

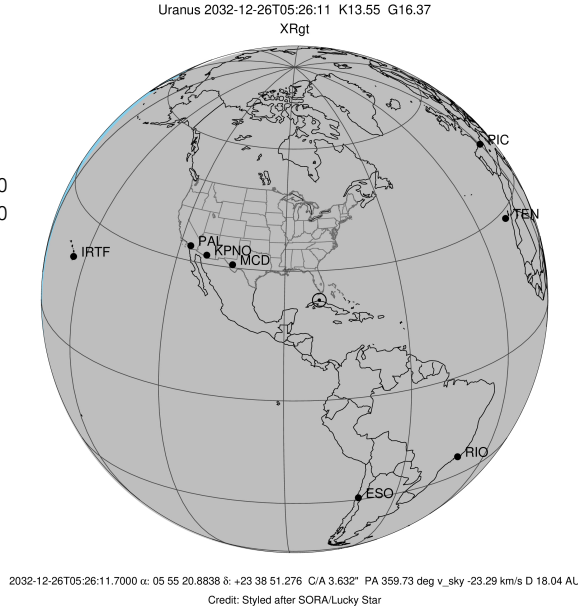
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-12-26T05:26:11.700
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3427814605827531264
 2Mass ID (if available) : 05552088+2338512

ICRS Star Coord at Epoch: 05h 55m 20.88377s +23:38:51.27626s

RUWE (>1.4 is poor) : 1.06
 K magnitude : 13.548
 G magnitude : 16.370
 RP magnitude : 15.471
 BP magnitude : 17.163
 DUPflag : 0
 Distance (au) : 18.039
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.29
 Sun-Target sep (deg) : 174.40
 Sun-Moon sep (deg) : 110.52
 B (ring opening deg) : 76.23
 PA of pole (deg) : 54.11

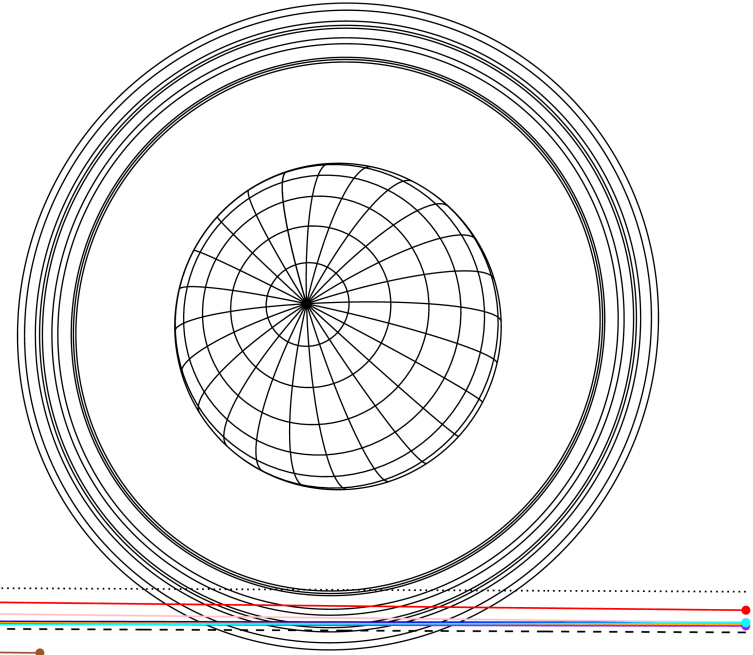
a(km) ring

- 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



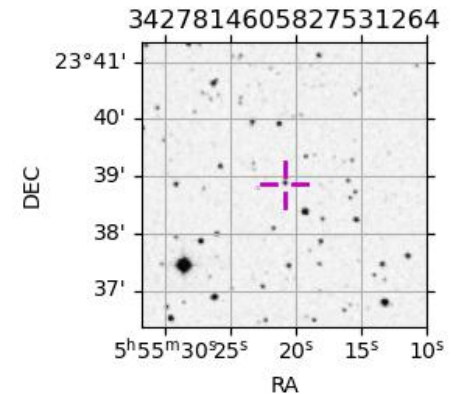
Uranus 2032-12-26T05:26:11 K13.55 G16.37 XRgt

