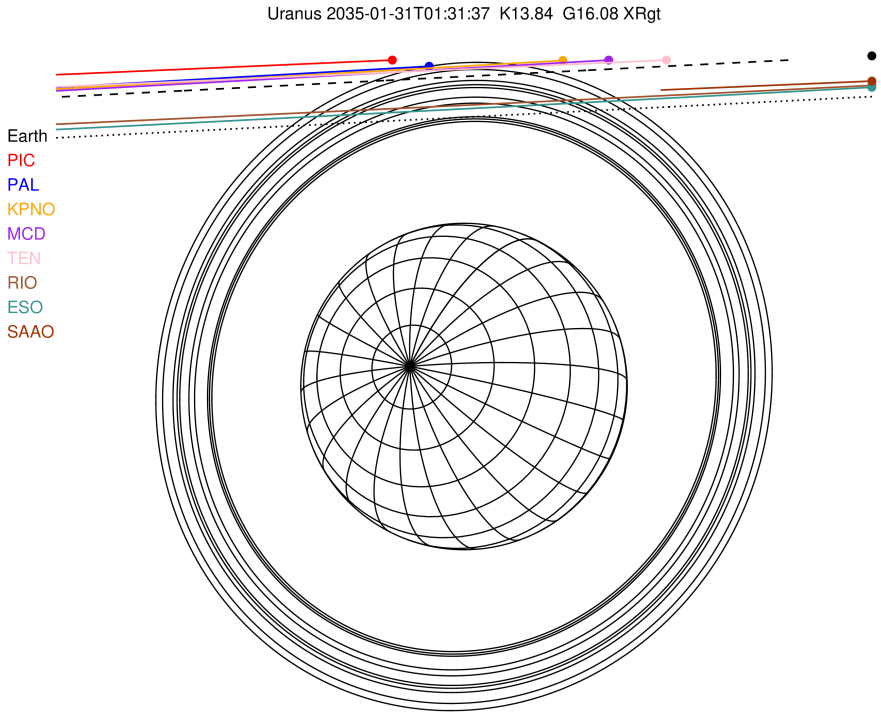
Stellar occultation prediction by rfrench@wellesley.edu Sun Jun 25 01:35:12 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2035-01-31T01:31:37.090
Event type : XRgt
: No Uranus occs
: Ring occs: geocentric, topocentric
Gaia source ID : 3382590008949876352
2Mass ID (if available) : 06293257+2336023

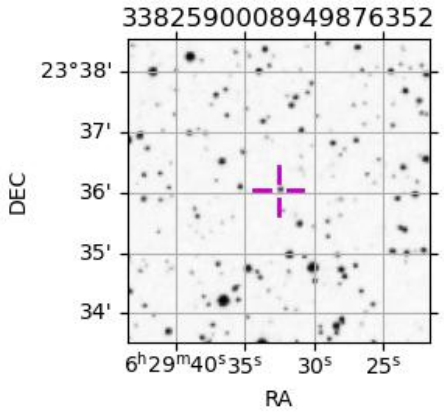
ICRS Star Coord at Epoch: 06h 29m 32.57881s +23:36:02.29695s
RUWE (>1.4 is poor) : 1.07
K magnitude : 13.838
G magnitude : 16.080
RP magnitude : 15.404
BP magnitude : 16.597
DUPflag : 0
Distance (au) : 18.056
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -18.37
Sun-Target sep (deg) : 146.27
Sun-Moon sep (deg) : 121.53
B (ring opening deg) : 69.31
PA of pole (deg) : 69.62

#	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



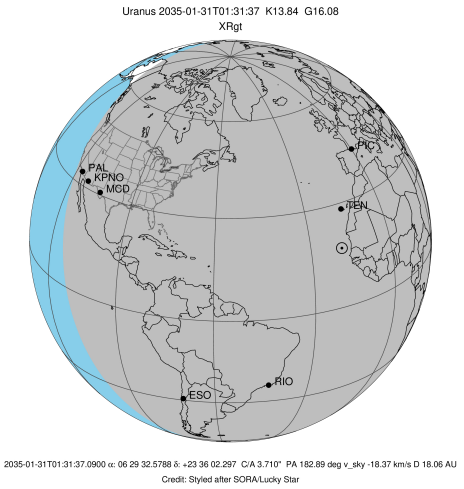
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

