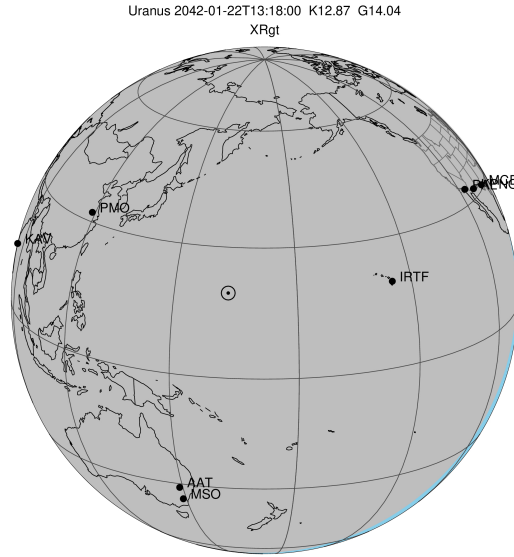


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2042-01-22T13:18:00.700
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 659978079297940608
 2Mass ID (if available) : 08522426+1816081

ICRS Star Coord at Epoch: 08h 52m 24.24780s +18:16:07.96752s

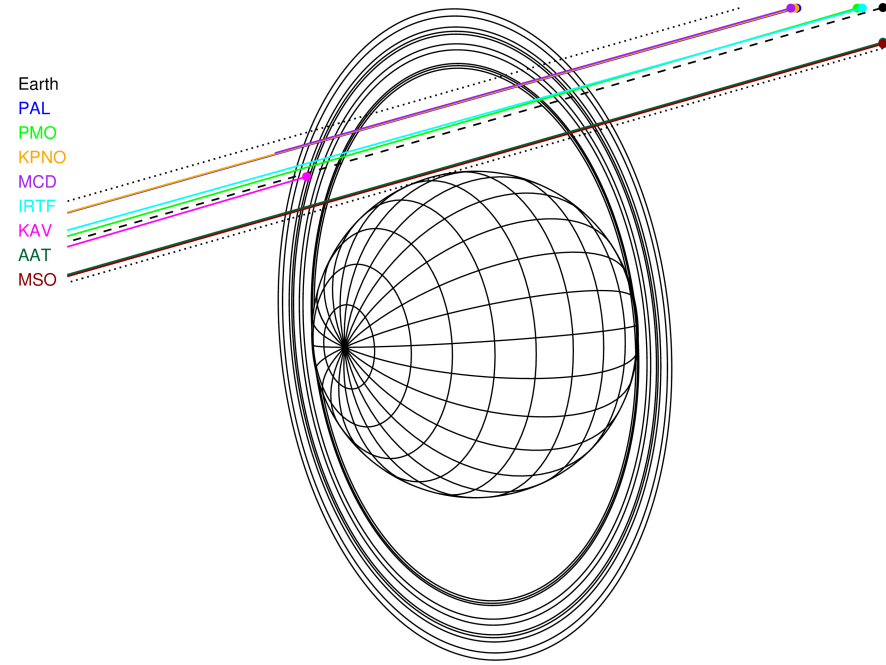
RUWE (>1.4 is poor) : 0.96
 K magnitude : 12.871
 G magnitude : 14.041
 RP magnitude : 13.631
 BP magnitude : 14.294
 DUPflag : 1
 Distance (au) : 17.512
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.87
 Sun-Target sep (deg) : 171.58
 Sun-Moon sep (deg) : 175.64
 B (ring opening deg) : 36.68
 PA of pole (deg) : 95.62

#	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



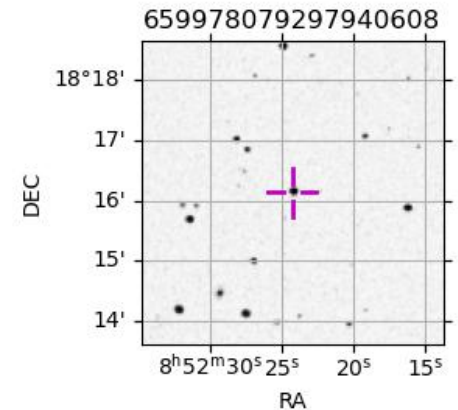
2042-01-22T13:18:00.7000 ex: 08 52 24.2478 s: +18 16 07.968 C/A 2.494 PA 196.04 deg v_sky -22.87 km/s D 17.51 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2042-01-22T13:18:00 K12.87 G14.04 XRgt

