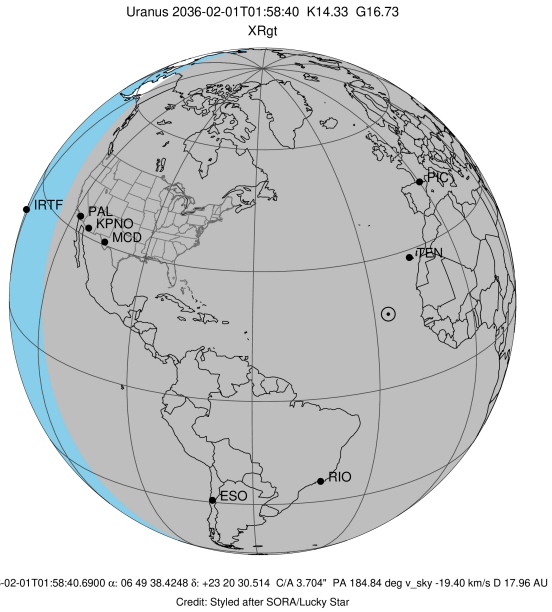
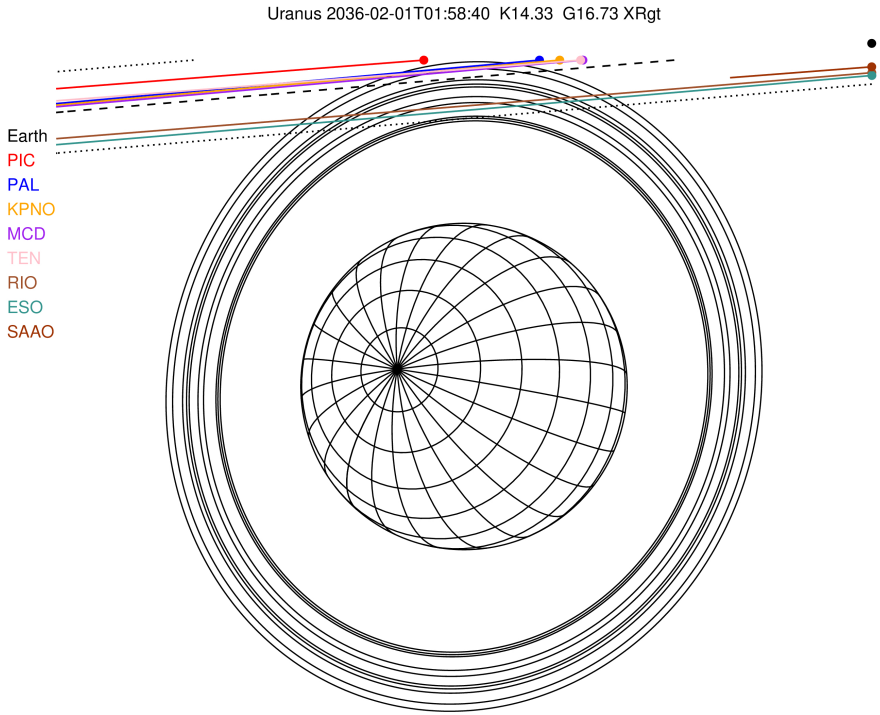
Stellar occultation prediction by rfrench@wellesley.edu Sun Jun 25 01:48:18 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2036-02-01T01:58:40.690
Event type : XRgt
: No Uranus occs
: Ring occs: geocentric, topocentric
Gaia source ID : 3379579374313422080
2Mass ID (if available) : 06493841+2320305

ICRS Star Coord at Epoch: 06h 49m 38.42479s +23:20:30.51384s
RUWE (>1.4 is poor) : 3.42
K magnitude : 14.332
G magnitude : 16.729
RP magnitude : 15.884
BP magnitude : 17.093
DUPflag : 0
Distance (au) : 17.961
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -19.40
Sun-Target sep (deg) : 150.10
Sun-Moon sep (deg) : 109.87
B (ring opening deg) : 64.98
PA of pole (deg) : 75.49

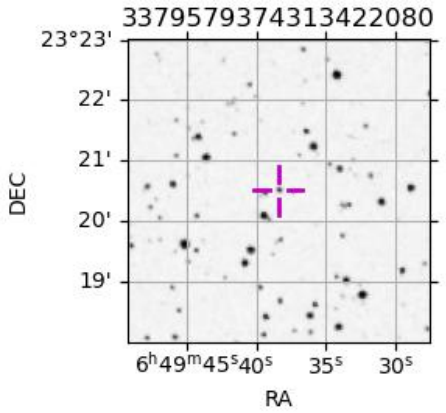
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon





