

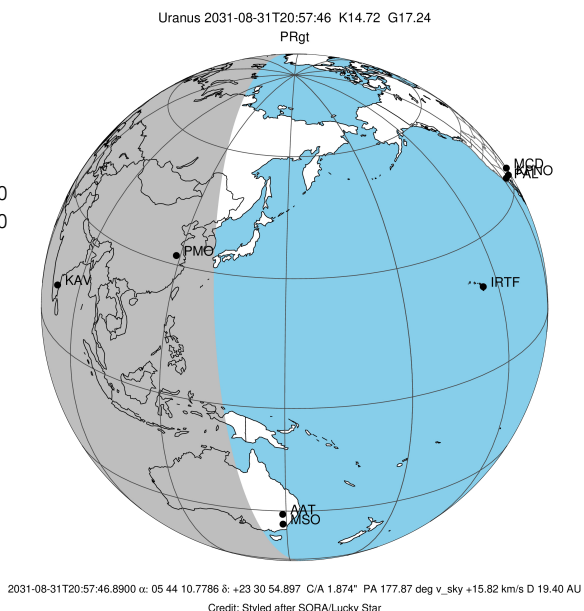
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-08-31T20:57:46.890
 Event type : PRgt
 : Uranus occs: not geocentric or topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3427623698822450944
 2Mass ID (if available) : 05441076+2330549

ICRS Star Coord at Epoch: 05h 44m 10.77857s +23:30:54.89702s

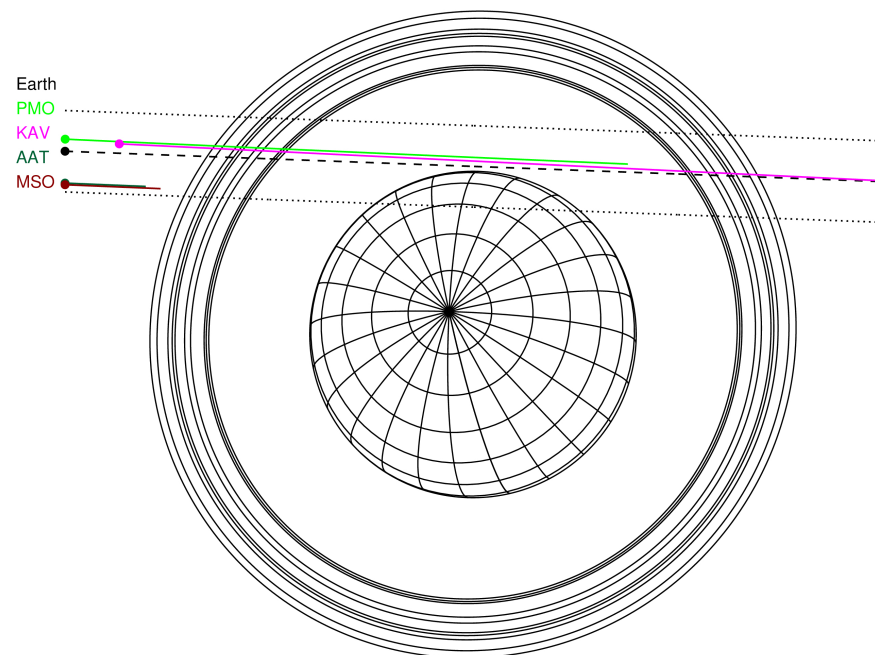
RUWE (>1.4 is poor) : 1.07
 K magnitude : 14.723
 G magnitude : 17.238
 RP magnitude : 16.450
 BP magnitude : 17.899
 DUPflag : 0
 Distance (au) : 19.404
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 15.82
 Sun-Target sep (deg) : 71.45
 Sun-Moon sep (deg) : 115.58
 B (ring opening deg) : 78.28
 PA of pole (deg) : 46.19