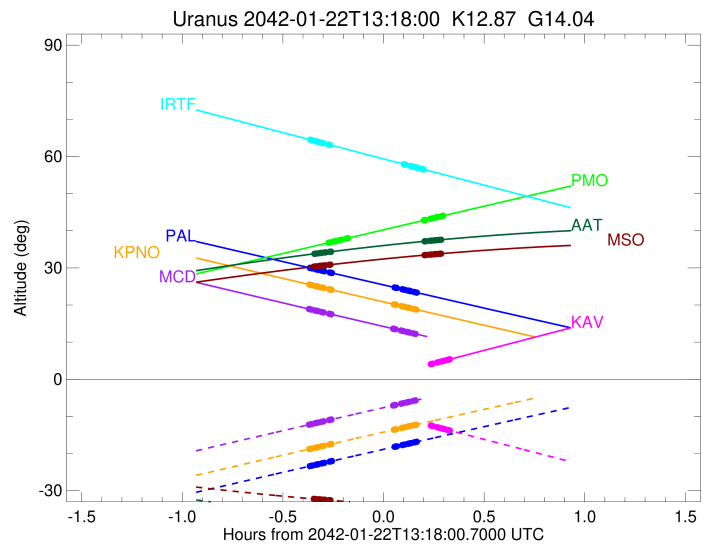
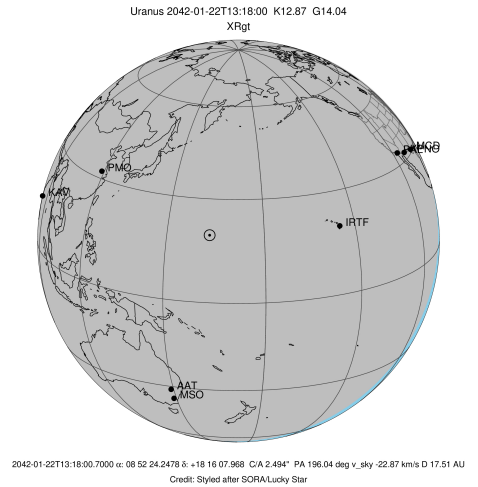


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++		+++++	JAN 22 12:56 - JAN 22 13:27	PnnRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++		+++++	JAN 22 13:01 - JAN 22 13:35	PnnRie
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++		+++++	JAN 22 12:55 - JAN 22 13:27	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++		+++++	JAN 22 12:55 - JAN 22 13:27	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++		+++++	JAN 22 12:56 - JAN 22 13:29	PnnRie
KAV	Kavalur Observatory	12.6	78.8			+++	JAN 22 13:36 - JAN 22 13:37	PnnRne
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	+++++		+++++	JAN 22 12:57 - JAN 22 13:34	PnnRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++		+++++	JAN 22 12:57 - JAN 22 13:34	PnnRie



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2042-01-22T13:14:53.670
 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 : 659978079297940608
 2Mass ID (if available) : 08522426+1816081
 ICRS Star Coord at Epoch: 08h 52m 24.24780s +18:16:07.96752s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 12.871
 G magnitude : 14.041
 RP magnitude : 13.631
 BP magnitude : 14.294
 DUPflag : 1
 Distance (au) : 17.512
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.87
 Sun-Target sep (deg) : 171.58
 Sun-Moon sep (deg) : 174.88
 B (ring opening deg) : 36.68
 PA of pole (deg) : 95.62
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.804
 C/A sky separation (km) : 35607.7
 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_itrff93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

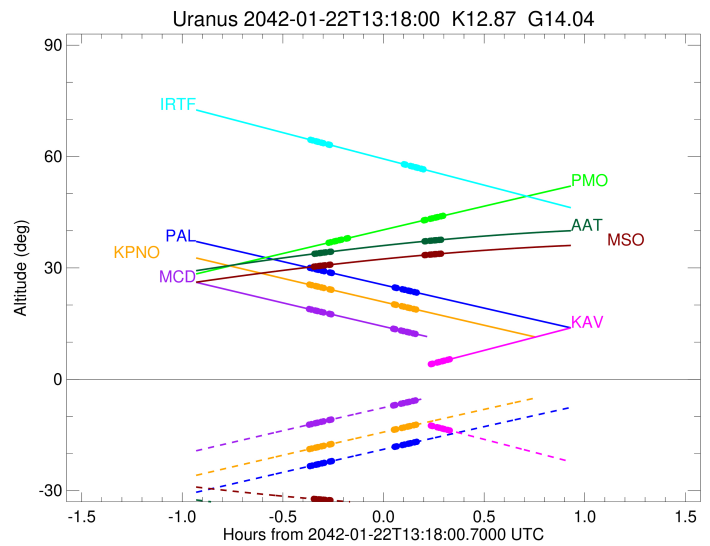
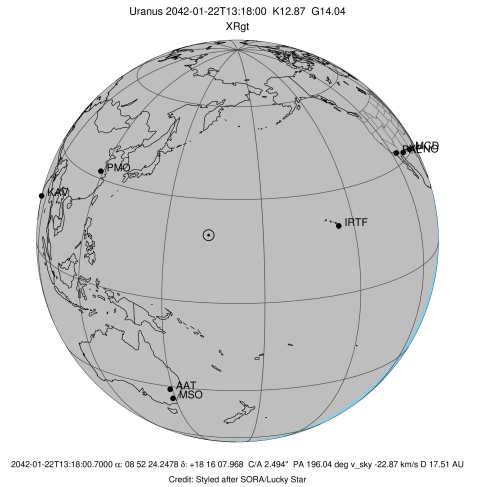


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2042-01-22T12:56:07.371		30.00	-23.38	51071.86	-26.84		
lambda	I	2042-01-22T12:56:46.415		29.86	-23.25	50026.71	-26.48		
delta	I	2042-01-22T12:57:52.910		29.63	-23.02	48300.35	-25.42		
gamma	I	2042-01-22T12:58:19.454		29.53	-22.93	47631.43	-24.97		
eta	I	2042-01-22T12:58:37.805		29.47	-22.87	47176.12	-24.65		
beta	I	2042-01-22T12:59:41.128		29.25	-22.65	45649.77	-23.44		
alpha	I	2042-01-22T13:00:20.487		29.11	-22.51	44743.48	-22.67		
4	I	2042-01-22T13:02:01.797		28.76	-22.16	42557.80	-20.32		
5	I	2042-01-22T13:02:19.333		28.70	-22.10	42190.47	-19.82		
6	I	2042-01-22T13:02:37.217		28.63	-22.04	41851.78	-19.44		

