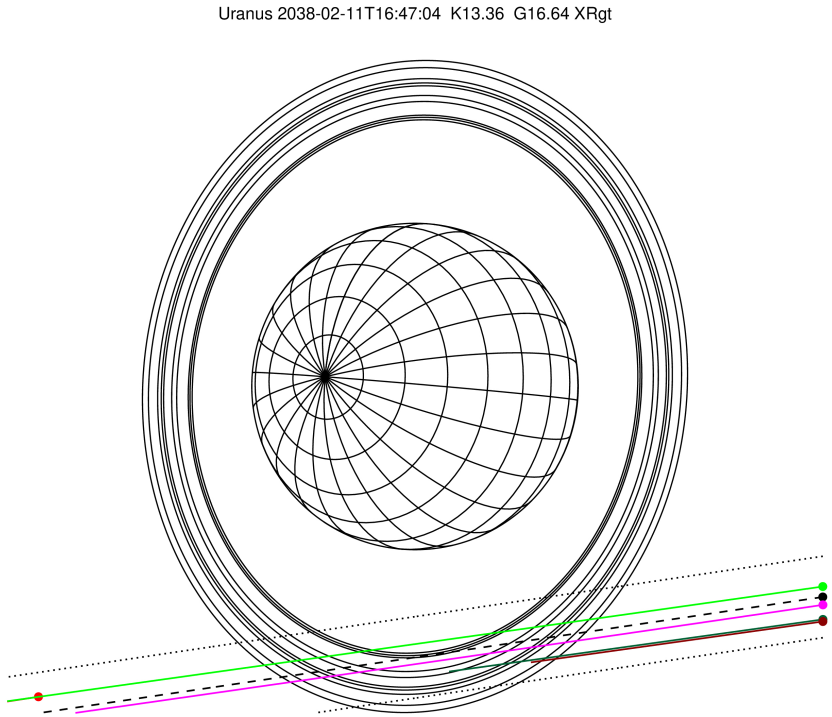
Stellar occultation prediction by rfrench@wellesley.edu Sun Jun 25 02:11:06 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2038-02-11T16:47:04.940
Event type : XRgt
: No Uranus occs
: Ring occs: geocentric, topocentric
Gaia source ID : 866450626235028224
2Mass ID (if available) : 07282992+2223023

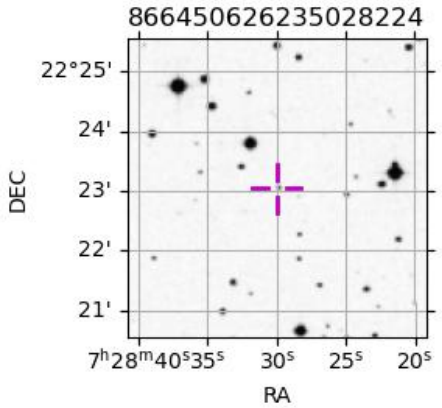
ICRS Star Coord at Epoch: 07h 28m 29.95672s +22:23:02.89900s
RUWE (>1.4 is poor) : 1.07
K magnitude : 13.358
G magnitude : 16.645
RP magnitude : 15.580
BP magnitude : 17.784
DUPflag : 0
Distance (au) : 17.856
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -18.73
Sun-Target sep (deg) : 147.85
Sun-Moon sep (deg) : 65.67
B (ring opening deg) : 56.34
PA of pole (deg) : 83.82

#	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



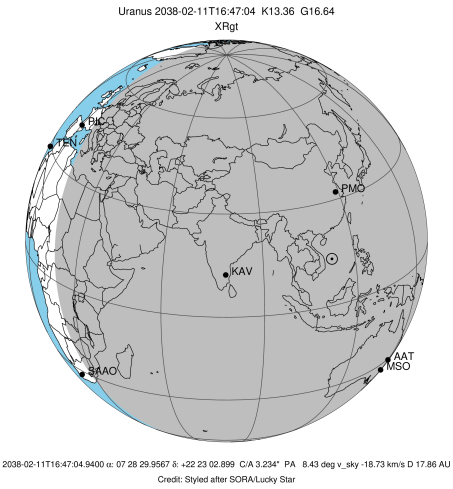
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