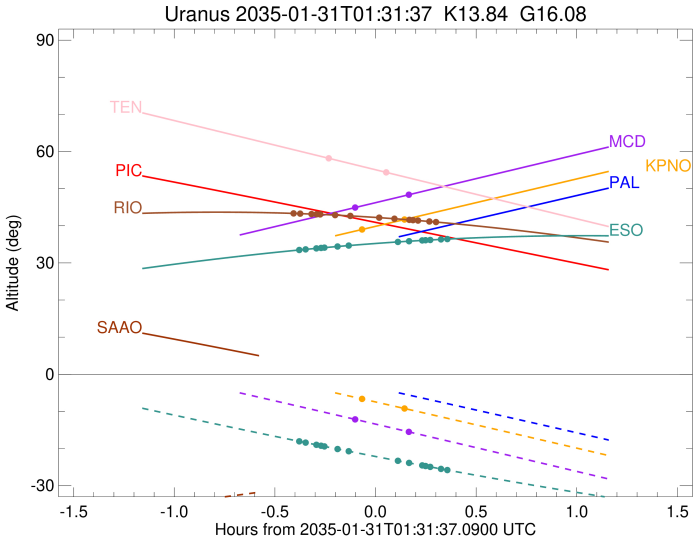
Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1			+	JAN 31 01:40 - JAN 31 01:40	PnnRne
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+		+	JAN 31 01:25 - JAN 31 01:41	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+		+	JAN 31 01:23 - JAN 31 01:42	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5	+		+	JAN 31 01:16 - JAN 31 01:36	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	+++++++		+++++++	JAN 31 01:06 - JAN 31 01:50	PnnRie
ESO	European Southern Obs	-29.3	289.3	+++++++		+++++++	JAN 31 01:08 - JAN 31 01:53	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_2035-01-31T01_31_37.0900_PAL.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:18:40 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2035-01-31T01:36:14.460
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 : 3382590008949876352
2Mass ID (if available) : 06293257+2336023
ICRS Star Coord at Epoch: 06h 29m 32.57881s +23:36:02.29695s
RUWE (>1.4 is poor) : 1.07
K magnitude : 13.838
G magnitude : 16.080
RP magnitude : 15.404
BP magnitude : 16.597
DUPflag : 0
Distance (au) : 18.056
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -18.37
Sun-Target sep (deg) : 146.27
Sun-Moon sep (deg) : 121.64
B (ring opening deg) : 69.31
PA of pole (deg) : 69.62
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.847
C/A sky separation (km) : 50381.7
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





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

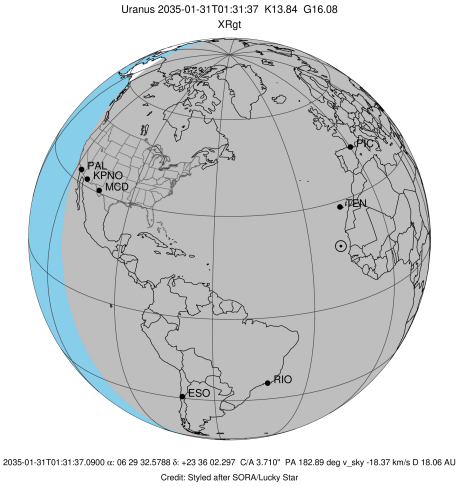
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-01-31T01:27:16.696		34.68	-2.77x	51552.74	-3.06		