PIC
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO

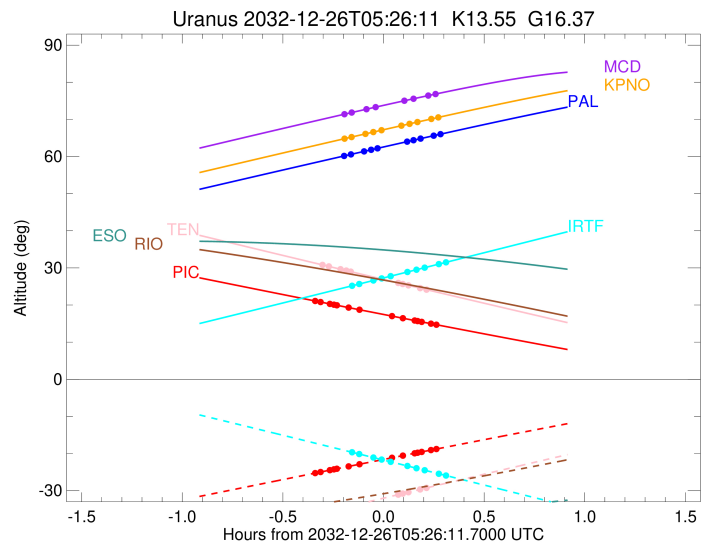
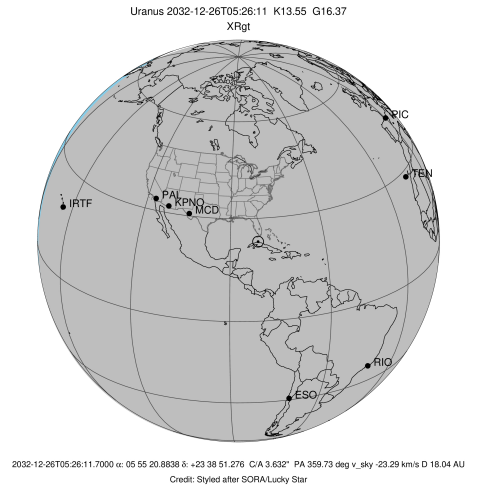


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	++++++		++++++	DEC 26 05:06 - DEC 26 05:41	PnnRie
PAL	Palomar Mt (200")	33.4	243.1	++++		++++	DEC 26 05:15 - DEC 26 05:42	PnnRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	++++		++++	DEC 26 05:15 - DEC 26 05:41	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	++++		++++	DEC 26 05:15 - DEC 26 05:41	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5	++++		++++	DEC 26 05:08 - DEC 26 05:38	PnnRie
IRTF	Mauna Kea/IRTF	19.8	204.5	++++		++++	DEC 26 05:17 - DEC 26 05:44	PnnRie
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
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					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 : 2032-12-26T05:23:01.910
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 3427814605827531264
 2Mass ID (if available) : 05552088+2338512
 ICRS Star Coord at Epoch: 05h 55m 20.88377s +23:38:51.27626s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 13.548
 G magnitude : 16.370
 RP magnitude : 15.471
 BP magnitude : 17.163
 DUPflag : 0
 Distance (au) : 18.039
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.29
 Sun-Target sep (deg) : 174.40
 Sun-Moon sep (deg) : 111.01
 B (ring opening deg) : 76.23
 PA of pole (deg) : 54.11
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.345
 C/A sky separation (km) : 43761.5
 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

