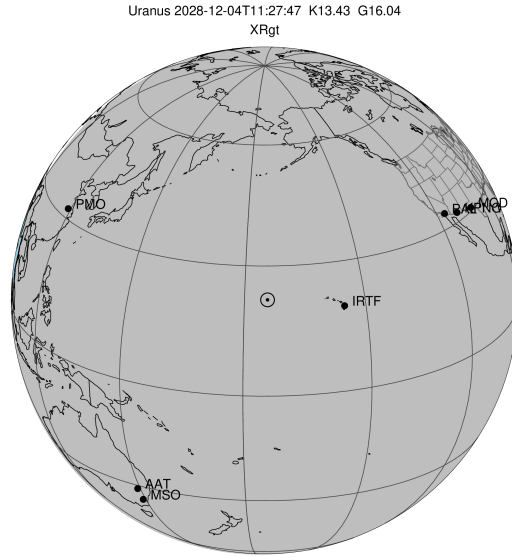


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-12-04T11:27:47.760
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 146372008708006016
 2Mass ID (if available) : 04410227+2210006

ICRS Star Coord at Epoch: 04h 41m 02.26561s +22:10:00.63575s

RUWE (>1.4 is poor) : 1.07
 K magnitude : 13.425
 G magnitude : 16.036
 RP magnitude : 15.227
 BP magnitude : 16.737
 DUPflag : 0
 Distance (au) : 18.308
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.45
 Sun-Target sep (deg) : 179.33
 Sun-Moon sep (deg) : 29.88
 B (ring opening deg) : 80.33
 PA of pole (deg) : -44.88

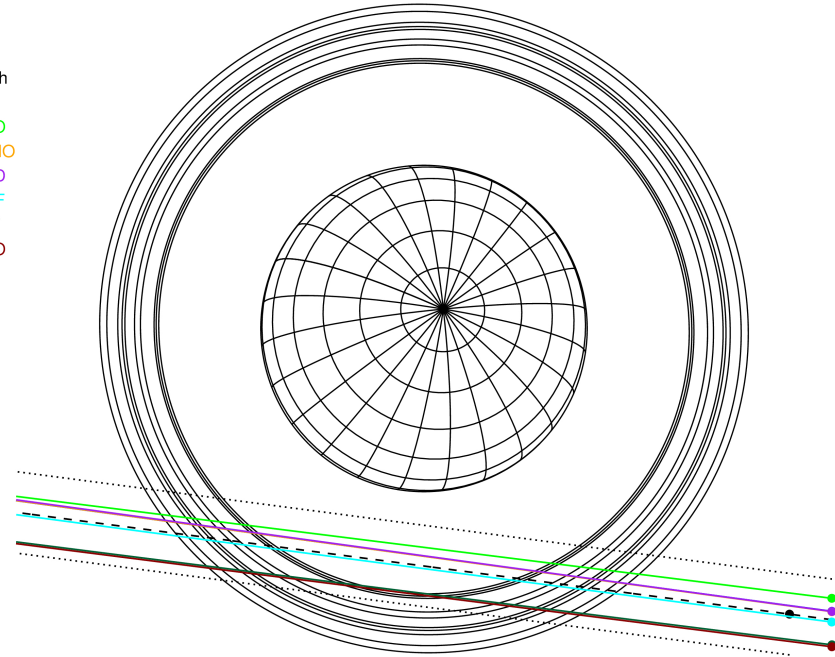
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2028-12-04T11:27:47.7600 ra: 04 41 02.2656 s: +22 10 00.636 C/A 2.773° PA 352.50 deg v_sky -23.45 km/s D 18.31 AU
 Credit: Styled after SORA/Lucky Star

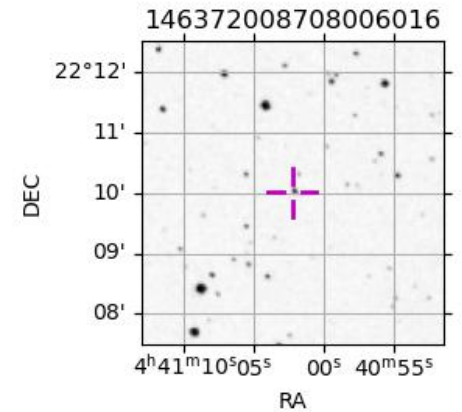
Uranus 2028-12-04T11:27:47 K13.43 G16.04 XRgt

Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 AAT
 MSO

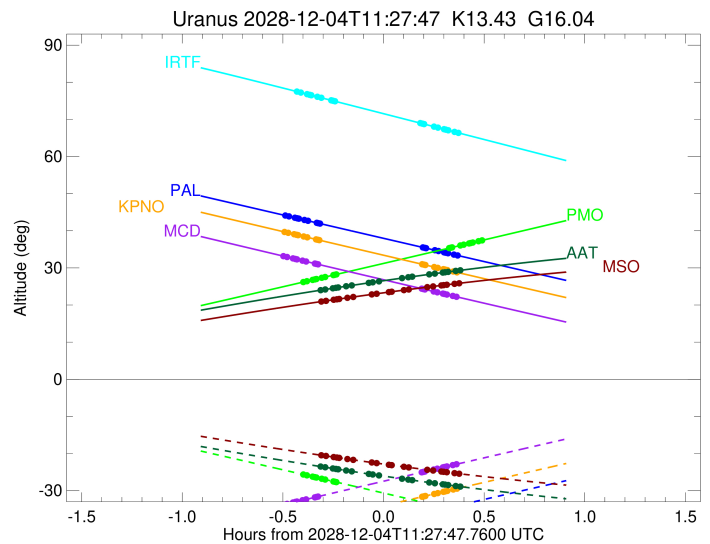
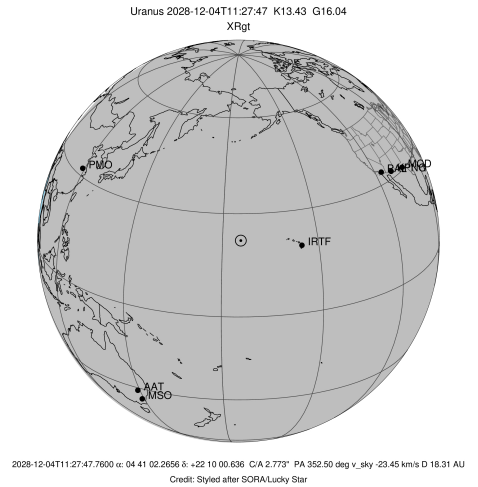


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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 04 10:58 - DEC 04 11:50	PnnRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++		+++++	DEC 04 11:03 - DEC 04 11:57	PnnRie
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++		+++++	DEC 04 10:58 - DEC 04 11:50	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++		+++++	DEC 04 10:57 - DEC 04 11:49	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++		+++++	DEC 04 11:01 - DEC 04 11:50	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 04 11:08 - DEC 04 11:51	PnnRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++		+++++	DEC 04 11:09 - DEC 04 11:50	PnnRie



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-12-04T11:24:32.170
 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 : 146372008708006016
 2Mass ID (if available) : 04410227+2210006
 ICRS Star Coord at Epoch: 04h 41m 02.26561s +22:10:00.63575s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 13.425
 G magnitude : 16.036
 RP magnitude : 15.227
 BP magnitude : 16.737
 DUPflag : 0
 Distance (au) : 18.308
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.45
 Sun-Target sep (deg) : 179.33
 Sun-Moon sep (deg) : 29.54
 B (ring opening deg) : 80.33
 PA of pole (deg) : -44.88
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.661
 C/A sky separation (km) : 35333.5
 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

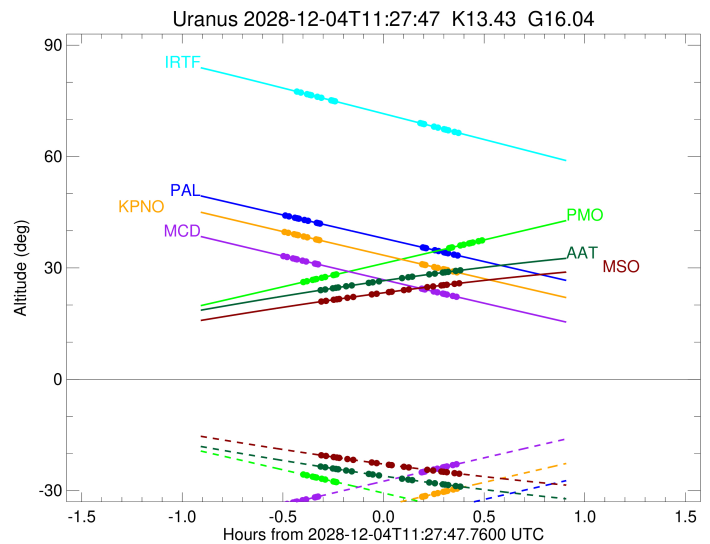
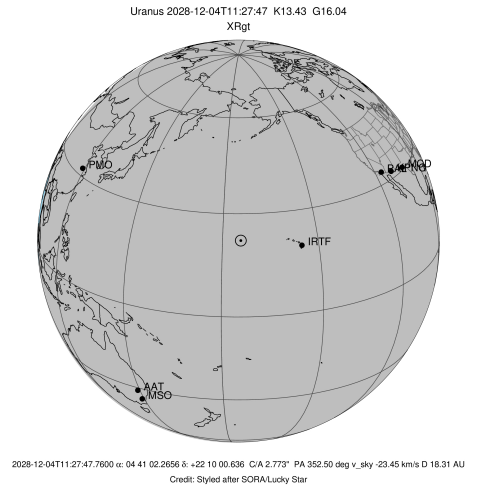


