

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2027-12-03T17:37:18.600  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 145336303114517248  
 2Mass ID (if available) : 04222449+2127153

ICRS Star Coord at Epoch: 04h 22m 24.51969s +21:27:14.97746s

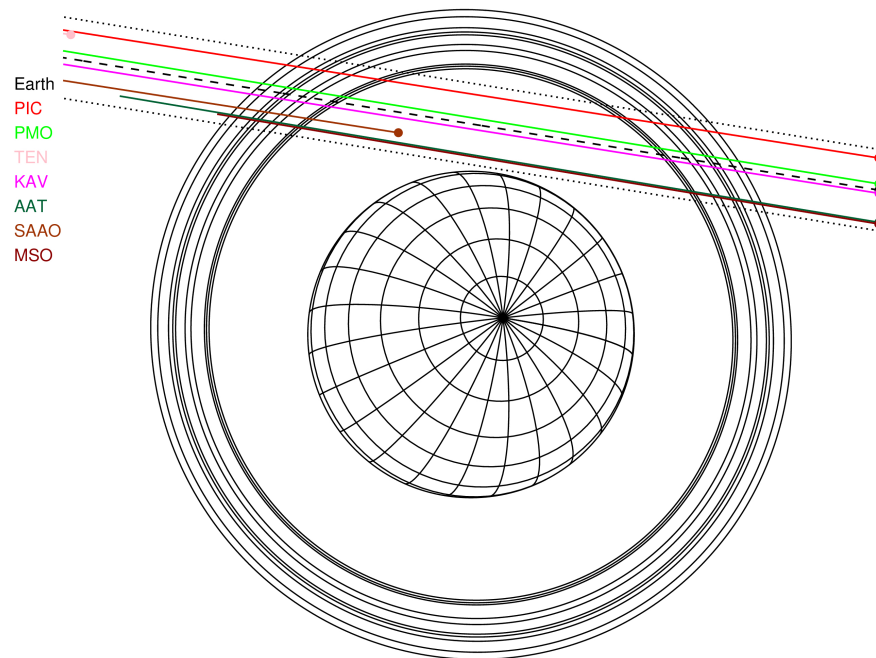
RUWE (>1.4 is poor) : 0.92  
 K magnitude : 11.582  
 G magnitude : 13.914  
 RP magnitude : 13.136  
 BP magnitude : 14.550  
 DUPflag : 0  
 Distance (au) : 18.379  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.41  
 Sun-Target sep (deg) : 176.46  
 Sun-Moon sep (deg) : 113.36  
 B (ring opening deg) : 77.24  
 PA of pole (deg) : -62.49

#	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



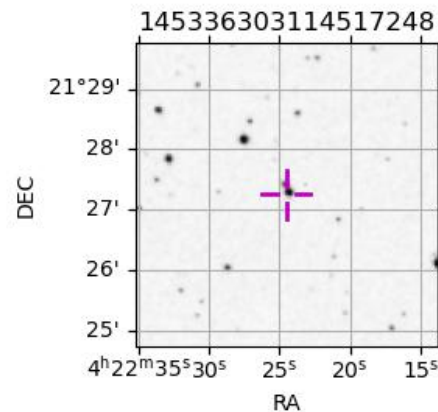
2027-12-03T17:37:18.6000 ra: 04 22 24.5197 s: +21 27 14.977 C/A 2.447 PA 170.78 deg v\_sky -23.41 km/s D 18.38 AU  
 Credit: Styled after SORA/Lucky Star