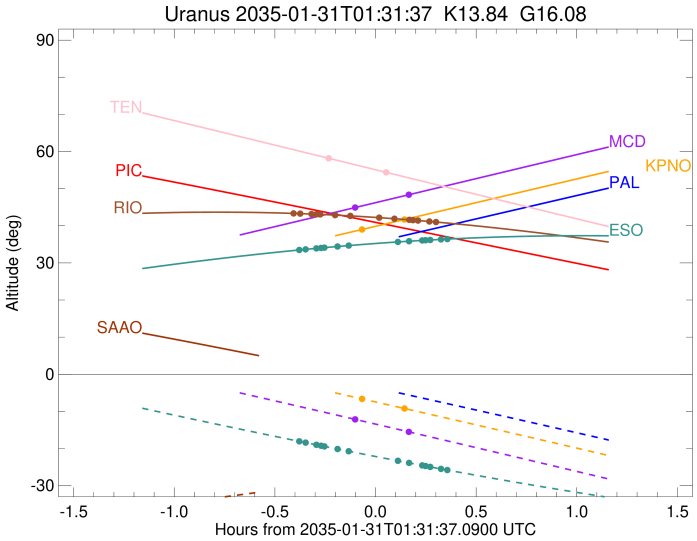
No planet occultations

epsilon	E	2035-01-31T01:40:42.845		37.48	-5.43	51504.24	3.06		

Uranus_2035-01-31T01_31_37.0900_KPNO.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:23:02 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2035-01-31T01:36:02.120
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 : 3382590008949876352
2Mass ID (if available) : 06293257+2336023
ICRS Star Coord at Epoch: 06h 29m 32.57881s +23:36:02.29695s
RUWE (>1.4 is poor) : 1.07
K magnitude : 13.838
G magnitude : 16.080
RP magnitude : 15.404
BP magnitude : 16.597
DUPflag : 0
Distance (au) : 18.056
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -18.37
Sun-Target sep (deg) : 146.27
Sun-Moon sep (deg) : 121.70
B (ring opening deg) : 69.31
PA of pole (deg) : 69.62
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.825
C/A sky separation (km) : 50089.7
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





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

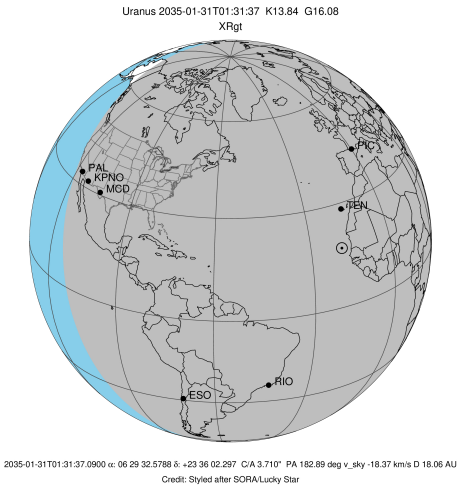
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-01-31T01:25:39.878		38.59	-6.24	51549.71	-3.70		

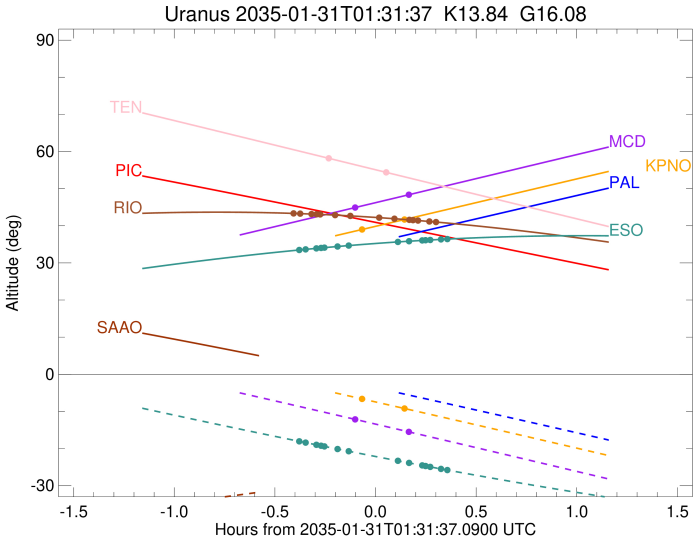
No planet occultations

epsilon	E	2035-01-31T01:41:57.119		42.04	-9.57	51493.86	3.71		

Uranus_2035-01-31T01_31_37.0900_MCD.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:25:11 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2035-01-31T01:35:38.130
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 : 3382590008949876352
2Mass ID (if available) : 06293257+2336023
ICRS Star Coord at Epoch: 06h 29m 32.57881s +23:36:02.29695s
RUWE (>1.4 is poor) : 1.07
K magnitude : 13.838
G magnitude : 16.080
RP magnitude : 15.404
BP magnitude : 16.597
DUPflag : 0
Distance (au) : 18.056
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -18.37
Sun-Target sep (deg) : 146.27
Sun-Moon sep (deg) : 121.79
B (ring opening deg) : 69.31
PA of pole (deg) : 69.62
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.799
C/A sky separation (km) : 49757.0
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