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2028-12-04T10:58:24.941		44.13	-44.76	51266.52	-17.24		
lambda	I	2028-12-04T10:59:38.271		43.88	-44.51	50026.71	-16.70		
delta	I	2028-12-04T11:01:23.634		43.51	-44.14	48300.35	-16.06		
gamma	I	2028-12-04T11:02:05.646		43.36	-43.99	47631.47	-15.78		
eta	I	2028-12-04T11:02:34.679		43.26	-43.89	47176.12	-15.58		
beta	I	2028-12-04T11:04:13.173		42.92	-43.55	45675.68	-14.88		
alpha	I	2028-12-04T11:05:19.302		42.68	-43.32	44709.50	-14.34		
4	I	2028-12-04T11:07:58.168		42.13	-42.76	42534.75	-12.96		
5	I	2028-12-04T11:08:26.120		42.03	-42.67	42177.07	-12.68		
6	I	2028-12-04T11:08:54.783		41.93	-42.57	41817.43	-12.40		

No planet occultations

6	E	2028-12-04T11:39:26.677		35.53	-36.19	41794.75	12.38		
5	E	2028-12-04T11:39:56.919		35.43	-36.09	42160.02	12.65		
4	E	2028-12-04T11:40:25.479		35.33	-35.99	42531.88	12.93		
alpha	E	2028-12-04T11:43:03.298		34.78	-35.44	44684.61	14.31		
beta	E	2028-12-04T11:44:11.356		34.54	-35.20	45677.84	14.84		
eta	E	2028-12-04T11:45:49.979		34.20	-34.86	47176.12	15.55		
gamma	E	2028-12-04T11:46:18.860		34.10	-34.76	47627.92	15.74		
delta	E	2028-12-04T11:47:01.207		33.95	-34.61	48300.35	16.02		
lambda	E	2028-12-04T11:48:46.861		33.58	-34.25	50026.71	16.65		
epsilon	E	2028-12-04T11:50:15.923		33.28	-33.94	51531.86	17.18		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-12-04T11:30:53.870
 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 : 146372008708006016
 2Mass ID (if available) : 04410227+2210006
 ICRS Star Coord at Epoch: 04h 41m 02.26561s +22:10:00.63575s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 13.425
 G magnitude : 16.036
 RP magnitude : 15.227
 BP magnitude : 16.737
 DUPflag : 0
 Distance (au) : 18.308
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.45
 Sun-Target sep (deg) : 179.33
 Sun-Moon sep (deg) : 30.72
 B (ring opening deg) : 80.33
 PA of pole (deg) : -44.88
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.561
 C/A sky separation (km) : 34012.1
 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

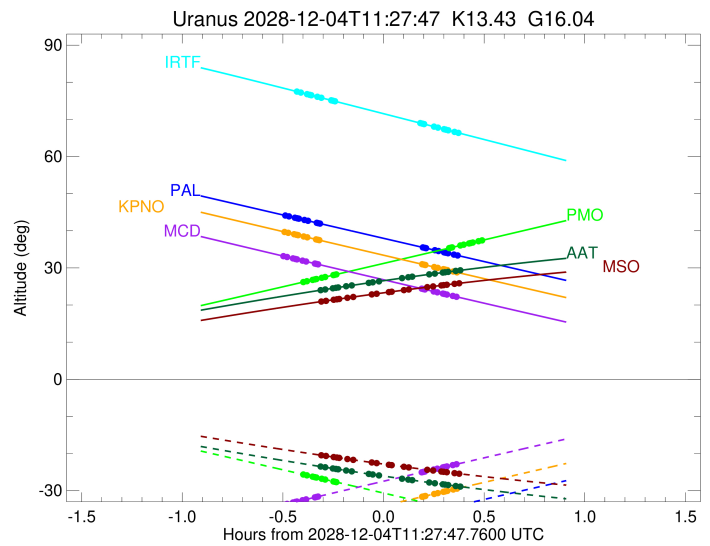
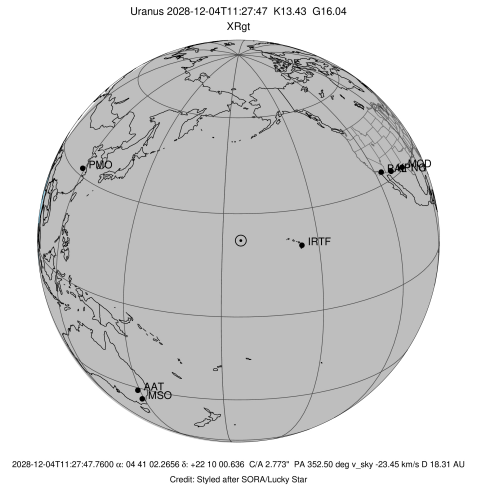