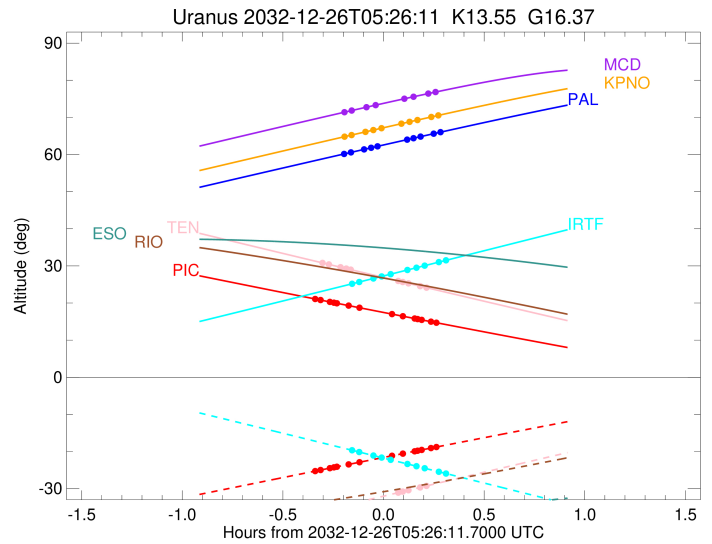
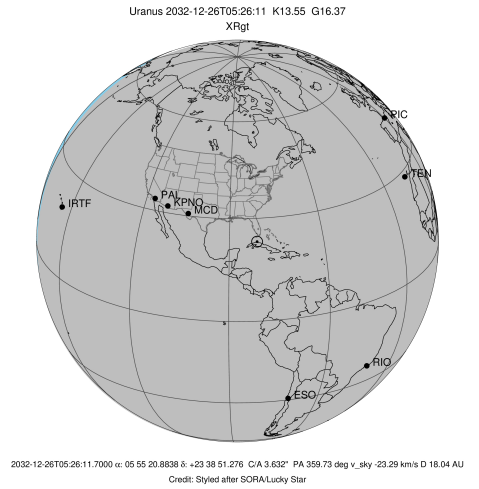


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-12-26T05:06:23.601		20.99	-25.18	50756.28	-11.66		
lambda	I	2032-12-26T05:07:27.461		20.80	-24.98	50026.71	-11.15		
delta	I	2032-12-26T05:10:13.717		20.30	-24.48	48300.35	-9.59		
gamma	I	2032-12-26T05:11:26.694		20.08	-24.26	47626.69	-8.86		
eta	I	2032-12-26T05:12:19.138		19.93	-24.10	47176.12	-8.32		
beta	I	2032-12-26T05:15:51.736		19.30	-23.46	45653.65	-5.95		
alpha	I	2032-12-26T05:19:13.486		18.70	-22.86	44694.80	-3.52		

No planet occultations

alpha	E	2032-12-26T05:28:31.232		17.05	-21.19	44688.74	3.52		
beta	E	2032-12-26T05:31:53.230		16.46	-20.59	45645.55	5.94		
eta	E	2032-12-26T05:35:27.534		15.83	-19.95	47176.12	8.31		
gamma	E	2032-12-26T05:36:19.630		15.68	-19.79	47622.91	8.85		
delta	E	2032-12-26T05:37:33.155		15.47	-19.58	48300.35	9.58		
lambda	E	2032-12-26T05:40:19.728		14.98	-19.08	50026.71	11.12		
epsilon	E	2032-12-26T05:41:32.502		14.77	-18.87	50859.03	11.63		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-12-26T05:27:56.100
 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 : 3427814605827531264
 2Mass ID (if available) : 05552088+2338512
 ICRS Star Coord at Epoch: 05h 55m 20.88377s +23:38:51.27626s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 13.548
 G magnitude : 16.370
 RP magnitude : 15.471
 BP magnitude : 17.163
 DUPflag : 0
 Distance (au) : 18.039
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.29
 Sun-Target sep (deg) : 174.40
 Sun-Moon sep (deg) : 111.14
 B (ring opening deg) : 76.23
 PA of pole (deg) : 54.11
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.538
 C/A sky separation (km) : 46287.4
 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

