

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2027-11-12T14:56:41.350
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 145306925538372992
 2Mass ID (if available) : 04260721+2135321

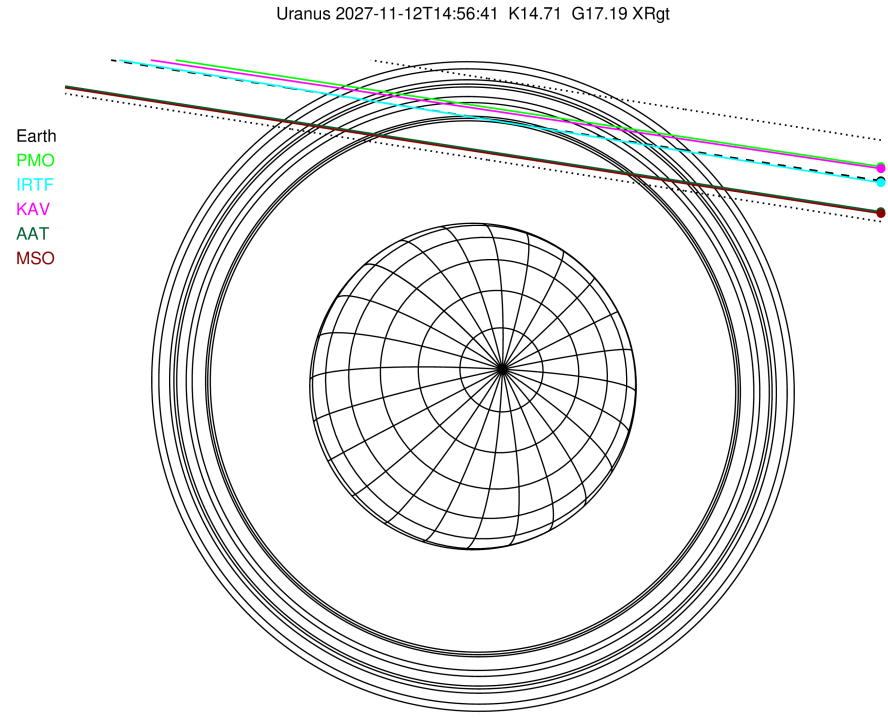
ICRS Star Coord at Epoch: 04h 26m 07.22747s +21:35:32.03378s

RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.715
 G magnitude : 17.190
 RP magnitude : 16.398
 BP magnitude : 17.838
 DUPflag : 0
 Distance (au) : 18.426
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.88
 Sun-Target sep (deg) : 161.34
 Sun-Moon sep (deg) : 37.87
 B (ring opening deg) : 77.93
 PA of pole (deg) : -59.70

#	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

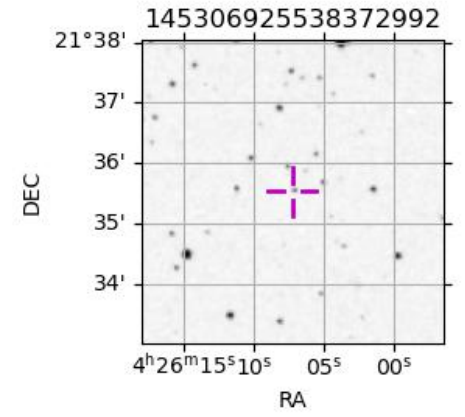


2027-11-12T14:56:41.3500 ra: 04 26 07.2275 s: +21 35 32.0334 C/A 3.126° PA 171.09 deg v_sky -21.88 km/s D 18.43 AU
 Credit: Styled after SORA/Lucky Star