No planet occultations

6	E	2042-01-22T13:21:16.204		24.74	-18.21	41809.21	19.42		
5	E	2042-01-22T13:21:35.825		24.67	-18.14	42155.34	19.80		
4	E	2042-01-22T13:21:53.191		24.61	-18.08	42526.41	20.30		
alpha	E	2042-01-22T13:23:37.077		24.25	-17.73	44747.78	22.64		
beta	E	2042-01-22T13:24:16.339		24.11	-17.59	45642.32	23.40		
eta	E	2042-01-22T13:25:20.290		23.89	-17.38	47176.12	24.60		
gamma	E	2042-01-22T13:25:38.546		23.82	-17.31	47628.20	24.93		
delta	E	2042-01-22T13:26:05.269		23.73	-17.22	48300.35	25.38		
lambda	E	2042-01-22T13:27:11.898		23.50	-17.00	50026.71	26.43		
epsilon	E	2042-01-22T13:27:39.076		23.41	-16.90	50750.35	26.78		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2042-01-22T13:21:28.990
 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 : 659978079297940608
 2Mass ID (if available) : 08522426+1816081
 ICRS Star Coord at Epoch: 08h 52m 24.2478s +18:16:07.96752s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 12.871
 G magnitude : 14.041
 RP magnitude : 13.631
 BP magnitude : 14.294
 DUPflag : 1
 Distance (au) : 17.512
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.87
 Sun-Target sep (deg) : 171.58
 Sun-Moon sep (deg) : 175.66
 B (ring opening deg) : 36.68
 PA of pole (deg) : 95.62
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.555
 C/A sky separation (km) : 32451.7
 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_itrff93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

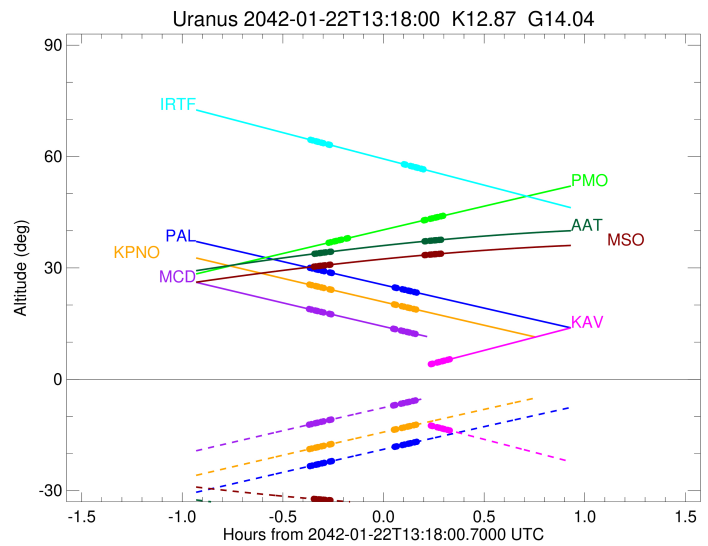
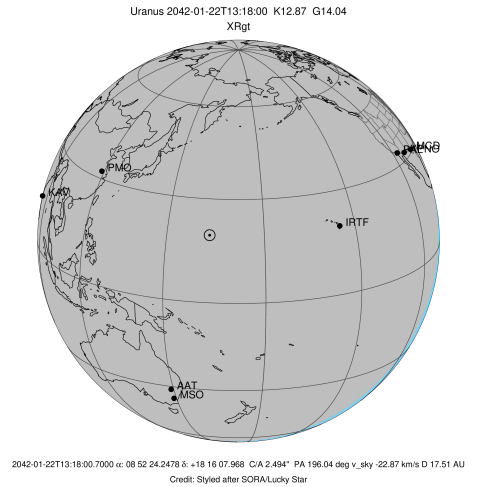


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2042-01-22T13:01:41.011		36.78	-44.88	51103.72	-29.13		
lambda	I	2042-01-22T13:02:18.015		36.92	-45.01	50026.71	-28.88		
delta	I	2042-01-22T13:03:18.624		37.13	-45.23	48300.35	-28.07		
gamma	I	2042-01-22T13:03:42.600		37.22	-45.31	47631.30	-27.73		
eta	I	2042-01-22T13:03:59.086		37.27	-45.37	47176.12	-27.49		
beta	I	2042-01-22T13:04:55.331		37.47	-45.57	45651.49	-26.59		
alpha	I	2042-01-22T13:05:30.030		37.60	-45.69	44740.91	-26.03		
4	I	2042-01-22T13:06:56.232		37.90	-45.99	42563.17	-24.35		
5	I	2042-01-22T13:07:10.362		37.95	-46.04	42199.16	-23.98		
6	I	2042-01-22T13:07:25.627		38.01	-46.10	41856.80	-23.75		