Uranus 2027-12-03T17:37:18 K11.58 G13.91 XRgt

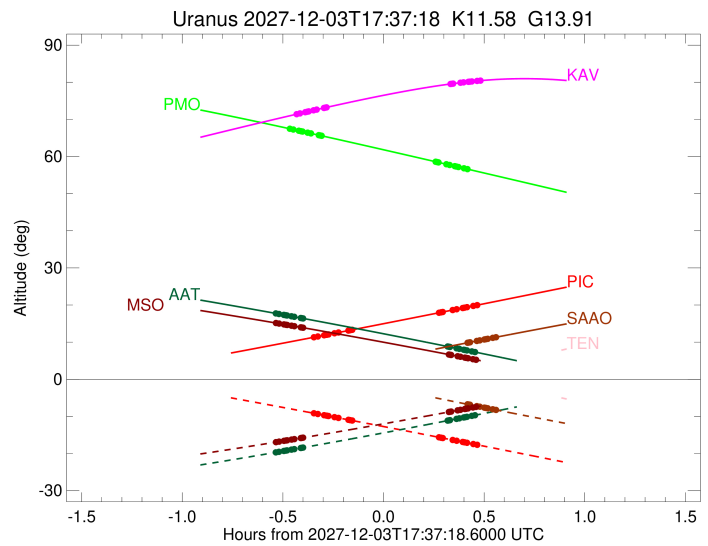
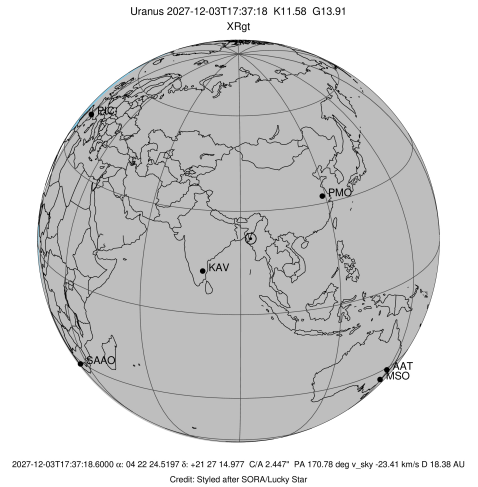


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++		+++++	DEC 03 17:16 - DEC 03 18:05	PnnRie
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++		+++++	DEC 03 17:09 - DEC 03 18:02	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					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++		+++++	DEC 03 17:11 - DEC 03 18:06	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	+++++		+++++	DEC 03 17:05 - DEC 03 18:04	PnnRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8			+++++	DEC 03 18:02 - DEC 03 18:11	PnnRne
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++		+++++	DEC 03 17:05 - DEC 03 18:05	PnnRie



target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2027-12-03T17:40:17.650  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Observer code : PIC  
 Location : Pic du Midi  
 Latitude (deg) : 42.93656  
 E. Longitude (deg) : 0.14231  
 Altitude (km) : 2.890  
 Gaia source ID : 145336303114517248  
 2Mass ID (if available) : 04222449+2127153  
 ICRS Star Coord at Epoch: 04h 22m 24.51969s +21:27:14.97746s  
 RUWE (>1.4 is poor) : 0.92  
 K magnitude : 11.582  
 G magnitude : 13.914  
 RP magnitude : 13.136  
 BP magnitude : 14.550  
 DUPflag : 0  
 Distance (au) : 18.379  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.41  
 Sun-Target sep (deg) : 176.46  
 Sun-Moon sep (deg) : 113.80  
 B (ring opening deg) : 77.24  
 PA of pole (deg) : -62.49  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.792  
 C/A sky separation (km) : 37222.3  
 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

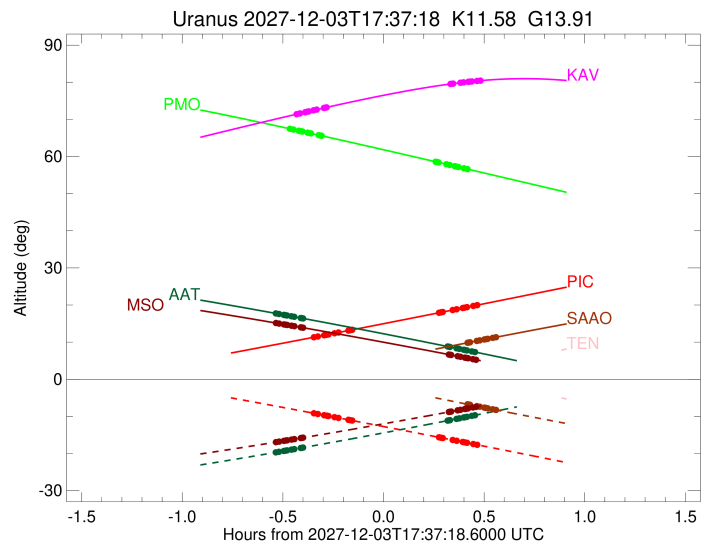
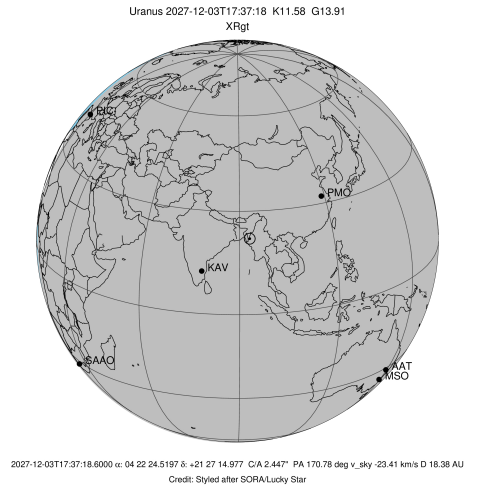


