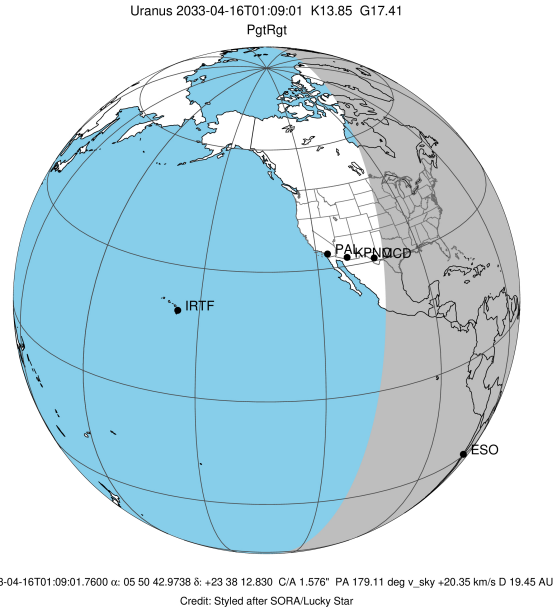
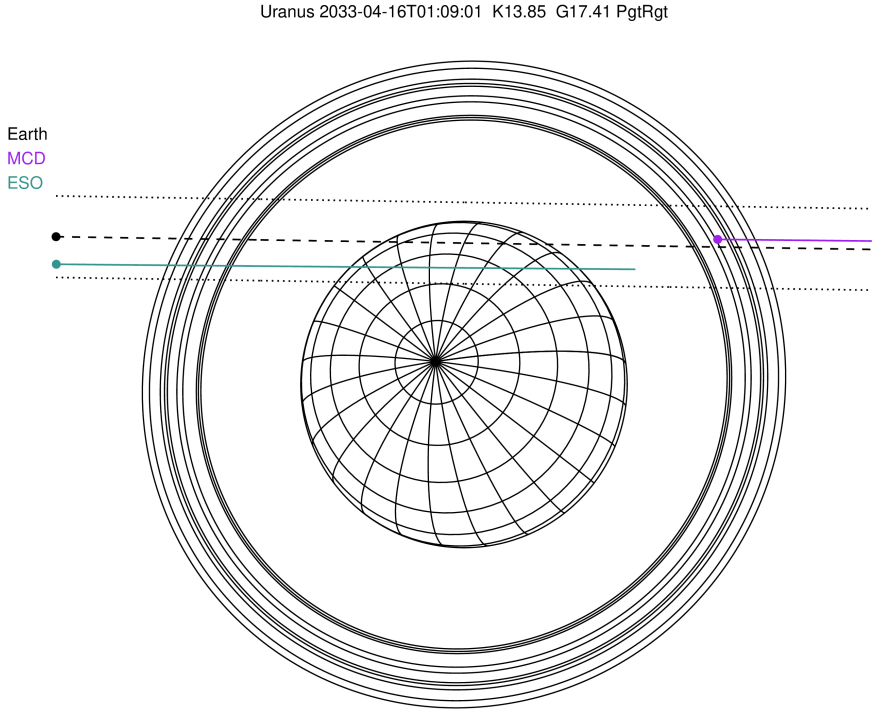
Stellar occultation prediction by rfrench@wellesley.edu Sun Jun 25 00:52:47 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2033-04-16T01:09:01.760
Event type : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Gaia source ID : 3427508353182193792
2Mass ID (if available) : 05504296+2338128

ICRS Star Coord at Epoch: 05h 50m 42.97381s +23:38:12.82983s
RUWE (>1.4 is poor) : 0.98
K magnitude : 13.847
G magnitude : 17.405
RP magnitude : 16.382
BP magnitude : 18.466
DUPflag : 0
Distance (au) : 19.450
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : 20.35
Sun-Target sep (deg) : 61.96
Sun-Moon sep (deg) : 131.75
B (ring opening deg) : 77.08
PA of pole (deg) : 50.97

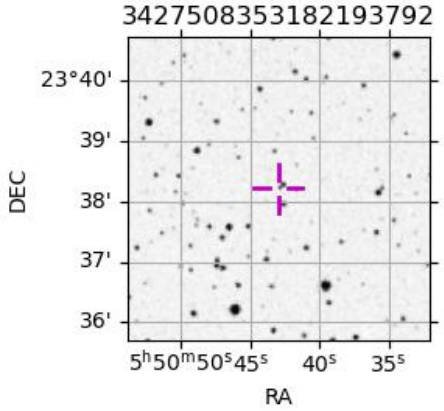
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon





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			+++++	APR 16 01:45 - APR 16 01:48	PnnRne
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	++++++++++	+ +		APR 16 00:34 - APR 16 01:27	PieRin
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_2033-04-16T01_09_01.7600_MCD.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:24:47 2023

```
target                  : Uranus
target radius (km)      :  25559.00
C/A epoch               : 2033-04-16T01:11:13.410
Event type              : PgtRgt
: Uranus occs: geocentric, topocentric
: 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          : 3427508353182193792
2Mass ID (if available) : 05504296+2338128
ICRS Star Coord at Epoch: 05h 50m 42.97381s +23:38:12.82983s
RUWE (>1.4 is poor)     :   0.98
K magnitude             : 13.847
G magnitude             : 17.405
RP magnitude            : 16.382
BP magnitude            : 18.466
DUPflag                 : 0
Distance (au)           : 19.450
f0 (km)                 :       0.000
g0 (km)                 :       0.000
skyplane vel. (km/s)    :  20.35
Sun-Target sep (deg)    :   61.96
Sun-Moon sep (deg)      :  132.62
B (ring opening deg)    :   77.08
PA of pole (deg)        :   50.97
