12-10T09:37:14.742		5.84	-7.87	48300.35	-12.46		
gamma	I	2030-12-10T09:38:09.815		6.02	-8.06	47626.32	-12.01		
eta	I	2030-12-10T09:38:47.812		6.14	-8.18	47176.12	-11.68		
beta	I	2030-12-10T09:41:05.159		6.59	-8.63	45656.10	-10.42		
alpha	I	2030-12-10T09:42:42.391		6.91	-8.95	44688.03	-9.48		
4	I	2030-12-10T09:47:08.709		7.78	-9.83	42545.68	-6.55		
5	I	2030-12-10T09:48:13.173		7.99	-10.04	42156.50	-5.76		
6	I	2030-12-10T09:49:18.608		8.20	-10.26	41801.79	-4.93		

No planet occultations

6	E	2030-12-10T10:01:51.820	10.69	-12.76	41795.29	4.93
5	E	2030-12-10T10:03:02.194	10.92	-13.00	42173.82	5.77
4	E	2030-12-10T10:04:06.943	11.14	-13.21	42569.78	6.56
alpha	E	2030-12-10T10:08:31.674	12.02	-14.10	44709.05	9.50
beta	E	2030-12-10T10:10:05.098	12.33	-14.41	45642.59	10.45
eta	E	2030-12-10T10:12:23.383	12.79	-14.88	47176.12	11.72
gamma	E	2030-12-10T10:13:01.668	12.92	-15.01	47630.97	12.04
delta	E	2030-12-10T10:13:56.207	13.10	-15.19	48300.35	12.50
lambda	E	2030-12-10T10:16:08.789	13.55	-15.64	50026.71	13.53
epsilon	E	2030-12-10T10:17:52.354	13.89	-15.99	51465.78	14.16

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-10T09:49:34.820
 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 : 3415599684476588288
 2Mass ID (if available) : 05184323+2311301
 ICRS Star Coord at Epoch: 05h 18m 43.23564s +23:11:30.22291s
 RUWE (>1.4 is poor) : 1.11
 K magnitude : 13.651
 G magnitude : 16.572
 RP magnitude : 15.674
 BP magnitude : 17.379
 DUPflag : 0
 Distance (au) : 18.172
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.41
 Sun-Target sep (deg) : 177.42
 Sun-Moon sep (deg) : 2.66
 B (ring opening deg) : 81.68
 PA of pole (deg) : 16.00
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.886
 C/A sky separation (km) : 38035.9
 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



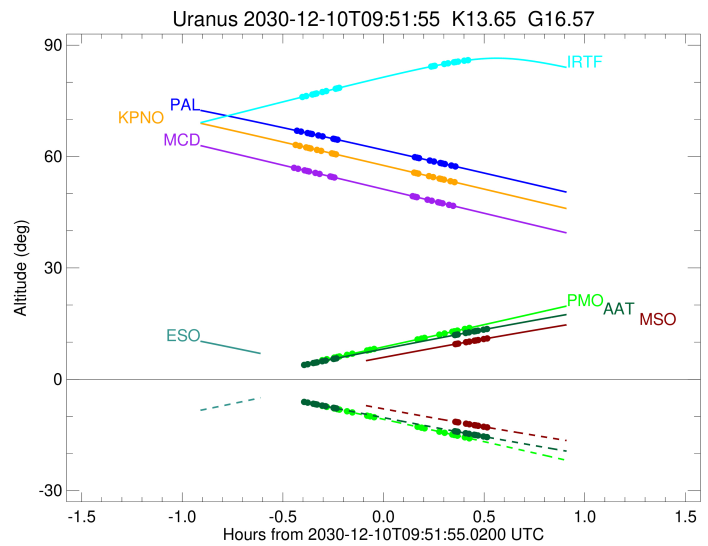
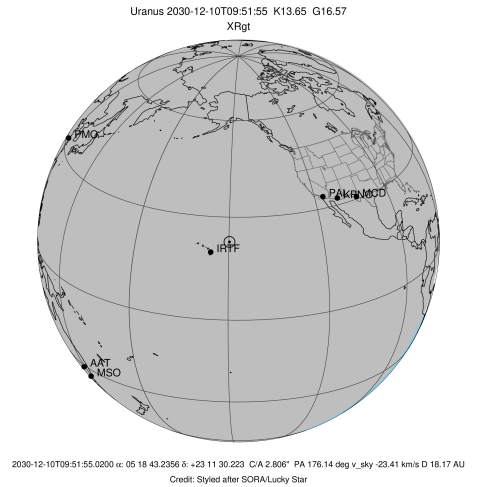
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-12-10T09:25:56.008		63.07	-60.61	50959.17	-15.76		