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2028-12-04T11:03:48.437		26.17	-25.64	51248.59	-17.70		
lambda	I	2028-12-04T11:04:58.657		26.41	-25.88	50026.71	-17.22		
delta	I	2028-12-04T11:06:40.551		26.77	-26.24	48300.35	-16.65		
gamma	I	2028-12-04T11:07:21.007		26.91	-26.38	47631.41	-16.41		
eta	I	2028-12-04T11:07:48.892		27.01	-26.47	47176.12	-16.24		
beta	I	2028-12-04T11:09:23.107		27.33	-26.80	45674.88	-15.62		
alpha	I	2028-12-04T11:10:25.698		27.55	-27.02	44711.43	-15.16		
4	I	2028-12-04T11:12:54.636		28.07	-27.54	42536.59	-13.97		
5	I	2028-12-04T11:13:20.348		28.16	-27.62	42180.93	-13.73		
6	I	2028-12-04T11:13:46.804		28.25	-27.72	41820.07	-13.51		

No planet occultations

6	E	2028-12-04T11:47:17.342		35.32	-34.75	41794.82	13.54		
5	E	2028-12-04T11:47:45.190		35.42	-34.85	42161.41	13.77		
4	E	2028-12-04T11:48:11.457		35.51	-34.94	42532.92	14.01		
alpha	E	2028-12-04T11:50:38.655		36.03	-35.46	44684.63	15.20		
beta	E	2028-12-04T11:51:42.904		36.26	-35.68	45677.44	15.67		
eta	E	2028-12-04T11:53:16.718		36.59	-36.01	47176.12	16.29		
gamma	E	2028-12-04T11:53:44.298		36.68	-36.11	47627.77	16.46		
delta	E	2028-12-04T11:54:24.850		36.83	-36.25	48300.35	16.71		
lambda	E	2028-12-04T11:56:06.413		37.19	-36.61	50026.71	17.28		
epsilon	E	2028-12-04T11:57:32.220		37.49	-36.91	51528.38	17.76		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-12-04T11:24:19.420
 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 : 146372008708006016
 2Mass ID (if available) : 04410227+2210006
 ICRS Star Coord at Epoch: 04h 41m 02.26561s +22:10:00.63575s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 13.425
 G magnitude : 16.036
 RP magnitude : 15.227
 BP magnitude : 16.737
 DUPflag : 0
 Distance (au) : 18.308
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.45
 Sun-Target sep (deg) : 179.33
 Sun-Moon sep (deg) : 29.47
 B (ring opening deg) : 80.33
 PA of pole (deg) : -44.88
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.662
 C/A sky separation (km) : 35350.2
 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_itrff93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

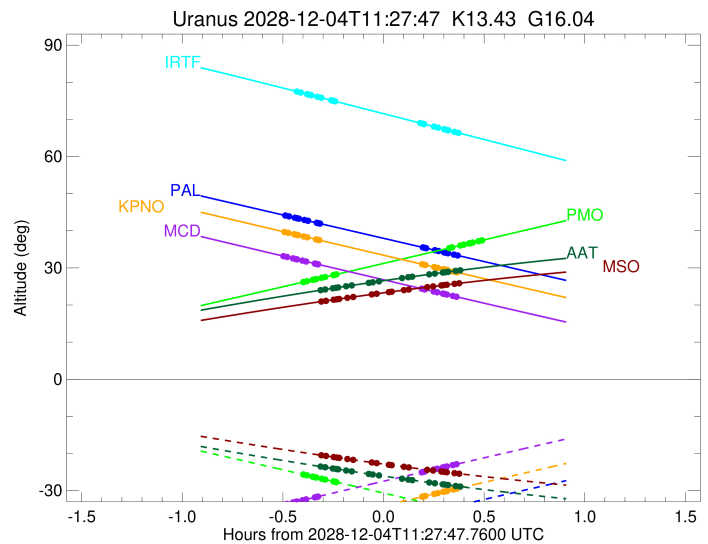
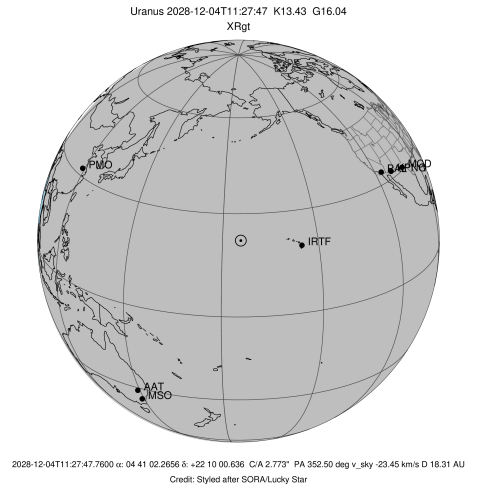