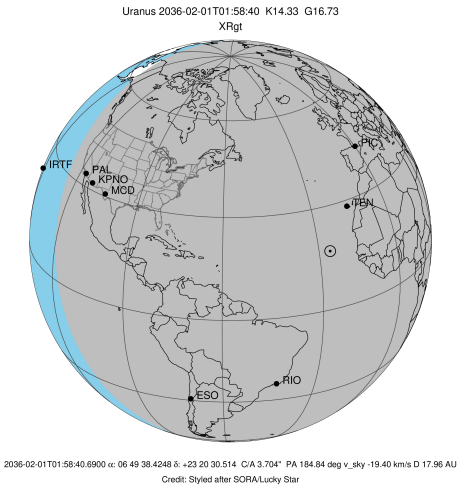
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

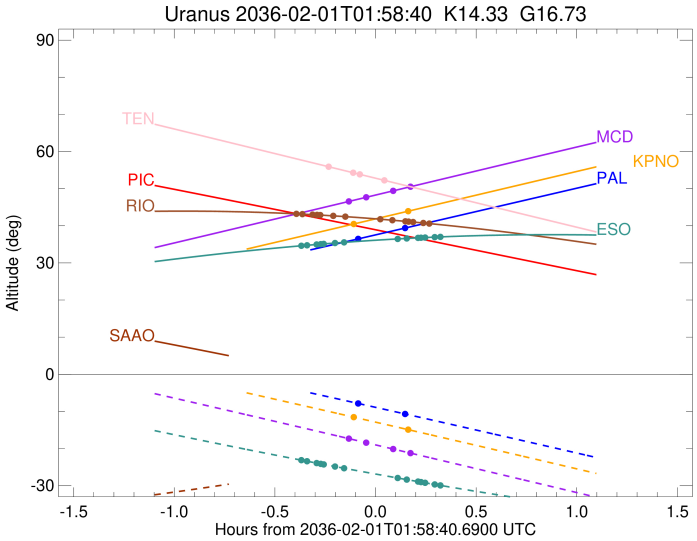
Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	|	|	|	|	PnnRnn
PAL	Palomar Mt (200")	33.4	243.1	|+	|	+ |	FEB 01 01:54 - FEB 01 02:06 |	PnnRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8	|	|	|	|	PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	|+	|	+ |	FEB 01 01:53 - FEB 01 02:07 |	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	|++	|	++ |	FEB 01 01:51 - FEB 01 02:08 |	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5	|++	|	++ |	FEB 01 01:45 - FEB 01 02:00 |	PnnRie
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	|+++++++	|	+++++++ |	FEB 01 01:35 - FEB 01 02:14 |	PnnRie
ESO	European Southern Obs	-29.3	289.3	|+++++++	|	+++++++ |	FEB 01 01:37 - FEB 01 02:18 |	PnnRie
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_2036-02-01T01_58_40.6900_PAL.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:18:48 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2036-02-01T02:02:57.690
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 : 3379579374313422080
2Mass ID (if available) : 06493841+2320305
ICRS Star Coord at Epoch: 06h 49m 38.42479s +23:20:30.51384s
RUWE (>1.4 is poor) : 3.42
K magnitude : 14.332
G magnitude : 16.729
RP magnitude : 15.884
BP magnitude : 17.093
DUPflag : 0
Distance (au) : 17.961
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -19.40
Sun-Target sep (deg) : 150.10
Sun-Moon sep (deg) : 110.63
B (ring opening deg) : 64.98
PA of pole (deg) : 75.49
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.826
C/A sky separation (km) : 49838.5
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

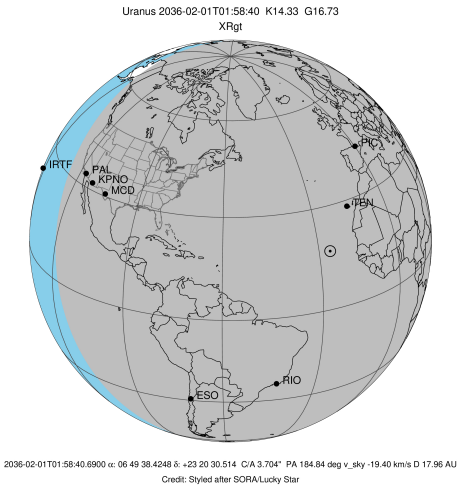
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2036-02-01T01:54:44.973		36.72	-8.11	50907.45	-3.25		