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-12-03T17:16:20.292		11.28	-9.12	51376.37	-16.31		
lambda	I	2027-12-03T17:17:44.958		11.53	-9.36	50026.71	-15.68		
delta	I	2027-12-03T17:19:37.723		11.85	-9.68	48300.35	-14.93		
gamma	I	2027-12-03T17:20:23.085		11.99	-9.81	47630.64	-14.60		
eta	I	2027-12-03T17:20:54.468		12.08	-9.90	47176.12	-14.36		
beta	I	2027-12-03T17:22:44.675		12.40	-10.22	45641.11	-13.49		
alpha	I	2027-12-03T17:23:54.221		12.60	-10.41	44720.51	-12.87		
4	I	2027-12-03T17:26:56.019		13.13	-10.94	42531.50	-11.15		
5	I	2027-12-03T17:27:26.910		13.23	-11.02	42200.66	-10.85		
6	I	2027-12-03T17:27:58.582		13.32	-11.12	41857.20	-10.50		

No planet occultations

6	E	2027-12-03T17:53:53.732		17.92	-15.64	41879.16	10.52		
5	E	2027-12-03T17:54:30.304		18.03	-15.75	42273.91	10.87		
4	E	2027-12-03T17:54:56.931		18.11	-15.83	42567.03	11.17		
alpha	E	2027-12-03T17:57:52.812		18.64	-16.35	44688.51	12.90		
beta	E	2027-12-03T17:59:05.769		18.86	-16.56	45652.60	13.52		
eta	E	2027-12-03T18:00:54.813		19.19	-16.89	47176.12	14.40		
gamma	E	2027-12-03T18:01:25.689		19.28	-16.98	47624.41	14.64		
delta	E	2027-12-03T18:02:11.356		19.42	-17.11	48300.35	14.97		
lambda	E	2027-12-03T18:04:03.802		19.75	-17.44	50026.71	15.73		
epsilon	E	2027-12-03T18:05:35.697		20.03	-17.72	51498.14	16.36		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2027-12-03T17:35:17.810  
 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 : 145336303114517248  
 2Mass ID (if available) : 04222449+2127153  
 ICRS Star Coord at Epoch: 04h 22m 24.51969s +21:27:14.97746s  
 RUWE (>1.4 is poor) : 0.92  
 K magnitude : 11.582  
 G magnitude : 13.914  
 RP magnitude : 13.136  
 BP magnitude : 14.550  
 DUPflag : 0  
 Distance (au) : 18.379  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.41  
 Sun-Target sep (deg) : 176.46  
 Sun-Moon sep (deg) : 113.92  
 B (ring opening deg) : 77.24  
 PA of pole (deg) : -62.49  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.515  
 C/A sky separation (km) : 33522.1  
 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\_itrfr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk