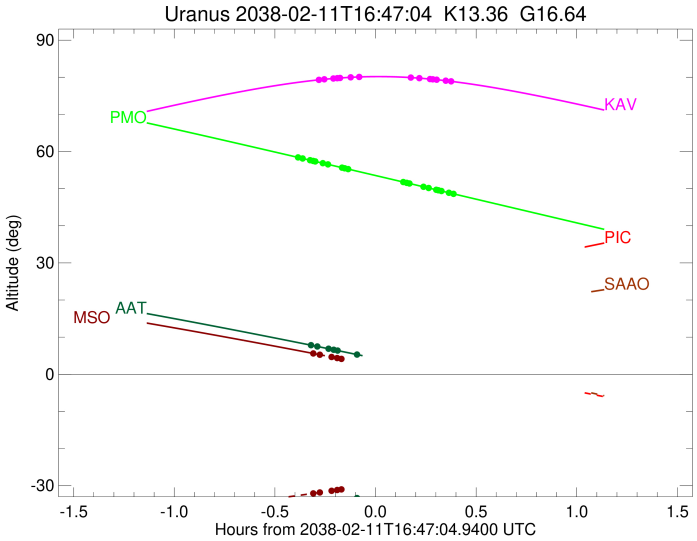
Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	|	|	|	|	PnnRnn
PAL	Palomar Mt (200")	33.4	243.1	|	|	|	|	PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	|++++++++++	|	++++++++++	FEB 11 16:24 - FEB 11 17:10	PnnRie
KPNO	Kitt Peak Natl Obs	32.0	248.4	|	|	|	|	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	|+++++++	|	+++++++	FEB 11 16:30 - FEB 11 17:09	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	|++++++	|	|	FEB 11 16:28 - FEB 11 16:41	PnnRin
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	|	|	|	|	PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	|++	|	|	FEB 11 16:29 - FEB 11 16:30	PnnRin



Uranus_2038-02-11T16_47_04.9400_PMO.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:21:09 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2038-02-11T16:44:32.550
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 : 866450626235028224
2Mass ID (if available) : 07282992+2223023
ICRS Star Coord at Epoch: 07h 28m 29.95672s +22:23:02.89900s
RUWE (>1.4 is poor) : 1.07
K magnitude : 13.358
G magnitude : 16.645
RP magnitude : 15.580
BP magnitude : 17.784
DUPflag : 0
Distance (au) : 17.856
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -18.73
Sun-Target sep (deg) : 147.85
Sun-Moon sep (deg) : 66.53
B (ring opening deg) : 56.34
PA of pole (deg) : 83.82
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.085
C/A sky separation (km) : 39950.4
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

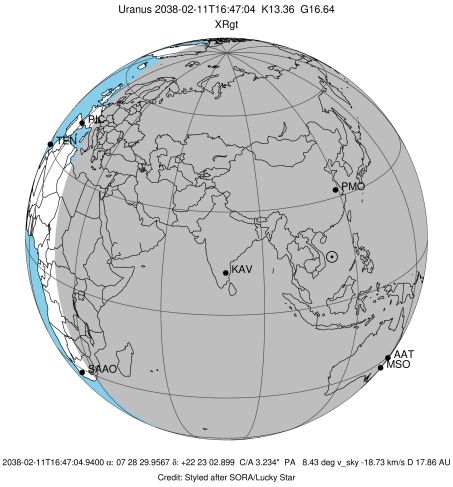
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-02-11T16:24:29.116		58.32	-71.89	50753.01	-13.78		
lambda	I	2038-02-11T16:25:22.609		58.13	-71.88	50026.71	-13.40		
delta	I	2038-02-11T16:27:36.034		57.66	-71.83	48300.35	-12.46		
gamma	I	2038-02-11T16:28:31.248		57.47	-71.80	47623.86	-12.04		
eta	I	2038-02-11T16:29:08.892		57.33	-71.79	47176.12	-11.75		
beta	I	2038-02-11T16:31:23.417		56.86	-71.71	45672.27	-10.63		
alpha	I	2038-02-11T16:32:57.918		56.53	-71.65	44708.05	-9.78		
4	I	2038-02-11T16:37:10.655		55.64	-71.46	42547.65	-7.22		
5	I	2038-02-11T16:38:00.498		55.46	-71.41	42196.52	-6.61		
6	I	2038-02-11T16:38:55.864		55.27	-71.36	41867.59	-6.04		

