

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-10-23T06:59:24.120
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3413037371411104640
 2Mass ID (if available) : 04474700+2221479

ICRS Star Coord at Epoch: 04h 47m 46.99278s +22:21:47.67508s

RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.221
 G magnitude : 17.853
 RP magnitude : 16.799
 BP magnitude : 18.993
 DUPflag : 0
 Distance (au) : 18.566
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -15.35
 Sun-Target sep (deg) : 136.66
 Sun-Moon sep (deg) : 155.48
 B (ring opening deg) : 81.20
 PA of pole (deg) : -36.15

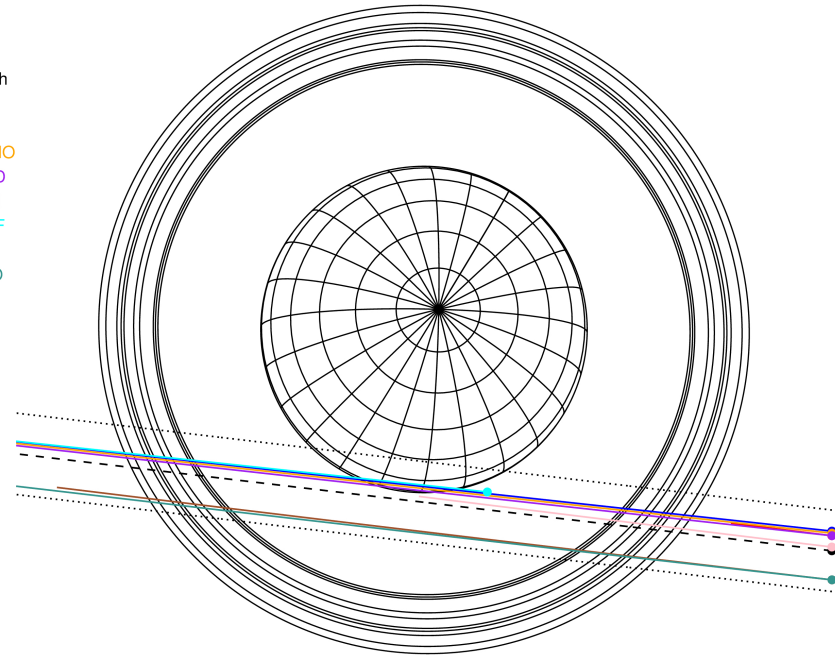
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2028-10-23T06:59:24.1200 α: 04 47 46.9928 α: +22 21 47.675 C/A 1.991° PA 353.22 deg v_sky -15.35 km/s D 18.57 AU
 Credit: Styled after SORA/Lucky Star

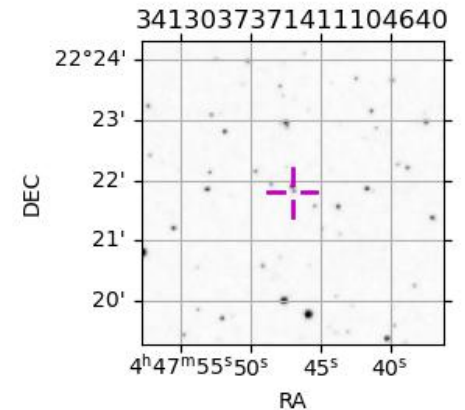
Uranus 2028-10-23T06:59:24 K14.22 G17.85 PtRgt

Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO

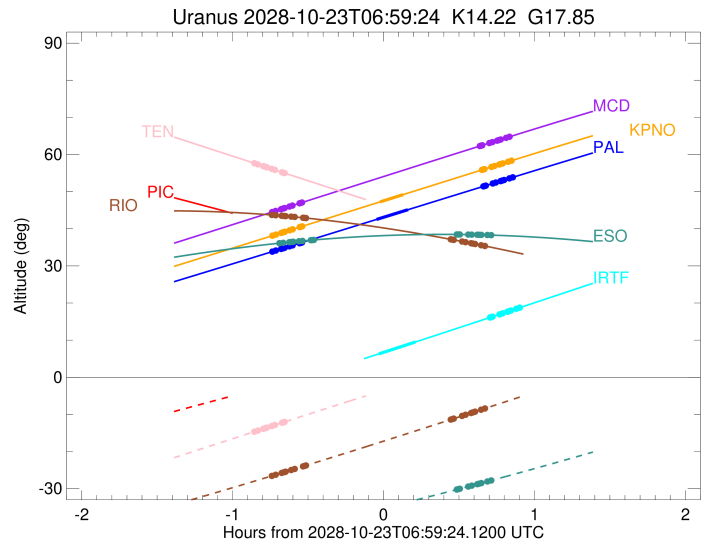
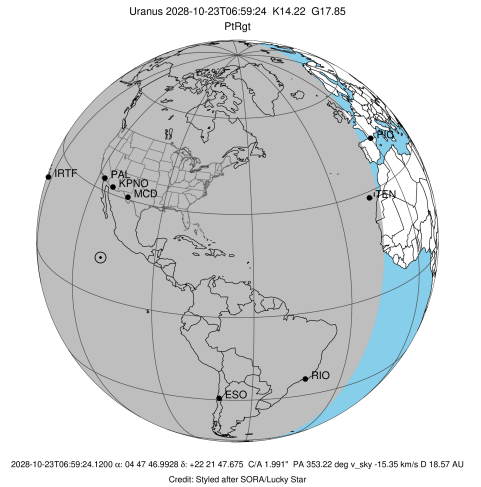