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2028-12-04T10:58:11.223		39.70	-40.34	51266.91	-17.21		
lambda	I	2028-12-04T10:59:24.682		39.44	-40.08	50026.71	-16.68		
delta	I	2028-12-04T11:01:10.207		39.07	-39.70	48300.35	-16.03		
gamma	I	2028-12-04T11:01:52.286		38.92	-39.55	47631.48	-15.76		
eta	I	2028-12-04T11:02:21.366		38.82	-39.45	47176.12	-15.56		
beta	I	2028-12-04T11:04:00.027		38.47	-39.10	45675.69	-14.85		
alpha	I	2028-12-04T11:05:06.279		38.23	-38.87	44709.46	-14.31		
4	I	2028-12-04T11:07:45.464		37.67	-38.31	42534.72	-12.93		
5	I	2028-12-04T11:08:13.481		37.57	-38.21	42177.00	-12.65		
6	I	2028-12-04T11:08:42.208		37.47	-38.11	41817.38	-12.37		

No planet occultations

6	E	2028-12-04T11:39:13.764		31.01	-31.67	41794.75	12.35		
5	E	2028-12-04T11:39:44.079		30.90	-31.56	42160.01	12.62		
4	E	2028-12-04T11:40:12.706		30.80	-31.46	42531.87	12.90		
alpha	E	2028-12-04T11:42:50.867		30.24	-30.91	44684.62	14.28		
beta	E	2028-12-04T11:43:59.060		30.01	-30.67	45677.84	14.82		
eta	E	2028-12-04T11:45:37.870		29.66	-30.32	47176.12	15.52		
gamma	E	2028-12-04T11:46:06.804		29.56	-30.22	47627.92	15.71		
delta	E	2028-12-04T11:46:49.227		29.41	-30.07	48300.35	15.99		
lambda	E	2028-12-04T11:48:35.065		29.04	-29.70	50026.71	16.62		
epsilon	E	2028-12-04T11:50:04.277		28.73	-29.39	51531.85	17.16		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-12-04T11:24:04.720
 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 : 146372008708006016
 2Mass ID (if available) : 04410227+2210006
 ICRS Star Coord at Epoch: 04h 41m 02.26561s +22:10:00.63575s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 13.425
 G magnitude : 16.036
 RP magnitude : 15.227
 BP magnitude : 16.737
 DUPflag : 0
 Distance (au) : 18.308
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.45
 Sun-Target sep (deg) : 179.33
 Sun-Moon sep (deg) : 29.37
 B (ring opening deg) : 80.33
 PA of pole (deg) : -44.88
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.656
 C/A sky separation (km) : 35273.4
 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



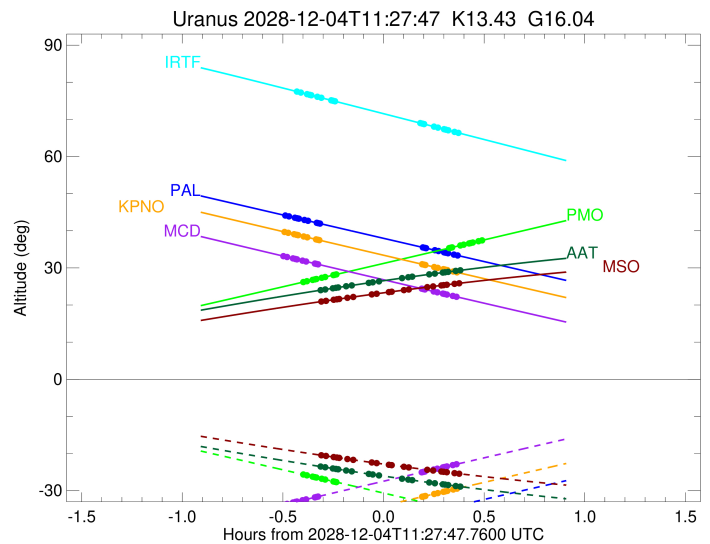
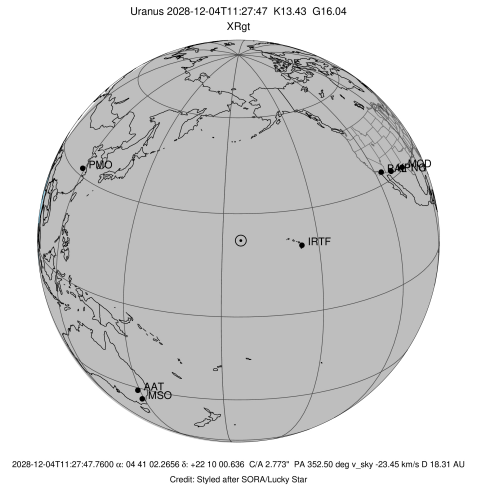
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2028-12-04T10:57:50.702		33.19	-33.83	51266.37	-17.22		
lambda	I	2028-12-04T10:59:04.098		32.93	-33.57	50026.71	-16.68		
delta	I	2028-12-04T11:00:49.548		32.56	-33.19	48300.35	-16.05		
gamma	I	2028-12-04T11:01:31.586		32.41	-33.04	47631.48	-15.77		
eta	I	2028-12-04T11:02:00.634		32.30	-32.94	47176.12	-15.58		
beta	I	2028-12-04T11:03:39.159		31.95	-32.59	45675.67	-14.88		
alpha	I	2028-12-04T11:04:45.282		31.72	-32.36	44709.53	-14.34		
4	I	2028-12-04T11:07:24.044		31.15	-31.79	42534.79	-12.97		
5	I	2028-12-04T11:07:51.956		31.05	-31.69	42177.15	-12.69		
6	I	2028-12-04T11:08:20.575		30.95	-31.59	41817.48	-12.42		