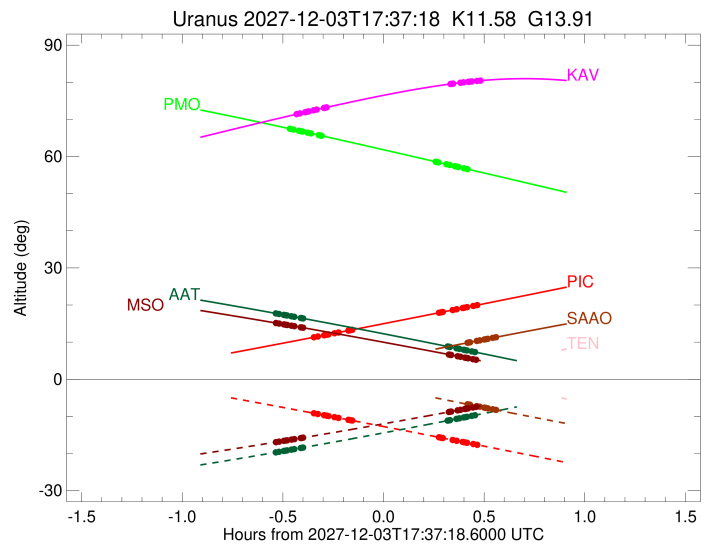
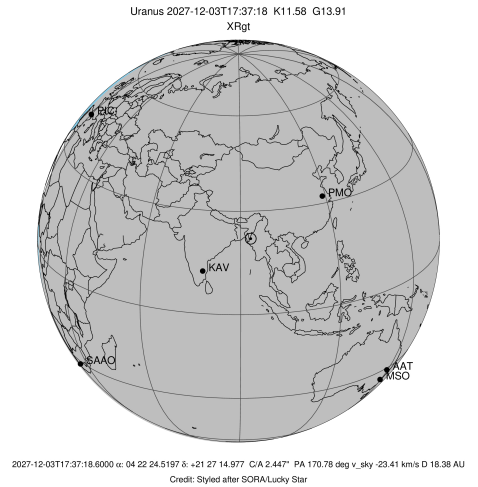


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-12-03T17:09:13.526		67.51	-70.75	51339.42	-18.29		
lambda	I	2027-12-03T17:10:26.490		67.27	-70.52	50026.71	-17.80		
delta	I	2027-12-03T17:12:04.982		66.95	-70.20	48300.35	-17.24		
gamma	I	2027-12-03T17:12:44.064		66.82	-70.08	47630.98	-17.01		
eta	I	2027-12-03T17:13:10.941		66.73	-69.99	47176.12	-16.84		
beta	I	2027-12-03T17:14:43.796		66.42	-69.69	45641.51	-16.21		
alpha	I	2027-12-03T17:15:40.814		66.23	-69.51	44725.37	-15.79		
4	I	2027-12-03T17:18:04.931		65.75	-69.04	42528.42	-14.64		
5	I	2027-12-03T17:18:28.876		65.67	-68.96	42188.75	-14.46		
6	I	2027-12-03T17:18:52.256		65.59	-68.88	41850.25	-14.24		

No planet occultations

6	E	2027-12-03T17:52:53.237		58.59	-62.00	41879.74	14.23		
5	E	2027-12-03T17:53:21.466		58.49	-61.91	42284.63	14.44		
4	E	2027-12-03T17:53:41.344		58.43	-61.84	42574.11	14.63		
alpha	E	2027-12-03T17:56:00.156		57.94	-61.36	44686.68	15.77		
beta	E	2027-12-03T17:57:00.743		57.73	-61.15	45654.94	16.19		
eta	E	2027-12-03T17:58:32.861		57.41	-60.83	47176.12	16.81		
gamma	E	2027-12-03T17:58:59.358		57.31	-60.74	47623.86	16.98		
delta	E	2027-12-03T17:59:38.918		57.18	-60.60	48300.35	17.22		
lambda	E	2027-12-03T18:01:17.566		56.83	-60.26	50026.71	17.77		
epsilon	E	2027-12-03T18:02:38.227		56.55	-59.98	51476.99	18.26		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2027-12-03T17:38:17.690  
 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 : 145336303114517248  
 2Mass ID (if available) : 04222449+2127153  
 ICRS Star Coord at Epoch: 04h 22m 24.51969s +21:27:14.97746s  
 RUWE (>1.4 is poor) : 0.92  
 K magnitude : 11.582  
 G magnitude : 13.914  
 RP magnitude : 13.136  
 BP magnitude : 14.550  
 DUPflag : 0  
 Distance (au) : 18.379  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.41  
 Sun-Target sep (deg) : 176.46  
 Sun-Moon sep (deg) : 114.23  
 B (ring opening deg) : 77.24  
 PA of pole (deg) : -62.49  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.384  
 C/A sky separation (km) : 31780.7  
 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\_itrf93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk