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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 23 06:15 - OCT 23 07:51	PieRie
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	OCT 23 06:15 - OCT 23 07:50	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++		+++++	OCT 23 06:15 - OCT 23 07:49	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5	+++++			OCT 23 06:08 - OCT 23 06:20	PnnRin
IRTF	Mauna Kea/IRTF	19.8	204.5		+ +	+++++	OCT 23 06:57 - OCT 23 07:54	PieRne
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++++		+++++	OCT 23 06:15 - OCT 23 07:40	PnnRie
ESO	European Southern Obs	-29.3	289.3	+++++		+++++	OCT 23 06:18 - OCT 23 07:42	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

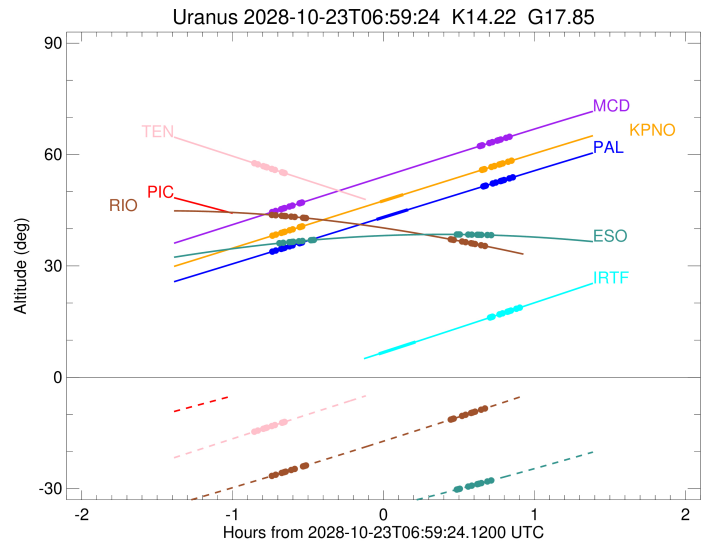
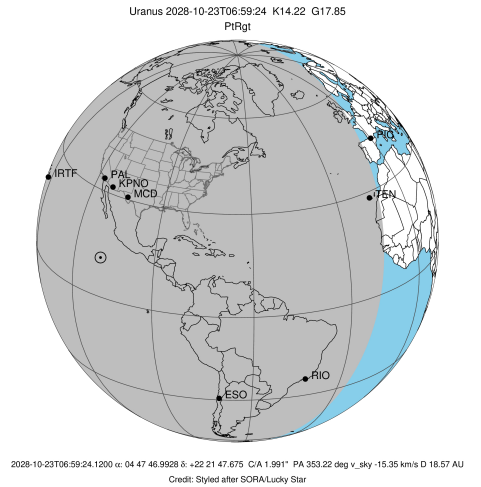


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-10-23T07:03:23.800
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3413037371411104640
 2Mass ID (if available) : 04474700+2221479
 ICRS Star Coord at Epoch: 04h 47m 46.99278s +22:21:47.67508s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.221
 G magnitude : 17.853
 RP magnitude : 16.799
 BP magnitude : 18.993
 DUPflag : 0
 Distance (au) : 18.566
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -15.35
 Sun-Target sep (deg) : 136.66
 Sun-Moon sep (deg) : 156.27
 B (ring opening deg) : 81.20
 PA of pole (deg) : -36.15
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.816
 C/A sky separation (km) : 24459.5
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.bsp
 earthstns_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