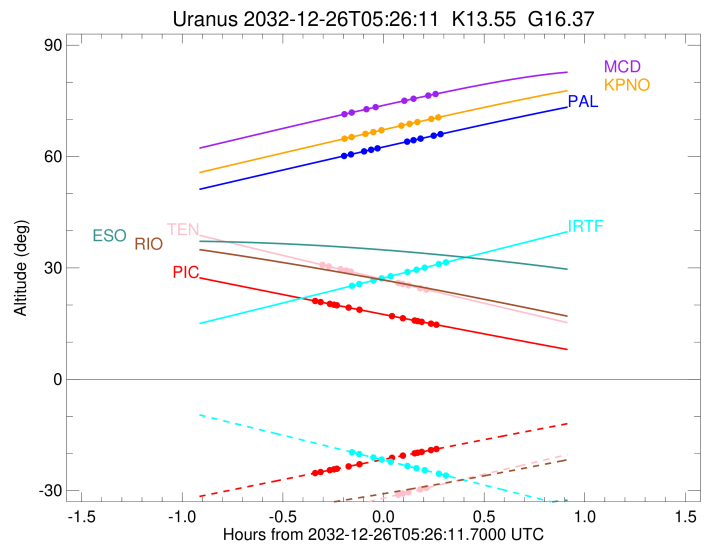
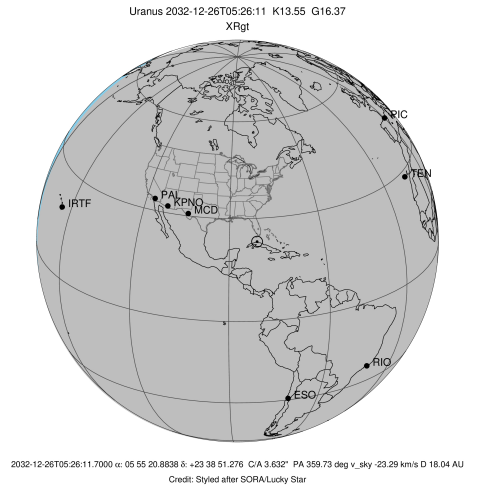


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-12-26T05:15:10.605		60.31	-55.14	50747.85	-9.33		
lambda	I	2032-12-26T05:16:31.095		60.59	-55.41	50026.71	-8.56		
delta	I	2032-12-26T05:20:26.972		61.40	-56.23	48300.35	-6.03		
gamma	I	2032-12-26T05:22:34.010		61.83	-56.67	47625.73	-4.57		
eta	I	2032-12-26T05:24:29.581		62.23	-57.07	47176.12	-3.20		

No planet occultations

eta	E	2032-12-26T05:33:10.160		64.00	-58.86	47176.12	3.20		
gamma	E	2032-12-26T05:35:05.266		64.39	-59.26	47623.79	4.58		
delta	E	2032-12-26T05:37:12.664		64.82	-59.69	48300.35	6.04		
lambda	E	2032-12-26T05:41:08.374		65.61	-60.50	50026.71	8.57		
epsilon	E	2032-12-26T05:42:37.153		65.91	-60.80	50826.47	9.34		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-12-26T05:27:39.910
 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 : 3427814605827531264
 2Mass ID (if available) : 05552088+2338512
 ICRS Star Coord at Epoch: 05h 55m 20.88377s +23:38:51.27626s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 13.548
 G magnitude : 16.370
 RP magnitude : 15.471
 BP magnitude : 17.163
 DUPflag : 0
 Distance (au) : 18.039
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.29
 Sun-Target sep (deg) : 174.40
 Sun-Moon sep (deg) : 111.19
 B (ring opening deg) : 76.23
 PA of pole (deg) : 54.11
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.556
 C/A sky separation (km) : 46523.6
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

