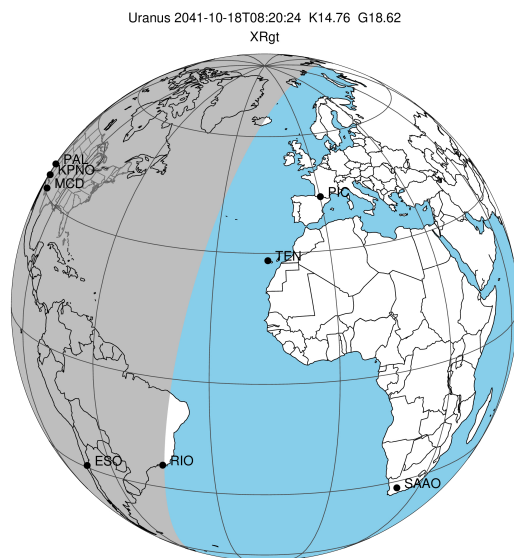


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2041-10-18T08:20:24.010
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 612221478940158592
 2Mass ID (if available) : 08573423+1751421

ICRS Star Coord at Epoch: 08h 57m 34.29263s +17:51:40.82544s

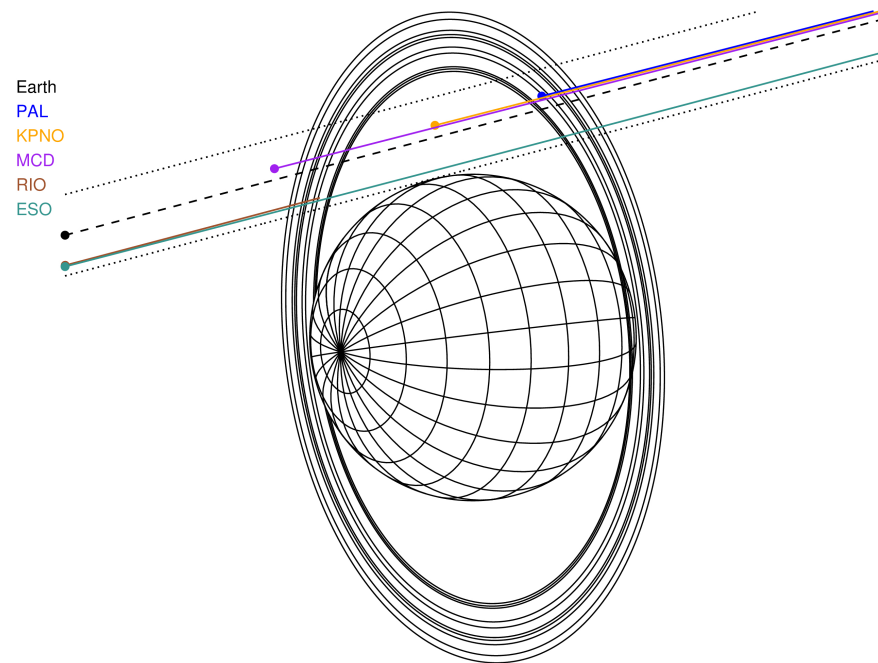
RUWE (>1.4 is poor) : 1.06
 K magnitude : 14.763
 G magnitude : 18.623
 RP magnitude : 17.419
 BP magnitude : 20.197
 DUPflag : 0
 Distance (au) : 18.765
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 15.34
 Sun-Target sep (deg) : 73.01
 Sun-Moon sep (deg) : 4.67
 B (ring opening deg) : 35.42
 PA of pole (deg) : 96.22

#	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



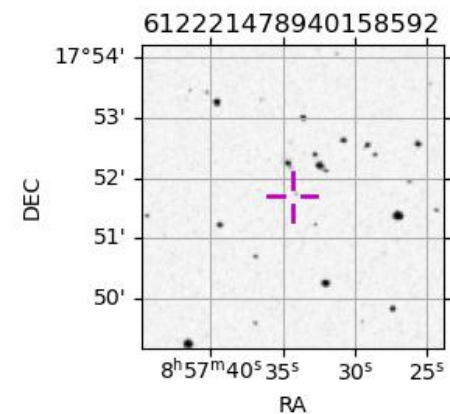
2041-10-18T08:20:24.0100 ex: 08 57 34.2926 8: +17 51 40.825 C/A 2.337" PA 194.79 deg v_sky +15.34 km/s D 18.77 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2041-10-18T08:20:24 K14.76 G18.62 XRgt

