

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2042-12-22T20:15:50.780
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 631753787611006080
 2Mass ID (if available) : 09162663+1634268

ICRS Star Coord at Epoch: 09h 16m 26.63359s +16:34:26.56118s

RUWE (>1.4 is poor) : 1.02
 K magnitude : 14.347
 G magnitude : 15.729
 RP magnitude : 15.237
 BP magnitude : 16.046
 DUPflag : 0
 Distance (au) : 17.747
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.08
 Sun-Target sep (deg) : 134.08
 Sun-Moon sep (deg) : 98.64
 B (ring opening deg) : 30.78
 PA of pole (deg) : 98.08

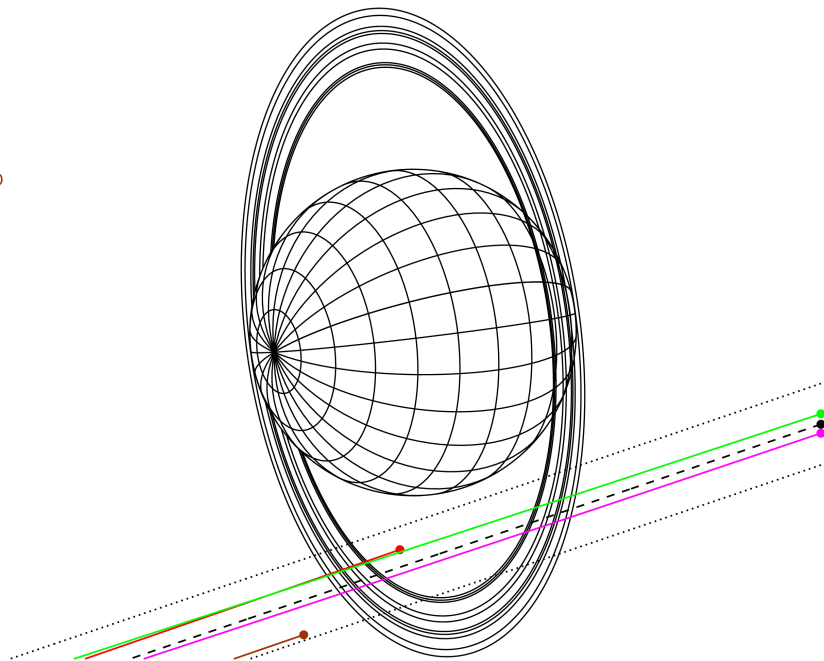
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2042-12-22T20:15:50.7800 α: 09 16 26.6336 β: +16 34 26.561 C/A 2.639° PA 18.75 deg v_sky -14.08 km/s D 17.75 AU
 Credit: Styled after SORA/Lucky Star

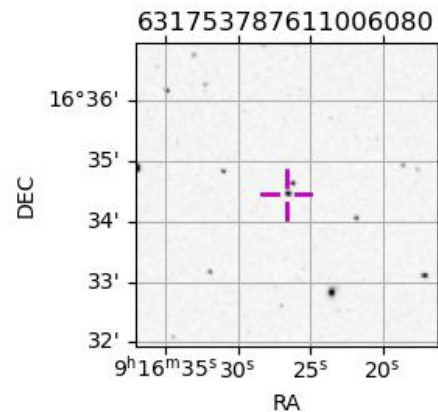
Uranus 2042-12-22T20:15:50 K14.35 G15.73 XRgt