No planet occultations

6	E	2042-01-22T13:29:57.640		42.80	-50.85	41805.09	23.78		
5	E	2042-01-22T13:30:14.523		42.86	-50.91	42157.27	24.01		
4	E	2042-01-22T13:30:28.444		42.91	-50.96	42525.94	24.38		
alpha	E	2042-01-22T13:31:56.854		43.22	-51.27	44745.61	26.07		
beta	E	2042-01-22T13:32:31.323		43.34	-51.39	45643.20	26.63		
eta	E	2042-01-22T13:33:27.966		43.54	-51.58	47176.12	27.54		
gamma	E	2042-01-22T13:33:44.293		43.60	-51.64	47627.70	27.78		
delta	E	2042-01-22T13:34:08.355		43.68	-51.73	48300.35	28.13		
lambda	E	2042-01-22T13:35:08.852		43.90	-51.94	50026.71	28.93		
epsilon	E	2042-01-22T13:35:34.006		43.99	-52.02	50758.47	29.19		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2042-01-22T13:14:44.660
 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 : 659978079297940608
 2Mass ID (if available) : 08522426+1816081
 ICRS Star Coord at Epoch: 08h 52m 24.24780s +18:16:07.96752s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 12.871
 G magnitude : 14.041
 RP magnitude : 13.631
 BP magnitude : 14.294
 DUPflag : 1
 Distance (au) : 17.512
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.87
 Sun-Target sep (deg) : 171.58
 Sun-Moon sep (deg) : 174.85
 B (ring opening deg) : 36.68
 PA of pole (deg) : 95.62
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.810
 C/A sky separation (km) : 35684.3
 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

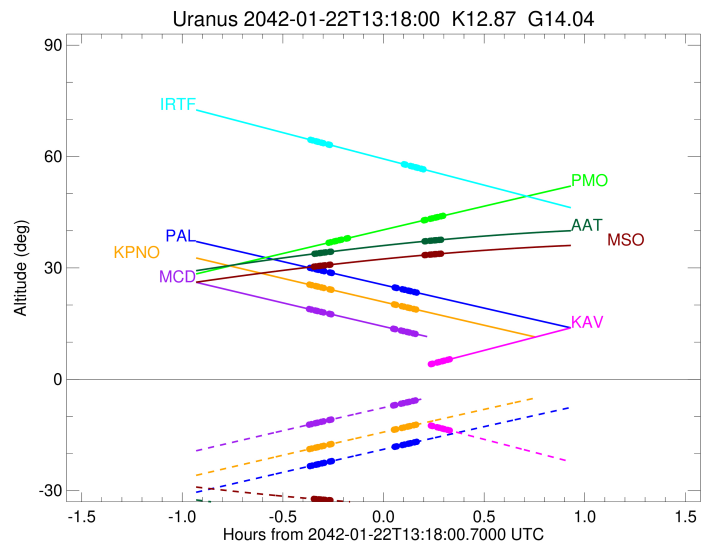
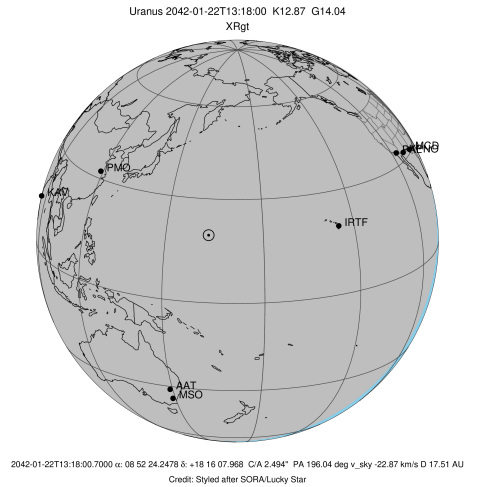


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2042-01-22T12:55:58.284		25.49	-18.80	51070.97	-26.74		
lambda	I	2042-01-22T12:56:37.437		25.35	-18.66	50026.71	-26.38		
delta	I	2042-01-22T12:57:44.193		25.12	-18.43	48300.35	-25.32		
gamma	I	2042-01-22T12:58:10.848		25.02	-18.34	47631.44	-24.87		
eta	I	2042-01-22T12:58:29.279		24.96	-18.28	47176.12	-24.54		
beta	I	2042-01-22T12:59:32.903		24.73	-18.06	45649.72	-23.32		
alpha	I	2042-01-22T13:00:12.460		24.59	-17.92	44743.55	-22.55		
4	I	2042-01-22T13:01:54.399		24.23	-17.57	42557.64	-20.18		
5	I	2042-01-22T13:02:12.073		24.17	-17.50	42190.22	-19.68		
6	I	2042-01-22T13:02:30.074		24.11	-17.44	41851.63	-19.29		

No planet occultations

6	E	2042-01-22T13:21:03.726		20.19	-13.61	41809.32	19.27		
5	E	2042-01-22T13:21:23.471		20.12	-13.54	42155.31	19.65		
4	E	2042-01-22T13:21:40.975		20.06	-13.48	42526.43	20.15		
alpha	E	2042-01-22T13:23:25.501		19.70	-13.12	44747.82	22.51		
beta	E	2042-01-22T13:24:04.965		19.56	-12.99	45642.30	23.28		
eta	E	2042-01-22T13:25:09.223		19.33	-12.77	47176.12	24.49		
gamma	E	2042-01-22T13:25:27.560		19.27	-12.71	47628.22	24.82		
delta	E	2042-01-22T13:25:54.397		19.17	-12.62	48300.35	25.27		
lambda	E	2042-01-22T13:27:01.292		18.94	-12.39	50026.71	26.33		
epsilon	E	2042-01-22T13:27:28.568		18.85	-12.29	50750.20	26.69		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2042-01-22T13:14:37.750
 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 : 659978079297940608
 2Mass ID (if available) : 08522426+1816081
 ICRS Star Coord at Epoch: 08h 52m 24.24780s +18:16:07.96752s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 12.871
 G magnitude : 14.041
 RP magnitude : 13.631
 BP magnitude : 14.294
 DUPflag : 1
 Distance (au) : 17.512
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.87
 Sun-Target sep (deg) : 171.58
 Sun-Moon sep (deg) : 174.81
 B (ring opening deg) : 36.68
 PA of pole (deg) : 95.62
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.822
 C/A sky separation (km) : 35836.8
 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_itrff93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