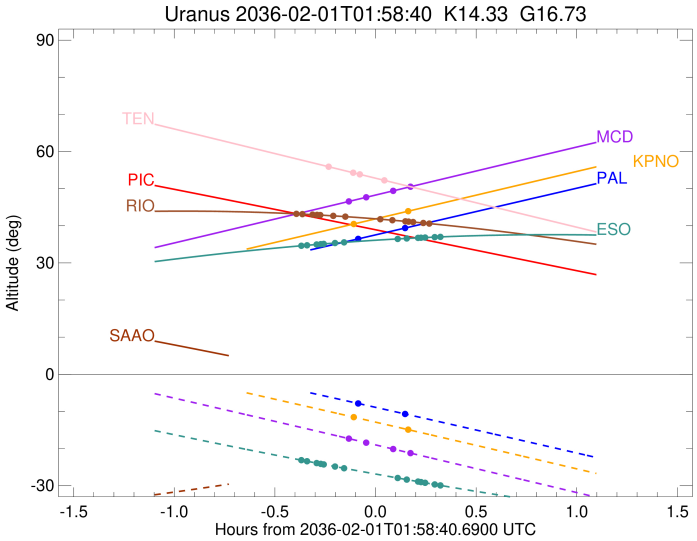
No planet occultations

epsilon	E	2036-02-01T02:06:49.510		39.25	-10.56	51016.11	3.25		

Uranus_2036-02-01T01_58_40.6900_KPNO.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:23:10 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2036-02-01T02:02:44.440
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 : 3379579374313422080
2Mass ID (if available) : 06493841+2320305
ICRS Star Coord at Epoch: 06h 49m 38.42479s +23:20:30.51384s
RUWE (>1.4 is poor) : 3.42
K magnitude : 14.332
G magnitude : 16.729
RP magnitude : 15.884
BP magnitude : 17.093
DUPflag : 0
Distance (au) : 17.961
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -19.40
Sun-Target sep (deg) : 150.10
Sun-Moon sep (deg) : 110.67
B (ring opening deg) : 64.98
PA of pole (deg) : 75.49
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.805
C/A sky separation (km) : 49560.5
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

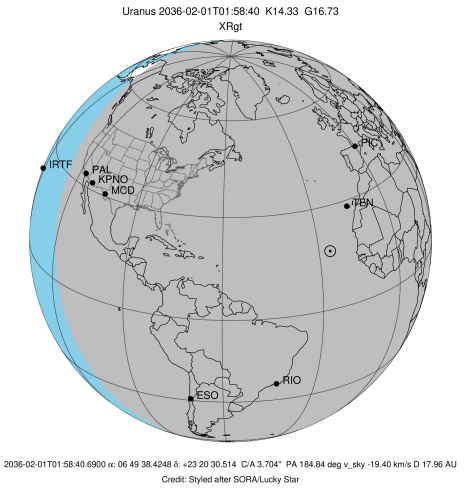
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2036-02-01T01:53:16.416		40.71	-11.77	50896.68	-3.95		