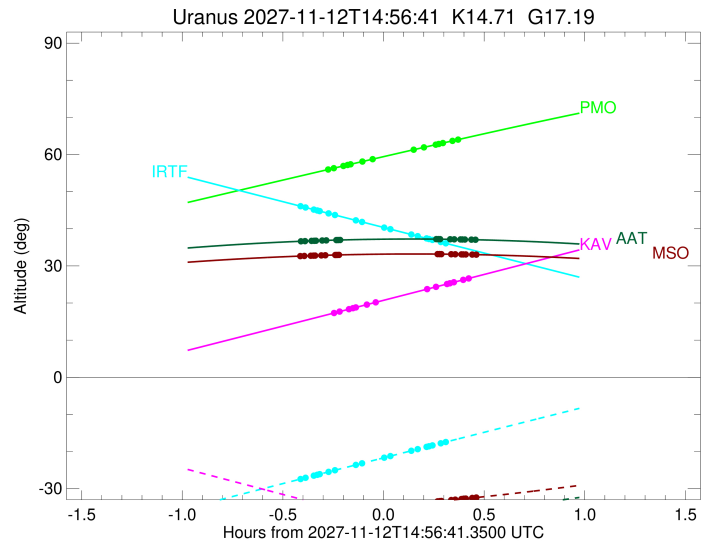
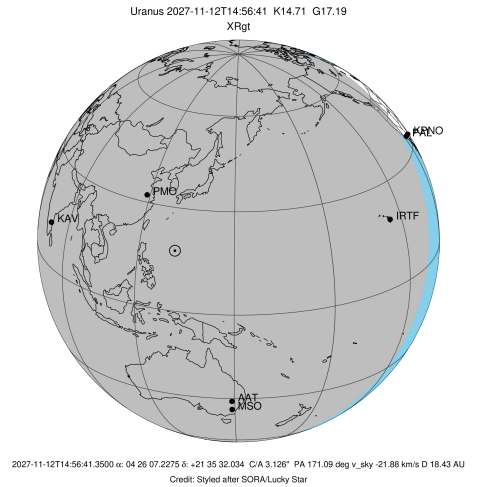


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEncode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	++++++		++++++	NOV 12 14:39 - NOV 12 15:19	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	++++++		++++++	NOV 12 14:31 - NOV 12 15:15	PnnRie
KAV	Kavalur Observatory	12.6	78.8	++++++		++++++	NOV 12 14:41 - NOV 12 15:22	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	++++++		++++++	NOV 12 14:31 - NOV 12 15:24	PnnRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	++++++		++++++	NOV 12 14:31 - NOV 12 15:24	PnnRie



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2027-11-12T14:58:51.860
 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 : 145306925538372992
 2Mass ID (if available) : 04260721+2135321
 ICRS Star Coord at Epoch: 04h 26m 07.22747s +21:35:32.03378s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.715
 G magnitude : 17.190
 RP magnitude : 16.398
 BP magnitude : 17.838
 DUPflag : 0
 Distance (au) : 18.426
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.88
 Sun-Target sep (deg) : 161.34
 Sun-Moon sep (deg) : 38.04
 B (ring opening deg) : 77.93
 PA of pole (deg) : -59.70
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.260
 C/A sky separation (km) : 43567.6
 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_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

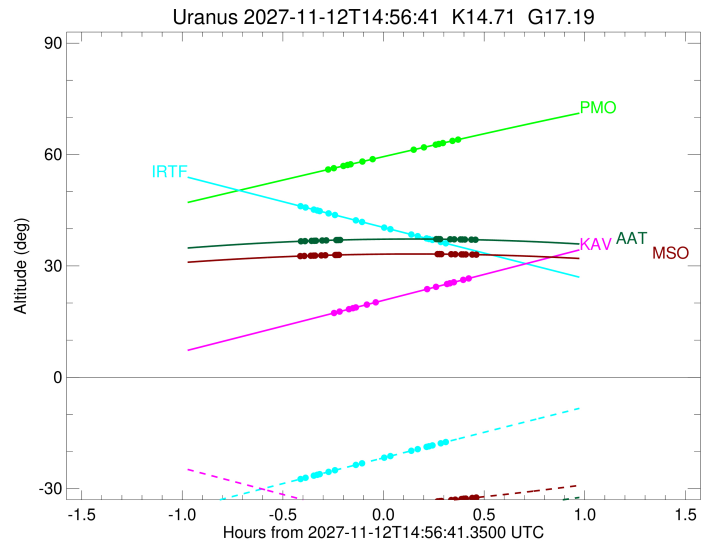
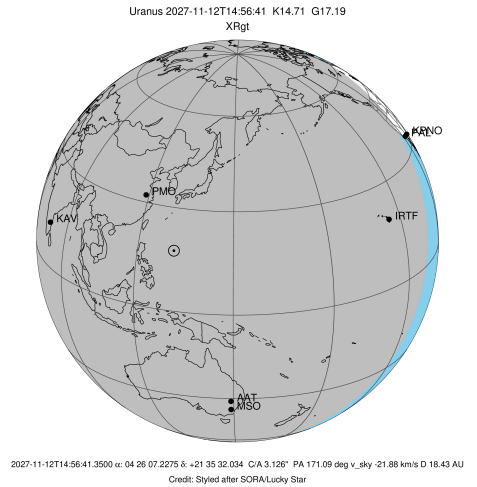
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-11-12T14:39:39.115		55.85	-68.92	51540.72	-11.78		
lambda	I	2027-11-12T14:41:53.781		56.33	-69.29	50026.71	-10.73		
delta	I	2027-11-12T14:44:45.783		56.93	-69.76	48300.35	-9.32		
gamma	I	2027-11-12T14:46:00.766		57.19	-69.96	47626.55	-8.65		
eta	I	2027-11-12T14:46:54.346		57.38	-70.10	47176.12	-8.16		
beta	I	2027-11-12T14:50:28.480		58.13	-70.66	45650.35	-6.07		
alpha	I	2027-11-12T14:53:38.344		58.79	-71.14	44687.72	-4.03		