lambda	I	2030-12-10T09:26:56.386		62.86	-60.39	50026.71	-15.25		
delta	I	2030-12-10T09:28:52.695		62.46	-59.99	48300.35	-14.43		
gamma	I	2030-12-10T09:29:40.040		62.29	-59.82	47625.77	-14.07		
eta	I	2030-12-10T09:30:12.294		62.18	-59.71	47176.12	-13.81		
beta	I	2030-12-10T09:32:06.038		61.78	-59.31	45658.42	-12.85		
alpha	I	2030-12-10T09:33:23.729		61.51	-59.04	44686.39	-12.16		
4	I	2030-12-10T09:36:34.920		60.84	-58.37	42539.71	-10.24		
5	I	2030-12-10T09:37:13.988		60.70	-58.23	42154.84	-9.79		
6	I	2030-12-10T09:37:49.679		60.58	-58.11	41807.21	-9.37		

No planet occultations

6	E	2030-12-10T10:00:56.438		55.69	-53.22	41794.76	9.37		
5	E	2030-12-10T10:01:37.017		55.55	-53.08	42183.23	9.79		
4	E	2030-12-10T10:02:16.556		55.41	-52.94	42576.65	10.23		
alpha	E	2030-12-10T10:05:26.795		54.73	-52.27	44712.66	12.15		
beta	E	2030-12-10T10:06:41.046		54.47	-52.00	45641.92	12.84		
eta	E	2030-12-10T10:08:36.210		54.06	-51.60	47176.12	13.79		
gamma	E	2030-12-10T10:09:08.897		53.95	-51.48	47631.16	14.05		
delta	E	2030-12-10T10:09:55.934		53.78	-51.31	48300.35	14.40		
lambda	E	2030-12-10T10:11:52.441		53.37	-50.90	50026.71	15.22		
epsilon	E	2030-12-10T10:13:26.188		53.03	-50.57	51481.76	15.73		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2030-12-10T09:49:07.750
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      : 3415599684476588288
2Mass ID (if available) : 05184323+2311301
ICRS Star Coord at Epoch: 05h 18m 43.23564s +23:11:30.22291s
RUWE (>1.4 is poor) : 1.11
K magnitude         : 13.651
G magnitude         : 16.572
RP magnitude        : 15.674
BP magnitude        : 17.379
DUPflag            : 0
Distance (au)       : 18.172
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -23.41
Sun-Target sep (deg) : 177.42
Sun-Moon sep (deg)  : 2.59
B (ring opening deg) : 81.68
PA of pole (deg)    : 16.00
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.886
