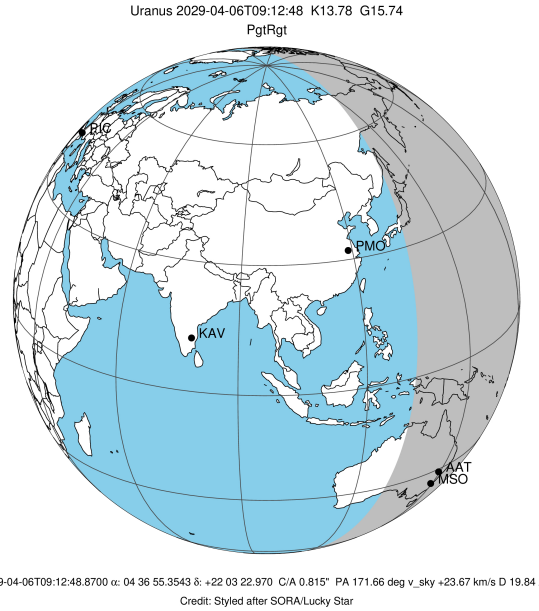
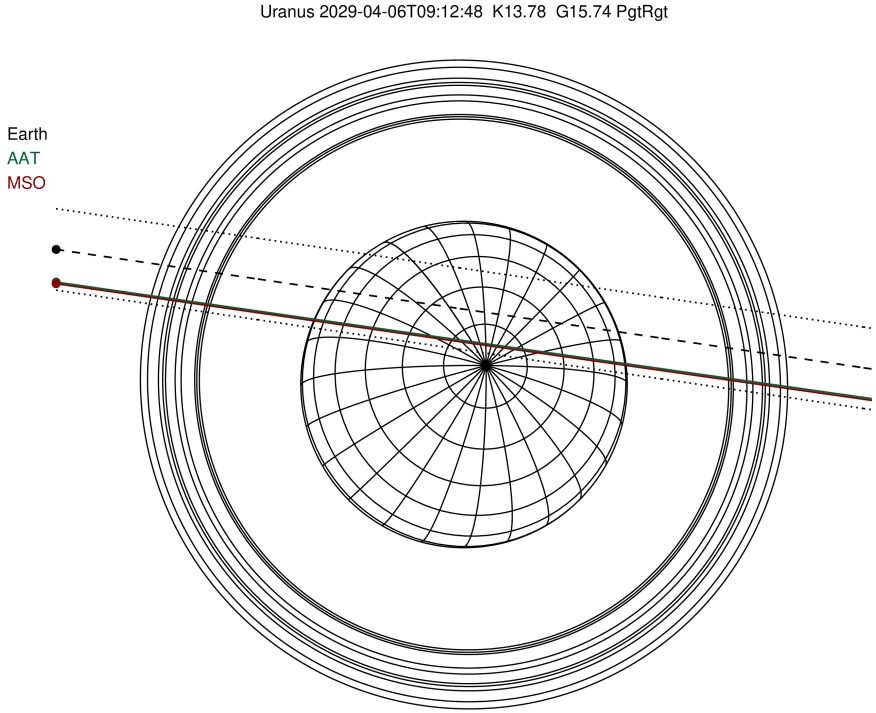
Stellar occultation prediction by rfrench@wellesley.edu Sat Jun 24 23:39:46 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2029-04-06T09:12:48.870
Event type : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Gaia source ID : 1449159117149233 92
2Mass ID (if available) : 04365534+2203231

ICRS Star Coord at Epoch: 04h 36m 55.35430s +22:03:22.97018s
RUWE (>1.4 is poor) : 1.01
K magnitude : 13.779
G magnitude : 15.743
RP magnitude : 15.073
BP magnitude : 16.238
DUPflag : 0
Distance (au) : 19.837
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : 23.67
Sun-Target sep (deg) : 54.36
Sun-Moon sep (deg) : 137.76
B (ring opening deg) : 79.71
PA of pole (deg) : -49.42

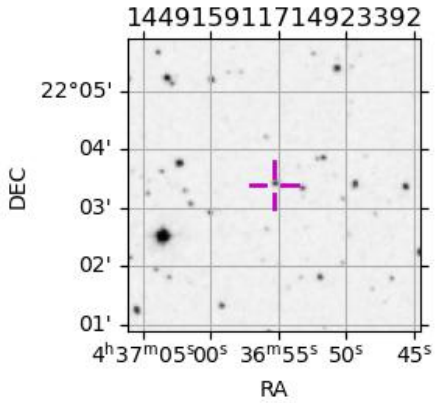
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon





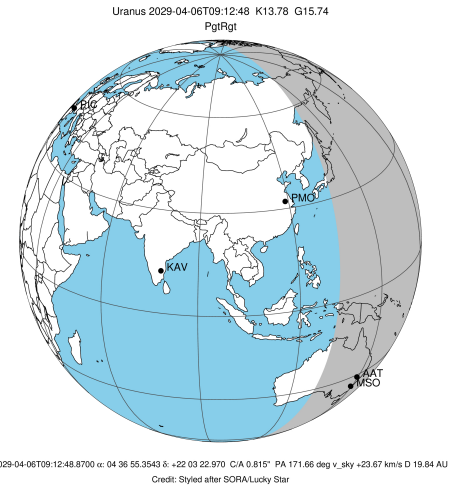
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