No planet occultations

6	E	2028-12-04T11:39:06.118		24.42	-25.08	41794.75	12.40		
5	E	2028-12-04T11:39:36.332		24.32	-24.98	42160.13	12.67		
4	E	2028-12-04T11:40:04.860		24.22	-24.88	42531.96	12.94		
alpha	E	2028-12-04T11:42:42.626		23.66	-24.32	44684.61	14.31		
beta	E	2028-12-04T11:43:50.704		23.42	-24.09	45677.81	14.84		
eta	E	2028-12-04T11:45:29.400		23.08	-23.74	47176.12	15.53		
gamma	E	2028-12-04T11:45:58.308		22.98	-23.64	47627.91	15.73		
delta	E	2028-12-04T11:46:40.701		22.83	-23.49	48300.35	16.00		
lambda	E	2028-12-04T11:48:26.493		22.46	-23.12	50026.71	16.63		
epsilon	E	2028-12-04T11:49:55.669		22.14	-22.81	51531.48	17.16		

```

target                : Uranus
target radius (km)    : 25559.00
C/A epoch             : 2028-12-04T11:26:24.950
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       : 146372008708006016
2Mass ID (if available) : 04410227+2210006
ICRS Star Coord at Epoch: 04h 41m 02.26561s +22:10:00.63575s
RUWE (>1.4 is poor) : 1.07
K magnitude           : 13.425
G magnitude           : 16.036
RP magnitude          : 15.227
BP magnitude          : 16.737
DUPflag              : 0
Distance (au)        : 18.308
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -23.45
Sun-Target sep (deg) : 179.33
Sun-Moon sep (deg)   : 30.08
B (ring opening deg) : 80.33
PA of pole (deg)     : -44.88
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.808
C/A sky separation (km) : 37288.4
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
    
```

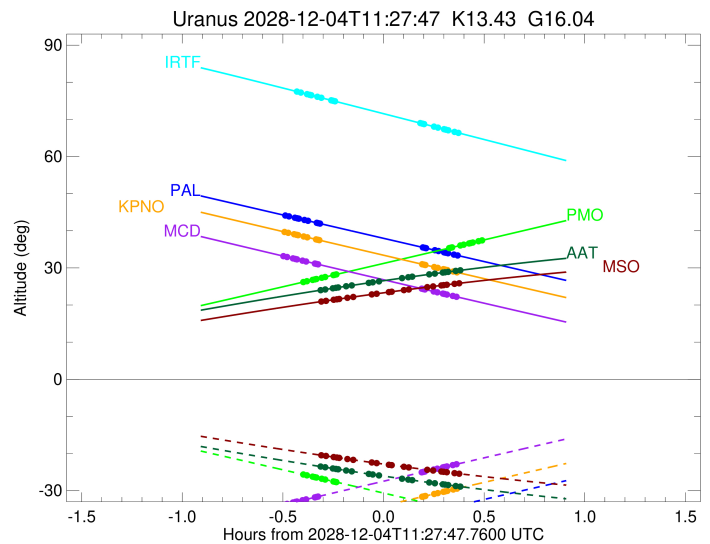
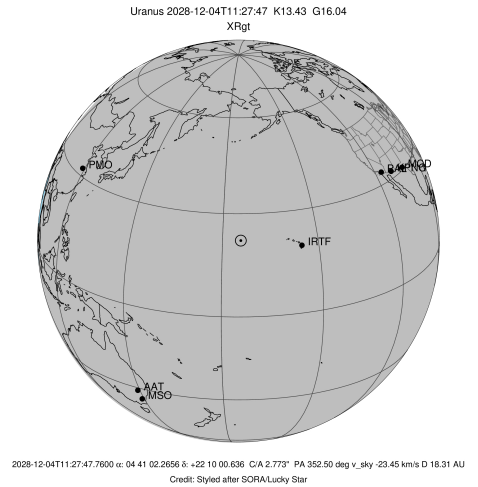