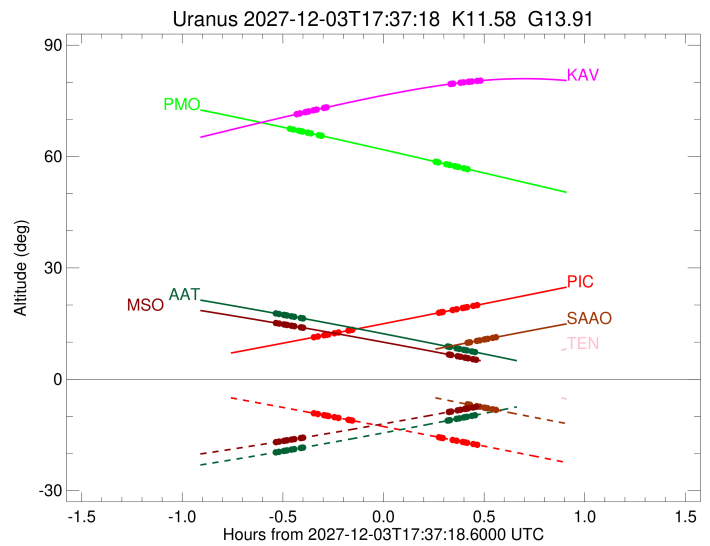
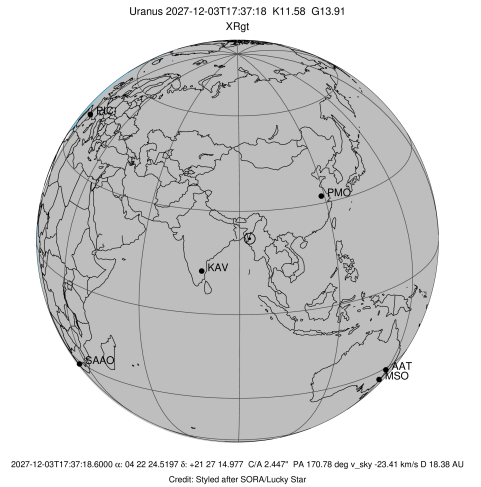


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-12-03T17:11:16.135		71.38	-67.96	51324.95	-19.02		
lambda	I	2027-12-03T17:12:25.369		71.62	-68.21	50026.71	-18.59		
delta	I	2027-12-03T17:13:59.427		71.95	-68.54	48300.35	-18.11		
gamma	I	2027-12-03T17:14:36.587		72.07	-68.68	47631.08	-17.91		
eta	I	2027-12-03T17:15:02.095		72.16	-68.77	47176.12	-17.76		
beta	I	2027-12-03T17:16:29.788		72.46	-69.08	45641.75	-17.23		
alpha	I	2027-12-03T17:17:23.211		72.64	-69.26	44727.14	-16.87		
4	I	2027-12-03T17:19:37.163		73.10	-69.73	42527.60	-15.91		
5	I	2027-12-03T17:19:59.349		73.17	-69.81	42184.78	-15.76		
6	I	2027-12-03T17:20:20.731		73.25	-69.88	41847.66	-15.58		

No planet occultations

6	E	2027-12-03T17:57:19.635		79.55	-76.91	41879.63	15.59		
5	E	2027-12-03T17:57:45.813		79.60	-76.98	42289.00	15.77		
4	E	2027-12-03T17:58:03.945		79.64	-77.03	42577.27	15.92		
alpha	E	2027-12-03T18:00:12.329		79.88	-77.36	44686.01	16.88		
beta	E	2027-12-03T18:01:09.175		79.98	-77.51	45656.11	17.25		
eta	E	2027-12-03T18:02:35.922		80.13	-77.72	47176.12	17.78		
gamma	E	2027-12-03T18:03:00.990		80.17	-77.78	47623.60	17.92		
delta	E	2027-12-03T18:03:38.534		80.23	-77.88	48300.35	18.13		
lambda	E	2027-12-03T18:05:12.502		80.36	-78.10	50026.71	18.61		
epsilon	E	2027-12-03T18:06:29.047		80.47	-78.27	51464.77	19.04		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2027-12-03T17:34:24.300  
 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 : 145336303114517248  
 2Mass ID (if available) : 04222449+2127153  
 ICRS Star Coord at Epoch: 04h 22m 24.51969s +21:27:14.97746s  
 RUWE (>1.4 is poor) : 0.92  
 K magnitude : 11.582  
 G magnitude : 13.914  
 RP magnitude : 13.136  
 BP magnitude : 14.550  
 DUPflag : 0  
 Distance (au) : 18.379  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.41  
 Sun-Target sep (deg) : 176.46  
 Sun-Moon sep (deg) : 113.30  
 B (ring opening deg) : 77.24  
 PA of pole (deg) : -62.49  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.084  
 C/A sky separation (km) : 27776.1  
 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