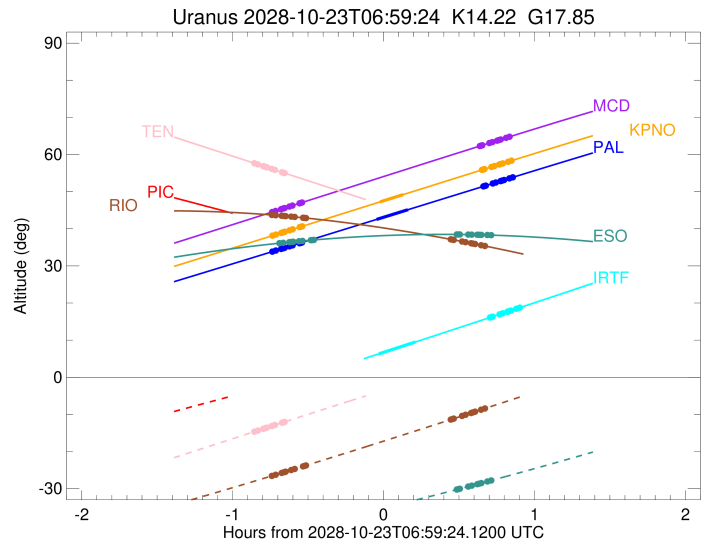
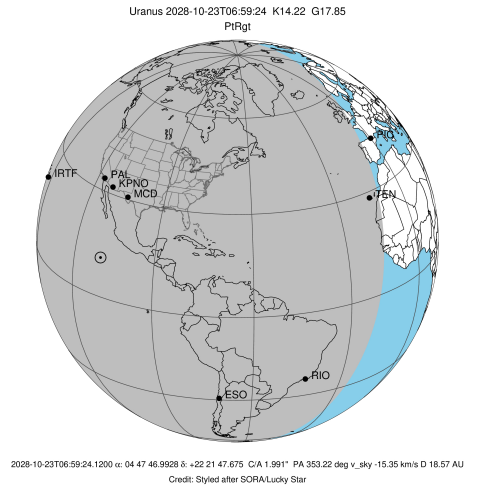
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2028-10-23T06:15:38.120		33.94	-62.27	50811.17	-13.61		
lambda	I	2028-10-23T06:16:36.024		34.14	-62.41	50026.71	-13.51		
delta	I	2028-10-23T06:18:44.490		34.58	-62.71	48300.35	-13.36		
gamma	I	2028-10-23T06:19:35.168		34.76	-62.83	47625.05	-13.29		
eta	I	2028-10-23T06:20:09.000		34.88	-62.91	47176.12	-13.25		
beta	I	2028-10-23T06:22:05.401		35.28	-63.17	45643.96	-13.08		
alpha	I	2028-10-23T06:23:13.873		35.52	-63.33	44752.17	-12.97		
4	I	2028-10-23T06:26:00.448		36.10	-63.70	42615.65	-12.68		
5	I	2028-10-23T06:26:24.132		36.18	-63.75	42315.25	-12.63		
6	I	2028-10-23T06:26:59.052		36.31	-63.82	41876.63	-12.57		
Uranus	I	2028-10-23T06:56:38.136		42.52	-66.98	25261.87		-6.28	-6.57
Uranus	E	2028-10-23T07:09:07.069		45.14	-67.82	25037.37		-8.39	-8.78
6	E	2028-10-23T07:39:05.686		51.42	-68.38	41840.29	12.66		
5	E	2028-10-23T07:39:34.327		51.52	-68.37	42208.46	12.73		
4	E	2028-10-23T07:40:00.943		51.61	-68.36	42547.97	12.77		
alpha	E	2028-10-23T07:42:48.542		52.19	-68.30	44709.12	13.07		
beta	E	2028-10-23T07:44:02.239		52.45	-68.26	45677.78	13.19		
eta	E	2028-10-23T07:45:55.067		52.84	-68.20	47176.12	13.36		
gamma	E	2028-10-23T07:46:29.080		52.96	-68.18	47631.41	13.41		
delta	E	2028-10-23T07:47:18.836		53.13	-68.15	48300.35	13.48		
lambda	E	2028-10-23T07:49:26.131		53.58	-68.07	50026.71	13.64		
epsilon	E	2028-10-23T07:51:15.107		53.95	-67.99	51520.42	13.75		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-10-23T07:03:09.290
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 3413037371411104640
 2Mass ID (if available) : 04474700+2221479
 ICRS Star Coord at Epoch: 04h 47m 46.99278s +22:21:47.67508s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.221
 G magnitude : 17.853
 RP magnitude : 16.799
 BP magnitude : 18.993
 DUPflag : 0
 Distance (au) : 18.566
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -15.35
 Sun-Target sep (deg) : 136.66
 Sun-Moon sep (deg) : 156.26
 B (ring opening deg) : 81.20
 PA of pole (deg) : -36.15
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.839
 C/A sky separation (km) : 24768.3
 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_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	2028-10-23T06:15:40.399		38.23	-66.16	50812.78	-13.59		
lambda	I	2028-10-23T06:16:38.528		38.44	-66.28	50026.71	-13.49		
delta	I	2028-10-23T06:18:47.269		38.89	-66.54	48300.35	-13.33		
gamma	I	2028-10-23T06:19:38.066		39.07	-66.64	47625.09	-13.26		
eta	I	2028-10-23T06:20:11.989		39.19	-66.70	47176.12	-13.21		
beta	I	2028-10-23T06:22:08.719		39.61	-66.92	45644.05	-13.04		
alpha	I	2028-10-23T06:23:17.418		39.85	-67.05	44752.20	-12.93		
4	I	2028-10-23T06:26:04.648		40.44	-67.35	42615.56	-12.62		
5	I	2028-10-23T06:26:28.424		40.53	-67.39	42315.24	-12.58		
6	I	2028-10-23T06:27:03.501		40.65	-67.45	41876.78	-12.51		
Uranus	I	2028-10-23T06:58:02.462		47.25	-69.61	25226.62		-6.65	-6.96
Uranus	E	2028-10-23T07:07:13.181		49.20	-69.81	25059.13		-8.20	-8.59
6	E	2028-10-23T07:38:32.406		55.86	-68.84	41840.67	12.59		
5	E	2028-10-23T07:39:01.220		55.96	-68.80	42209.13	12.66		
4	E	2028-10-23T07:39:27.933		56.06	-68.77	42548.31	12.71		
alpha	E	2028-10-23T07:42:16.256		56.65	-68.56	44709.38	13.02		
beta	E	2028-10-23T07:43:30.202		56.91	-68.46	45677.69	13.14		
eta	E	2028-10-23T07:45:23.416		57.31	-68.31	47176.12	13.32		
gamma	E	2028-10-23T07:45:57.535		57.43	-68.26	47631.42	13.37		
delta	E	2028-10-23T07:46:47.435		57.60	-68.19	48300.35	13.44		
lambda	E	2028-10-23T07:48:55.068		58.05	-68.00	50026.71	13.61		
epsilon	E	2028-10-23T07:50:44.215		58.44	-67.83	51519.32	13.71		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-10-23T07:02:41.590
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 3413037371411104640
 2Mass ID (if available) : 04474700+2221479
 ICRS Star Coord at Epoch: 04h 47m 46.99278s +22:21:47.67508s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.221
 G magnitude : 17.853
 RP magnitude : 16.799
 BP magnitude : 18.993
 DUPflag : 0
 Distance (au) : 18.566
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -15.35
 Sun-Target sep (deg) : 136.66
 Sun-Moon sep (deg) : 156.23
 B (ring opening deg) : 81.20
 PA of pole (deg) : -36.15
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.867
 C/A sky separation (km) : 25137.0
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.bsp
 earthstns_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