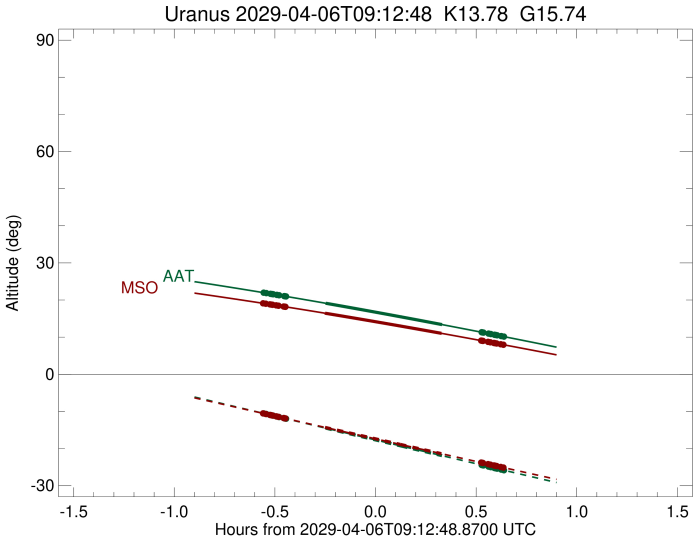
Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4					PnnRnn
MCD	McDonald Obs. 2.7m	30.7	256.0					PnnRnn
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
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	++++++++++	+ +	++++++++++	APR 06 08:39 - APR 06 09:51	PieRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	++++++++++	+ +	++++++++++	APR 06 08:39 - APR 06 09:51	PieRie



Uranus_2029-04-06T09_12_48.8700_AAT.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:36:53 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2029-04-06T09:15:24.870
Event type : PgtRgt
: Uranus occs: geocentric, topocentric
: 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 : 144915911714923392
2Mass ID (if available) : 04365534+2203231
ICRS Star Coord at Epoch: 04h 36m 55.35430s +22:03:22.97018s
RUWE (>1.4 is poor) : 1.01
K magnitude : 13.779
G magnitude : 15.743
RP magnitude : 15.073
BP magnitude : 16.238
DUPflag : 0
Distance (au) : 19.837
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : 23.67
Sun-Target sep (deg) : 54.36
Sun-Moon sep (deg) : 137.52
B (ring opening deg) : 79.71
PA of pole (deg) : -49.42
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.473
C/A sky separation (km) : 6805.4
NAIF SPICE kernels : RAJobs_U111+rgf15.spk
URKALLv1.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