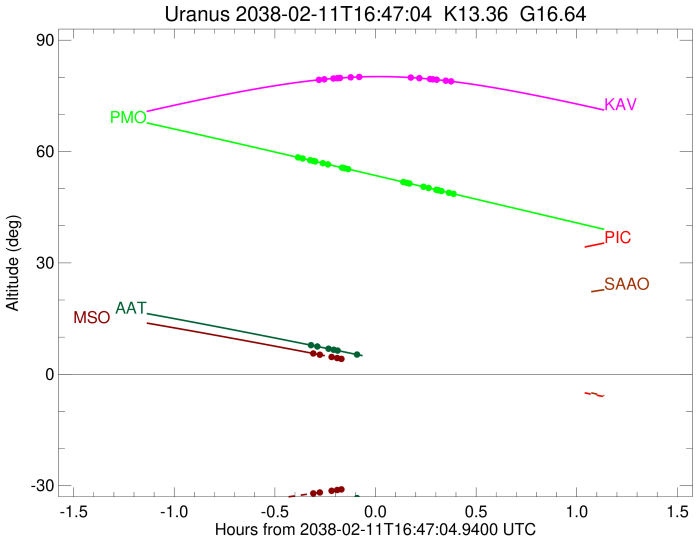
No planet occultations

6	E	2038-02-11T16:55:20.873		51.79	-70.10	41847.95	6.03		
5	E	2038-02-11T16:56:10.578		51.61	-70.02	42163.75	6.61		
4	E	2038-02-11T16:57:10.365		51.40	-69.92	42575.88	7.21		
alpha	E	2038-02-11T17:01:24.071		50.50	-69.47	44737.10	9.76		
beta	E	2038-02-11T17:02:56.565		50.17	-69.30	45681.23	10.61		
eta	E	2038-02-11T17:05:10.348		49.70	-69.05	47176.12	11.72		
gamma	E	2038-02-11T17:05:47.845		49.57	-68.98	47620.96	12.01		
delta	E	2038-02-11T17:06:43.444		49.37	-68.87	48300.35	12.43		
lambda	E	2038-02-11T17:08:57.244		48.90	-68.60	50026.71	13.36		
epsilon	E	2038-02-11T17:10:18.305		48.61	-68.43	51131.08	13.74		

Uranus_2038-02-11T16_47_04.9400_KAV.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:31:53 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2038-02-11T16:47:05.590
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 : 866450626235028224
2Mass ID (if available) : 07282992+2223023
ICRS Star Coord at Epoch: 07h 28m 29.95672s +22:23:02.89900s
RUWE (>1.4 is poor) : 1.07
K magnitude : 13.358
G magnitude : 16.645
RP magnitude : 15.580
BP magnitude : 17.784
DUPflag : 0
Distance (au) : 17.856
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -18.73
Sun-Target sep (deg) : 147.85
Sun-Moon sep (deg) : 66.49
B (ring opening deg) : 56.34
PA of pole (deg) : 83.82
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.324
C/A sky separation (km) : 43045.0
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

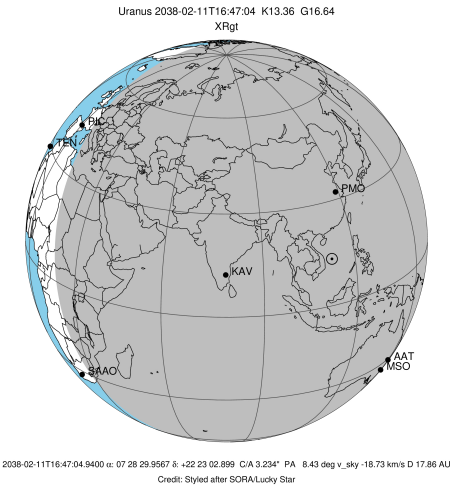
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-02-11T16:30:46.398		79.36	-53.98	50764.41	-11.83		
lambda	I	2038-02-11T16:31:50.360		79.46	-54.24	50026.71	-11.29		
delta	I	2038-02-11T16:34:32.858		79.68	-54.89	48300.35	-9.94		
gamma	I	2038-02-11T16:35:43.193		79.76	-55.18	47623.24	-9.31		
eta	I	2038-02-11T16:36:32.411		79.82	-55.38	47176.12	-8.86		
beta	I	2038-02-11T16:39:41.666		79.99	-56.14	45674.99	-7.00		
alpha	I	2038-02-11T16:42:17.303		80.10	-56.77	44714.89	-5.35		