C/A sky separation (km) : 38036.5
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
  
```

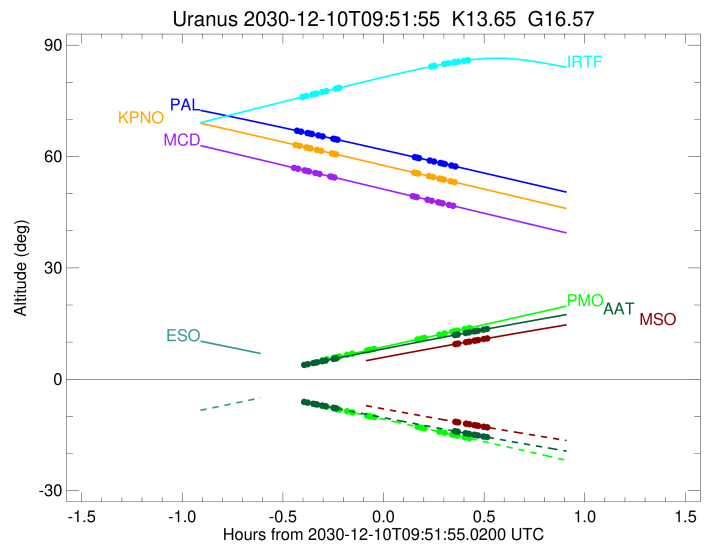
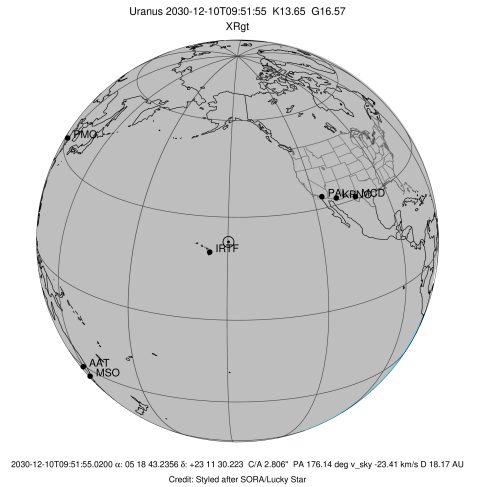


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-12-10T09:25:27.472		56.91	-54.39	50958.89	-15.75		
lambda	I	2030-12-10T09:26:27.890		56.69	-54.18	50026.71	-15.23		
delta	I	2030-12-10T09:28:24.311		56.28	-53.76	48300.35	-14.41		
gamma	I	2030-12-10T09:29:11.704		56.11	-53.59	47625.77	-14.05		
eta	I	2030-12-10T09:29:43.990		55.99	-53.47	47176.12	-13.80		
beta	I	2030-12-10T09:31:37.847		55.58	-53.06	45658.43	-12.84		
alpha	I	2030-12-10T09:32:55.619		55.30	-52.79	44686.38	-12.15		
4	I	2030-12-10T09:36:07.015		54.61	-52.10	42539.68	-10.23		
5	I	2030-12-10T09:36:46.122		54.47	-51.96	42154.84	-9.78		
6	I	2030-12-10T09:37:21.850		54.34	-51.83	41807.23	-9.36		

No planet occultations

6	E	2030-12-10T10:00:30.118		49.35	-46.85	41794.76	9.35		
5	E	2030-12-10T10:01:10.744		49.20	-46.70	42183.18	9.77		
4	E	2030-12-10T10:01:50.337		49.06	-46.56	42576.61	10.22		
alpha	E	2030-12-10T10:05:00.824		48.37	-45.88	44712.64	12.13		
beta	E	2030-12-10T10:06:15.175		48.10	-45.61	45641.92	12.82		
eta	E	2030-12-10T10:08:10.489		47.69	-45.20	47176.12	13.78		
gamma	E	2030-12-10T10:08:43.220		47.57	-45.08	47631.16	14.03		
delta	E	2030-12-10T10:09:30.320		47.40	-44.91	48300.35	14.38		
lambda	E	2030-12-10T10:11:26.982		46.98	-44.49	50026.71	15.20		
epsilon	E	2030-12-10T10:13:00.844		46.64	-44.16	51481.57	15.71		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-10T09:52:36.400
 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 : 3415599684476588288
 2Mass ID (if available) : 05184323+2311301
 ICRS Star Coord at Epoch: 05h 18m 43.23564s +23:11:30.22291s
 RUWE (>1.4 is poor) : 1.11
 K magnitude : 13.651
 G magnitude : 16.572
 RP magnitude : 15.674
 BP magnitude : 17.379
 DUPflag : 0
 Distance (au) : 18.172
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.41