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

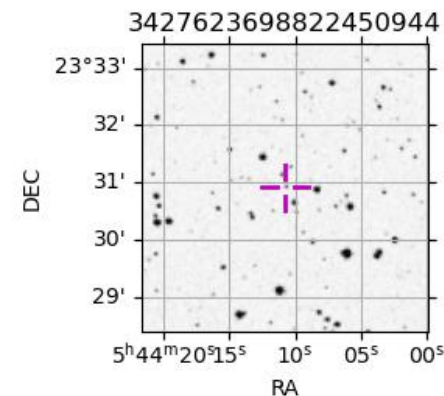


Uranus 2031-08-31T20:57:46 K14.72 G17.24 PRgt

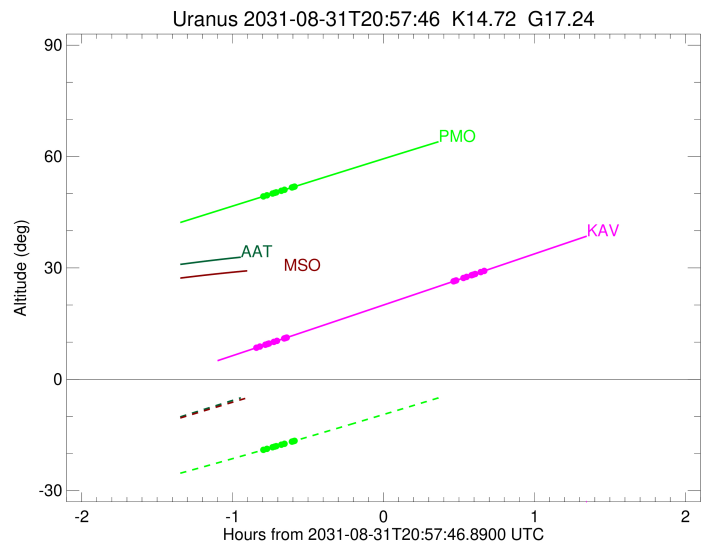
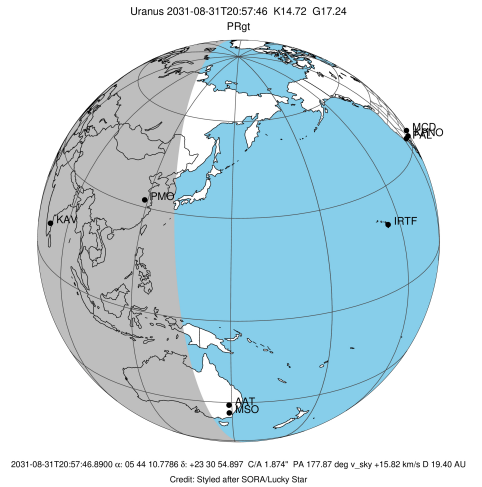


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++			AUG 31 20:09 - AUG 31 20:22	PnnRin
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	+++++	+++++		AUG 31 20:06 - AUG 31 21:37	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 : 2031-08-31T20:54:48.940
 Event type : PRgt
 : Uranus occs: not geocentric or topocentric
 : 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 : 3427623698822450944
 2Mass ID (if available) : 05441076+2330549
 ICRS Star Coord at Epoch: 05h 44m 10.77857s +23:30:54.89702s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 14.723
 G magnitude : 17.238
 RP magnitude : 16.450
 BP magnitude : 17.899
 DUPflag : 0
 Distance (au) : 19.404
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 15.82
 Sun-Target sep (deg) : 71.45
 Sun-Moon sep (deg) : 116.57
 B (ring opening deg) : 78.28
 PA of pole (deg) : 46.19
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.969
 C/A sky separation (km) : 27711.6
 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



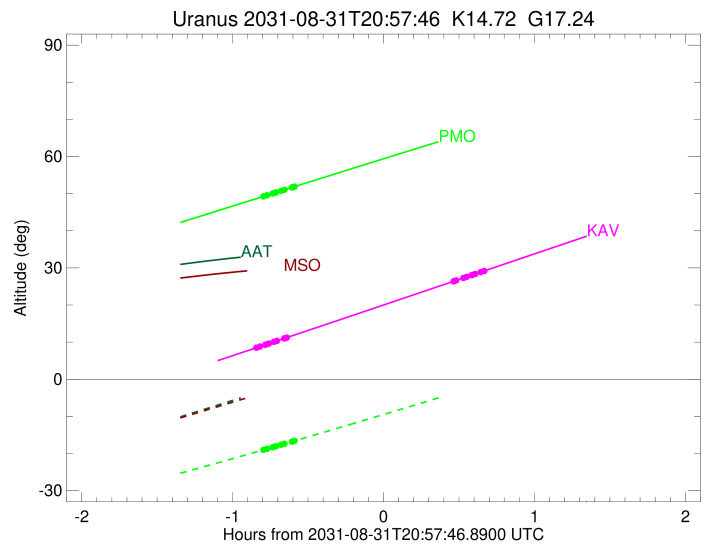
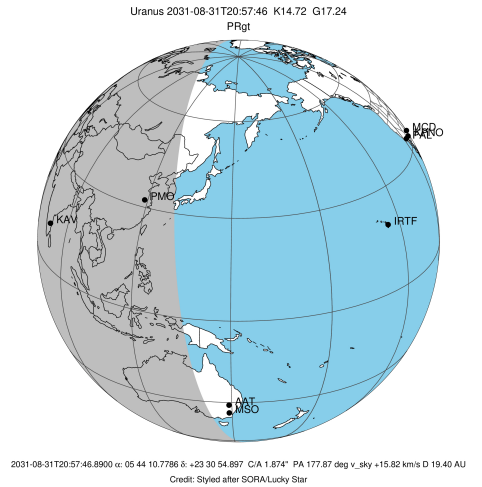
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2031-08-31T20:09:34.253	49.16	-19.11	51528.11	-13.20		
lambda	I	2031-08-31T20:11:28.490	49.56	-18.74	50026.71	-13.06		
delta	I	2031-08-31T20:13:41.833	50.04	-18.31	48300.35	-12.83		
gamma	I	2031-08-31T20:14:34.684	50.22	-18.13	47624.52	-12.74		
eta	I	2031-08-31T20:15:09.970	50.35	-18.02	47176.12	-12.67		
beta	I	2031-08-31T20:17:09.022	50.77	-17.63	45681.16	-12.44		
alpha	I	2031-08-31T20:18:25.779	51.04	-17.38	44734.56	-12.29		
4	I	2031-08-31T20:21:21.237	51.67	-16.80	42611.36	-11.86		
5	I	2031-08-31T20:21:53.894	51.78	-16.70	42229.98	-11.76		
6	I	2031-08-31T20:22:31.340	51.91	-16.57	41796.15	-11.68		

