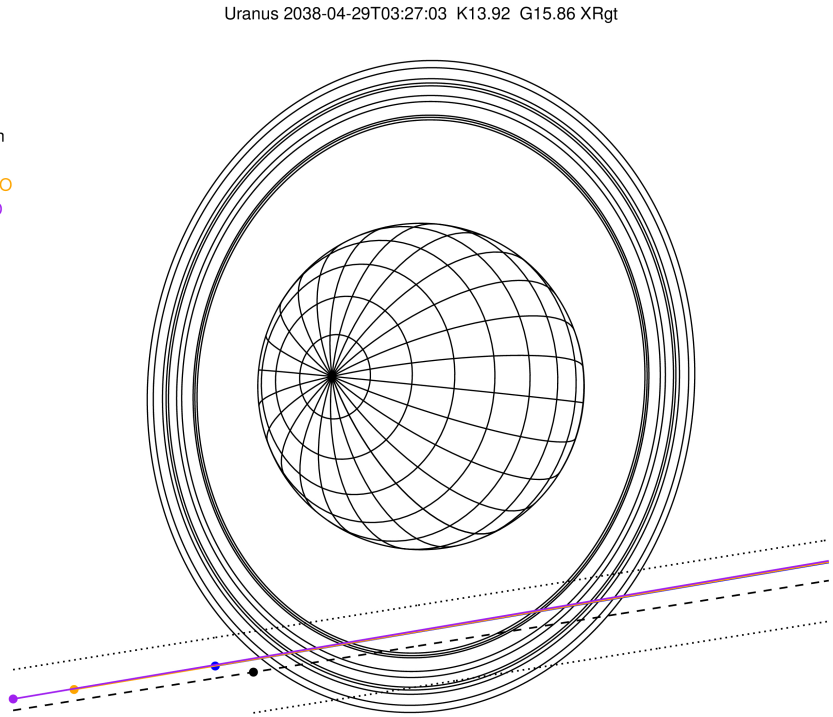
Stellar occultation prediction by rfrench@wellesley.edu Sun Jun 25 02:12:39 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2038-04-29T03:27:03.720
Event type : XRgt
: No Uranus occs
: Ring occs: geocentric, topocentric
Gaia source ID : 866091154652377600
2Mass ID (if available) : 07265291+2225118

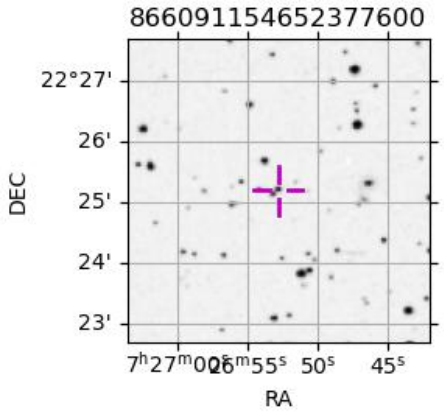
ICRS Star Coord at Epoch: 07h 26m 52.91608s +22:25:11.65770s
RUWE (>1.4 is poor) : 1.03
K magnitude : 13.921
G magnitude : 15.865
RP magnitude : 15.226
BP magnitude : 16.306
DUPflag : 0
Distance (au) : 18.980
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : 15.87
Sun-Target sep (deg) : 71.60
Sun-Moon sep (deg) : 128.81
B (ring opening deg) : 56.71
PA of pole (deg) : 83.55

#	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



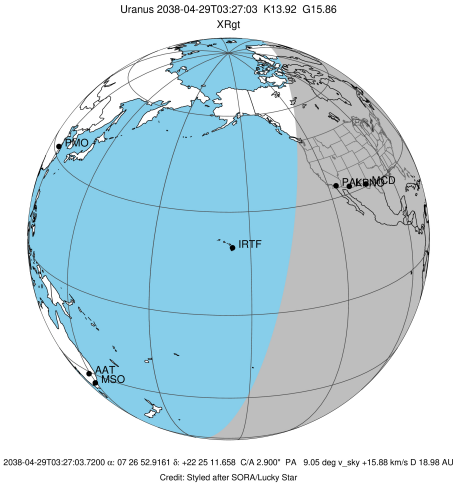
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