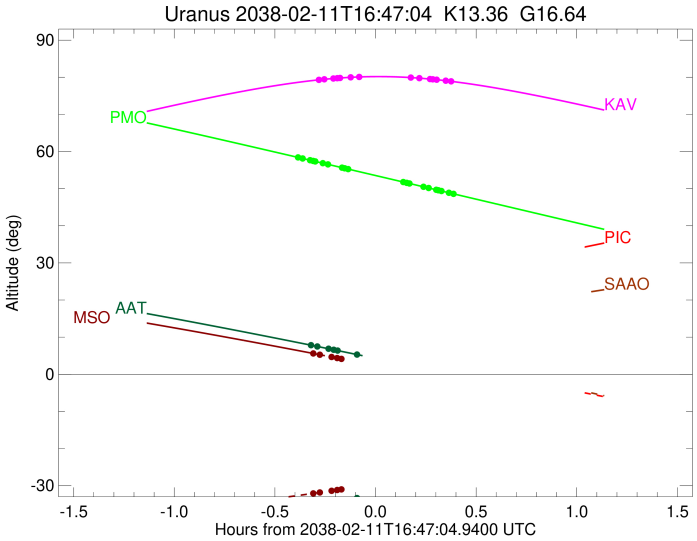
No planet occultations

alpha	E	2038-02-11T16:57:36.460		79.92	-60.49	44730.68	5.35		
beta	E	2038-02-11T17:00:09.952		79.77	-61.11	45680.89	7.00		
eta	E	2038-02-11T17:03:18.200		79.53	-61.87	47176.12	8.85		
gamma	E	2038-02-11T17:04:07.193		79.46	-62.07	47621.00	9.31		
delta	E	2038-02-11T17:05:17.795		79.35	-62.35	48300.35	9.93		
lambda	E	2038-02-11T17:08:00.360		79.08	-63.01	50026.71	11.28		
epsilon	E	2038-02-11T17:09:31.432		78.92	-63.38	51085.96	11.82		

Uranus_2038-02-11T16_47_04.9400_AAT.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:38:20 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2038-02-11T16:42:26.360
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 : 866450626235028224
2Mass ID (if available) : 07282992+2223023
ICRS Star Coord at Epoch: 07h 28m 29.95672s +22:23:02.89900s
RUWE (>1.4 is poor) : 1.07
K magnitude : 13.358
G magnitude : 16.645
RP magnitude : 15.580
BP magnitude : 17.784
DUPflag : 0
Distance (au) : 17.856
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -18.73
Sun-Target sep (deg) : 147.85
Sun-Moon sep (deg) : 66.04
B (ring opening deg) : 56.34
PA of pole (deg) : 83.82
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.471
C/A sky separation (km) : 44955.2
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

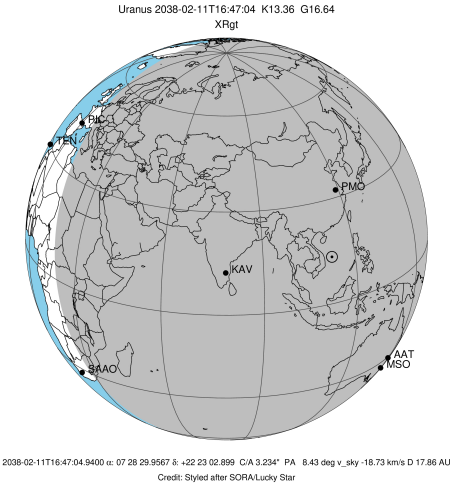
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-02-11T16:28:29.198		7.72	-35.20	50776.15	-10.14		
lambda	I	2038-02-11T16:29:45.949		7.49	-35.03	50026.71	-9.45		
delta	I	2038-02-11T16:33:07.119		6.87	-34.56	48300.35	-7.68		
gamma	I	2038-02-11T16:34:40.649		6.59	-34.34	47622.75	-6.80		
eta	I	2038-02-11T16:35:49.740		6.37	-34.18	47176.12	-6.12		
beta	I	2038-02-11T16:41:34.160		5.31	-33.35	45677.65	-2.53		