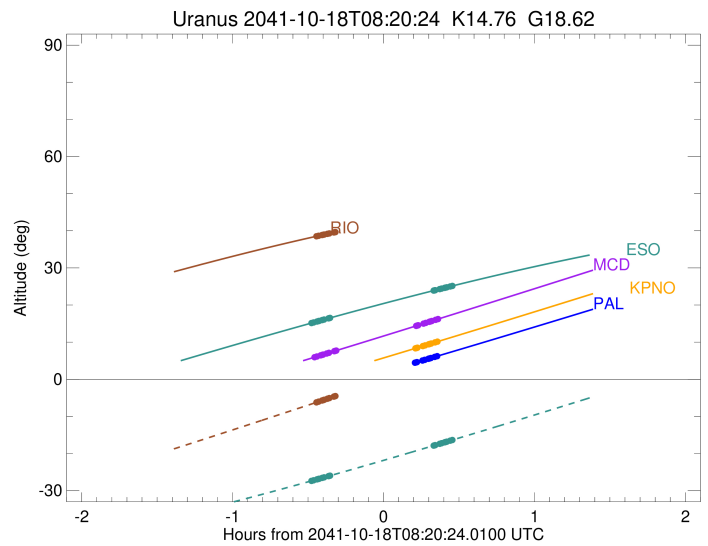
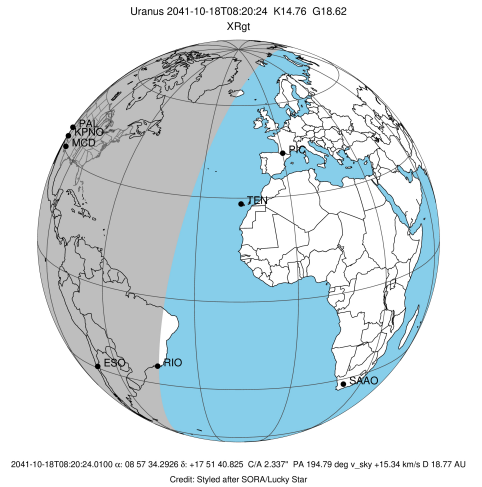


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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			++++++	OCT 18 08:35 - OCT 18 08:41	PnnRne
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4			++++++	OCT 18 08:33 - OCT 18 08:41	PnnRne
MCD	McDonald Obs. 2.7m	30.7	256.0	++++++		++++++	OCT 18 07:52 - OCT 18 08:41	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	++++++			OCT 18 07:53 - OCT 18 07:58	PnnRin
ESO	European Southern Obs	-29.3	289.3	++++++		++++++	OCT 18 07:51 - OCT 18 08:47	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



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2041-10-18T08:14:12.090
 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 : 612221478940158592
 2Mass ID (if available) : 08573423+1751421
 ICRS Star Coord at Epoch: 08h 57m 34.29263s +17:51:40.82544s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 14.763
 G magnitude : 18.623
 RP magnitude : 17.419
 BP magnitude : 20.197
 DUPflag : 0
 Distance (au) : 18.765
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 15.34
 Sun-Target sep (deg) : 73.01
 Sun-Moon sep (deg) : 4.36
 B (ring opening deg) : 35.42
 PA of pole (deg) : 96.22
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.496
 C/A sky separation (km) : 33965.1
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.bsp
 ural61.bsp
 vgr2.ural61.bsp
 peph.ural60.bsp
 earthstns_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