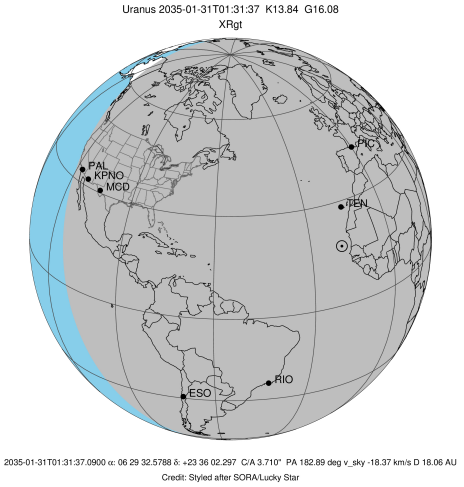
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-01-31T01:23:56.290		44.56	-11.81	51551.12	-4.34		

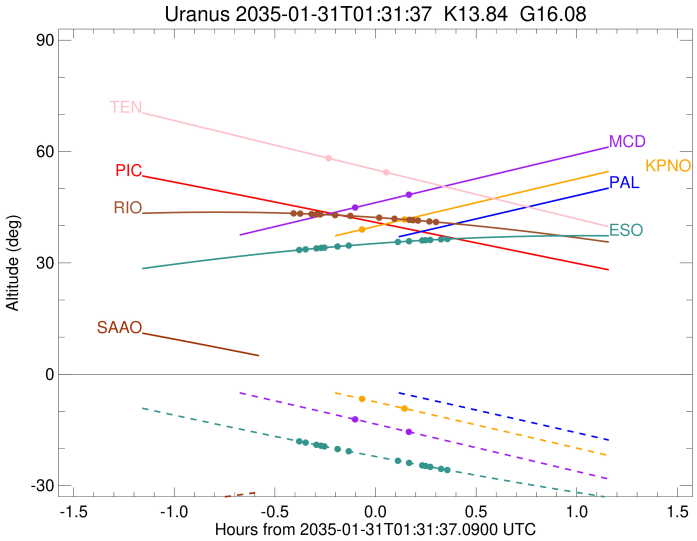
No planet occultations

epsilon	E	2035-01-31T01:42:55.370		48.66	-15.80	51486.43	4.34		

Uranus_2035-01-31T01_31_37.0900_TEN.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:27:20 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2035-01-31T01:28:15.770
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 : 3382590008949876352
2Mass ID (if available) : 06293257+2336023
ICRS Star Coord at Epoch: 06h 29m 32.57881s +23:36:02.29695s
RUWE (>1.4 is poor) : 1.07
K magnitude : 13.838
G magnitude : 16.080
RP magnitude : 15.404
BP magnitude : 16.597
DUPflag : 0
Distance (au) : 18.056
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -18.37
Sun-Target sep (deg) : 146.27
Sun-Moon sep (deg) : 122.44
B (ring opening deg) : 69.31
PA of pole (deg) : 69.62
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.791
C/A sky separation (km) : 49650.0
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

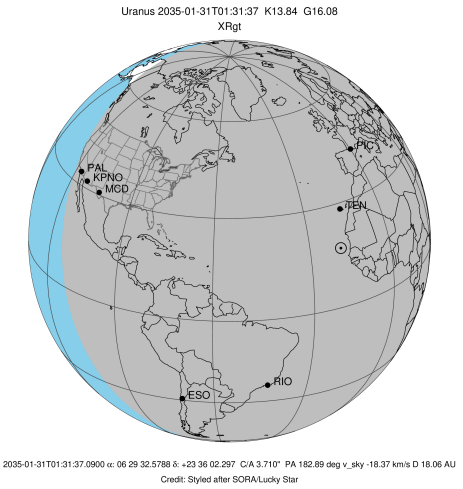
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-01-31T01:16:10.147		58.51	-79.32	51552.30	-4.59		