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (")  :   1.643
C/A sky separation (km) :  23171.0
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
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pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
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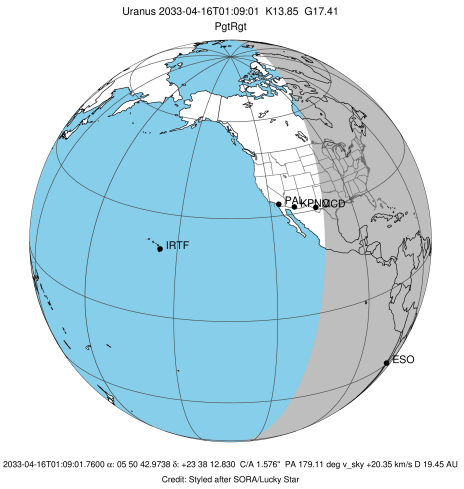
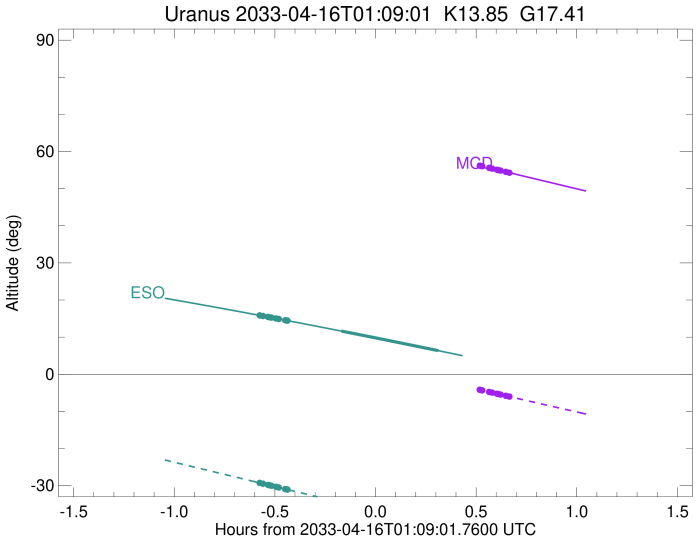


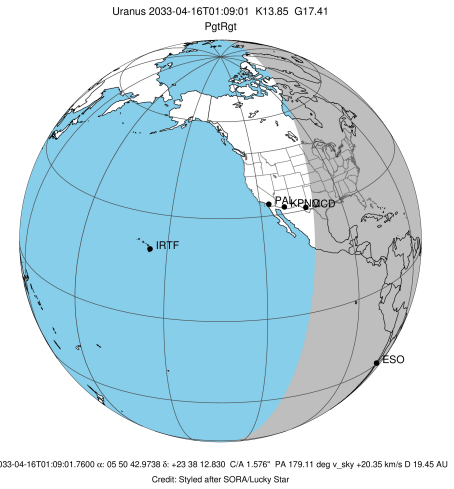


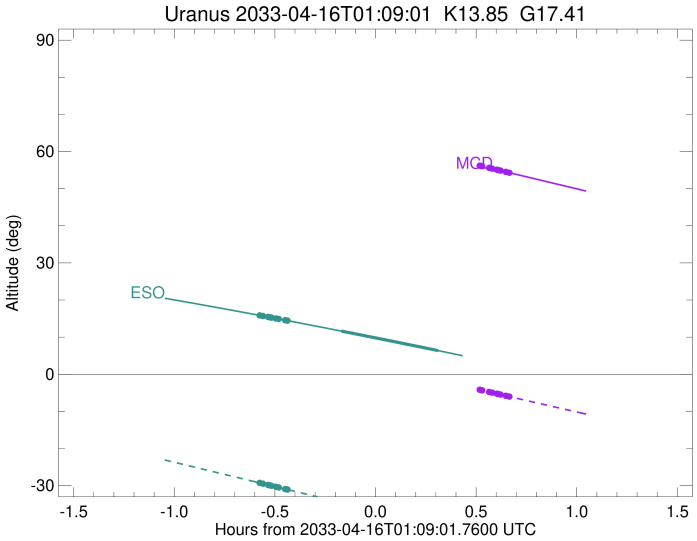
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-04-16T00:34:28.762		70.21	9.72x	51055.45	-17.96		
lambda	I	2033-04-16T00:35:25.980		70.01	9.51x	50026.71	-17.93		
delta	I	2033-04-16T00:37:02.752		69.67	9.17x	48300.35	-17.75		
gamma	I	2033-04-16T00:37:40.671		69.54	9.03x	47628.89	-17.67		
eta	I	2033-04-16T00:38:06.335		69.45	8.94x	47176.12	-17.61		
beta	I	2033-04-16T00:39:33.261		69.14	8.63x	45653.65	-17.42		
alpha	I	2033-04-16T00:40:28.646		68.95	8.43x	44690.32	-17.28		
4	I	2033-04-16T00:42:34.189		68.51	7.99x	42548.52	-16.93		
5	I	2033-04-16T00:42:55.081		68.44	7.91x	42182.63	-16.90		
6	I	2033-04-16T00:43:12.883		68.38	7.85x	41879.54	-16.82		
Uranus	I	2033-04-16T01:03:07.258		64.15	3.61x	25129.16		11.29	11.81
Uranus	E	2033-04-16T01:20:08.646		60.50	0.01x	25527.48		3.00	3.15
6	E	2033-04-16T01:40:04.858		56.21	-4.17x	41825.17	16.88		
5	E	2033-04-16T01:40:33.478		56.10	-4.27x	42311.34	16.95		
4	E	2033-04-16T01:40:47.195		56.06	-4.32x	42544.16	16.99		
alpha	E	2033-04-16T01:42:53.546		55.60	-4.76x	44714.46	17.34		
beta	E	2033-04-16T01:43:47.189		55.41	-4.94x	45648.29	17.48		
eta	E	2033-04-16T01:45:14.056		55.10	-5.24	47176.12	17.68		
gamma	E	2033-04-16T01:45:39.173		55.00	-5.33	47620.96	17.74		
delta	E	2033-04-16T01:46:17.387		54.87	-5.46	48300.35	17.82		
lambda	E	2033-04-16T01:47:53.760		54.52	-5.80	50026.71	18.01		
epsilon	E	2033-04-16T01:48:40.900		54.35	-5.96	50877.47	18.03		

Uranus_2033-04-16T01_09_01.7600_ESO.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:35:25 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2033-04-16T01:12:58.760
Event type : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code : ESO