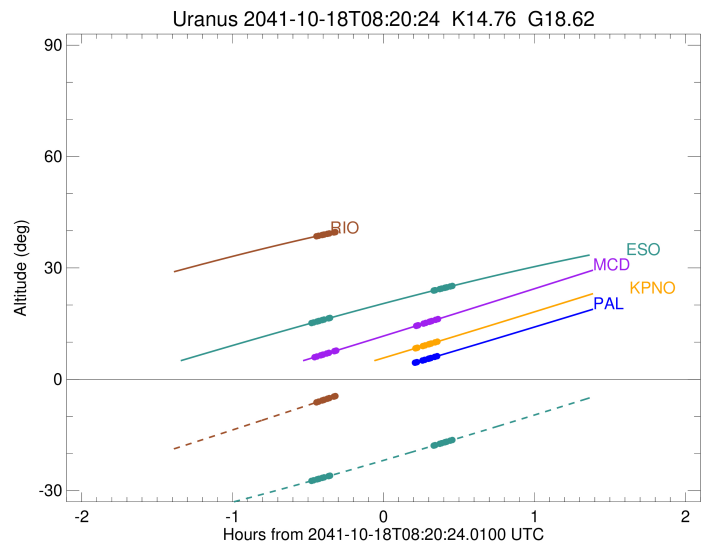
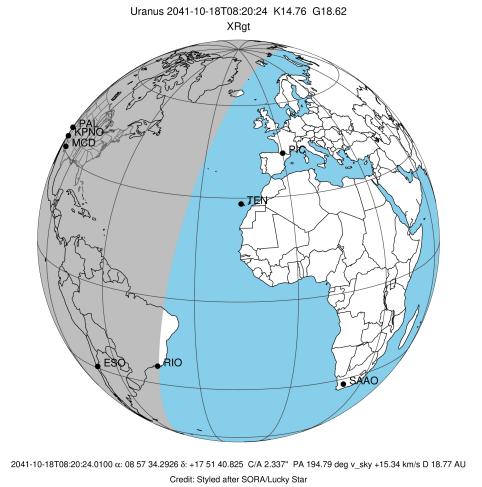


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2041-10-18T07:53:22.963	-3.29x	-66.12	51478.05	-19.68			
lambda	I	2041-10-18T07:54:37.258	-3.05x	-66.07	50026.71	-19.30			
delta	I	2041-10-18T07:56:08.178	-2.76x	-65.99	48300.35	-18.67			
gamma	I	2041-10-18T07:56:44.698	-2.64x	-65.96	47623.55	-18.39			
eta	I	2041-10-18T07:57:09.147	-2.56x	-65.94	47176.12	-18.21			
beta	I	2041-10-18T07:58:32.894	-2.29x	-65.86	45676.89	-17.52			
alpha	I	2041-10-18T07:59:28.858	-2.11x	-65.80	44703.24	-16.99			
4	I	2041-10-18T08:01:37.806	-1.69x	-65.67	42590.33	-15.75			
5	I	2041-10-18T08:01:58.598	-1.63x	-65.65	42238.92	-15.54			
6	I	2041-10-18T08:02:25.142	-1.54x	-65.62	41869.49	-15.23			

No planet occultations

6	E	2041-10-18T08:32:57.427	4.47x	-62.80	41874.10	15.17			
5	E	2041-10-18T08:33:22.704	4.55x	-62.75	42312.48	15.48			
4	E	2041-10-18T08:33:44.313	4.62x	-62.70	42616.10	15.68			
alpha	E	2041-10-18T08:35:50.498	5.04	-62.45	44686.08	16.92			
beta	E	2041-10-18T08:36:47.693	5.23	-62.34	45675.42	17.44			
eta	E	2041-10-18T08:38:12.275	5.51	-62.16	47176.12	18.11			
gamma	E	2041-10-18T08:38:36.751	5.59	-62.11	47621.62	18.29			
delta	E	2041-10-18T08:39:13.580	5.72	-62.03	48300.35	18.56			
lambda	E	2041-10-18T08:40:45.029	6.02	-61.84	50026.71	19.18			
epsilon	E	2041-10-18T08:41:29.040	6.17	-61.75	50877.03	19.56			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2041-10-18T08:14:05.900
 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 : 612221478940158592
 2Mass ID (if available) : 08573423+1751421
 ICRS Star Coord at Epoch: 08h 57m 34.29263s +17:51:40.82544s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 14.763
 G magnitude : 18.623
 RP magnitude : 17.419
 BP magnitude : 20.197
 DUPflag : 0
 Distance (au) : 18.765
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 15.34
 Sun-Target sep (deg) : 73.01
 Sun-Moon sep (deg) : 4.40
 B (ring opening deg) : 35.42
 PA of pole (deg) : 96.22
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.474
 C/A sky separation (km) : 33666.3
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.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