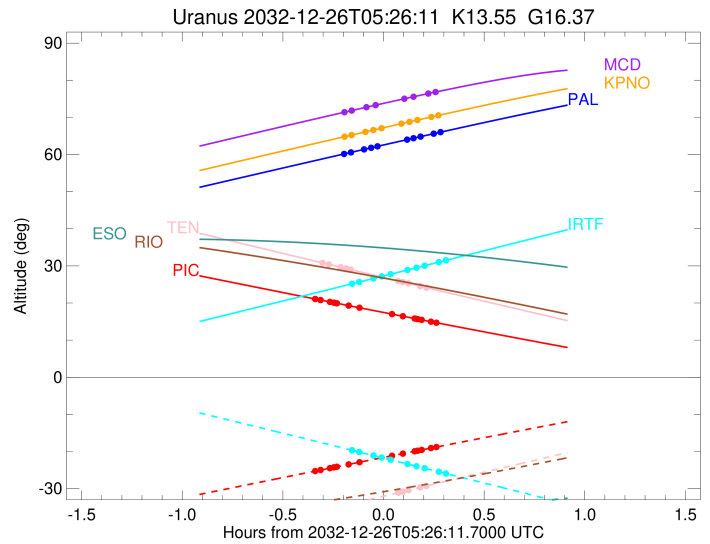
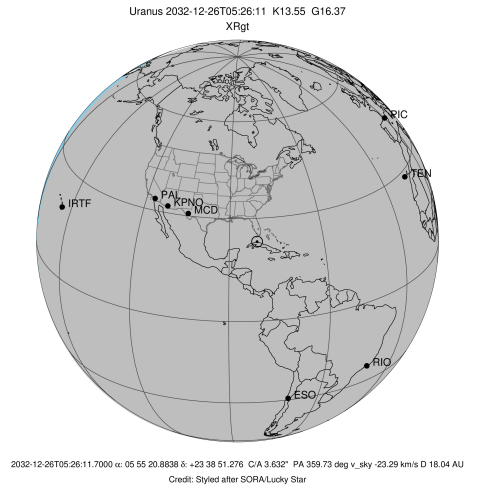


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-12-26T05:15:19.254		64.96	-59.74	50747.14	-9.07		
lambda	I	2032-12-26T05:16:42.272		65.25	-60.03	50026.71	-8.26		
delta	I	2032-12-26T05:20:51.219		66.11	-60.91	48300.35	-5.56		
gamma	I	2032-12-26T05:23:13.562		66.60	-61.40	47625.58	-3.90		
eta	I	2032-12-26T05:25:42.861		67.12	-61.92	47176.12	-2.11		

No planet occultations

eta	E	2032-12-26T05:31:24.938		68.29	-63.12	47176.12	2.11		
gamma	E	2032-12-26T05:33:53.779		68.79	-63.63	47623.93	3.91		
delta	E	2032-12-26T05:36:16.490		69.28	-64.13	48300.35	5.57		
lambda	E	2032-12-26T05:40:25.298		70.12	-64.99	50026.71	8.27		
epsilon	E	2032-12-26T05:41:56.625		70.42	-65.30	50823.62	9.07		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-12-26T05:27:13.910
 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 : 3427814605827531264
 2Mass ID (if available) : 05552088+2338512
 ICRS Star Coord at Epoch: 05h 55m 20.88377s +23:38:51.27626s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 13.548
 G magnitude : 16.370
 RP magnitude : 15.471
 BP magnitude : 17.163
 DUPflag : 0
 Distance (au) : 18.039
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.29
 Sun-Target sep (deg) : 174.40
 Sun-Moon sep (deg) : 111.25
 B (ring opening deg) : 76.23
 PA of pole (deg) : 54.11
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.574
 C/A sky separation (km) : 46761.9
 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