 Sun-Target sep (deg) : 177.42
 Sun-Moon sep (deg) : 3.03
 B (ring opening deg) : 81.68
 PA of pole (deg) : 16.00
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.777
 C/A sky separation (km) : 36594.1
 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

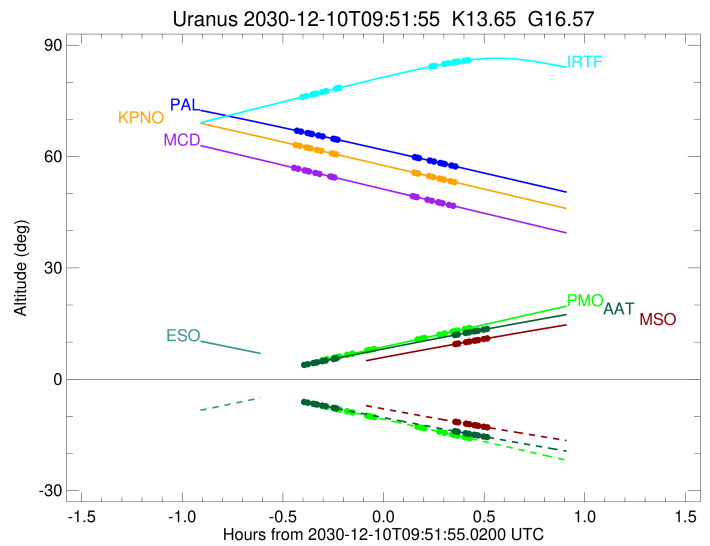
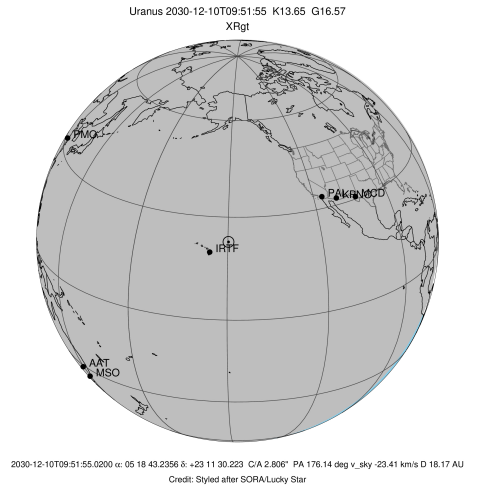


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-12-10T09:27:57.132		76.09	-78.67	50946.09	-16.55		
lambda	I	2030-12-10T09:28:53.680		76.30	-78.88	50026.71	-16.09		
delta	I	2030-12-10T09:30:43.408		76.71	-79.29	48300.35	-15.37		
gamma	I	2030-12-10T09:31:27.767		76.88	-79.45	47625.54	-15.06		
eta	I	2030-12-10T09:31:57.838		76.99	-79.56	47176.12	-14.83		
beta	I	2030-12-10T09:33:42.942		77.38	-79.95	45659.44	-14.01		
alpha	I	2030-12-10T09:34:53.913		77.65	-80.21	44685.84	-13.42		
4	I	2030-12-10T09:37:43.690		78.28	-80.83	42537.55	-11.84		
5	I	2030-12-10T09:38:17.037		78.40	-80.95	42154.93	-11.48		
6	I	2030-12-10T09:38:47.084		78.51	-81.06	41809.56	-11.14		

No planet occultations

6	E	2030-12-10T10:06:02.924		84.23	-86.21	41795.00	11.15		
5	E	2030-12-10T10:06:37.784		84.33	-86.28	42188.42	11.48		
4	E	2030-12-10T10:07:11.528		84.44	-86.34	42580.17	11.84		
alpha	E	2030-12-10T10:10:00.054		84.93	-86.60	44714.86	13.43		
beta	E	2030-12-10T10:11:07.464		85.11	-86.67	45641.60	14.02		
eta	E	2030-12-10T10:12:53.752		85.39	-86.75	47176.12	14.84		
gamma	E	2030-12-10T10:13:24.184		85.47	-86.76	47631.27	15.07		
delta	E	2030-12-10T10:14:08.136		85.57	-86.77	48300.35	15.38		
lambda	E	2030-12-10T10:15:57.791		85.82	-86.76	50026.71	16.10		
epsilon	E	2030-12-10T10:17:27.333		85.99	-86.71	51492.33	16.56		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-12-10T09:55:42.310
 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 : 3415599684476588288
 2Mass ID (if available) : 05184323+2311301
 ICRS Star Coord at Epoch: 05h 18m 43.23564s +23:11:30.22291s
 RUWE (>1.4 is poor) : 1.11