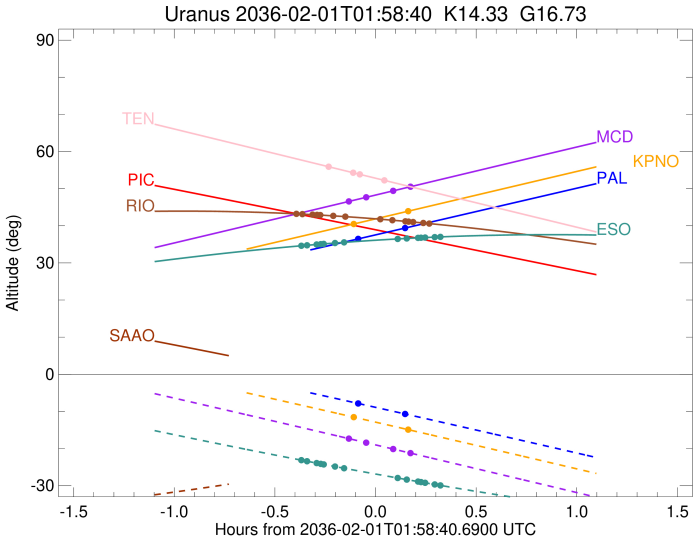
No planet occultations

epsilon	E	2036-02-01T02:07:53.942		43.82	-14.81	51028.57	3.95		

Uranus_2036-02-01T01_58_40.6900_MCD.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:25:19 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2036-02-01T02:02:19.810
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 : 3379579374313422080
2Mass ID (if available) : 06493841+2320305
ICRS Star Coord at Epoch: 06h 49m 38.42479s +23:20:30.51384s
RUWE (>1.4 is poor) : 3.42
K magnitude : 14.332
G magnitude : 16.729
RP magnitude : 15.884
BP magnitude : 17.093
DUPflag : 0
Distance (au) : 17.961
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -19.40
Sun-Target sep (deg) : 150.10
Sun-Moon sep (deg) : 110.71
B (ring opening deg) : 64.98
PA of pole (deg) : 75.49
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.781
C/A sky separation (km) : 49252.9
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

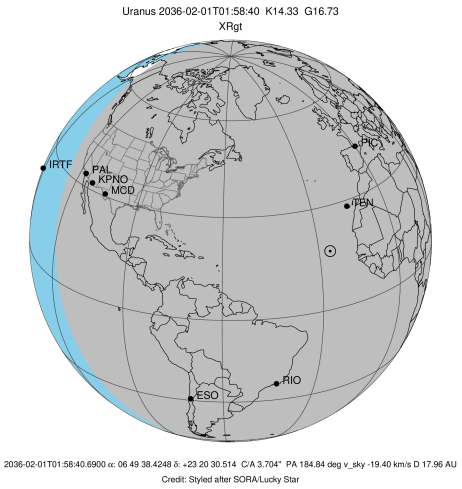
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2036-02-01T01:51:42.710		46.77	-17.54	50886.81	-4.61		
lambda	I	2036-02-01T01:56:00.514		47.70	-18.45	50026.71	-2.17		

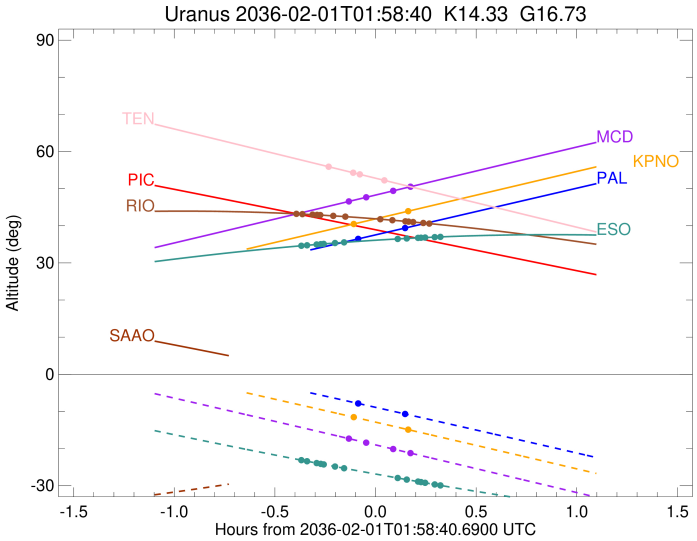
No planet occultations

lambda	E	2036-02-01T02:03:50.492	49.39	-20.12	50026.71	2.17		
epsilon	E	2036-02-01T02:08:41.290	50.43	-21.15	51040.22	4.61		

Uranus_2036-02-01T01_58_40.6900_TEN.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:27:27 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2036-02-01T01:55:21.740
Event type : XRgt
: No Uranus occs
: Ring occs: geocentric, topocentric
Observer code : TEN
Location : Teide Obs./Tenerife
Latitude (deg) : 28.30050
E. Longitude (deg) : 343.48909
Altitude (km) : 2.395
Gaia source ID : 3379579374313422080
2Mass ID (if available) : 06493841+2320305
ICRS Star Coord at Epoch: 06h 49m 38.42479s +23:20:30.51384s
RUWE (>1.4 is poor) : 3.42
K magnitude : 14.332
G magnitude : 16.729
RP magnitude : 15.884
BP magnitude : 17.093
DUPflag : 0
Distance (au) : 17.961
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -19.40
Sun-Target sep (deg) : 150.10
Sun-Moon sep (deg) : 110.37
B (ring opening deg) : 64.98
PA of pole (deg) : 75.49
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.803
C/A sky separation (km) : 49535.5
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