Location : European Southern Obs. (3.6m)
Latitude (deg) : -29.26097
E. Longitude (deg) : 289.26831
Altitude (km) : 2.400
Gaia source ID : 3427508353182193792
2Mass ID (if available) : 05504296+2338128
ICRS Star Coord at Epoch: 05h 50m 42.97381s +23:38:12.82983s
RUWE (>1.4 is poor) : 0.98
K magnitude : 13.847
G magnitude : 17.405
RP magnitude : 16.382
BP magnitude : 18.466
DUPflag : 0
Distance (au) : 19.450
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : 20.35
Sun-Target sep (deg) : 61.96
Sun-Moon sep (deg) : 132.32
B (ring opening deg) : 77.08
PA of pole (deg) : 50.97
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.295
C/A sky separation (km) : 18260.6
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	2033-04-16T00:34:32.832		15.85	-29.27	51099.47	-18.98		
lambda	I	2033-04-16T00:35:29.259		15.69	-29.48	50026.71	-18.98		
delta	I	2033-04-16T00:37:00.462		15.44	-29.81	48300.35	-18.87		
gamma	I	2033-04-16T00:37:36.052		15.33	-29.94	47629.42	-18.83		
eta	I	2033-04-16T00:38:00.147		15.27	-30.03	47176.12	-18.80		
beta	I	2033-04-16T00:39:21.268		15.04	-30.32	45656.05	-18.68		
alpha	I	2033-04-16T00:40:12.822		14.89	-30.51	44692.98	-18.60		
4	I	2033-04-16T00:42:08.744		14.56	-30.93	42554.12	-18.40		
5	I	2033-04-16T00:42:28.751		14.50	-31.00	42174.73	-18.38		
6	I	2033-04-16T00:42:44.683		14.45	-31.06	41878.54	-18.34		
Uranus	I	2033-04-16T00:58:50.784		11.63	-34.55	25013.98		12.78	13.37
Uranus	E	2033-04-16T01:27:44.210		6.36	-40.77	25553.07		-1.30	-1.36
6	E	2033-04-16T01:43:49.044		3.33x	-44.19	41819.83	18.45		
5	E	2033-04-16T01:44:15.649		3.25x	-44.28	42313.94	18.49		
4	E	2033-04-16T01:44:28.323		3.20x	-44.32	42549.14	18.51		
alpha	E	2033-04-16T01:46:24.877		2.83x	-44.73	44718.60	18.72		
beta	E	2033-04-16T01:47:14.556		2.68x	-44.91	45650.21	18.80		
eta	E	2033-04-16T01:48:35.438		2.42x	-45.19	47176.12	18.92		
gamma	E	2033-04-16T01:48:58.930		2.34x	-45.27	47621.01	18.95		
delta	E	2033-04-16T01:49:34.725		2.23x	-45.40	48300.35	19.00		
lambda	E	2033-04-16T01:51:05.301		1.94x	-45.72	50026.71	19.12		
epsilon	E	2033-04-16T01:51:51.452		1.79x	-45.88	50910.15	19.12		