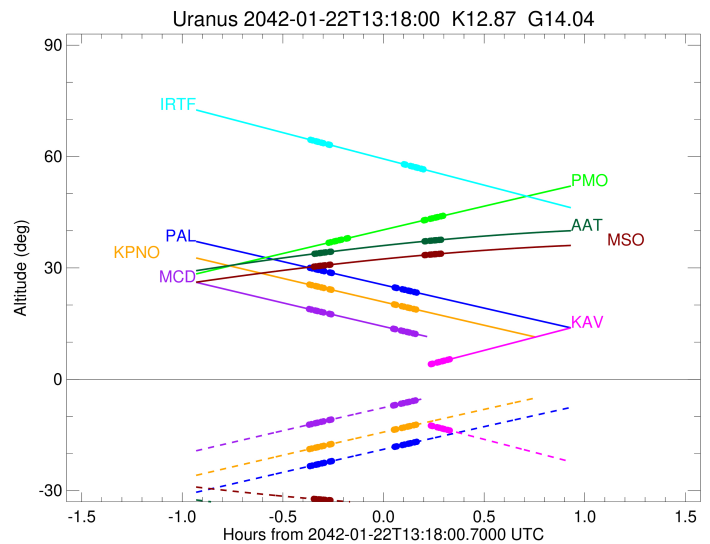
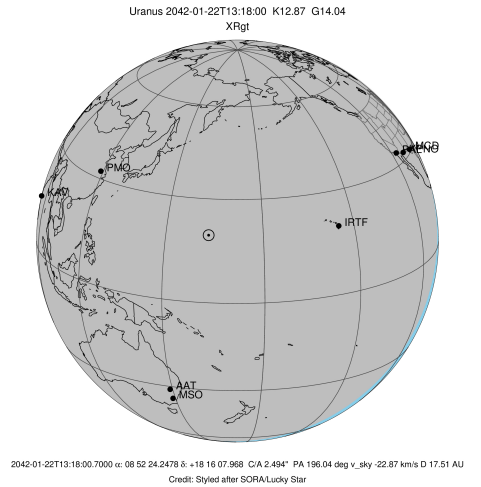


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2042-01-22T12:55:51.896		18.91	-12.22	51069.15	-26.57		
lambda	I	2042-01-22T12:56:31.244		18.77	-12.08	50026.71	-26.20		
delta	I	2042-01-22T12:57:38.486		18.53	-11.85	48300.35	-25.13		
gamma	I	2042-01-22T12:58:05.351		18.44	-11.76	47631.45	-24.67		
eta	I	2042-01-22T12:58:23.934		18.37	-11.69	47176.12	-24.34		
beta	I	2042-01-22T12:59:28.127		18.14	-11.47	45649.63	-23.10		
alpha	I	2042-01-22T13:00:08.063		18.00	-11.33	44743.69	-22.32		
4	I	2042-01-22T13:01:51.222		17.64	-10.98	42557.33	-19.91		
5	I	2042-01-22T13:02:09.171		17.57	-10.91	42189.73	-19.40		
6	I	2042-01-22T13:02:27.399		17.51	-10.85	41851.33	-19.01		

No planet occultations

6	E	2042-01-22T13:20:49.469		13.63	-7.08	41809.55	18.99		
5	E	2042-01-22T13:21:09.454		13.56	-7.01	42155.25	19.37		
4	E	2042-01-22T13:21:27.229		13.50	-6.95	42526.48	19.89		
alpha	E	2042-01-22T13:23:12.991		13.13	-6.59	44747.92	22.28		
beta	E	2042-01-22T13:23:52.837		12.99	-6.45	45642.26	23.06		
eta	E	2042-01-22T13:24:57.672		12.76	-6.23	47176.12	24.29		
gamma	E	2042-01-22T13:25:16.162		12.70	-6.17	47628.24	24.62		
delta	E	2042-01-22T13:25:43.211		12.60	-6.08	48300.35	25.08		
lambda	E	2042-01-22T13:26:50.599		12.37	-5.85	50026.71	26.14		
epsilon	E	2042-01-22T13:27:18.049		12.27	-5.76	50749.90	26.51		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2042-01-22T13:15:42.650
 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 : 659978079297940608
 2Mass ID (if available) : 08522426+1816081
 ICRS Star Coord at Epoch: 08h 52m 24.24780s +18:16:07.96752s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 12.871
 G magnitude : 14.041
 RP magnitude : 13.631
 BP magnitude : 14.294
 DUPflag : 1
 Distance (au) : 17.512
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.87
 Sun-Target sep (deg) : 171.58
 Sun-Moon sep (deg) : 175.37
 B (ring opening deg) : 36.68
 PA of pole (deg) : 95.62
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.589
 C/A sky separation (km) : 32885.6
 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_itrff93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