 K magnitude : 13.651
 G magnitude : 16.572
 RP magnitude : 15.674
 BP magnitude : 17.379
 DUPflag : 0
 Distance (au) : 18.172
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.41
 Sun-Target sep (deg) : 177.42
 Sun-Moon sep (deg) : 3.34
 B (ring opening deg) : 81.68
 PA of pole (deg) : 16.00
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.521
 C/A sky separation (km) : 33221.2
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



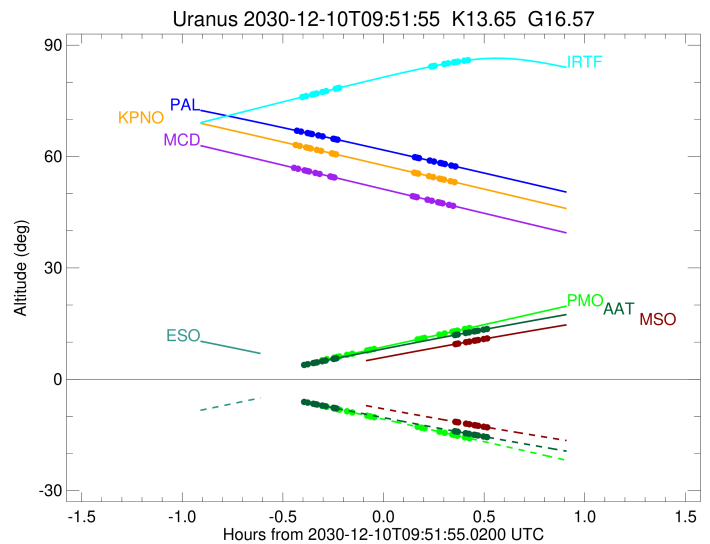
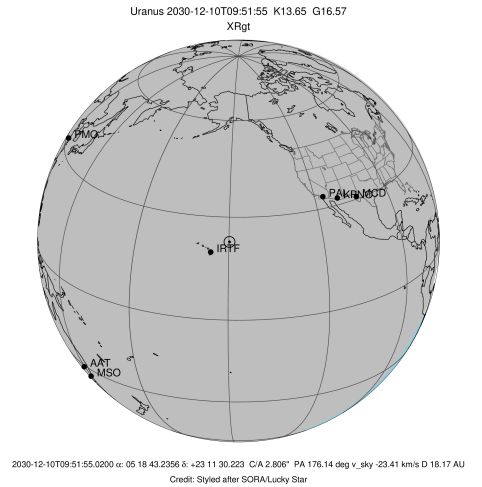
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-12-10T09:28:29.461		3.90x	-6.14	50916.06	-17.83		
lambda	I	2030-12-10T09:29:19.983		4.06x	-6.30	50026.71	-17.48		
delta	I	2030-12-10T09:31:00.227		4.37x	-6.60	48300.35	-16.95		
gamma	I	2030-12-10T09:31:40.328		4.49x	-6.72	47625.00	-16.73		
eta	I	2030-12-10T09:32:07.290		4.57x	-6.80	47176.12	-16.57		
beta	I	2030-12-10T09:33:40.306		4.86x	-7.08	45661.72	-15.98		
alpha	I	2030-12-10T09:34:42.212		5.05	-7.27	44684.99	-15.57		
4	I	2030-12-10T09:37:05.071		5.49	-7.70	42533.66	-14.50		
5	I	2030-12-10T09:37:31.654		5.57	-7.78	42156.36	-14.26		
6	I	2030-12-10T09:37:55.425		5.64	-7.85	41814.64	-14.05		

No planet occultations

6	E	2030-12-10T10:13:07.236		11.90	-13.98	41796.24	14.09		
5	E	2030-12-10T10:13:35.786		11.98	-14.06	42198.86	14.30		
4	E	2030-12-10T10:14:02.718		12.06	-14.13	42586.62	14.54		
alpha	E	2030-12-10T10:16:23.993		12.46	-14.53	44719.21	15.62		
beta	E	2030-12-10T10:17:22.164		12.62	-14.69	45641.18	16.03		
eta	E	2030-12-10T10:18:56.149		12.89	-14.95	47176.12	16.62		
gamma	E	2030-12-10T10:19:23.408		12.97	-15.03	47631.43	16.78		
delta	E	2030-12-10T10:20:02.994		13.08	-15.13	48300.35	17.01		
lambda	E	2030-12-10T10:21:42.895		13.36	-15.41	50026.71	17.54		
epsilon	E	2030-12-10T10:23:06.562		13.60	-15.64	51511.60	17.89		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2030-12-10T09:55:33.440