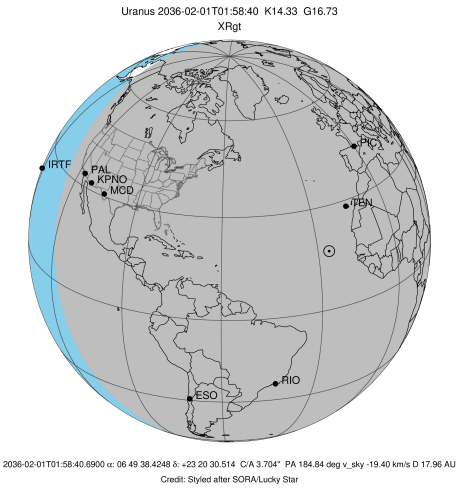
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2036-02-01T01:45:47.047		55.67	-77.54	50891.41	-4.09		
lambda	I	2036-02-01T01:52:40.379		54.15	-76.69	50027.20	-0.21		

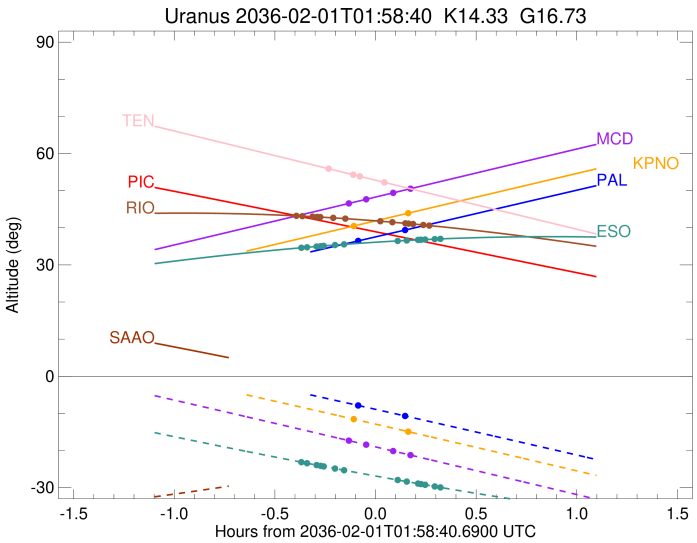
No planet occultations

lambda	E	2036-02-01T01:53:21.592		53.99	-76.60	50027.20	0.21		
epsilon	E	2036-02-01T02:00:48.096		52.35	-75.53	51026.56	4.09		

Uranus_2036-02-01T01_58_40.6900_RIO.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:33:47 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2036-02-01T01:56:58.520
Event type : XRgt
: No Uranus occs
: Ring occs: geocentric, topocentric
Observer code : RIO
Location : Rio de Janeiro
Latitude (deg) : -22.89506
E. Longitude (deg) : 316.77708
Altitude (km) : 0.033
Gaia source ID : 3379579374313422080
2Mass ID (if available) : 06493841+2320305
ICRS Star Coord at Epoch: 06h 49m 38.42479s +23:20:30.51384s
RUWE (>1.4 is poor) : 3.42
K magnitude : 14.332
G magnitude : 16.729
RP magnitude : 15.884
BP magnitude : 17.093
DUPflag : 0
Distance (au) : 17.961
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -19.40
Sun-Target sep (deg) : 150.10
Sun-Moon sep (deg) : 110.36
B (ring opening deg) : 64.98
PA of pole (deg) : 75.49
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.361
C/A sky separation (km) : 43775.3
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

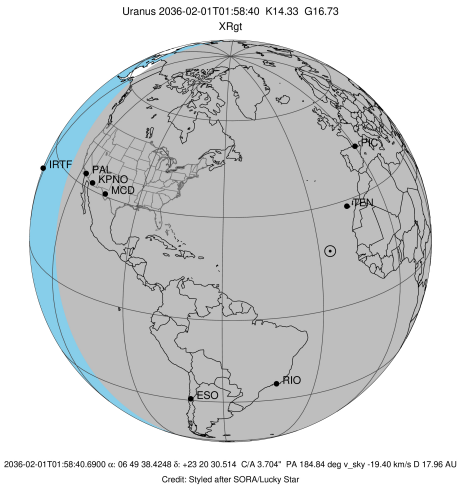
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2036-02-01T01:35:39.175		43.19	-44.27	50804.77	-10.75		
lambda	I	2036-02-01T01:36:53.941		43.14	-44.41	50026.71	-10.14		
delta	I	2036-02-01T01:39:56.808		42.99	-44.76	48300.35	-8.72		
gamma	I	2036-02-01T01:41:17.613		42.93	-44.92	47622.74	-8.05		
eta	I	2036-02-01T01:42:14.865		42.88	-45.02	47176.12	-7.55		
beta	I	2036-02-01T01:46:08.687		42.67	-45.45	45657.78	-5.41		
alpha	I	2036-02-01T01:49:42.820		42.46	-45.83	44727.42	-3.25		