No planet occultations

alpha	E	2027-11-12T15:05:29.706		61.26	-72.79	44684.70	4.03		
beta	E	2027-11-12T15:08:42.021		61.92	-73.19	45660.70	6.07		
eta	E	2027-11-12T15:12:14.212		62.65	-73.61	47176.12	8.17		
gamma	E	2027-11-12T15:13:07.277		62.83	-73.71	47622.71	8.66		
delta	E	2027-11-12T15:14:22.596		63.09	-73.85	48300.35	9.33		
lambda	E	2027-11-12T15:17:14.317		63.68	-74.15	50026.71	10.75		
epsilon	E	2027-11-12T15:19:18.641		64.10	-74.35	51422.46	11.80		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2027-11-12T14:52:54.780
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      : 145306925538372992
2Mass ID (if available) : 04260721+2135321
ICRS Star Coord at Epoch: 04h 26m 07.22747s +21:35:32.03378s
RUWE (>1.4 is poor) : 1.04
K magnitude         : 14.715
G magnitude         : 17.190
RP magnitude        : 16.398
BP magnitude        : 17.838
DUPflag            : 0
Distance (au)       : 18.426
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -21.88
Sun-Target sep (deg) : 161.34
Sun-Moon sep (deg)  : 38.81
B (ring opening deg) : 77.93
PA of pole (deg)    : -59.70
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.115
C/A sky separation (km) : 41627.6
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall11.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
    