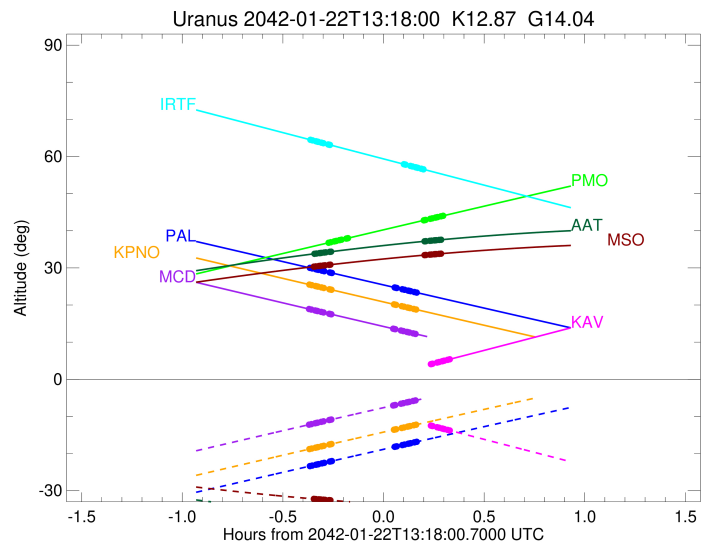
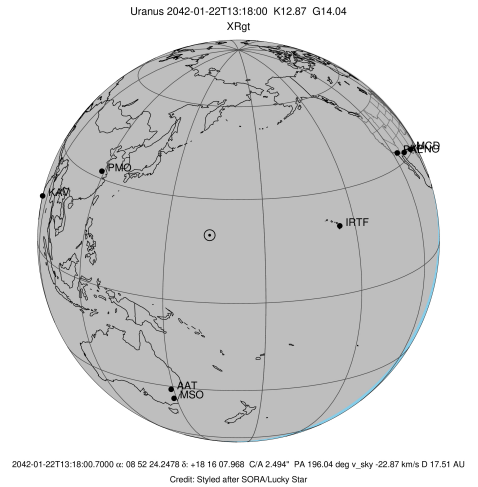


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2042-01-22T12:56:15.419		64.50	-56.43	51101.65	-29.06		
lambda	I	2042-01-22T12:56:52.456		64.35	-56.28	50026.71	-28.79		
delta	I	2042-01-22T12:57:53.300		64.11	-56.05	48300.35	-27.95		
gamma	I	2042-01-22T12:58:17.394		64.02	-55.95	47631.32	-27.59		
eta	I	2042-01-22T12:58:33.969		63.95	-55.89	47176.12	-27.33		
beta	I	2042-01-22T12:59:30.590		63.73	-55.67	45651.36	-26.39		
alpha	I	2042-01-22T13:00:05.553		63.59	-55.53	44741.12	-25.80		
4	I	2042-01-22T13:01:32.702		63.25	-55.19	42562.73	-24.04		
5	I	2042-01-22T13:01:47.058		63.19	-55.13	42198.43	-23.65		
6	I	2042-01-22T13:02:02.491		63.13	-55.07	41856.39	-23.40		

No planet occultations

6	E	2042-01-22T13:24:01.209		57.95	-49.94	41805.68	23.38		
5	E	2042-01-22T13:24:18.248		57.88	-49.87	42156.89	23.63		
4	E	2042-01-22T13:24:32.464		57.83	-49.82	42525.96	24.01		
alpha	E	2042-01-22T13:26:02.058		57.47	-49.47	44745.99	25.78		
beta	E	2042-01-22T13:26:36.874		57.34	-49.33	45643.04	26.36		
eta	E	2042-01-22T13:27:34.063		57.11	-49.11	47176.12	27.30		
gamma	E	2042-01-22T13:27:50.532		57.05	-49.05	47627.79	27.55		
delta	E	2042-01-22T13:28:14.785		56.95	-48.95	48300.35	27.91		
lambda	E	2042-01-22T13:29:15.715		56.71	-48.71	50026.71	28.74		
epsilon	E	2042-01-22T13:29:40.973		56.61	-48.62	50756.83	29.02		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2042-01-22T13:22:47.210
 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 : 659978079297940608
 2Mass ID (if available) : 08522426+1816081
 ICRS Star Coord at Epoch: 08h 52m 24.24780s +18:16:07.96752s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 12.871
 G magnitude : 14.041
 RP magnitude : 13.631
 BP magnitude : 14.294
 DUPflag : 1
 Distance (au) : 17.512
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.87
 Sun-Target sep (deg) : 171.58
 Sun-Moon sep (deg) : 175.82
 B (ring opening deg) : 36.68
 PA of pole (deg) : 95.62
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.453
 C/A sky separation (km) : 31151.7
 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_itrff93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