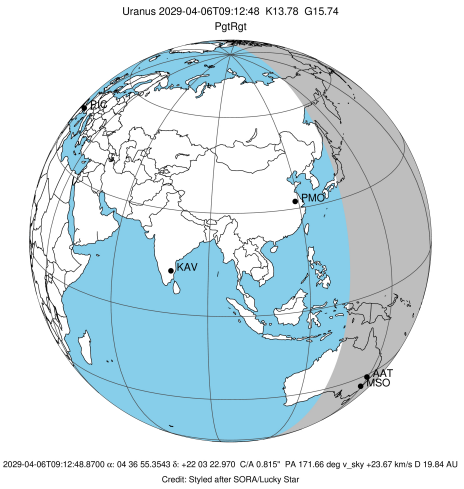


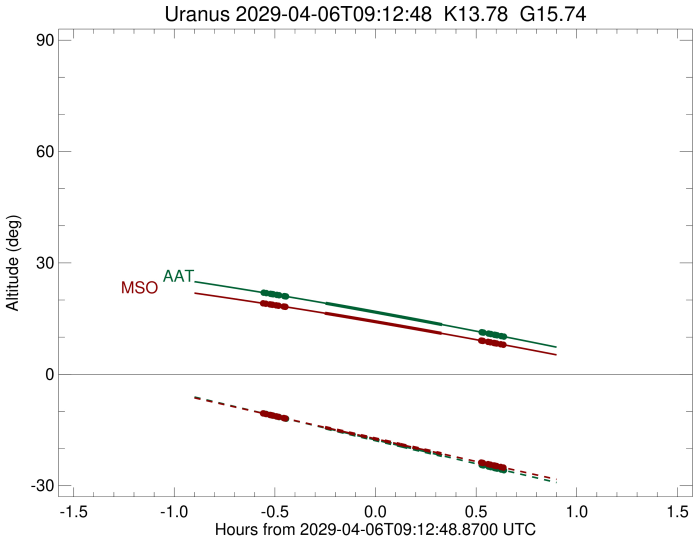
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-04-06T08:39:38.299		21.95	-10.58	50934.92	-23.33		
lambda	I	2029-04-06T08:40:17.272		21.86	-10.72	50026.71	-23.30		
delta	I	2029-04-06T08:41:31.388		21.67	-10.98	48300.35	-23.28		
gamma	I	2029-04-06T08:42:00.123		21.60	-11.09	47631.37	-23.28		
eta	I	2029-04-06T08:42:19.681		21.55	-11.16	47176.12	-23.27		
beta	I	2029-04-06T08:43:23.952		21.39	-11.39	45680.38	-23.26		
alpha	I	2029-04-06T08:44:06.586		21.28	-11.54	44689.17	-23.25		
4	I	2029-04-06T08:45:38.965		21.04	-11.87	42545.38	-23.22		
5	I	2029-04-06T08:45:54.127		21.01	-11.92	42190.30	-23.22		
6	I	2029-04-06T08:46:10.665		20.96	-11.98	41808.86	-23.21		
Uranus	I	2029-04-06T08:57:57.056		19.13	-14.50	25448.92		-4.45	-4.66
Uranus	E	2029-04-06T09:32:38.469		13.38	-21.92	25156.24		8.62	9.02
6	E	2029-04-06T09:44:28.885		11.32	-24.44	41874.30	23.31		
5	E	2029-04-06T09:44:47.395		11.26	-24.51	42298.59	23.31		
4	E	2029-04-06T09:45:00.377		11.23	-24.55	42607.55	23.32		
alpha	E	2029-04-06T09:46:32.008		10.96	-24.88	44741.33	23.35		
beta	E	2029-04-06T09:47:10.669		10.84	-25.01	45644.48	23.36		
eta	E	2029-04-06T09:48:16.182		10.65	-25.25	47176.12	23.38		
gamma	E	2029-04-06T09:48:35.242		10.59	-25.31	47621.80	23.39		
delta	E	2029-04-06T09:49:04.253		10.50	-25.42	48300.35	23.39		
lambda	E	2029-04-06T09:50:18.018		10.29	-25.68	50026.71	23.41		
epsilon	E	2029-04-06T09:51:18.550		10.11	-25.89	51444.36	23.44		

Uranus_2029-04-06T09_12_48.8700_MSO.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:41:12 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2029-04-06T09:15:14.710
Event type : PgtRgt
: Uranus occs: geocentric, topocentric
: 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 : 144915911714923392
2Mass ID (if available) : 04365534+2203231
ICRS Star Coord at Epoch: 04h 36m 55.35430s +22:03:22.97018s
RUWE (>1.4 is poor) : 1.01
K magnitude : 13.779
G magnitude : 15.743
RP magnitude : 15.073
BP magnitude : 16.238
DUPflag : 0
Distance (au) : 19.837
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : 23.67
Sun-Target sep (deg) : 54.36
Sun-Moon sep (deg) : 137.52
B (ring opening deg) : 79.71
PA of pole (deg) : -49.42
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.455
C/A sky separation (km) : 6543.0
NAIF SPICE kernels : RAJobs_U111+rgf15.spk
URKALLv1.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	2029-04-06T08:39:27.972	19.09	-10.57	50933.18	-23.36			
lambda	I	2029-04-06T08:40:06.821	19.00	-10.70	50026.71	-23.33			
delta	I	2029-04-06T08:41:20.841	18.83	-10.95	48300.35	-23.32			
gamma	I	2029-04-06T08:41:49.538	18.76	-11.05	47631.36	-23.31			
eta	I	2029-04-06T08:42:09.069	18.71	-11.12	47176.12	-23.31			
beta	I	2029-04-06T08:43:13.253	18.56	-11.34	45680.35	-23.29			
alpha	I	2029-04-06T08:43:55.820	18.46	-11.48	44689.27	-23.28			
4	I	2029-04-06T08:45:28.076	18.24	-11.80	42545.16	-23.26			
5	I	2029-04-06T08:45:43.220	18.21	-11.85	42189.88	-23.26			
6	I	2029-04-06T08:45:59.727	18.17	-11.90	41808.66	-23.25			
Uranus	I	2029-04-06T08:57:44.565	16.45	-14.31	25444.13			-4.55	-4.76
Uranus	E	2029-04-06T09:32:31.187	11.02	-21.40	25161.92			8.55	8.95
6	E	2029-04-06T09:44:20.002	9.07	-23.79	41874.16	23.34			
5	E	2029-04-06T09:44:38.474	9.02	-23.86	42298.27	23.35			
4	E	2029-04-06T09:44:51.447	8.98	-23.90	42607.37	23.35			
alpha	E	2029-04-06T09:46:22.969	8.73	-24.21	44741.48	23.38			
beta	E	2029-04-06T09:47:01.571	8.62	-24.34	45644.41	23.39			
eta	E	2029-04-06T09:48:07.008	8.43	-24.56	47176.12	23.41			
gamma	E	2029-04-06T09:48:26.046	8.38	-24.62	47621.79	23.41			
delta	E	2029-04-06T09:48:55.023	8.30	-24.72	48300.35	23.42			
lambda	E	2029-04-06T09:50:08.707	8.09	-24.97	50026.71	23.44			
epsilon	E	2029-04-06T09:51:09.110	7.92	-25.17	51442.85	23.47			