No planet occultations

6	E	2031-08-31T21:28:30.187	65.82	-3.18x	41830.78	11.62		
5	E	2031-08-31T21:28:58.215	65.92	-3.08x	42156.16	11.70		
4	E	2031-08-31T21:29:31.178	66.03	-2.96x	42544.82	11.79		
alpha	E	2031-08-31T21:32:34.509	66.66	-2.33x	44744.14	12.21		
beta	E	2031-08-31T21:33:48.883	66.91	-2.07x	45657.72	12.36		
eta	E	2031-08-31T21:35:50.605	67.33	-1.65x	47176.12	12.59		
gamma	E	2031-08-31T21:36:25.935	67.45	-1.53x	47622.04	12.65		
delta	E	2031-08-31T21:37:19.349	67.63	-1.34x	48300.35	12.74		
lambda	E	2031-08-31T21:39:33.653	68.09	-0.87x	50026.71	12.96		
epsilon	E	2031-08-31T21:40:37.897	68.31	-0.65x	50862.37	13.10		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-08-31T20:51:47.880
 Event type : PRgt
 : Uranus occs: not geocentric or topocentric
 : 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 : 3427623698822450944
 2Mass ID (if available) : 05441076+2330549
 ICRS Star Coord at Epoch: 05h 44m 10.77857s +23:30:54.89702s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 14.723
 G magnitude : 17.238
 RP magnitude : 16.450
 BP magnitude : 17.899
 DUPflag : 0
 Distance (au) : 19.404
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 15.82
 Sun-Target sep (deg) : 71.45
 Sun-Moon sep (deg) : 116.30
 B (ring opening deg) : 78.28
 PA of pole (deg) : 46.19
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.928
 C/A sky separation (km) : 27131.3
 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	2031-08-31T20:06:47.906		8.39	-60.79	51529.45	-13.53		
lambda	I	2031-08-31T20:08:39.473		8.81	-60.47	50026.71	-13.38		
delta	I	2031-08-31T20:10:49.480		9.30	-60.08	48300.35	-13.17		
gamma	I	2031-08-31T20:11:40.969		9.50	-59.93	47624.57	-13.08		
eta	I	2031-08-31T20:12:15.341		9.63	-59.83	47176.12	-13.02		
beta	I	2031-08-31T20:14:11.217		10.06	-59.48	45681.14	-12.79		
alpha	I	2031-08-31T20:15:25.881		10.35	-59.26	44734.19	-12.64		
4	I	2031-08-31T20:18:16.196		10.99	-58.74	42611.65	-12.23		
5	I	2031-08-31T20:18:47.777		11.11	-58.64	42231.11	-12.13		
6	I	2031-08-31T20:19:24.159		11.25	-58.53	41796.31	-12.06		

No planet occultations

6	E	2031-08-31T21:25:36.377		26.38	-44.92	41831.80	11.95		
5	E	2031-08-31T21:26:03.614		26.48	-44.82	42156.53	12.02		
4	E	2031-08-31T21:26:35.574		26.61	-44.70	42543.96	12.11		
alpha	E	2031-08-31T21:29:34.336		27.29	-44.05	44743.64	12.51		
beta	E	2031-08-31T21:30:46.973		27.57	-43.78	45657.29	12.65		
eta	E	2031-08-31T21:32:46.008		28.02	-43.34	47176.12	12.87		
gamma	E	2031-08-31T21:33:20.583		28.16	-43.21	47622.11	12.93		
delta	E	2031-08-31T21:34:12.863		28.36	-43.02	48300.35	13.02		
lambda	E	2031-08-31T21:36:24.442		28.86	-42.53	50026.71	13.22		
epsilon	E	2031-08-31T21:37:27.027		29.10	-42.30	50856.94	13.36		