Earth
 PIC
 PMO
 KAV
 SAAO

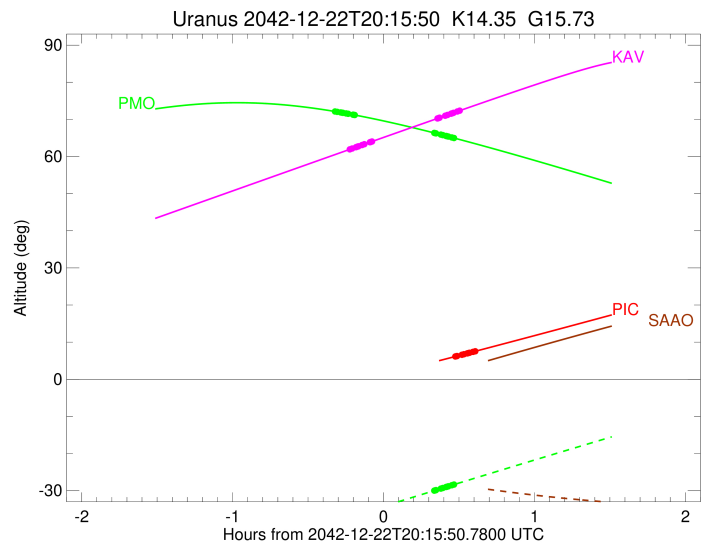
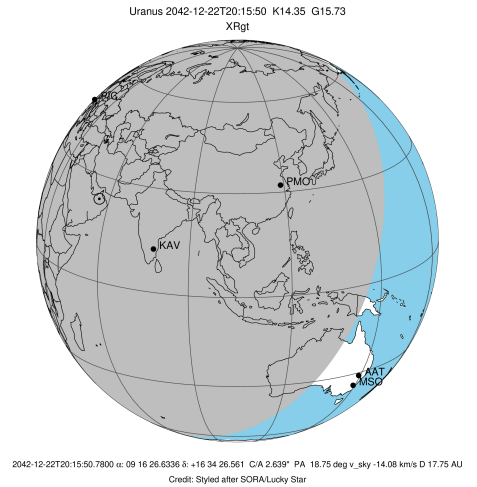


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEncode
PIC	Pic du Midi	42.9	0.1			+++++	DEC 22 20:44 - DEC 22 20:51	PnnRne
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++		+++++	DEC 22 19:56 - DEC 22 20:43	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 22 20:02 - DEC 22 20:45	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					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2042-12-22T20:22:21.990
 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 : 631753787611006080
 2Mass ID (if available) : 09162663+1634268
 ICRS Star Coord at Epoch: 09h 16m 26.63359s +16:34:26.56118s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 14.347
 G magnitude : 15.729
 RP magnitude : 15.237
 BP magnitude : 16.046
 DUPflag : 0
 Distance (au) : 17.747
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.08
 Sun-Target sep (deg) : 134.08
 Sun-Moon sep (deg) : 98.80
 B (ring opening deg) : 30.78
 PA of pole (deg) : 98.08
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.443
 C/A sky separation (km) : 31442.5
 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

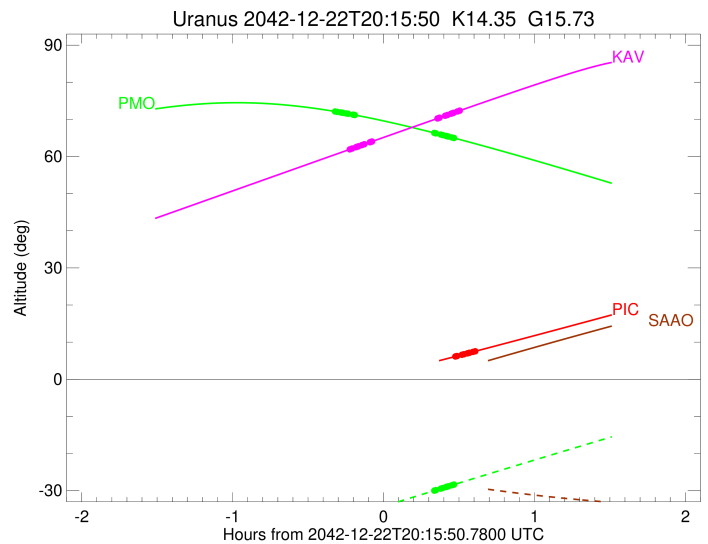
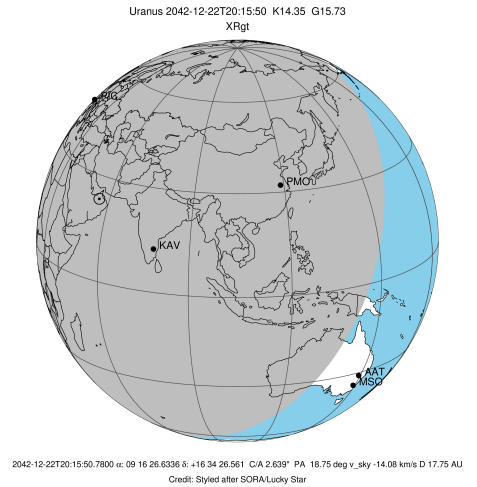