```



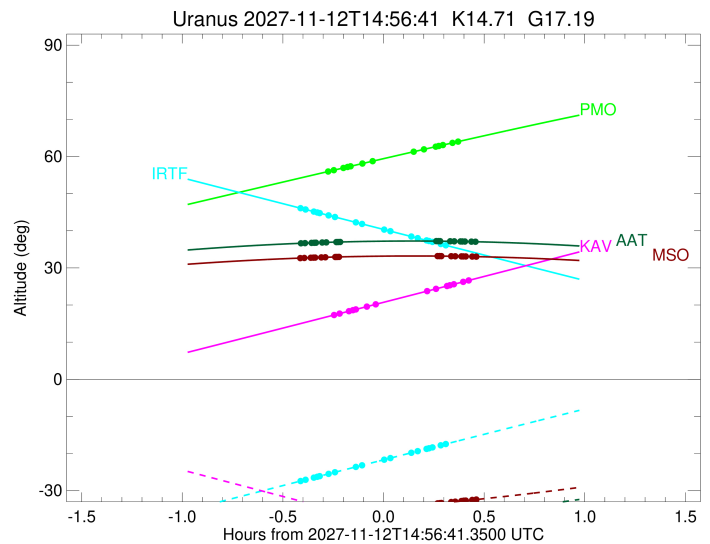
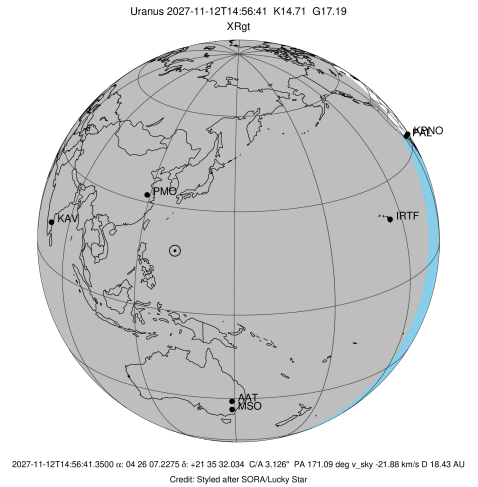
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-11-12T14:31:29.216		46.19	-27.53	51531.11	-13.08		
lambda	I	2027-11-12T14:33:28.364		45.73	-27.07	50026.71	-12.21		
delta	I	2027-11-12T14:35:56.371		45.16	-26.50	48300.35	-11.10		
gamma	I	2027-11-12T14:36:58.443		44.92	-26.26	47627.11	-10.59		
eta	I	2027-11-12T14:37:41.758		44.76	-26.09	47176.12	-10.23		
beta	I	2027-11-12T14:40:22.255		44.14	-25.47	45648.12	-8.80		
alpha	I	2027-11-12T14:42:18.289		43.69	-25.03	44690.69	-7.65		
4	I	2027-11-12T14:48:27.645		42.27	-23.61	42580.35	-3.68		
5	I	2027-11-12T14:49:59.584		41.91	-23.25	42297.39	-2.61		

No planet occultations

5	E	2027-11-12T14:57:15.466		40.23	-21.58	42307.33	2.61		
4	E	2027-11-12T14:58:47.350		39.88	-21.23	42594.18	3.68		
alpha	E	2027-11-12T15:04:52.817		38.48	-19.83	44684.74	7.65		
beta	E	2027-11-12T15:06:51.636		38.02	-19.37	45663.10	8.78		
eta	E	2027-11-12T15:09:30.709		37.41	-18.76	47176.12	10.21		
gamma	E	2027-11-12T15:10:13.663		37.25	-18.60	47622.38	10.57		
delta	E	2027-11-12T15:11:16.310		37.00	-18.36	48300.35	11.07		
lambda	E	2027-11-12T15:13:44.654		36.44	-17.79	50026.71	12.18		
epsilon	E	2027-11-12T15:15:34.312		36.02	-17.37	51404.17	13.04		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2027-11-12T15:01:19.950
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      : 145306925538372992
2Mass ID (if available) : 04260721+2135321
ICRS Star Coord at Epoch: 04h 26m 07.22747s +21:35:32.03378s
RUWE (>1.4 is poor) : 1.04
K magnitude         : 14.715
G magnitude         : 17.190
RP magnitude        : 16.398
BP magnitude        : 17.838
DUPflag            : 0
Distance (au)       : 18.426
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -21.88
Sun-Target sep (deg) : 161.34
Sun-Moon sep (deg)  : 37.37
B (ring opening deg) : 77.93
PA of pole (deg)    : -59.70
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.229
C/A sky separation (km) : 43151.6
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall11.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
  
```



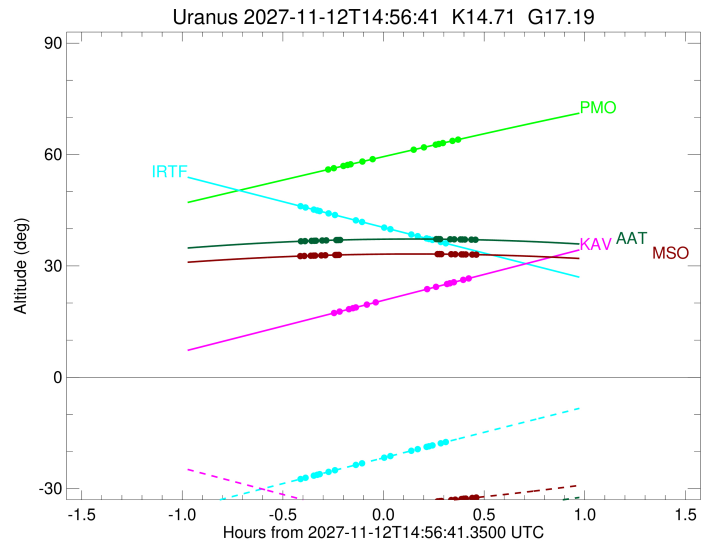
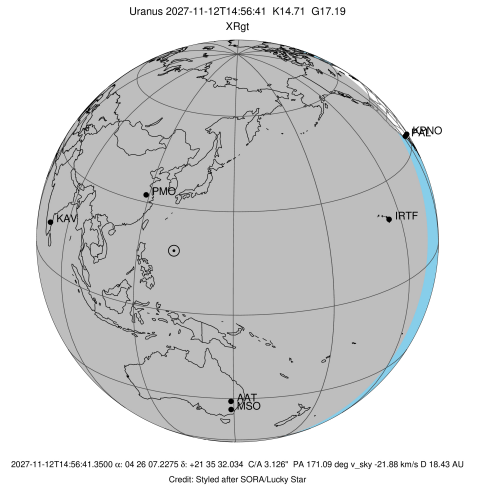
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-11-12T14:41:25.251		17.19	-35.06	51539.25	-11.95		
lambda	I	2027-11-12T14:43:37.409		17.70	-35.59	50026.71	-10.96		
delta	I	2027-11-12T14:46:24.791		18.34	-36.25	48300.35	-9.64		
gamma	I	2027-11-12T14:47:36.960		18.62	-36.54	47626.66	-9.02		
eta	I	2027-11-12T14:48:28.153		18.82	-36.74	47176.12	-8.57		
beta	I	2027-11-12T14:51:47.732		19.59	-37.53	45649.84	-6.70		
alpha	I	2027-11-12T14:54:31.317		20.22	-38.18	44688.38	-5.01		