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2028-12-04T11:01:51.199		77.53	-78.14	51286.06	-16.43		
lambda	I	2028-12-04T11:03:09.658		77.23	-77.85	50026.71	-15.80		
delta	I	2028-12-04T11:05:01.589		76.80	-77.42	48300.35	-15.03		
gamma	I	2028-12-04T11:05:46.577		76.63	-77.25	47631.53	-14.70		
eta	I	2028-12-04T11:06:17.812		76.51	-77.13	47176.12	-14.46		
beta	I	2028-12-04T11:08:04.696		76.10	-76.72	45676.59	-13.59		
alpha	I	2028-12-04T11:09:17.798		75.82	-76.45	44707.13	-12.93		
4	I	2028-12-04T11:12:17.701		75.13	-75.76	42532.54	-11.16		
5	I	2028-12-04T11:12:50.572		75.00	-75.63	42172.27	-10.79		
6	I	2028-12-04T11:13:24.390		74.87	-75.50	41813.96	-10.42		

No planet occultations

6	E	2028-12-04T11:38:39.984		69.03	-69.69	41794.92	10.42		
5	E	2028-12-04T11:39:15.380		68.89	-69.56	42157.58	10.78		
4	E	2028-12-04T11:39:48.806		68.76	-69.43	42529.91	11.15		
alpha	E	2028-12-04T11:42:47.487		68.07	-68.74	44684.75	12.92		
beta	E	2028-12-04T11:44:02.424		67.78	-68.45	45678.65	13.58		
eta	E	2028-12-04T11:45:49.289		67.37	-68.04	47176.12	14.45		
gamma	E	2028-12-04T11:46:20.331		67.25	-67.92	47628.26	14.69		
delta	E	2028-12-04T11:47:05.584		67.07	-67.75	48300.35	15.02		
lambda	E	2028-12-04T11:48:57.630		66.64	-67.32	50026.71	15.78		
epsilon	E	2028-12-04T11:50:31.683		66.28	-66.95	51539.17	16.41		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-12-04T11:30:17.320
 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 : 146372008708006016
 2Mass ID (if available) : 04410227+2210006
 ICRS Star Coord at Epoch: 04h 41m 02.26561s +22:10:00.63575s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 13.425
 G magnitude : 16.036
 RP magnitude : 15.227
 BP magnitude : 16.737
 DUPflag : 0
 Distance (au) : 18.308
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.45
 Sun-Target sep (deg) : 179.33
 Sun-Moon sep (deg) : 30.59
 B (ring opening deg) : 80.33
 PA of pole (deg) : -44.88
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.101
 C/A sky separation (km) : 41177.1
 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

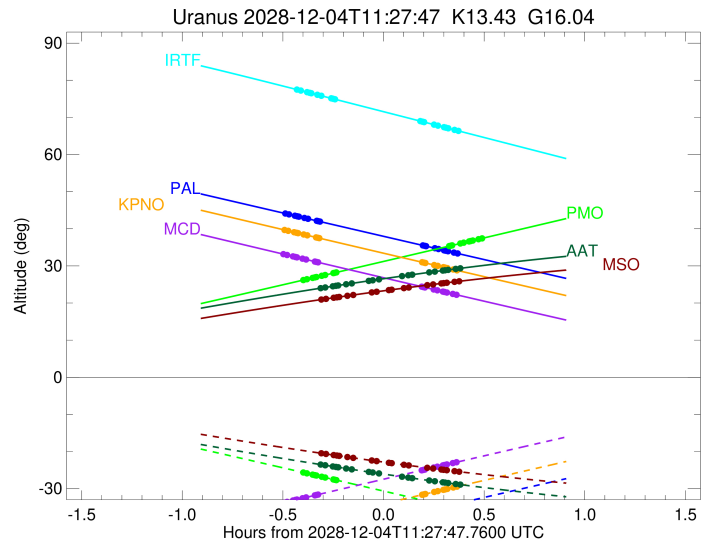
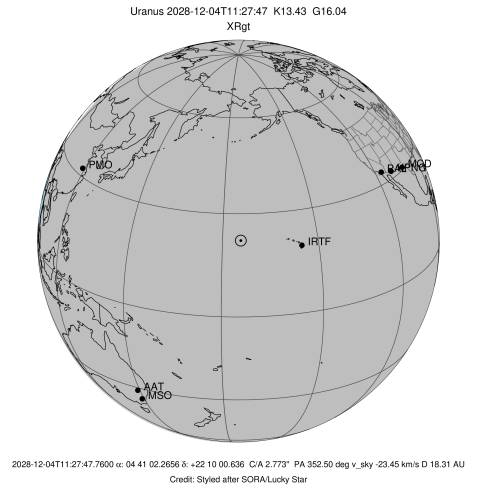