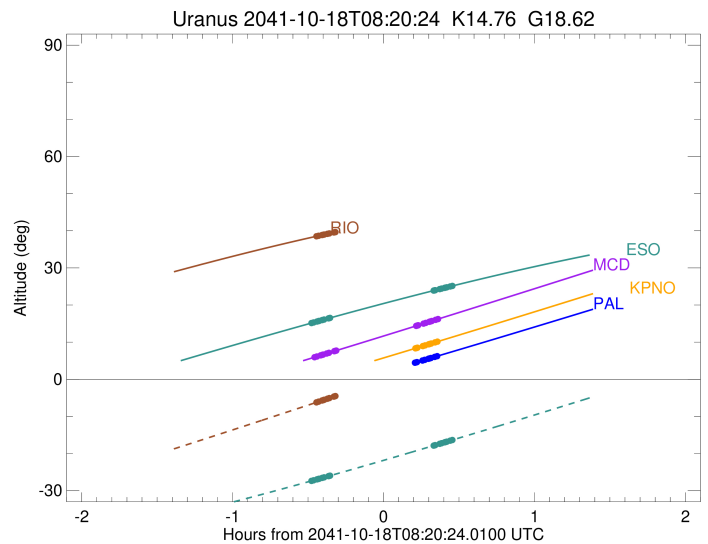
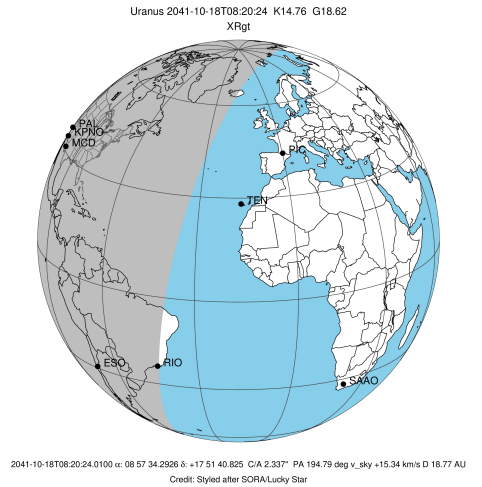


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2041-10-18T07:53:02.603	0.23x	-65.99	51479.95	-19.78			
lambda	I	2041-10-18T07:54:16.617	0.48x	-65.87	50026.71	-19.40			
delta	I	2041-10-18T07:55:46.995	0.78x	-65.72	48300.35	-18.79			
gamma	I	2041-10-18T07:56:23.265	0.90x	-65.67	47623.60	-18.52			
eta	I	2041-10-18T07:56:47.540	0.98x	-65.63	47176.12	-18.34			
beta	I	2041-10-18T07:58:10.618	1.26x	-65.49	45676.77	-17.68			
alpha	I	2041-10-18T07:59:06.021	1.44x	-65.39	44703.56	-17.17			
4	I	2041-10-18T08:01:13.519	1.87x	-65.17	42589.84	-15.96			
5	I	2041-10-18T08:01:34.060	1.94x	-65.13	42237.95	-15.76			
6	I	2041-10-18T08:02:00.171	2.02x	-65.08	41869.14	-15.46			

No planet occultations

6	E	2041-10-18T08:33:08.409	8.34	-61.00	41873.84	15.40
5	E	2041-10-18T08:33:33.305	8.43	-60.94	42312.72	15.69
4	E	2041-10-18T08:33:54.634	8.50	-60.88	42616.03	15.89
alpha	E	2041-10-18T08:35:59.381	8.93	-60.57	44686.18	17.08
beta	E	2041-10-18T08:36:56.025	9.12	-60.42	45675.29	17.59
eta	E	2041-10-18T08:38:19.948	9.41	-60.20	47176.12	18.24
gamma	E	2041-10-18T08:38:44.252	9.49	-60.14	47621.64	18.42
delta	E	2041-10-18T08:39:20.837	9.62	-60.05	48300.35	18.68
lambda	E	2041-10-18T08:40:51.758	9.93	-59.81	50026.71	19.28
epsilon	E	2041-10-18T08:41:35.431	10.08	-59.69	50874.75	19.65