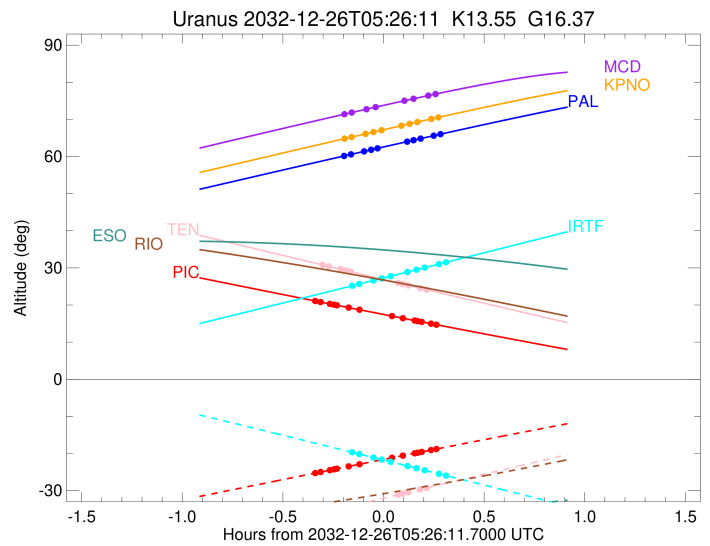
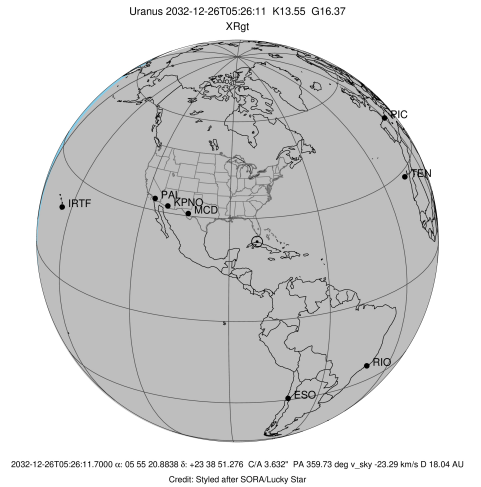


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-12-26T05:15:19.154		71.56	-66.35	50746.45	-8.79		
lambda	I	2032-12-26T05:16:45.012		71.86	-66.65	50026.71	-7.94		
delta	I	2032-12-26T05:21:09.936		72.76	-67.58	48300.35	-5.04		
gamma	I	2032-12-26T05:23:55.919		73.33	-68.16	47625.39	-3.08		

No planet occultations

gamma	E	2032-12-26T05:32:19.833		75.01	-69.91	47624.09	3.08		
delta	E	2032-12-26T05:35:06.201		75.56	-70.48	48300.35	5.04		
lambda	E	2032-12-26T05:39:31.026		76.41	-71.39	50026.71	7.95		
epsilon	E	2032-12-26T05:41:05.229		76.71	-71.71	50820.77	8.80		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-12-26T05:22:37.510
 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 : 3427814605827531264
 2Mass ID (if available) : 05552088+2338512
 ICRS Star Coord at Epoch: 05h 55m 20.88377s +23:38:51.27626s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 13.548
 G magnitude : 16.370
 RP magnitude : 15.471
 BP magnitude : 17.163
 DUPflag : 0
 Distance (au) : 18.039
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.29
 Sun-Target sep (deg) : 174.40
 Sun-Moon sep (deg) : 111.18
 B (ring opening deg) : 76.23
 PA of pole (deg) : 54.11
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.488
 C/A sky separation (km) : 45634.2
 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