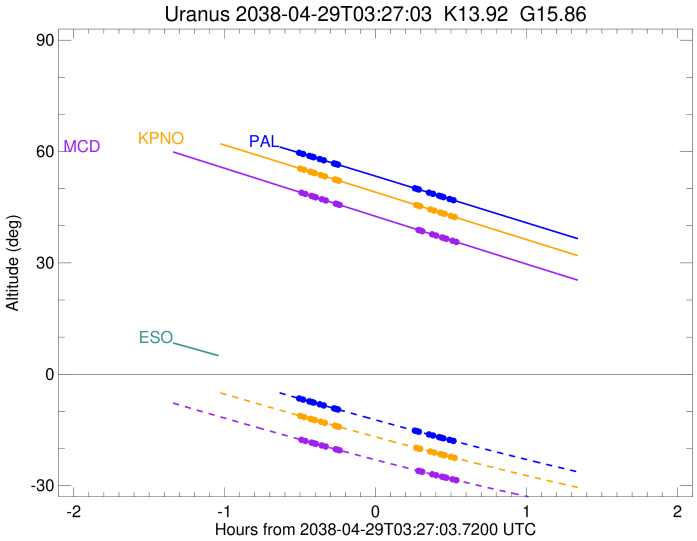
Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1	++++++++++		++++++++++	APR 29 02:56 - APR 29 03:58	PnnRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	++++++++++		++++++++++	APR 29 02:56 - APR 29 03:58	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	++++++++++		++++++++++	APR 29 02:57 - APR 29 03:59	PnnRie
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					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



Uranus_2038-04-29T03_27_03.7200_PAL.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:19:01 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2038-04-29T03:30:44.850
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 : 866091154652377600
2Mass ID (if available) : 07265291+2225118
ICRS Star Coord at Epoch: 07h 26m 52.91608s +22:25:11.65770s
RUWE (>1.4 is poor) : 1.03
K magnitude : 13.921
G magnitude : 15.865
RP magnitude : 15.226
BP magnitude : 16.306
DUPflag : 0
Distance (au) : 18.980
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : 15.87
Sun-Target sep (deg) : 71.60
Sun-Moon sep (deg) : 129.08
B (ring opening deg) : 56.71
PA of pole (deg) : 83.55
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.748
C/A sky separation (km) : 37827.5
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	2038-04-29T02:56:12.345		59.75	-6.42	51541.83	-12.34		
lambda	I	2038-04-29T02:58:17.810		59.33	-6.82	50026.71	-11.84		
delta	I	2038-04-29T03:00:47.539		58.81	-7.30	48300.35	-11.21		
gamma	I	2038-04-29T03:01:48.029		58.61	-7.50	47630.21	-10.94		
eta	I	2038-04-29T03:02:29.899		58.46	-7.63	47176.12	-10.75		
beta	I	2038-04-29T03:04:57.554		57.96	-8.11	45642.47	-10.02		
alpha	I	2038-04-29T03:06:33.875		57.63	-8.41	44704.57	-9.51		
4	I	2038-04-29T03:10:38.706		56.78	-9.19	42548.42	-8.04		
5	I	2038-04-29T03:11:07.828		56.68	-9.29	42315.09	-7.83		
6	I	2038-04-29T03:12:09.344		56.47	-9.48	41854.08	-7.42		

No planet occultations

6	E	2038-04-29T03:42:40.003		50.12	-15.18	41819.82	7.45		
5	E	2038-04-29T03:43:37.903		49.91	-15.36	42290.02	7.86		
4	E	2038-04-29T03:44:15.904		49.78	-15.47	42587.88	8.07		
alpha	E	2038-04-29T03:48:20.144		48.93	-16.21	44739.36	9.55		
beta	E	2038-04-29T03:49:53.977		48.60	-16.49	45660.29	10.06		
eta	E	2038-04-29T03:52:18.999		48.10	-16.93	47176.12	10.80		
gamma	E	2038-04-29T03:53:00.106		47.95	-17.05	47624.02	10.99		
delta	E	2038-04-29T03:54:00.861		47.74	-17.23	48300.35	11.27		
lambda	E	2038-04-29T03:56:29.802		47.22	-17.68	50026.71	11.90		
epsilon	E	2038-04-29T03:58:14.292		46.85	-17.99	51291.73	12.41		