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      : 3415599684476588288
2Mass ID (if available) : 05184323+2311301
ICRS Star Coord at Epoch: 05h 18m 43.23564s +23:11:30.22291s
RUWE (>1.4 is poor) : 1.11
K magnitude         : 13.651
G magnitude         : 16.572
RP magnitude        : 15.674
BP magnitude        : 17.379
DUPflag            : 0
Distance (au)       : 18.172
f0 (km)            : 0.000
g0 (km)            : 0.000
skyplane vel. (km/s) : -23.41
Sun-Target sep (deg) : 177.42
Sun-Moon sep (deg)  : 3.30
B (ring opening deg) : 81.68
PA of pole (deg)    : 16.00
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.497
C/A sky separation (km) : 32910.9
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	2030-12-10T09:28:08.764		1.77x	-3.93x	50913.30	-17.94		
lambda	I	2030-12-10T09:28:58.777		1.91x	-4.07x	50026.71	-17.61		
delta	I	2030-12-10T09:30:38.248		2.21x	-4.36x	48300.35	-17.09		
gamma	I	2030-12-10T09:31:18.011		2.32x	-4.47x	47624.95	-16.88		
eta	I	2030-12-10T09:31:44.730		2.40x	-4.55x	47176.12	-16.72		
beta	I	2030-12-10T09:33:16.828		2.67x	-4.82x	45661.93	-16.15		
alpha	I	2030-12-10T09:34:18.073		2.85x	-4.99x	44684.94	-15.75		
4	I	2030-12-10T09:36:39.098		3.26x	-5.39	42533.36	-14.72		
5	I	2030-12-10T09:37:05.241		3.34x	-5.47	42156.55	-14.49		
6	I	2030-12-10T09:37:28.624		3.41x	-5.54	41815.10	-14.28		

No planet occultations

6	E	2030-12-10T10:13:16.480		9.46	-11.45	41796.38	14.32		
5	E	2030-12-10T10:13:44.640		9.53	-11.53	42199.72	14.52		
4	E	2030-12-10T10:14:11.139		9.61	-11.60	42587.11	14.75		
alpha	E	2030-12-10T10:16:30.594		9.98	-11.96	44719.56	15.80		
beta	E	2030-12-10T10:17:28.111		10.14	-12.11	45641.16	16.20		
eta	E	2030-12-10T10:19:01.191		10.39	-12.36	47176.12	16.77		
gamma	E	2030-12-10T10:19:28.211		10.46	-12.43	47631.44	16.93		
delta	E	2030-12-10T10:20:07.465		10.57	-12.53	48300.35	17.15		
lambda	E	2030-12-10T10:21:46.606		10.83	-12.79	50026.71	17.67		
epsilon	E	2030-12-10T10:23:09.791		11.05	-13.00	51513.02	18.01		