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2041-10-18T08:14:03.500
 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 : 612221478940158592
 2Mass ID (if available) : 08573423+1751421
 ICRS Star Coord at Epoch: 08h 57m 34.29263s +17:51:40.82544s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 14.763
 G magnitude : 18.623
 RP magnitude : 17.419
 BP magnitude : 20.197
 DUPflag : 0
 Distance (au) : 18.765
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 15.34
 Sun-Target sep (deg) : 73.01
 Sun-Moon sep (deg) : 4.46
 B (ring opening deg) : 35.42
 PA of pole (deg) : 96.22
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.448
 C/A sky separation (km) : 33317.0
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.bsp
 ural61.bsp
 vgr2.ural61.bsp
 peph.ural60.bsp
 earthstns_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

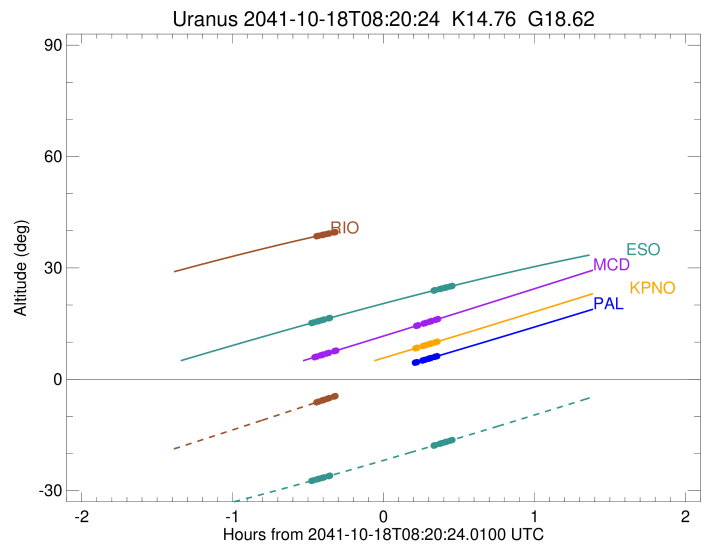
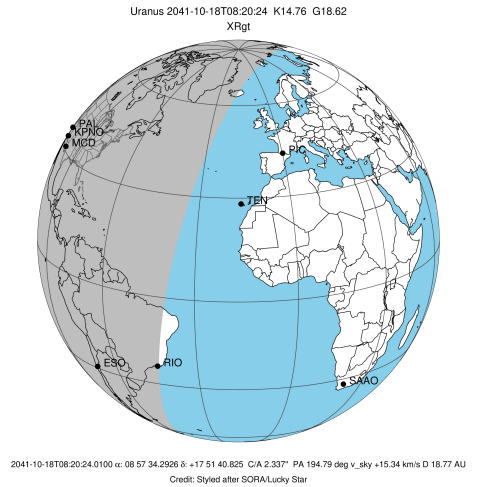


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2041-10-18T07:52:43.220		5.88	-63.42	51482.17	-19.87		
lambda	I	2041-10-18T07:53:56.983		6.14	-63.24	50026.71	-19.51		
delta	I	2041-10-18T07:55:26.826		6.45	-63.02	48300.35	-18.91		
gamma	I	2041-10-18T07:56:02.846		6.57	-62.93	47623.65	-18.66		
eta	I	2041-10-18T07:56:26.946		6.66	-62.87	47176.12	-18.48		
beta	I	2041-10-18T07:57:49.346		6.94	-62.66	45676.62	-17.84		
alpha	I	2041-10-18T07:58:44.171		7.13	-62.52	44703.93	-17.35		
4	I	2041-10-18T08:00:50.173		7.56	-62.20	42589.27	-16.19		
5	I	2041-10-18T08:01:10.460		7.63	-62.15	42236.81	-15.99		
6	I	2041-10-18T08:01:36.115		7.72	-62.08	41868.73	-15.71		