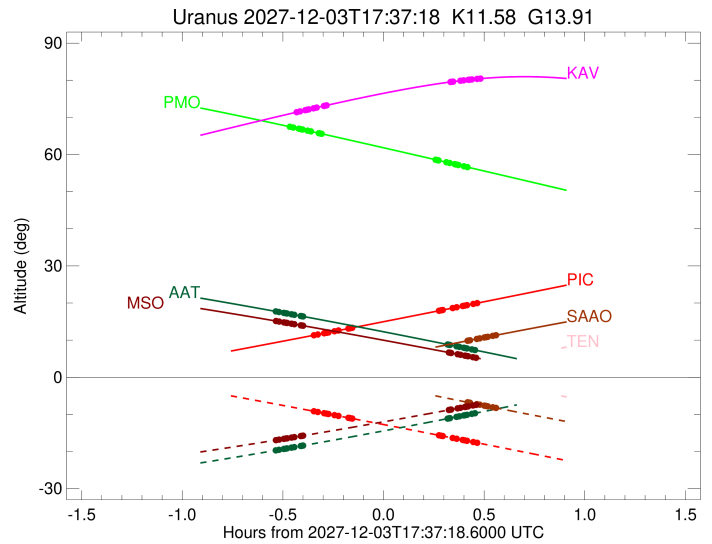
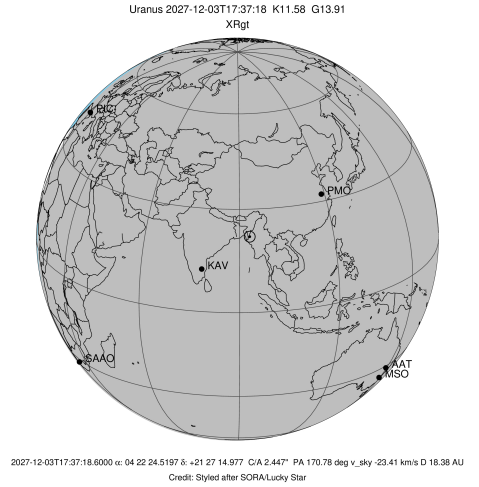
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-12-03T17:05:06.193		17.75	-19.71	51285.71	-20.24		
lambda	I	2027-12-03T17:06:09.044		17.58	-19.54	50026.71	-19.92		
delta	I	2027-12-03T17:07:36.436		17.34	-19.31	48300.35	-19.58		
gamma	I	2027-12-03T17:08:10.725		17.25	-19.22	47631.31	-19.44		
eta	I	2027-12-03T17:08:34.200		17.18	-19.16	47176.12	-19.34		
beta	I	2027-12-03T17:09:54.264		16.96	-18.95	45642.56	-18.97		
alpha	I	2027-12-03T17:10:42.431		16.83	-18.82	44731.32	-18.72		
4	I	2027-12-03T17:12:42.063		16.49	-18.50	42526.31	-18.08		
5	I	2027-12-03T17:13:01.907		16.44	-18.45	42176.32	-17.98		
6	I	2027-12-03T17:13:20.613		16.39	-18.40	41841.52	-17.86		