No planet occultations

alpha	E	2027-11-12T15:09:32.598		23.71	-41.75	44684.62	5.02		
beta	E	2027-11-12T15:12:18.524		24.35	-42.41	45661.40	6.71		
eta	E	2027-11-12T15:15:35.934		25.11	-43.20	47176.12	8.60		
gamma	E	2027-11-12T15:16:26.546		25.31	-43.40	47622.61	9.05		
delta	E	2027-11-12T15:17:38.959		25.59	-43.68	48300.35	9.67		
lambda	E	2027-11-12T15:20:25.810		26.24	-44.35	50026.71	11.00		
epsilon	E	2027-11-12T15:22:27.231		26.71	-44.83	51416.98	12.00		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2027-11-12T14:57:30.140
 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 : 145306925538372992
 2Mass ID (if available) : 04260721+2135321
 ICRS Star Coord at Epoch: 04h 26m 07.22747s +21:35:32.03378s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.715
 G magnitude : 17.190
 RP magnitude : 16.398
 BP magnitude : 17.838
 DUPflag : 0
 Distance (au) : 18.426
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.88
 Sun-Target sep (deg) : 161.34
 Sun-Moon sep (deg) : 38.20
 B (ring opening deg) : 77.93
 PA of pole (deg) : -59.70
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.748
 C/A sky separation (km) : 36729.5
 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

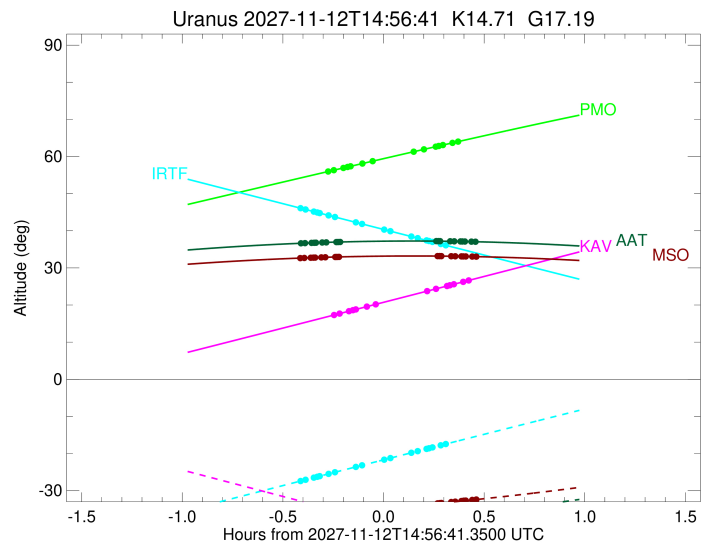
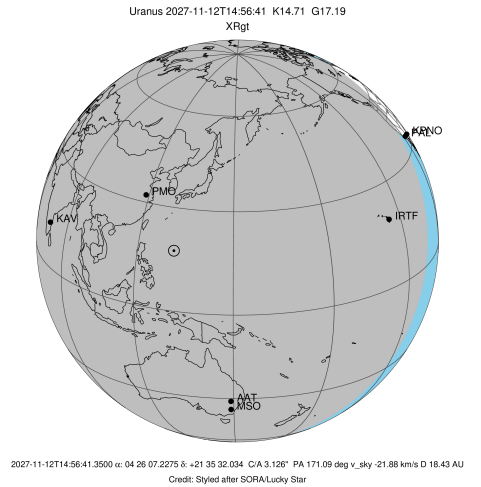