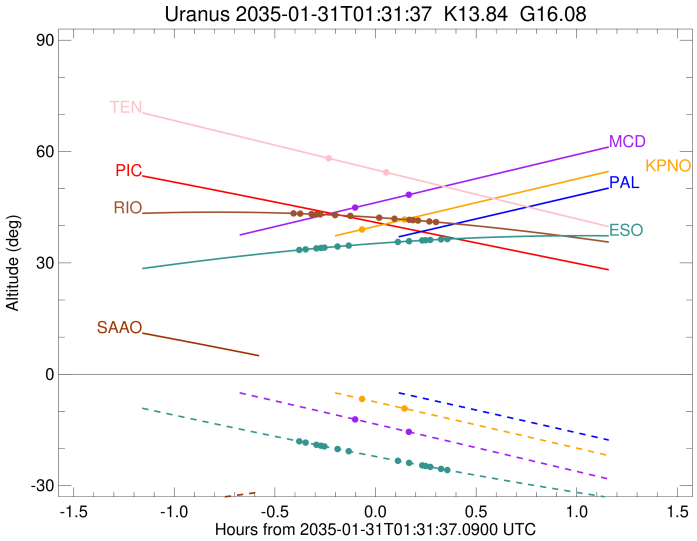
No planet occultations

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	E	2035-01-31T01:36:05.141		54.11	-78.66	51486.24	4.58		

Uranus_2035-01-31T01_31_37.0900_RIO.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:33:39 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2035-01-31T01:30:12.490
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 : 3382590008949876352
2Mass ID (if available) : 06293257+2336023
ICRS Star Coord at Epoch: 06h 29m 32.57881s +23:36:02.29695s
RUWE (>1.4 is poor) : 1.07
K magnitude : 13.838
G magnitude : 16.080
RP magnitude : 15.404
BP magnitude : 16.597
DUPflag : 0
Distance (au) : 18.056
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -18.37
Sun-Target sep (deg) : 146.27
Sun-Moon sep (deg) : 122.13
B (ring opening deg) : 69.31
PA of pole (deg) : 69.62
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.359
C/A sky separation (km) : 43992.8
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

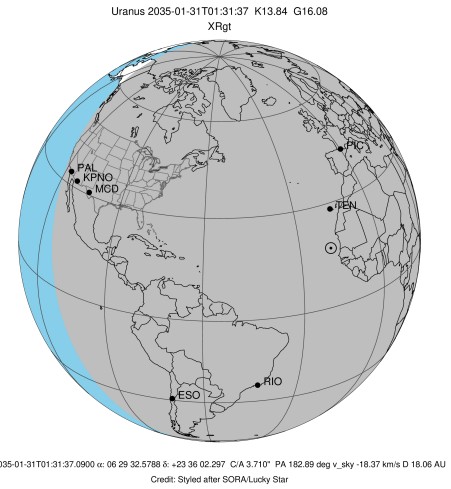
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-01-31T01:06:33.005		43.35	-40.27	51549.44	-10.12		
lambda	I	2035-01-31T01:09:11.141		43.27	-40.65	50026.71	-9.15		
delta	I	2035-01-31T01:12:34.526		43.16	-41.12	48300.35	-7.80		
gamma	I	2035-01-31T01:14:05.207		43.10	-41.33	47621.66	-7.16		
eta	I	2035-01-31T01:15:09.551		43.06	-41.48	47176.12	-6.69		
beta	I	2035-01-31T01:19:36.555		42.87	-42.08	45666.31	-4.60		
alpha	I	2035-01-31T01:24:27.656		42.64	-42.71	44687.24	-2.10		