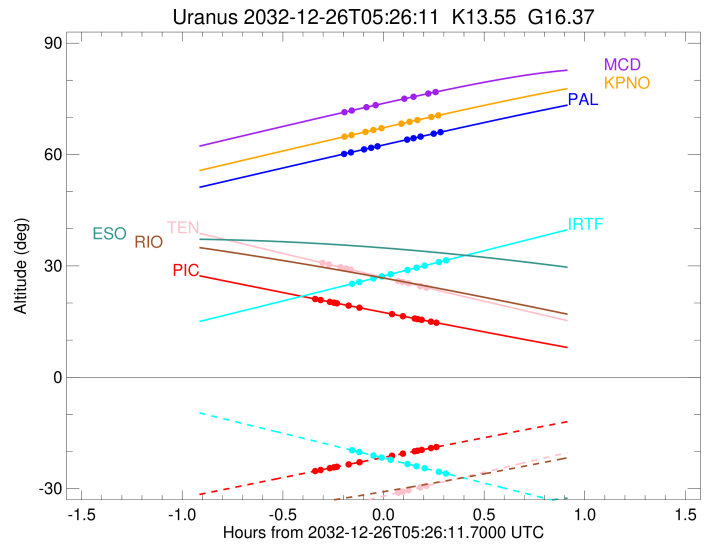
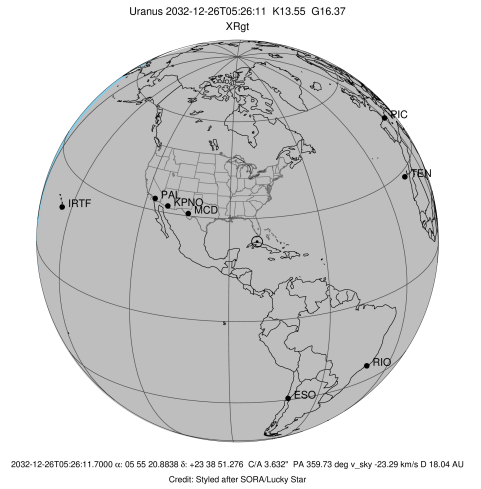
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-12-26T05:08:41.427		30.66	-35.83	50749.32	-9.98		
lambda	I	2032-12-26T05:09:56.234		30.39	-35.55	50026.71	-9.30		
delta	I	2032-12-26T05:13:25.565		29.64	-34.80	48300.35	-7.15		
gamma	I	2032-12-26T05:15:07.798		29.27	-34.43	47626.02	-6.03		
eta	I	2032-12-26T05:16:28.556		28.98	-34.14	47176.12	-5.11		

No planet occultations

eta	E	2032-12-26T05:30:32.874		25.96	-31.09	47176.12	5.10		
gamma	E	2032-12-26T05:31:53.295		25.67	-30.80	47623.46	6.02		
delta	E	2032-12-26T05:33:36.087		25.30	-30.43	48300.35	7.15		
lambda	E	2032-12-26T05:37:05.771		24.55	-29.68	50026.71	9.28		
epsilon	E	2032-12-26T05:38:29.482		24.26	-29.38	50837.13	9.96		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-12-26T05:29:55.350
 Event type : XRgt
 : No Uranus occs
 : 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 : 3427814605827531264
 2Mass ID (if available) : 05552088+2338512
 ICRS Star Coord at Epoch: 05h 55m 20.88377s +23:38:51.27626s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 13.548
 G magnitude : 16.370
 RP magnitude : 15.471
 BP magnitude : 17.163
 DUPflag : 0
 Distance (au) : 18.039
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.29
 Sun-Target sep (deg) : 174.40
 Sun-Moon sep (deg) : 110.63
 B (ring opening deg) : 76.23
 PA of pole (deg) : 54.11
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.560
 C/A sky separation (km) : 46576.4
 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	2032-12-26T05:17:34.813		25.35	-19.83	50747.19	-8.92		
lambda	I	2032-12-26T05:18:59.258		25.67	-20.15	50026.71	-8.11		
delta	I	2032-12-26T05:23:14.010		26.62	-21.10	48300.35	-5.39		
gamma	I	2032-12-26T05:25:42.385		27.18	-21.65	47625.56	-3.69		
eta	I	2032-12-26T05:28:28.336		27.80	-22.27	47176.12	-1.72		

No planet occultations

eta	E	2032-12-26T05:33:11.615		28.87	-23.32	47176.12	1.72		
gamma	E	2032-12-26T05:35:57.049		29.49	-23.94	47623.98	3.69		
delta	E	2032-12-26T05:38:25.711		30.05	-24.50	48300.35	5.40		
lambda	E	2032-12-26T05:42:40.100		31.01	-25.45	50026.71	8.13		
epsilon	E	2032-12-26T05:44:12.684		31.36	-25.80	50821.86	8.94		