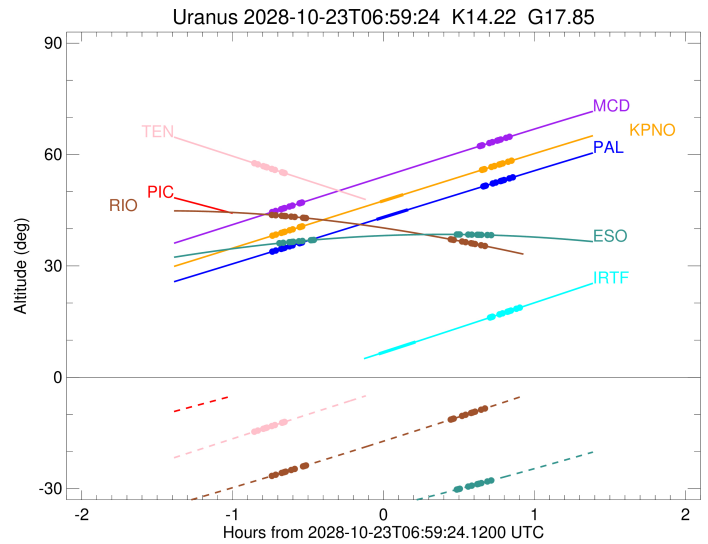
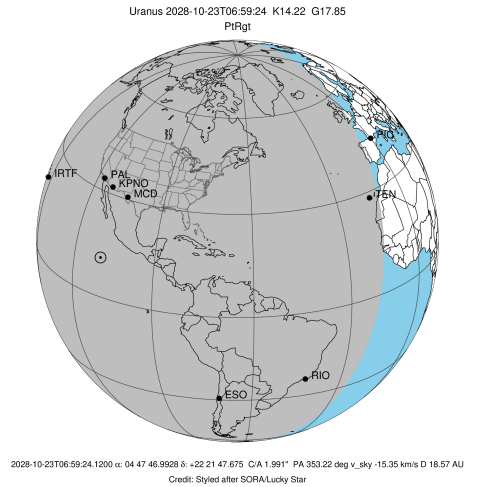