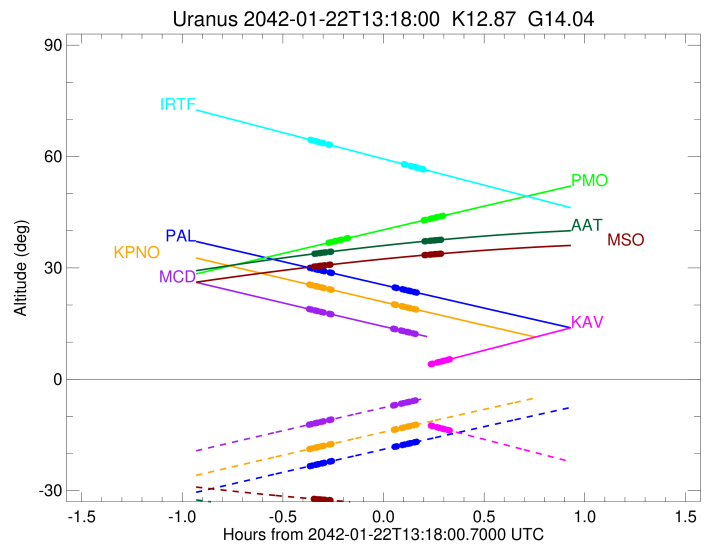
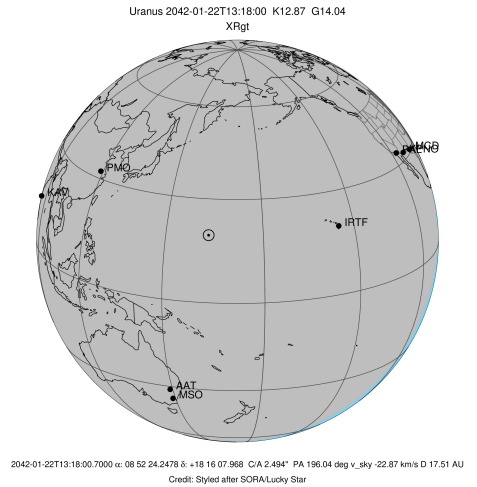


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2042-01-22T13:02:20.253	-2.85x	-5.58	51115.76	-29.59			
lambda	I	2042-01-22T13:02:57.075	-2.71x	-5.72	50026.71	-29.37			
delta	I	2042-01-22T13:03:56.555	-2.48x	-5.95	48300.35	-28.66			
gamma	I	2042-01-22T13:04:20.021	-2.39x	-6.04	47631.24	-28.36			
eta	I	2042-01-22T13:04:36.129	-2.33x	-6.10	47176.12	-28.15			
beta	I	2042-01-22T13:05:30.907	-2.12x	-6.31	45652.15	-27.36			
alpha	I	2042-01-22T13:06:04.656	-1.98x	-6.44	44739.91	-26.87			
4	I	2042-01-22T13:07:27.632	-1.66x	-6.76	42565.12	-25.41			
5	I	2042-01-22T13:07:40.997	-1.61x	-6.81	42202.39	-25.08			
6	I	2042-01-22T13:07:55.787	-1.56x	-6.87	41858.49	-24.89			

No planet occultations

6	E	2042-01-22T13:32:04.832	4.06x	-12.47	41803.71	24.95			
5	E	2042-01-22T13:32:21.229	4.12x	-12.53	42158.37	25.14			
4	E	2042-01-22T13:32:34.367	4.17x	-12.59	42525.96	25.46			
alpha	E	2042-01-22T13:33:59.474	4.50x	-12.92	44744.68	26.94			
beta	E	2042-01-22T13:34:32.961	4.63x	-13.05	45643.60	27.43			
eta	E	2042-01-22T13:35:28.080	4.85x	-13.26	47176.12	28.22			
gamma	E	2042-01-22T13:35:44.012	4.91x	-13.32	47627.49	28.44			
delta	E	2042-01-22T13:36:07.545	5.00	-13.41	48300.35	28.74			
lambda	E	2042-01-22T13:37:06.852	5.23	-13.64	50026.71	29.46			
epsilon	E	2042-01-22T13:37:31.713	5.33	-13.74	50762.63	29.68			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2042-01-22T13:18:29.990
 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 : 659978079297940608
 2Mass ID (if available) : 08522426+1816081
 ICRS Star Coord at Epoch: 08h 52m 24.24780s +18:16:07.96752s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 12.871
 G magnitude : 14.041
 RP magnitude : 13.631
 BP magnitude : 14.294
 DUPflag : 1
 Distance (au) : 17.512
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.87
 Sun-Target sep (deg) : 171.58
 Sun-Moon sep (deg) : 176.48
 B (ring opening deg) : 36.68
 PA of pole (deg) : 95.62
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.083
 C/A sky separation (km) : 26461.7
 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_itrff93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

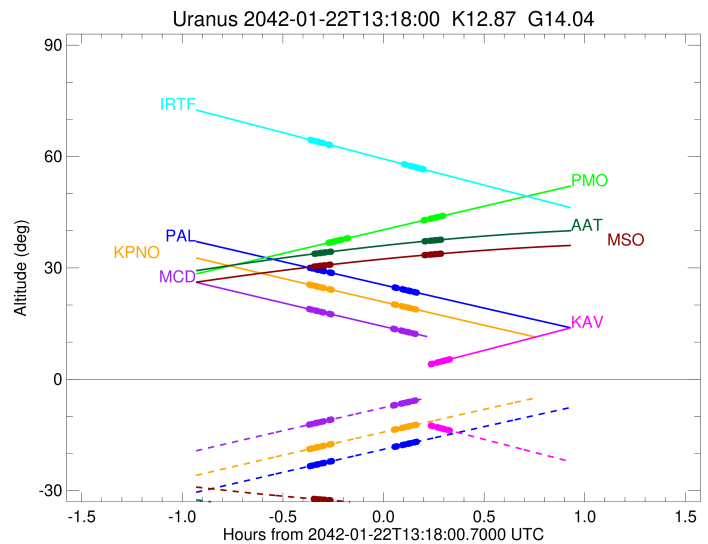
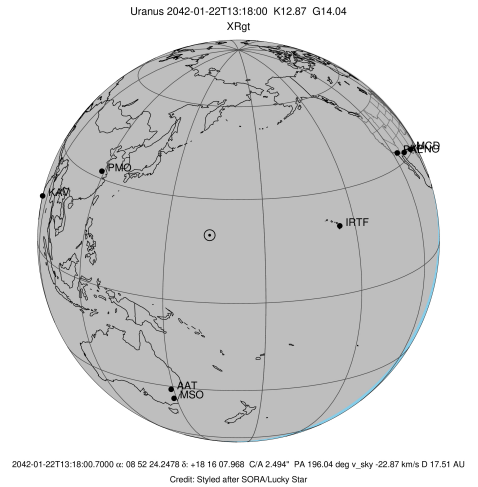