No planet occultations

6	E	2027-12-03T17:56:27.959		8.82	-11.13	41878.87	17.82		
5	E	2027-12-03T17:56:51.511		8.75	-11.06	42296.16	17.93		
4	E	2027-12-03T17:57:07.381		8.70	-11.02	42582.88	18.03		
alpha	E	2027-12-03T17:59:01.824		8.35	-10.68	44685.13	18.67		
beta	E	2027-12-03T17:59:53.617		8.19	-10.53	45658.27	18.91		
eta	E	2027-12-03T18:01:13.070		7.95	-10.29	47176.12	19.28		
gamma	E	2027-12-03T18:01:36.201		7.88	-10.22	47623.15	19.38		
delta	E	2027-12-03T18:02:11.024		7.77	-10.12	48300.35	19.52		
lambda	E	2027-12-03T18:03:38.719		7.50	-9.86	50026.71	19.85		
epsilon	E	2027-12-03T18:04:49.521		7.29	-9.65	51440.81	20.16		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2027-12-03T17:41:23.560  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Observer code : SAAO  
 Location : So. Afr. Astro. Obs. (Sutherland)  
 Latitude (deg) : -32.37953  
 E. Longitude (deg) : 20.81070  
 Altitude (km) : 1.768  
 Gaia source ID : 145336303114517248  
 2Mass ID (if available) : 04222449+2127153  
 ICRS Star Coord at Epoch: 04h 22m 24.51969s +21:27:14.97746s  
 RUWE (>1.4 is poor) : 0.92  
 K magnitude : 11.582  
 G magnitude : 13.914  
 RP magnitude : 13.136  
 BP magnitude : 14.550  
 DUPflag : 0  
 Distance (au) : 18.379  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.41  
 Sun-Target sep (deg) : 176.46  
 Sun-Moon sep (deg) : 113.75  
 B (ring opening deg) : 77.24  
 PA of pole (deg) : -62.49  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.211  
 C/A sky separation (km) : 29475.9  
 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\_itrfr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



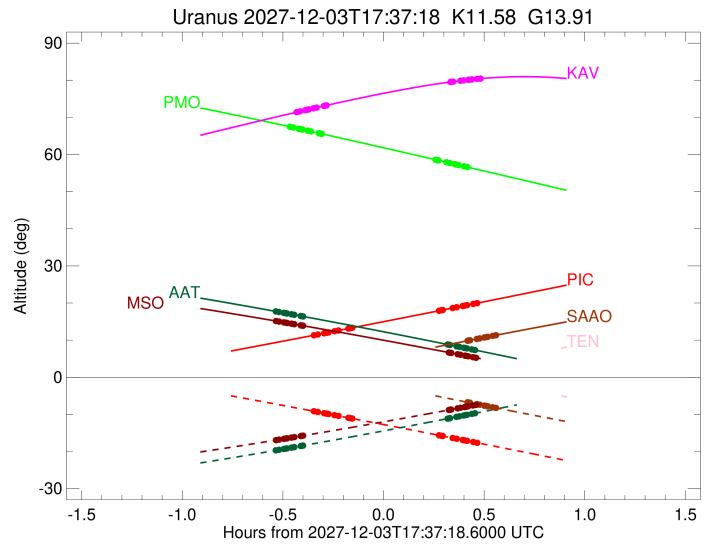
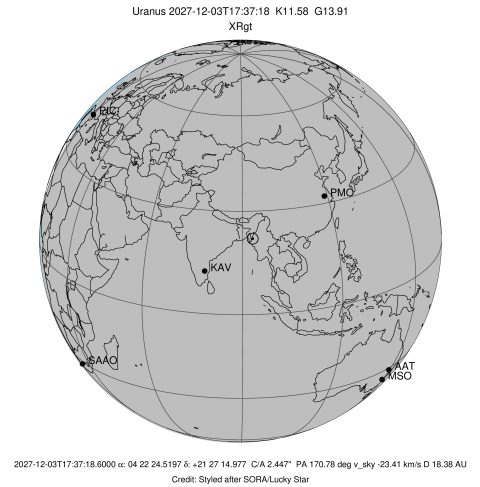
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-12-03T17:12:44.383		0.69x	2.51x	51304.68	-19.55		
lambda	I	2027-12-03T17:13:50.525		0.90x	2.30x	50026.71	-19.19		
delta	I	2027-12-03T17:15:21.369		1.19x	2.01x	48300.35	-18.81		
gamma	I	2027-12-03T17:15:57.099		1.30x	1.90x	47631.21	-18.64		
eta	I	2027-12-03T17:16:21.583		1.38x	1.82x	47176.12	-18.53		
beta	I	2027-12-03T17:17:45.329		1.64x	1.55x	45642.15	-18.11		
alpha	I	2027-12-03T17:18:35.944		1.80x	1.39x	44729.41	-17.82		
4	I	2027-12-03T17:20:41.994		2.20x	0.99x	42526.79	-17.07		
5	I	2027-12-03T17:21:02.858		2.26x	0.93x	42180.01	-16.95		
6	I	2027-12-03T17:21:22.698		2.33x	0.86x	41844.31	-16.82		