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2028-10-23T06:15:33.560		44.60	-70.25	50814.79	-13.57		
lambda	I	2028-10-23T06:16:31.955		44.81	-70.31	50026.71	-13.46		
delta	I	2028-10-23T06:18:41.001		45.27	-70.44	48300.35	-13.29		
gamma	I	2028-10-23T06:19:31.934		45.46	-70.49	47625.14	-13.22		
eta	I	2028-10-23T06:20:05.961		45.58	-70.53	47176.12	-13.17		
beta	I	2028-10-23T06:22:03.071		46.00	-70.63	45644.16	-12.99		
alpha	I	2028-10-23T06:23:12.036		46.25	-70.69	44752.24	-12.87		
4	I	2028-10-23T06:26:00.039		46.85	-70.81	42615.45	-12.56		
5	I	2028-10-23T06:26:23.925		46.94	-70.83	42315.21	-12.51		
6	I	2028-10-23T06:26:59.188		47.07	-70.85	41876.96	-12.44		

No planet occultations

6	E	2028-10-23T07:37:41.820		62.28	-66.92	41841.12	12.51		
5	E	2028-10-23T07:38:10.847		62.39	-66.86	42209.91	12.59		
4	E	2028-10-23T07:38:37.685		62.48	-66.80	42548.71	12.64		
alpha	E	2028-10-23T07:41:26.904		63.08	-66.41	44709.69	12.96		
beta	E	2028-10-23T07:42:41.159		63.34	-66.24	45677.59	13.08		
eta	E	2028-10-23T07:44:34.851		63.74	-65.97	47176.12	13.27		
gamma	E	2028-10-23T07:45:09.101		63.87	-65.89	47631.43	13.32		
delta	E	2028-10-23T07:45:59.182		64.04	-65.77	48300.35	13.39		
lambda	E	2028-10-23T07:48:07.233		64.49	-65.45	50026.71	13.57		
epsilon	E	2028-10-23T07:49:56.598		64.88	-65.18	51518.02	13.68		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-10-23T06:54:56.550
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 3413037371411104640
 2Mass ID (if available) : 04474700+2221479
 ICRS Star Coord at Epoch: 04h 47m 46.99278s +22:21:47.67508s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.221
 G magnitude : 17.853
 RP magnitude : 16.799
 BP magnitude : 18.993
 DUPflag : 0
 Distance (au) : 18.566
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -15.35
 Sun-Target sep (deg) : 136.66
 Sun-Moon sep (deg) : 155.18
 B (ring opening deg) : 81.20
 PA of pole (deg) : -36.15
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.934
 C/A sky separation (km) : 26037.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.bsp
 earthstns_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

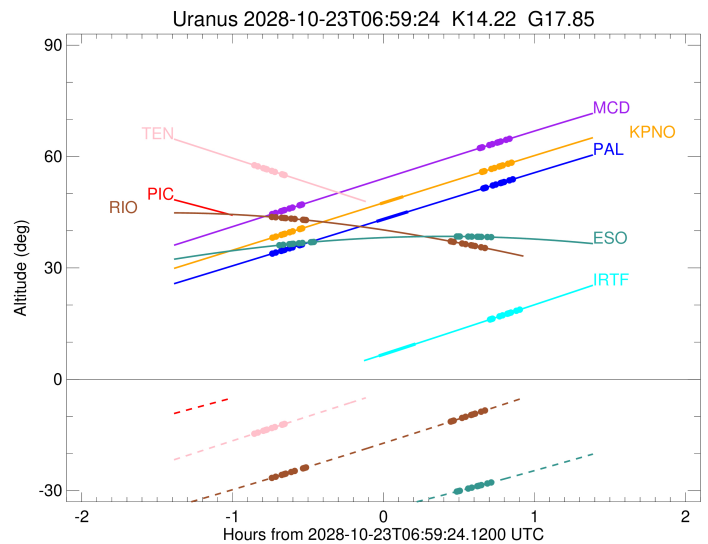
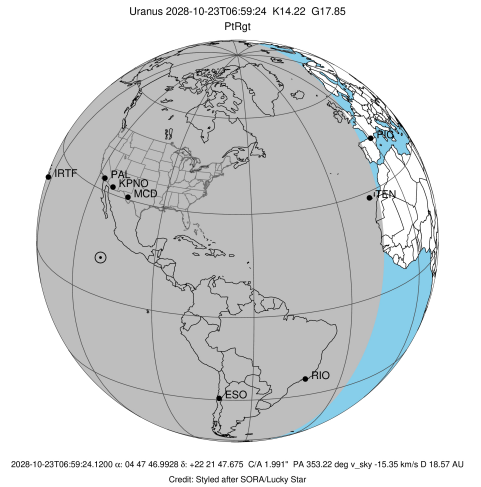