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2042-12-22T20:03:01.408	-1.01x	-38.26	51233.50	-20.99			
lambda	I	2042-12-22T20:03:58.995	-0.85x	-38.44	50026.71	-20.79			
delta	I	2042-12-22T20:05:23.065	-0.61x	-38.69	48300.35	-20.27			
gamma	I	2042-12-22T20:05:56.277	-0.52x	-38.79	47630.82	-20.05			
eta	I	2042-12-22T20:06:19.047	-0.45x	-38.86	47176.12	-19.89			
beta	I	2042-12-22T20:07:36.198	-0.24x	-39.10	45667.95	-19.33			
alpha	I	2042-12-22T20:08:27.973	-0.09x	-39.26	44688.78	-18.91			
4	I	2042-12-22T20:10:22.822	0.24x	-39.61	42533.35	-17.84			
5	I	2042-12-22T20:10:45.587	0.30x	-39.68	42161.61	-17.67			
6	I	2042-12-22T20:11:01.896	0.35x	-39.73	41816.91	-17.48			

No planet occultations

6	E	2042-12-22T20:44:23.326	6.14	-45.80	41870.82	17.55			
5	E	2042-12-22T20:44:40.503	6.19	-45.86	42192.45	17.75			
4	E	2042-12-22T20:45:02.605	6.25	-45.92	42541.87	17.92			
alpha	E	2042-12-22T20:46:59.175	6.59	-46.27	44701.68	19.00			
beta	E	2042-12-22T20:47:50.021	6.74	-46.43	45679.86	19.43			
eta	E	2042-12-22T20:49:05.837	6.97	-46.65	47176.12	19.99			
gamma	E	2042-12-22T20:49:28.374	7.03	-46.72	47628.52	20.16			
delta	E	2042-12-22T20:50:01.521	7.13	-46.82	48300.35	20.38			
lambda	E	2042-12-22T20:51:25.120	7.38	-47.07	50026.71	20.91			
epsilon	E	2042-12-22T20:51:59.233	7.48	-47.17	50743.52	21.11			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2042-12-22T20:15:23.760
 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 : 631753787611006080
 2Mass ID (if available) : 09162663+1634268
 ICRS Star Coord at Epoch: 09h 16m 26.63359s +16:34:26.56118s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 14.347
 G magnitude : 15.729
 RP magnitude : 15.237
 BP magnitude : 16.046
 DUPflag : 0
 Distance (au) : 17.747
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.08
 Sun-Target sep (deg) : 134.08
 Sun-Moon sep (deg) : 99.54
 B (ring opening deg) : 30.78
 PA of pole (deg) : 98.08
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.491
 C/A sky separation (km) : 32058.6
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



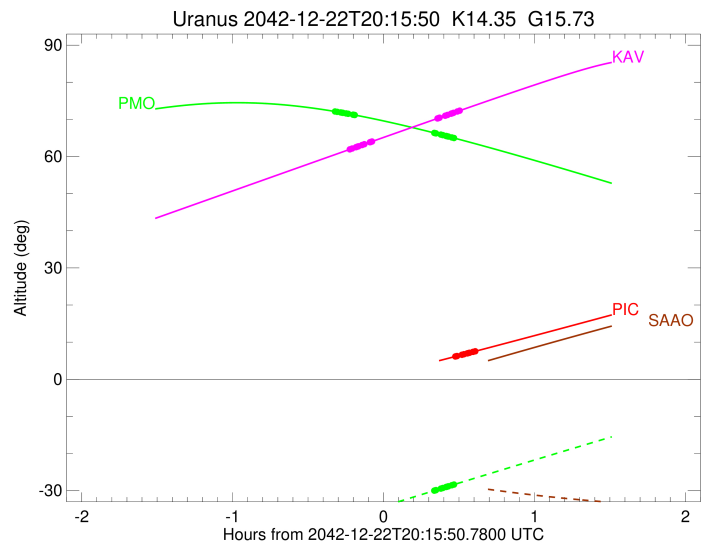
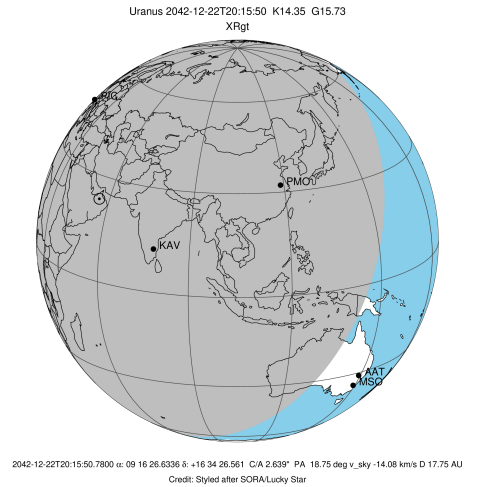
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2042-12-22T19:56:31.480		72.14	-38.30	51224.19	-21.44		
lambda	I	2042-12-22T19:57:27.436		72.03	-38.10	50026.71	-21.22		
delta	I	2042-12-22T19:58:49.868		71.87	-37.81	48300.35	-20.65		
gamma	I	2042-12-22T19:59:22.472		71.81	-37.69	47630.88	-20.41		
eta	I	2042-12-22T19:59:44.845		71.77	-37.62	47176.12	-20.24		
beta	I	2042-12-22T20:01:00.712		71.61	-37.35	45668.45	-19.63		
alpha	I	2042-12-22T20:01:51.777		71.51	-37.17	44688.35	-19.17		
4	I	2042-12-22T20:03:45.406		71.27	-36.77	42532.64	-18.00		
5	I	2042-12-22T20:04:07.839		71.22	-36.69	42160.69	-17.81		
6	I	2042-12-22T20:04:24.060		71.19	-36.63	41818.03	-17.60		