No planet occultations

6	E	2027-12-03T18:02:24.205		9.84	-6.75	41879.22	16.86		
5	E	2027-12-03T18:02:48.852		9.91	-6.82	42293.76	17.00		
4	E	2027-12-03T18:03:05.611		9.96	-6.87	42580.93	17.12		
alpha	E	2027-12-03T18:05:05.734		10.32	-7.23	44685.38	17.88		
beta	E	2027-12-03T18:05:59.680		10.47	-7.39	45657.52	18.17		
eta	E	2027-12-03T18:07:22.260		10.72	-7.64	47176.12	18.60		
gamma	E	2027-12-03T18:07:46.234		10.79	-7.71	47623.30	18.71		
delta	E	2027-12-03T18:08:22.259		10.89	-7.82	48300.35	18.88		
lambda	E	2027-12-03T18:09:52.765		11.16	-8.09	50026.71	19.27		
epsilon	E	2027-12-03T18:11:06.037		11.37	-8.30	51449.04	19.63		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2027-12-03T17:34:35.520
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       : 145336303114517248
2Mass ID (if available) : 04222449+2127153
ICRS Star Coord at Epoch: 04h 22m 24.51969s +21:27:14.97746s
RUWE (>1.4 is poor) : 0.92
K magnitude           : 11.582
G magnitude           : 13.914
RP magnitude          : 13.136
BP magnitude          : 14.550
DUPflag              : 0
Distance (au)        : 18.379
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -23.41
Sun-Target sep (deg) : 176.46
Sun-Moon sep (deg)   : 113.29
B (ring opening deg) : 77.24
PA of pole (deg)     : -62.49
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.064
C/A sky separation (km) : 27511.1
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_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	2027-12-03T17:05:09.216		15.16	-16.95	51283.40	-20.31		
lambda	I	2027-12-03T17:06:11.721		15.00	-16.80	50026.71	-20.00		
delta	I	2027-12-03T17:07:38.760		14.78	-16.58	48300.35	-19.67		
gamma	I	2027-12-03T17:08:12.896		14.69	-16.50	47631.33	-19.53		
eta	I	2027-12-03T17:08:36.265		14.63	-16.44	47176.12	-19.43		
beta	I	2027-12-03T17:09:55.930		14.42	-16.24	45642.62	-19.07		
alpha	I	2027-12-03T17:10:43.828		14.29	-16.12	44731.55	-18.83		
4	I	2027-12-03T17:12:42.738		13.98	-15.83	42526.27	-18.20		
5	I	2027-12-03T17:13:02.465		13.93	-15.78	42175.87	-18.10		
6	I	2027-12-03T17:13:21.043		13.88	-15.73	41841.17	-17.99		

No planet occultations

6	E	2027-12-03T17:56:49.396		6.66	-8.81	41878.80	17.95		
5	E	2027-12-03T17:57:12.818		6.59	-8.74	42296.61	18.05		
4	E	2027-12-03T17:57:28.572		6.54	-8.70	42583.25	18.15		
alpha	E	2027-12-03T17:59:22.275		6.22	-8.38	44685.08	18.78		
beta	E	2027-12-03T18:00:13.792		6.07	-8.24	45658.42	19.01		
eta	E	2027-12-03T18:01:32.836		5.84	-8.01	47176.12	19.39		
gamma	E	2027-12-03T18:01:55.856		5.77	-7.95	47623.12	19.47		
delta	E	2027-12-03T18:02:30.523		5.67	-7.85	48300.35	19.60		
lambda	E	2027-12-03T18:03:57.850		5.41	-7.61	50026.71	19.93		
epsilon	E	2027-12-03T18:05:08.294		5.21	-7.41	51439.00	20.24		