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2028-10-23T06:08:28.766		57.57	-14.57	50822.71	-13.48		
lambda	I	2028-10-23T06:09:28.142		57.35	-14.35	50026.71	-13.37		
delta	I	2028-10-23T06:11:38.205		56.87	-13.88	48300.35	-13.18		
gamma	I	2028-10-23T06:12:29.585		56.68	-13.69	47625.32	-13.10		
eta	I	2028-10-23T06:13:03.955		56.55	-13.57	47176.12	-13.04		
beta	I	2028-10-23T06:15:02.299		56.12	-13.13	45644.57	-12.84		
alpha	I	2028-10-23T06:16:12.135		55.86	-12.88	44752.35	-12.71		
4	I	2028-10-23T06:19:02.633		55.23	-12.26	42615.01	-12.35		
5	I	2028-10-23T06:19:26.866		55.14	-12.17	42315.05	-12.30		
6	I	2028-10-23T06:20:02.717		55.01	-12.04	41877.54	-12.22		

No planet occultations

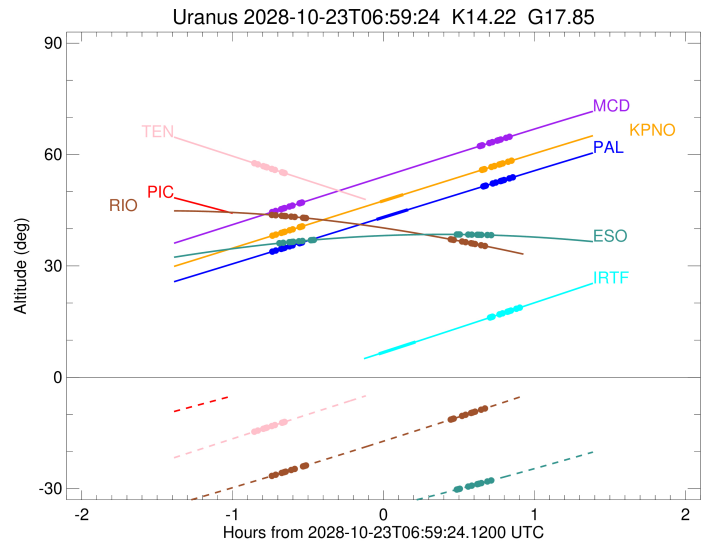
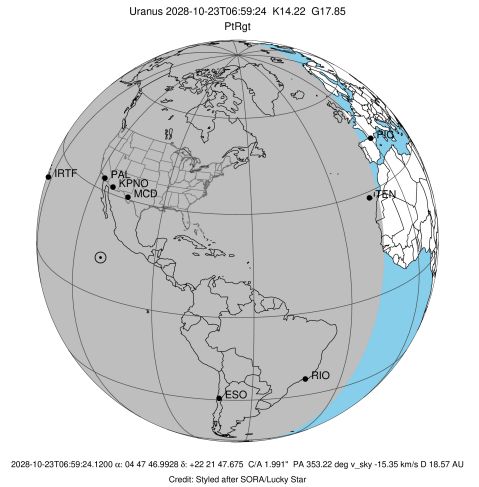
6	E	2028-10-23T07:29:18.728		39.73	2.94x	41841.72	12.17		
5	E	2028-10-23T07:29:48.621		39.62	3.05x	42210.96	12.25		
4	E	2028-10-23T07:30:16.149		39.52	3.15x	42549.24	12.30		
alpha	E	2028-10-23T07:33:09.773		38.89	3.76x	44710.06	12.65		
beta	E	2028-10-23T07:34:25.798		38.61	4.03x	45677.46	12.78		
eta	E	2028-10-23T07:36:22.148		38.18	4.44x	47176.12	12.97		
gamma	E	2028-10-23T07:36:57.170		38.06	4.57x	47631.44	13.03		
delta	E	2028-10-23T07:37:48.359		37.87	4.75x	48300.35	13.11		
lambda	E	2028-10-23T07:39:59.150		37.39	5.21x	50026.71	13.29		
epsilon	E	2028-10-23T07:41:50.674		36.98	5.60x	51516.86	13.40		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-10-23T07:05:20.960
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 3413037371411104640
 2Mass ID (if available) : 04474700+2221479
 ICRS Star Coord at Epoch: 04h 47m 46.99278s +22:21:47.67508s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.221
 G magnitude : 17.853
 RP magnitude : 16.799
 BP magnitude : 18.993
 DUPflag : 0
 Distance (au) : 18.566
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -15.35
 Sun-Target sep (deg) : 136.66
 Sun-Moon sep (deg) : 156.29
 B (ring opening deg) : 81.20
 PA of pole (deg) : -36.15
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.800
 C/A sky separation (km) : 24236.0
 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_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	2028-10-23T06:16:40.881	-2.56x	-34.40	50809.84	-13.42			
lambda	I	2028-10-23T06:17:39.497	-2.35x	-34.63	50026.71	-13.33			
delta	I	2028-10-23T06:19:49.735	-1.89x	-35.14	48300.35	-13.18			
gamma	I	2028-10-23T06:20:41.101	-1.71x	-35.35	47625.01	-13.12			
eta	I	2028-10-23T06:21:15.384	-1.58x	-35.48	47176.12	-13.07			
beta	I	2028-10-23T06:23:13.324	-1.16x	-35.94	45643.89	-12.91			
alpha	I	2028-10-23T06:24:22.672	-0.91x	-36.22	44752.14	-12.81			
4	I	2028-10-23T06:27:11.302	-0.31x	-36.88	42615.71	-12.52			
5	I	2028-10-23T06:27:35.279	-0.22x	-36.97	42315.25	-12.48			
6	I	2028-10-23T06:28:10.615	-0.09x	-37.11	41876.50	-12.42			
Uranus	I	2028-10-23T06:57:31.177	6.29	-44.02	25283.45	-6.04		-6.32	
Uranus	E	2028-10-23T07:12:07.652	9.51	-47.45	25026.74	-8.48		-8.87	
6	E	2028-10-23T07:41:44.827	16.10	-54.38	41840.10	12.55			
5	E	2028-10-23T07:42:13.708	16.21	-54.50	42208.12	12.61			
4	E	2028-10-23T07:42:40.580	16.31	-54.60	42547.80	12.66			
alpha	E	2028-10-23T07:45:29.741	16.94	-55.26	44708.99	12.95			
beta	E	2028-10-23T07:46:44.161	17.22	-55.55	45677.82	13.06			
eta	E	2028-10-23T07:48:38.096	17.64	-55.99	47176.12	13.23			
gamma	E	2028-10-23T07:49:12.449	17.77	-56.12	47631.41	13.28			
delta	E	2028-10-23T07:50:02.705	17.96	-56.32	48300.35	13.34			
lambda	E	2028-10-23T07:52:11.297	18.44	-56.82	50026.71	13.50			
epsilon	E	2028-10-23T07:54:01.432	18.85	-57.24	51520.86	13.60			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-10-23T06:57:41.880
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 3413037371411104640
 2Mass ID (if available) : 04474700+2221479
 ICRS Star Coord at Epoch: 04h 47m 46.99278s +22:21:47.67508s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.221
 G magnitude : 17.853
 RP magnitude : 16.799
 BP magnitude : 18.993
 DUPflag : 0
 Distance (au) : 18.566
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -15.35
 Sun-Target sep (deg) : 136.66
 Sun-Moon sep (deg) : 155.53
 B (ring opening deg) : 81.20
 PA of pole (deg) : -36.15
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.336
 C/A sky separation (km) : 31458.9
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.bsp
 earthstns_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