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2028-12-04T11:08:51.341		23.97	-23.48	51328.94	-14.14		
lambda	I	2028-12-04T11:10:26.786		24.19	-23.71	50026.71	-13.28		
delta	I	2028-12-04T11:12:42.429		24.51	-24.03	48300.35	-12.16		
gamma	I	2028-12-04T11:13:38.592		24.64	-24.16	47631.58	-11.66		
eta	I	2028-12-04T11:14:18.288		24.73	-24.25	47176.12	-11.29		
beta	I	2028-12-04T11:16:39.511		25.06	-24.58	45678.54	-9.90		
alpha	I	2028-12-04T11:18:24.089		25.29	-24.82	44701.37	-8.77		
4	I	2028-12-04T11:23:35.574		25.99	-25.52	42527.71	-5.05		
5	I	2028-12-04T11:24:56.452		26.17	-25.70	42160.51	-4.00		
6	I	2028-12-04T11:26:46.734		26.41	-25.94	41803.48	-2.52		

No planet occultations

6	E	2028-12-04T11:32:57.201		27.21	-26.75	41798.81	2.53		
5	E	2028-12-04T11:34:49.103		27.44	-26.98	42154.90	4.00		
4	E	2028-12-04T11:36:10.435		27.61	-27.16	42526.42	5.06		
alpha	E	2028-12-04T11:41:20.346		28.25	-27.80	44686.00	8.78		
beta	E	2028-12-04T11:43:06.604		28.46	-28.01	45680.13	9.92		
eta	E	2028-12-04T11:45:27.533		28.74	-28.30	47176.12	11.31		
gamma	E	2028-12-04T11:46:06.954		28.82	-28.37	47629.00	11.67		
delta	E	2028-12-04T11:47:03.257		28.93	-28.49	48300.35	12.17		
lambda	E	2028-12-04T11:49:18.686		29.19	-28.75	50026.71	13.30		
epsilon	E	2028-12-04T11:51:09.684		29.40	-28.97	51550.28	14.16		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-12-04T11:30:13.350
 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 : 146372008708006016
 2Mass ID (if available) : 04410227+2210006
 ICRS Star Coord at Epoch: 04h 41m 02.26561s +22:10:00.63575s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 13.425
 G magnitude : 16.036
 RP magnitude : 15.227
 BP magnitude : 16.737
 DUPflag : 0
 Distance (au) : 18.308
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.45
 Sun-Target sep (deg) : 179.33
 Sun-Moon sep (deg) : 30.56
 B (ring opening deg) : 80.33
 PA of pole (deg) : -44.88
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.122
 C/A sky separation (km) : 41461.5
 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_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	2028-12-04T11:09:02.979		20.91	-20.45	51332.49	-13.95		
lambda	I	2028-12-04T11:10:40.126		21.12	-20.66	50026.71	-13.06		
delta	I	2028-12-04T11:12:58.277		21.42	-20.96	48300.35	-11.91		
gamma	I	2028-12-04T11:13:55.684		21.55	-21.09	47631.58	-11.39		
eta	I	2028-12-04T11:14:36.350		21.63	-21.18	47176.12	-11.01		
beta	I	2028-12-04T11:17:01.813		21.94	-21.49	45678.69	-9.56		
alpha	I	2028-12-04T11:18:50.794		22.18	-21.72	44700.84	-8.37		
4	I	2028-12-04T11:24:31.743		22.89	-22.44	42527.30	-4.24		
5	I	2028-12-04T11:26:14.593		23.10	-22.65	42159.20	-2.89		
6	I	2028-12-04T11:28:50.226		23.41	-22.97	41867.96	0.64		

No planet occultations

6	E	2028-12-04T11:31:18.636		23.71	-23.27	41862.35	-0.48		
5	E	2028-12-04T11:33:22.705		23.95	-23.52	42155.16	2.89		
4	E	2028-12-04T11:35:06.006		24.15	-23.72	42526.21	4.24		
alpha	E	2028-12-04T11:40:45.391		24.80	-24.38	44686.17	8.38		
beta	E	2028-12-04T11:42:36.056		25.01	-24.59	45680.23	9.57		
eta	E	2028-12-04T11:45:01.233		25.28	-24.86	47176.12	11.02		
gamma	E	2028-12-04T11:45:41.626		25.35	-24.93	47629.06	11.40		
delta	E	2028-12-04T11:46:39.176		25.46	-25.04	48300.35	11.92		
lambda	E	2028-12-04T11:48:57.123		25.71	-25.29	50026.71	13.09		
epsilon	E	2028-12-04T11:50:49.833		25.91	-25.49	51550.86	13.97		