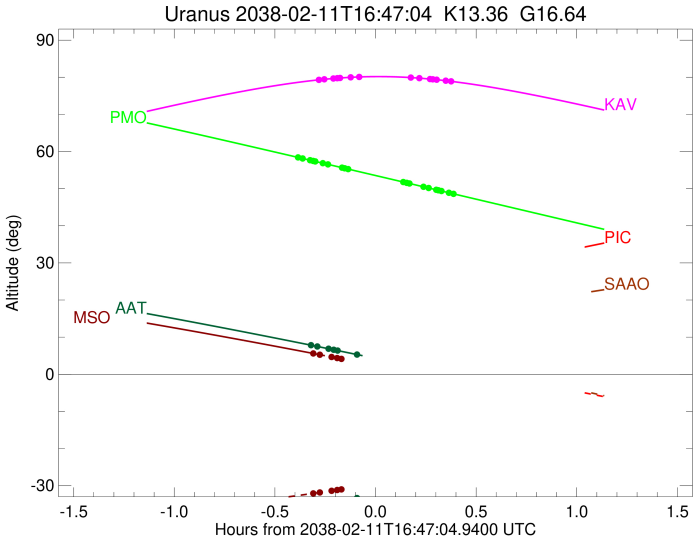
No planet occultations

beta	E	2038-02-11T16:49:13.029	3.88x	-32.22	45679.79	2.53			
eta	E	2038-02-11T16:54:56.805	2.80x	-31.35	47176.12	6.11			
gamma	E	2038-02-11T16:56:05.786	2.59x	-31.17	47621.10	6.79			
delta	E	2038-02-11T16:57:39.765	2.29x	-30.93	48300.35	7.67			
lambda	E	2038-02-11T17:01:01.470	1.65x	-30.40	50026.71	9.42			
epsilon	E	2038-02-11T17:02:46.106	1.32x	-30.12	51056.77	10.10			

Uranus_2038-02-11T16_47_04.9400_MSO.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:42:35 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2038-02-11T16:42:35.250
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 : 866450626235028224
2Mass ID (if available) : 07282992+2223023
ICRS Star Coord at Epoch: 07h 28m 29.95672s +22:23:02.89900s
RUWE (>1.4 is poor) : 1.07
K magnitude : 13.358
G magnitude : 16.645
RP magnitude : 15.580
BP magnitude : 17.784
DUPflag : 0
Distance (au) : 17.856
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -18.73
Sun-Target sep (deg) : 147.85
Sun-Moon sep (deg) : 66.00
B (ring opening deg) : 56.34
PA of pole (deg) : 83.82
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.498
C/A sky separation (km) : 45299.6
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	2038-02-11T16:29:10.722		5.49	-32.01	50778.59	-9.82		
lambda	I	2038-02-11T16:30:30.438		5.26	-31.84	50026.71	-9.10		
delta	I	2038-02-11T16:34:01.590		4.65x	-31.39	48300.35	-7.22		
gamma	I	2038-02-11T16:35:42.125		4.36x	-31.17	47622.65	-6.25		
eta	I	2038-02-11T16:36:58.041		4.13x	-31.01	47176.12	-5.50		

No planet occultations

eta	E	2038-02-11T16:54:09.496		1.07x	-28.65	47176.12	5.50		
gamma	E	2038-02-11T16:55:25.297		0.85x	-28.47	47621.13	6.24		
delta	E	2038-02-11T16:57:06.273		0.54x	-28.23	48300.35	7.20		
lambda	E	2038-02-11T17:00:37.939		-0.10x	-27.72	50026.71	9.08		
epsilon	E	2038-02-11T17:02:25.527		-0.42x	-27.45	51050.58	9.79		