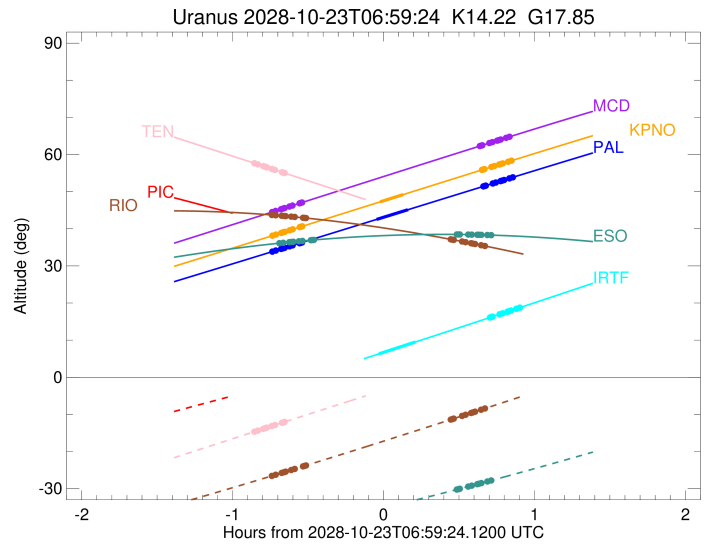
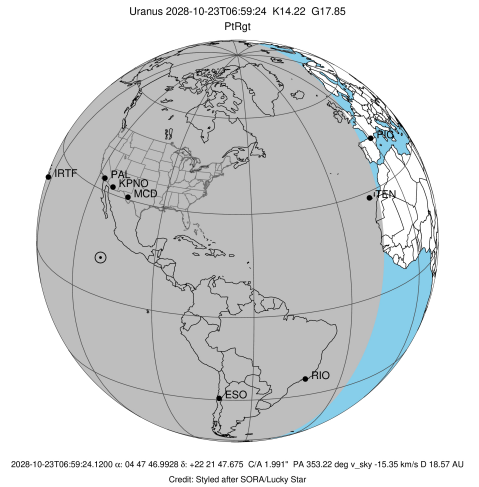