Uranus_2038-04-29T03_27_03.7200_KPNO.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:23:24 2023

```
target                  : Uranus
target radius (km)      :  25559.00
C/A epoch               : 2038-04-29T03:31:12.500
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          : 866091154652377600
2Mass ID (if available) : 07265291+2225118
ICRS Star Coord at Epoch: 07h 26m 52.91608s +22:25:11.65770s
RUWE (>1.4 is poor)     :   1.03
K magnitude             : 13.921
G magnitude             : 15.865
RP magnitude            : 15.226
BP magnitude            : 16.306
DUPflag                 : 0
Distance (au)           : 18.980
f0 (km)                 :       0.000
g0 (km)                 :       0.000
skyplane vel. (km/s)    :  15.87
Sun-Target sep (deg)    :   71.60
Sun-Moon sep (deg)      :  129.01
B (ring opening deg)    :   56.71
PA of pole (deg)        :   83.55
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (")  :   2.744
C/A sky separation (km) :  37770.7
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
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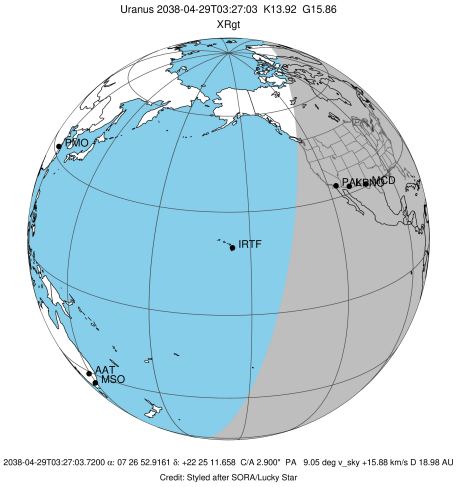

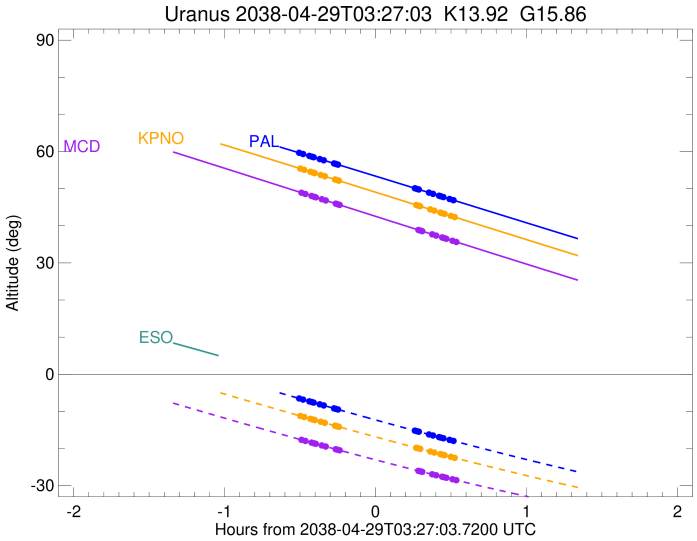

b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-04-29T02:56:39.361		55.51	-11.13	51541.72	-12.37		
lambda	I	2038-04-29T02:58:44.430		55.07	-11.53	50026.71	-11.87		
delta	I	2038-04-29T03:01:13.644		54.54	-12.01	48300.35	-11.25		
gamma	I	2038-04-29T03:02:13.907		54.33	-12.20	47630.22	-10.98		
eta	I	2038-04-29T03:02:55.613		54.18	-12.33	47176.12	-10.79		
beta	I	2038-04-29T03:05:22.630		53.66	-12.80	45642.45	-10.07		
alpha	I	2038-04-29T03:06:58.481		53.32	-13.10	44704.51	-9.56		
4	I	2038-04-29T03:11:01.790		52.46	-13.87	42548.32	-8.10		
5	I	2038-04-29T03:11:30.677		52.36	-13.96	42315.08	-7.90		
6	I	2038-04-29T03:12:31.685		52.14	-14.15	41854.19	-7.49		

No planet occultations

6	E	2038-04-29T03:43:13.368		45.61	-19.81	41819.67	7.51		
5	E	2038-04-29T03:44:10.754		45.40	-19.98	42289.81	7.92		
4	E	2038-04-29T03:44:48.499		45.27	-20.09	42588.02	8.13		
alpha	E	2038-04-29T03:48:51.137		44.41	-20.81	44739.44	9.60		
beta	E	2038-04-29T03:50:24.471		44.08	-21.09	45660.34	10.11		
eta	E	2038-04-29T03:52:48.801		43.57	-21.51	47176.12	10.85		
gamma	E	2038-04-29T03:53:29.728		43.42	-21.63	47624.01	11.04		
delta	E	2038-04-29T03:54:30.228		43.21	-21.81	48300.35	11.32		
lambda	E	2038-04-29T03:56:58.587		42.68	-22.24	50026.71	11.95		
epsilon	E	2038-04-29T03:58:42.637		42.31	-22.54	51290.96	12.45		

Uranus_2038-04-29T03_27_03.7200_MCD.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:25:32 2023