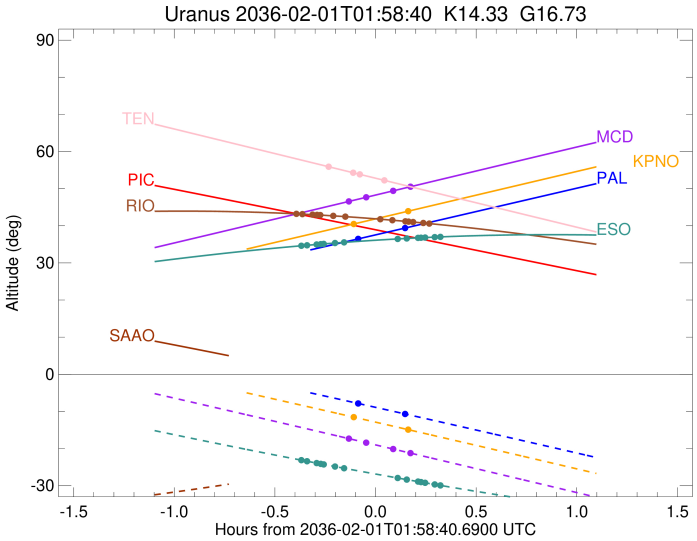
No planet occultations

alpha	E	2036-02-01T02:00:01.948		41.77	-46.84	44717.33	3.25		
beta	E	2036-02-01T02:03:40.924		41.50	-47.17	45667.76	5.41		
eta	E	2036-02-01T02:07:33.136		41.20	-47.50	47176.12	7.55		
gamma	E	2036-02-01T02:08:30.900		41.12	-47.58	47626.45	8.04		
delta	E	2036-02-01T02:09:51.323		41.01	-47.68	48300.35	8.71		
lambda	E	2036-02-01T02:12:54.397		40.75	-47.92	50026.71	10.12		
epsilon	E	2036-02-01T02:14:42.112		40.59	-48.06	51158.70	10.74		

Uranus_2036-02-01T01_58_40.6900_ESO.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:35:57 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2036-02-01T01:59:22.250
Event type : XRgt
: No Uranus occs
: 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 : 3379579374313422080
2Mass ID (if available) : 06493841+2320305
ICRS Star Coord at Epoch: 06h 49m 38.42479s +23:20:30.51384s
RUWE (>1.4 is poor) : 3.42
K magnitude : 14.332
G magnitude : 16.729
RP magnitude : 15.884
BP magnitude : 17.093
DUPflag : 0
Distance (au) : 17.961
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -19.40
Sun-Target sep (deg) : 150.10
Sun-Moon sep (deg) : 110.42
B (ring opening deg) : 64.98
PA of pole (deg) : 75.49
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.306
C/A sky separation (km) : 43068.4
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	2036-02-01T01:37:06.657		34.66	-23.23	50799.83	-11.24		
lambda	I	2036-02-01T01:38:17.454		34.75	-23.43	50026.71	-10.67		
delta	I	2036-02-01T01:41:09.352		34.96	-23.93	48300.35	-9.39		
gamma	I	2036-02-01T01:42:23.890		35.05	-24.14	47622.61	-8.79		
eta	I	2036-02-01T01:43:15.956		35.12	-24.29	47176.12	-8.36		
beta	I	2036-02-01T01:46:39.378		35.35	-24.87	45656.75	-6.56		
alpha	I	2036-02-01T01:49:19.419		35.53	-25.32	44729.97	-5.00		

No planet occultations

alpha	E	2036-02-01T02:05:13.972		36.46	-27.93	44714.42	5.00		
beta	E	2036-02-01T02:07:58.735		36.59	-28.37	45668.87	6.56		
eta	E	2036-02-01T02:11:20.328		36.74	-28.90	47176.12	8.36		
gamma	E	2036-02-01T02:12:12.842		36.78	-29.04	47626.67	8.80		
delta	E	2036-02-01T02:13:26.896		36.83	-29.23	48300.35	9.39		
lambda	E	2036-02-01T02:16:18.738		36.94	-29.68	50026.71	10.68		
epsilon	E	2036-02-01T02:18:02.435		37.01	-29.94	51171.16	11.24		