No planet occultations

6	E	2041-10-18T08:33:26.888	14.39	-56.67	41873.54	15.64
5	E	2041-10-18T08:33:51.387	14.48	-56.60	42312.98	15.92
4	E	2041-10-18T08:34:12.424	14.55	-56.53	42615.93	16.12
alpha	E	2041-10-18T08:36:15.682	14.99	-56.16	44686.30	17.26
beta	E	2041-10-18T08:37:11.758	15.18	-55.98	45675.13	17.75
eta	E	2041-10-18T08:38:35.008	15.48	-55.73	47176.12	18.38
gamma	E	2041-10-18T08:38:59.140	15.56	-55.65	47621.67	18.55
delta	E	2041-10-18T08:39:35.479	15.69	-55.54	48300.35	18.80
lambda	E	2041-10-18T08:41:05.876	16.01	-55.26	50026.71	19.38
epsilon	E	2041-10-18T08:41:49.203	16.16	-55.13	50872.19	19.74

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2041-10-18T08:18:41.270
 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 : 612221478940158592
 2Mass ID (if available) : 08573423+1751421
 ICRS Star Coord at Epoch: 08h 57m 34.29263s +17:51:40.82544s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 14.763
 G magnitude : 18.623
 RP magnitude : 17.419
 BP magnitude : 20.197
 DUPflag : 0
 Distance (au) : 18.765
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 15.34
 Sun-Target sep (deg) : 73.01
 Sun-Moon sep (deg) : 5.34
 B (ring opening deg) : 35.42
 PA of pole (deg) : 96.22
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.007
 C/A sky separation (km) : 27314.6
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.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

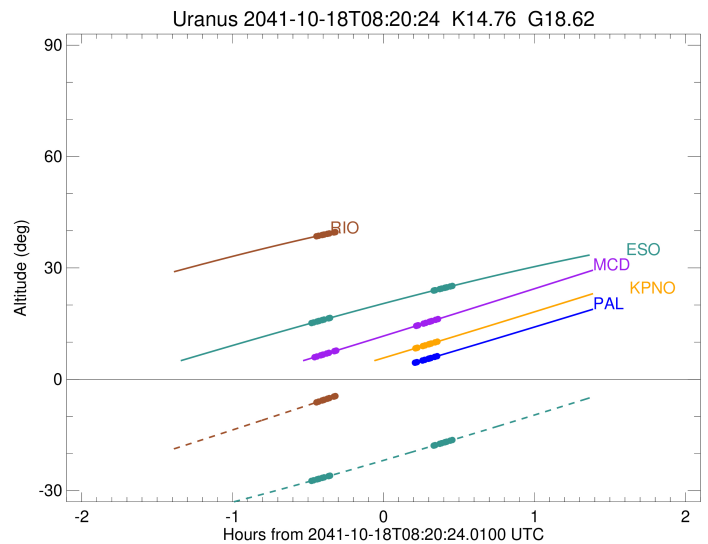
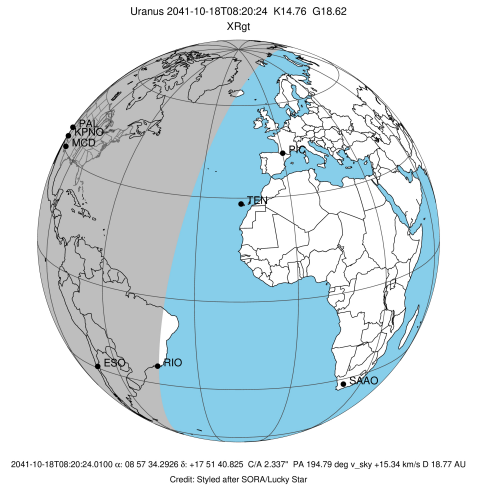


Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2041-10-18T07:53:29.201	38.48	-6.28	51513.68	-21.64		
lambda	I	2041-10-18T07:54:38.185	38.66	-6.02	50026.71	-21.42		
delta	I	2041-10-18T07:55:59.419	38.86	-5.72	48300.35	-21.08		
gamma	I	2041-10-18T07:56:31.598	38.94	-5.60	47624.47	-20.93		
eta	I	2041-10-18T07:56:53.071	38.99	-5.52	47176.12	-20.83		
beta	I	2041-10-18T07:58:05.689	39.17	-5.25	45674.01	-20.47		
alpha	I	2041-10-18T07:58:52.562	39.29	-5.07	44710.02	-20.19		
4	I	2041-10-18T08:00:39.490	39.55	-4.67x	42580.20	-19.56		
5	I	2041-10-18T08:00:56.847	39.59	-4.60x	42219.79	-19.46		
6	I	2041-10-18T08:01:16.885	39.64	-4.53x	41861.81	-19.30		