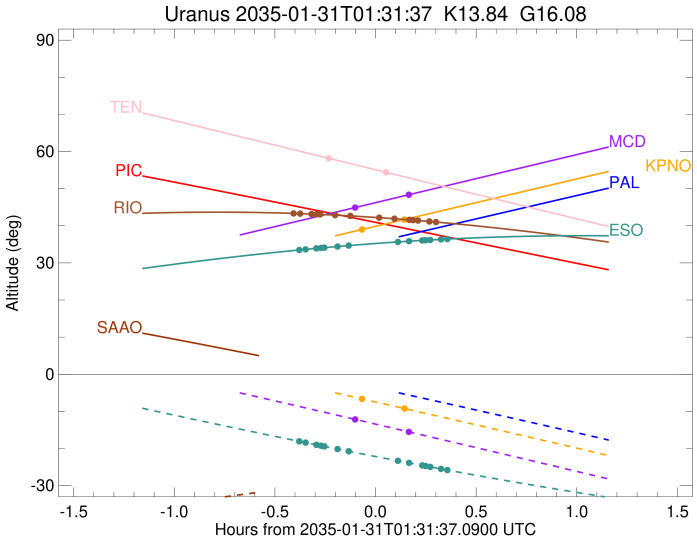
No planet occultations

alpha	E	2035-01-31T01:32:21.841		42.21	-43.70	44685.19	2.10		
beta	E	2035-01-31T01:37:15.341		41.90	-44.28	45674.47	4.59		
eta	E	2035-01-31T01:41:40.769		41.60	-44.79	47176.12	6.68		
gamma	E	2035-01-31T01:42:45.090		41.52	-44.91	47621.08	7.15		
delta	E	2035-01-31T01:44:15.938		41.41	-45.07	48300.35	7.80		
lambda	E	2035-01-31T01:47:39.549		41.16	-45.44	50026.71	9.14		
epsilon	E	2035-01-31T01:50:03.353		40.97	-45.69	51403.47	10.11		

Uranus_2035-01-31T01_31_37.0900_ESO.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:35:50 2023

target : Uranus
target radius (km) : 25559.00
C/A epoch : 2035-01-31T01:32:45.190
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 : 3382590008949876352
2Mass ID (if available) : 06293257+2336023
ICRS Star Coord at Epoch: 06h 29m 32.57881s +23:36:02.29695s
RUWE (>1.4 is poor) : 1.07
K magnitude : 13.838
G magnitude : 16.080
RP magnitude : 15.404
BP magnitude : 16.597
DUPflag : 0
Distance (au) : 18.056
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : -18.37
Sun-Target sep (deg) : 146.27
Sun-Moon sep (deg) : 121.85
B (ring opening deg) : 69.31
PA of pole (deg) : 69.62
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.316
C/A sky separation (km) : 43423.3
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	2035-01-31T01:08:16.100		33.42	-17.95	51548.19	-10.46		
lambda	I	2035-01-31T01:10:48.304		33.64	-18.42	50026.71	-9.55		
delta	I	2035-01-31T01:14:01.390		33.92	-19.00	48300.35	-8.31		
gamma	I	2035-01-31T01:15:25.978		34.03	-19.26	47621.73	-7.73		
eta	I	2035-01-31T01:16:25.245		34.11	-19.44	47176.12	-7.31		
beta	I	2035-01-31T01:20:20.337		34.42	-20.15	45665.43	-5.52		
alpha	I	2035-01-31T01:23:49.890		34.68	-20.77	44688.40	-3.78		

No planet occultations

alpha	E	2035-01-31T01:38:05.641		35.64	-23.27	44684.77	3.78		
beta	E	2035-01-31T01:41:37.414		35.84	-23.88	45675.24	5.53		
eta	E	2035-01-31T01:45:30.664		36.05	-24.54	47176.12	7.31		
gamma	E	2035-01-31T01:46:29.827		36.10	-24.71	47621.12	7.73		
delta	E	2035-01-31T01:47:54.456		36.17	-24.95	48300.35	8.32		
lambda	E	2035-01-31T01:51:07.442		36.33	-25.49	50026.71	9.55		
epsilon	E	2035-01-31T01:53:24.856		36.43	-25.87	51395.38	10.46		