No planet occultations

6	E	2042-12-22T20:36:01.155		66.36	-30.00	41870.53	17.59		
5	E	2042-12-22T20:36:18.303		66.31	-29.94	42191.73	17.80		
4	E	2042-12-22T20:36:40.290		66.25	-29.87	42541.52	17.99		
alpha	E	2042-12-22T20:38:36.150		65.91	-29.47	44701.44	19.16		
beta	E	2042-12-22T20:39:26.554		65.77	-29.29	45679.91	19.62		
eta	E	2042-12-22T20:40:41.570		65.55	-29.03	47176.12	20.22		
gamma	E	2042-12-22T20:41:03.848		65.48	-28.95	47628.55	20.40		
delta	E	2042-12-22T20:41:36.593		65.39	-28.84	48300.35	20.64		
lambda	E	2042-12-22T20:42:59.097		65.14	-28.55	50026.71	21.20		
epsilon	E	2042-12-22T20:43:32.733		65.04	-28.44	50743.51	21.42		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2042-12-22T20:18:53.140
 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 : 631753787611006080
 2Mass ID (if available) : 09162663+1634268
 ICRS Star Coord at Epoch: 09h 16m 26.63359s +16:34:26.56118s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 14.347
 G magnitude : 15.729
 RP magnitude : 15.237
 BP magnitude : 16.046
 DUPflag : 0
 Distance (au) : 17.747
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.08
 Sun-Target sep (deg) : 134.08
 Sun-Moon sep (deg) : 99.59
 B (ring opening deg) : 30.78
 PA of pole (deg) : 98.08
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.739
 C/A sky separation (km) : 35253.9
 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_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	2042-12-22T20:02:25.960		61.93	-68.29	51190.67	-19.86		
lambda	I	2042-12-22T20:03:24.762		62.16	-68.09	50026.71	-19.57		
delta	I	2042-12-22T20:04:54.683		62.52	-67.78	48300.35	-18.82		
gamma	I	2042-12-22T20:05:30.555		62.66	-67.66	47631.11	-18.49		
eta	I	2042-12-22T20:05:55.310		62.76	-67.57	47176.12	-18.26		
beta	I	2042-12-22T20:07:19.911		63.10	-67.28	45670.36	-17.44		
alpha	I	2042-12-22T20:08:17.915		63.33	-67.08	44686.83	-16.80		
4	I	2042-12-22T20:10:30.405		63.86	-66.62	42529.97	-15.17		
5	I	2042-12-22T20:10:56.454		63.97	-66.53	42157.43	-14.88		
6	I	2042-12-22T20:11:16.195		64.05	-66.46	41823.20	-14.58		

No planet occultations

6	E	2042-12-22T20:37:18.463		70.26	-60.86	41866.62	14.60		
5	E	2042-12-22T20:37:39.309		70.35	-60.78	42183.12	14.90		
4	E	2042-12-22T20:38:04.909		70.45	-60.69	42537.32	15.20		
alpha	E	2042-12-22T20:40:19.497		70.98	-60.20	44698.20	16.84		
beta	E	2042-12-22T20:41:16.628		71.21	-59.99	45680.58	17.47		
eta	E	2042-12-22T20:42:40.094		71.54	-59.68	47176.12	18.31		
gamma	E	2042-12-22T20:43:04.678		71.63	-59.59	47629.02	18.54		
delta	E	2042-12-22T20:43:40.574		71.77	-59.46	48300.35	18.86		
lambda	E	2042-12-22T20:45:10.262		72.13	-59.13	50026.71	19.62		
epsilon	E	2042-12-22T20:45:46.612		72.27	-58.99	50745.11	19.92		