No planet occultations

6	E	2041-10-18T08:42:19.888	44.90	4.78x	41868.25	19.25		
5	E	2041-10-18T08:42:39.768	44.94	4.85x	42315.20	19.41		
4	E	2041-10-18T08:42:57.139	44.97	4.92x	42613.57	19.50		
alpha	E	2041-10-18T08:44:41.073	45.15	5.31x	44688.70	20.12		
beta	E	2041-10-18T08:45:29.118	45.24	5.50x	45672.46	20.40		
eta	E	2041-10-18T08:46:42.321	45.36	5.78x	47176.12	20.76		
gamma	E	2041-10-18T08:47:03.758	45.40	5.86x	47622.15	20.86		
delta	E	2041-10-18T08:47:36.163	45.46	5.98x	48300.35	21.00		
lambda	E	2041-10-18T08:48:57.698	45.60	6.29x	50026.71	21.34		
epsilon	E	2041-10-18T08:49:35.369	45.66	6.43x	50833.33	21.55		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2041-10-18T08:16:49.670
 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 : 612221478940158592
 2Mass ID (if available) : 08573423+1751421
 ICRS Star Coord at Epoch: 08h 57m 34.29263s +17:51:40.82544s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 14.763
 G magnitude : 18.623
 RP magnitude : 17.419
 BP magnitude : 20.197
 DUPflag : 0
 Distance (au) : 18.765
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 15.34
 Sun-Target sep (deg) : 73.01
 Sun-Moon sep (deg) : 5.38
 B (ring opening deg) : 35.42
 PA of pole (deg) : 96.22
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.971
 C/A sky separation (km) : 26828.1
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.bsp
 ural61.bsp
 vgr2.ural61.bsp
 peph.ural60.bsp
 earthstns_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2041-10-18T07:51:30.730		15.09	-27.42	51515.20	-22.02		
lambda	I	2041-10-18T07:52:38.569		15.31	-27.21	50026.71	-21.81		
delta	I	2041-10-18T07:53:58.319		15.56	-26.96	48300.35	-21.48		
gamma	I	2041-10-18T07:54:29.889		15.66	-26.86	47624.52	-21.33		
eta	I	2041-10-18T07:54:50.954		15.72	-26.79	47176.12	-21.24		
beta	I	2041-10-18T07:56:02.151		15.94	-26.57	45673.85	-20.89		
alpha	I	2041-10-18T07:56:48.031		16.09	-26.42	44710.39	-20.62		
4	I	2041-10-18T07:58:32.673		16.41	-26.09	42579.65	-20.01		
5	I	2041-10-18T07:58:49.678		16.46	-26.04	42218.79	-19.92		
6	I	2041-10-18T07:59:09.188		16.52	-25.97	41861.36	-19.77		

No planet occultations

6	E	2041-10-18T08:40:23.254		23.89	-17.86	41867.70	19.67		
5	E	2041-10-18T08:40:42.712		23.95	-17.80	42315.24	19.83		
4	E	2041-10-18T08:40:59.713		24.00	-17.74	42613.27	19.92		
alpha	E	2041-10-18T08:42:41.598		24.29	-17.40	44688.98	20.51		
beta	E	2041-10-18T08:43:28.709		24.42	-17.24	45672.18	20.78		
eta	E	2041-10-18T08:44:40.630		24.62	-16.99	47176.12	21.12		
gamma	E	2041-10-18T08:45:01.704		24.68	-16.92	47622.20	21.21		
delta	E	2041-10-18T08:45:33.564		24.77	-16.81	48300.35	21.35		
lambda	E	2041-10-18T08:46:53.787		25.00	-16.54	50026.71	21.68		
epsilon	E	2041-10-18T08:47:30.704		25.10	-16.42	50829.62	21.88		