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-11-12T14:31:42.607		36.62	-40.04	51507.30	-15.73		
lambda	I	2027-11-12T14:33:18.618		36.68	-39.96	50026.71	-15.16		
delta	I	2027-11-12T14:35:15.082		36.74	-39.85	48300.35	-14.47		
gamma	I	2027-11-12T14:36:02.013		36.77	-39.81	47628.04	-14.17		
eta	I	2027-11-12T14:36:34.131		36.78	-39.78	47176.12	-13.96		
beta	I	2027-11-12T14:38:26.905		36.84	-39.67	45645.16	-13.18		
alpha	I	2027-11-12T14:39:40.362		36.88	-39.60	44696.04	-12.60		
4	I	2027-11-12T14:42:39.564		36.96	-39.42	42564.86	-11.12		
5	I	2027-11-12T14:43:06.225		36.97	-39.39	42274.23	-10.88		
6	I	2027-11-12T14:43:44.090		36.98	-39.35	41879.56	-10.51		

No planet occultations

6	E	2027-11-12T15:12:27.086		37.21	-37.10	41864.53	10.51		
5	E	2027-11-12T15:13:09.128		37.21	-37.03	42315.13	10.89		
4	E	2027-11-12T15:13:35.702		37.20	-36.99	42606.39	11.12		
alpha	E	2027-11-12T15:16:30.592		37.17	-36.72	44686.52	12.61		
beta	E	2027-11-12T15:17:46.584		37.16	-36.59	45667.56	13.19		
eta	E	2027-11-12T15:19:37.602		37.13	-36.41	47176.12	13.97		
gamma	E	2027-11-12T15:20:09.259		37.12	-36.36	47621.75	14.18		
delta	E	2027-11-12T15:20:56.606		37.11	-36.28	48300.35	14.48		
lambda	E	2027-11-12T15:22:53.003		37.07	-36.08	50026.71	15.17		
epsilon	E	2027-11-12T15:24:18.997		37.04	-35.94	51351.40	15.75		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2027-11-12T14:57:31.520
 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 : 145306925538372992
 2Mass ID (if available) : 04260721+2135321
 ICRS Star Coord at Epoch: 04h 26m 07.22747s +21:35:32.03378s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.715
 G magnitude : 17.190
 RP magnitude : 16.398
 BP magnitude : 17.838
 DUPflag : 0
 Distance (au) : 18.426
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.88
 Sun-Target sep (deg) : 161.34
 Sun-Moon sep (deg) : 38.17
 B (ring opening deg) : 77.93
 PA of pole (deg) : -59.70
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.729
 C/A sky separation (km) : 36474.7
 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	2027-11-12T14:31:30.848		32.63	-36.13	51505.89	-15.84		
lambda	I	2027-11-12T14:33:06.098		32.68	-36.06	50026.71	-15.27		
delta	I	2027-11-12T14:35:01.609		32.74	-35.97	48300.35	-14.60		
gamma	I	2027-11-12T14:35:48.100		32.76	-35.93	47628.08	-14.31		
eta	I	2027-11-12T14:36:19.903		32.78	-35.90	47176.12	-14.11		
beta	I	2027-11-12T14:38:11.426		32.83	-35.81	45645.04	-13.34		
alpha	I	2027-11-12T14:39:23.888		32.86	-35.74	44696.31	-12.78		
4	I	2027-11-12T14:42:20.135		32.94	-35.58	42564.31	-11.35		
5	I	2027-11-12T14:42:46.264		32.95	-35.56	42273.35	-11.12		
6	I	2027-11-12T14:43:23.229		32.96	-35.52	41879.51	-10.76		

No planet occultations

6	E	2027-11-12T15:12:50.252		33.18	-33.43	41864.10	10.76		
5	E	2027-11-12T15:13:31.405		33.18	-33.37	42315.18	11.12		
4	E	2027-11-12T15:13:57.447		33.17	-33.33	42606.73	11.35		
alpha	E	2027-11-12T15:16:49.377		33.14	-33.08	44686.64	12.79		
beta	E	2027-11-12T15:18:04.378		33.13	-32.97	45667.74	13.35		
eta	E	2027-11-12T15:19:54.142		33.11	-32.81	47176.12	14.12		
gamma	E	2027-11-12T15:20:25.485		33.10	-32.76	47621.73	14.32		
delta	E	2027-11-12T15:21:12.394		33.09	-32.69	48300.35	14.61		
lambda	E	2027-11-12T15:23:07.838		33.05	-32.51	50026.71	15.28		
epsilon	E	2027-11-12T15:24:33.068		33.03	-32.38	51348.91	15.85		