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2028-10-23T06:15:26.261		43.70	-26.49	50855.48	-12.39		
lambda	I	2028-10-23T06:16:33.823		43.64	-26.26	50026.71	-12.20		
delta	I	2028-10-23T06:18:57.078		43.50	-25.76	48300.35	-11.90		
gamma	I	2028-10-23T06:19:54.066		43.44	-25.57	47626.07	-11.77		
eta	I	2028-10-23T06:20:32.454		43.41	-25.43	47176.12	-11.68		
beta	I	2028-10-23T06:22:45.351		43.27	-24.97	45646.47	-11.34		
alpha	I	2028-10-23T06:24:04.921		43.19	-24.70	44752.29	-11.12		
4	I	2028-10-23T06:27:22.548		42.97	-24.01	42612.35	-10.52		
5	I	2028-10-23T06:27:50.887		42.94	-23.91	42312.84	-10.43		
6	I	2028-10-23T06:28:33.126		42.89	-23.77	41879.30	-10.29		

No planet occultations

6	E	2028-10-23T07:26:08.465		37.15	-11.40	41849.49	10.28		
5	E	2028-10-23T07:26:44.590		37.08	-11.27	42225.33	10.41		
4	E	2028-10-23T07:27:16.111		37.01	-11.15	42556.73	10.51		
alpha	E	2028-10-23T07:30:36.392		36.58	-10.42	44715.60	11.11		
beta	E	2028-10-23T07:32:01.846		36.39	-10.11	45675.39	11.33		
eta	E	2028-10-23T07:34:12.366		36.11	-9.63	47176.12	11.66		
gamma	E	2028-10-23T07:34:51.284		36.02	-9.48	47631.56	11.75		
delta	E	2028-10-23T07:35:47.901		35.89	-9.27	48300.35	11.88		
lambda	E	2028-10-23T07:38:11.407		35.57	-8.75	50026.71	12.18		
epsilon	E	2028-10-23T07:40:10.471		35.30	-8.31	51490.43	12.36		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-10-23T07:00:29.530
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 3413037371411104640
 2Mass ID (if available) : 04474700+2221479
 ICRS Star Coord at Epoch: 04h 47m 46.99278s +22:21:47.67508s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.221
 G magnitude : 17.853
 RP magnitude : 16.799
 BP magnitude : 18.993
 DUPflag : 0
 Distance (au) : 18.566
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -15.35
 Sun-Target sep (deg) : 136.66
 Sun-Moon sep (deg) : 155.90
 B (ring opening deg) : 81.20
 PA of pole (deg) : -36.15
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.358
 C/A sky separation (km) : 31755.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.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	2028-10-23T06:18:25.699		36.15	-41.25	50856.31	-12.28		
lambda	I	2028-10-23T06:19:33.903		36.23	-41.10	50026.71	-12.10		
delta	I	2028-10-23T06:21:58.450		36.39	-40.77	48300.35	-11.79		
gamma	I	2028-10-23T06:22:55.980		36.45	-40.64	47626.09	-11.65		
eta	I	2028-10-23T06:23:34.747		36.50	-40.55	47176.12	-11.56		
beta	I	2028-10-23T06:25:49.021		36.64	-40.25	45646.53	-11.22		
alpha	I	2028-10-23T06:27:09.489		36.72	-40.06	44752.28	-11.00		
4	I	2028-10-23T06:30:29.610		36.92	-39.59	42612.24	-10.38		
5	I	2028-10-23T06:30:58.337		36.95	-39.52	42312.72	-10.28		
6	I	2028-10-23T06:31:41.171		36.99	-39.42	41879.34	-10.14		

No planet occultations

6	E	2028-10-23T07:28:32.564		38.47	-30.25	41850.13	10.16		
5	E	2028-10-23T07:29:09.174		38.47	-30.14	42226.56	10.30		
4	E	2028-10-23T07:29:40.968		38.47	-30.05	42557.39	10.40		
alpha	E	2028-10-23T07:33:03.090		38.44	-29.45	44716.08	11.02		
beta	E	2028-10-23T07:34:29.132		38.42	-29.19	45675.19	11.25		
eta	E	2028-10-23T07:36:40.535		38.39	-28.80	47176.12	11.59		
gamma	E	2028-10-23T07:37:19.683		38.38	-28.68	47631.57	11.68		
delta	E	2028-10-23T07:38:16.613		38.36	-28.51	48300.35	11.81		
lambda	E	2028-10-23T07:40:40.814		38.32	-28.08	50026.71	12.13		
epsilon	E	2028-10-23T07:42:40.137		38.28	-27.72	51487.70	12.32		