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2042-01-22T12:57:25.874		33.81	-35.99	51164.18	-32.63		
lambda	I	2042-01-22T12:58:00.710		33.87	-36.04	50026.71	-32.51		
delta	I	2042-01-22T12:58:54.201		33.98	-36.11	48300.35	-32.03		
gamma	I	2042-01-22T12:59:15.163		34.02	-36.14	47630.96	-31.83		
eta	I	2042-01-22T12:59:29.484		34.04	-36.16	47176.12	-31.69		
beta	I	2042-01-22T13:00:17.772		34.13	-36.23	45654.77	-31.17		
alpha	I	2042-01-22T13:00:47.557		34.19	-36.27	44735.86	-30.86		
4	I	2042-01-22T13:01:58.626		34.32	-36.36	42572.32	-29.91		
5	I	2042-01-22T13:02:09.423		34.35	-36.38	42214.64	-29.68		
6	I	2042-01-22T13:02:22.609		34.37	-36.39	41864.24	-29.60		

No planet occultations

6	E	2042-01-22T13:30:10.446		37.16	-38.19	41800.09	29.63		
5	E	2042-01-22T13:30:25.010		37.18	-38.20	42162.82	29.71		
4	E	2042-01-22T13:30:35.699		37.19	-38.21	42526.70	29.94		
alpha	E	2042-01-22T13:31:48.929		37.30	-38.27	44741.52	30.88		
beta	E	2042-01-22T13:32:18.450		37.34	-38.29	45645.03	31.19		
eta	E	2042-01-22T13:33:07.154		37.41	-38.33	47176.12	31.72		
gamma	E	2042-01-22T13:33:21.334		37.43	-38.34	47626.86	31.86		
delta	E	2042-01-22T13:33:42.406		37.46	-38.36	48300.35	32.06		
lambda	E	2042-01-22T13:34:35.847		37.53	-38.40	50026.71	32.54		
epsilon	E	2042-01-22T13:34:58.878		37.57	-38.42	50778.34	32.67		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2042-01-22T13:18:22.940
 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 : 659978079297940608
 2Mass ID (if available) : 08522426+1816081
 ICRS Star Coord at Epoch: 08h 52m 24.24780s +18:16:07.96752s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 12.871
 G magnitude : 14.041
 RP magnitude : 13.631
 BP magnitude : 14.294
 DUPflag : 1
 Distance (au) : 17.512
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.87
 Sun-Target sep (deg) : 171.58
 Sun-Moon sep (deg) : 176.50
 B (ring opening deg) : 36.68
 PA of pole (deg) : 95.62
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.064
 C/A sky separation (km) : 26213.4
 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_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	2042-01-22T12:57:15.025		30.34	-32.23	51166.49	-32.73		
lambda	I	2042-01-22T12:57:49.831		30.41	-32.27	50026.71	-32.61		
delta	I	2042-01-22T12:58:43.151		30.50	-32.34	48300.35	-32.14		
gamma	I	2042-01-22T12:59:04.042		30.54	-32.37	47630.94	-31.95		
eta	I	2042-01-22T12:59:18.310		30.56	-32.39	47176.12	-31.81		
beta	I	2042-01-22T13:00:06.406		30.65	-32.45	45654.89	-31.29		
alpha	I	2042-01-22T13:00:36.077		30.70	-32.48	44735.66	-31.00		
4	I	2042-01-22T13:01:46.786		30.82	-32.57	42572.67	-30.07		
5	I	2042-01-22T13:01:57.500		30.84	-32.58	42215.23	-29.85		
6	I	2042-01-22T13:02:10.647		30.86	-32.60	41864.49	-29.77		

No planet occultations

6	E	2042-01-22T13:30:10.444		33.44	-34.25	41799.93	29.79		
5	E	2042-01-22T13:30:24.963		33.46	-34.26	42163.09	29.87		
4	E	2042-01-22T13:30:35.571		33.47	-34.27	42526.77	30.10		
alpha	E	2042-01-22T13:31:48.440		33.57	-34.33	44741.34	31.02		
beta	E	2042-01-22T13:32:17.845		33.61	-34.35	45645.11	31.32		
eta	E	2042-01-22T13:33:06.358		33.67	-34.38	47176.12	31.83		
gamma	E	2042-01-22T13:33:20.486		33.69	-34.39	47626.82	31.97		
delta	E	2042-01-22T13:33:41.488		33.72	-34.41	48300.35	32.17		
lambda	E	2042-01-22T13:34:34.760		33.79	-34.45	50026.71	32.64		
epsilon	E	2042-01-22T13:34:57.754		33.81	-34.46	50779.31	32.76		