```
target                  : Uranus
target radius (km)      :  25559.00
C/A epoch               : 2038-04-29T03:31:45.680
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          : 866091154652377600
2Mass ID (if available) : 07265291+2225118
ICRS Star Coord at Epoch: 07h 26m 52.91608s +22:25:11.65770s
RUWE (>1.4 is poor)     :   1.03
K magnitude             : 13.921
G magnitude             : 15.865
RP magnitude            : 15.226
BP magnitude            : 16.306
DUPflag                 : 0
Distance (au)           : 18.980
f0 (km)                 :       0.000
g0 (km)                 :       0.000
skyplane vel. (km/s)    :  15.87
Sun-Target sep (deg)    :   71.60
Sun-Moon sep (deg)      :  128.91
B (ring opening deg)    :   56.71
PA of pole (deg)        :   83.55
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (")  :   2.732
C/A sky separation (km) :  37604.5
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
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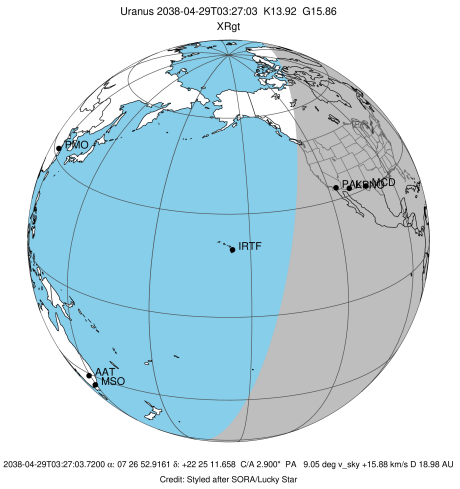

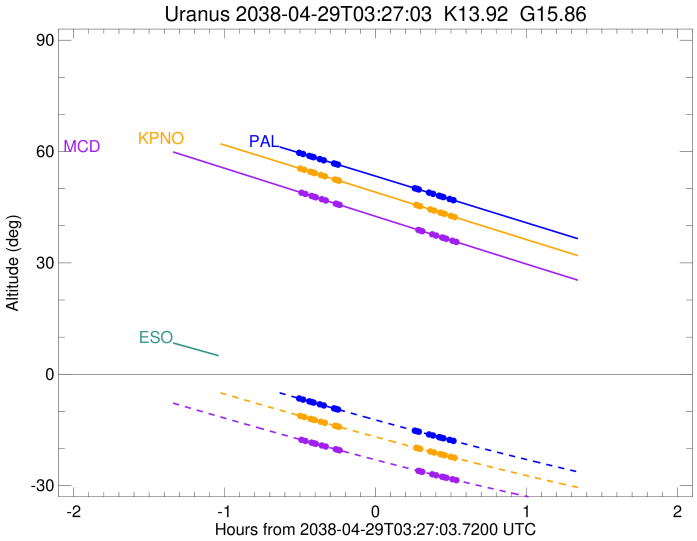

b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-04-29T02:57:08.157		49.01	-17.58	51541.26	-12.47		
lambda	I	2038-04-29T02:59:12.211		48.56	-17.96	50026.71	-11.97		
delta	I	2038-04-29T03:01:40.110		48.03	-18.42	48300.35	-11.36		
gamma	I	2038-04-29T03:02:39.786		47.82	-18.61	47630.23	-11.09		
eta	I	2038-04-29T03:03:21.067		47.67	-18.74	47176.12	-10.90		
beta	I	2038-04-29T03:05:46.422		47.14	-19.19	45642.41	-10.19		
alpha	I	2038-04-29T03:07:21.042		46.80	-19.48	44704.31	-9.70		
4	I	2038-04-29T03:11:20.301		45.94	-20.21	42548.00	-8.27		
5	I	2038-04-29T03:11:48.549		45.84	-20.30	42315.03	-8.07		
6	I	2038-04-29T03:12:48.194		45.63	-20.48	41854.55	-7.67		

No planet occultations

6	E	2038-04-29T03:44:05.099		38.88	-26.01	41819.28	7.70		
5	E	2038-04-29T03:45:01.131		38.68	-26.17	42289.25	8.10		
4	E	2038-04-29T03:45:38.202		38.55	-26.27	42588.41	8.30		
alpha	E	2038-04-29T03:49:36.691		37.70	-26.94	44739.64	9.74		
beta	E	2038-04-29T03:51:08.762		37.37	-27.20	45660.48	10.24		
eta	E	2038-04-29T03:53:31.367		36.86	-27.60	47176.12	10.97		
gamma	E	2038-04-29T03:54:11.850		36.71	-27.71	47623.98	11.16		
delta	E	2038-04-29T03:55:11.731		36.50	-27.87	48300.35	11.43		
lambda	E	2038-04-29T03:57:38.694		35.97	-28.28	50026.71	12.05		
epsilon	E	2038-04-29T03:59:21.698		35.60	-28.56	51288.98	12.55		