

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-11-17T04:52:32.820  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3424692095882393088  
 2Mass ID (if available) : 06020841+2338335

ICRS Star Coord at Epoch: 06h 02m 08.41871s +23:38:33.49779s

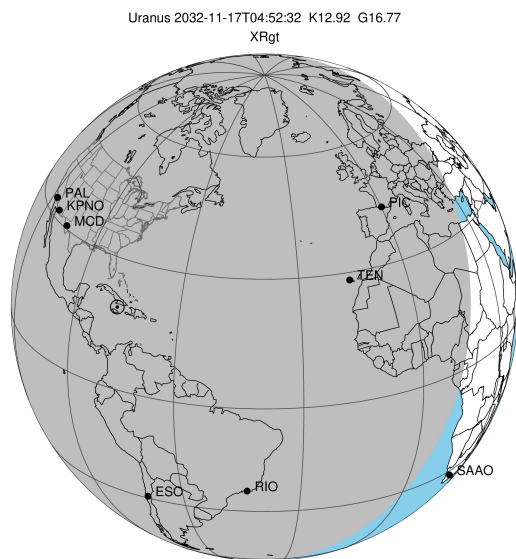
RUWE (>1.4 is poor) : 1.00  
 K magnitude : 12.918  
 G magnitude : 16.773  
 RP magnitude : 15.715  
 BP magnitude : 17.908  
 DUPflag : 0  
 Distance (au) : 18.212  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -17.86  
 Sun-Target sep (deg) : 144.44  
 Sun-Moon sep (deg) : 36.61  
 B (ring opening deg) : 74.94  
 PA of pole (deg) : 58.18

# 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

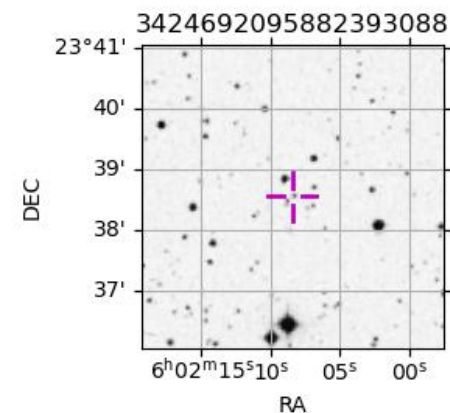
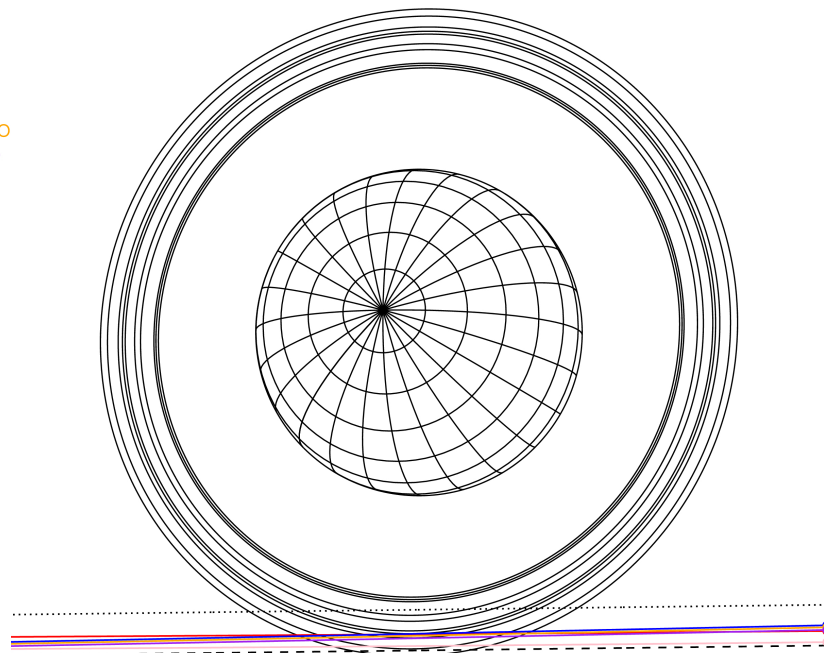
Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++		+++	NOV 17 04:35 - NOV 17 05:06	PnnRie
PAL	Palomar Mt (200")	33.4	243.1	+++		+++	NOV 17 04:42 - NOV 17 05:14	PnnRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++		+++	NOV 17 04:42 - NOV 17 05:13	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	++		++	NOV 17 04:43 - NOV 17 05:12	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5	++		++	NOV 17 04:41 - NOV 17 05:01	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					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



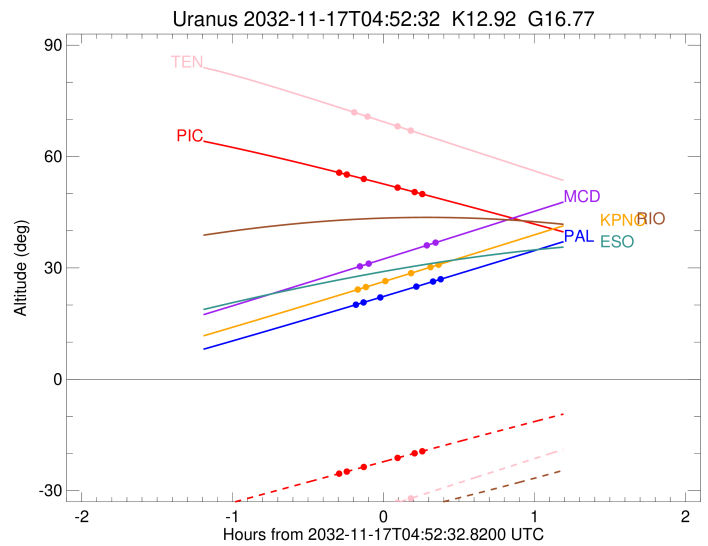
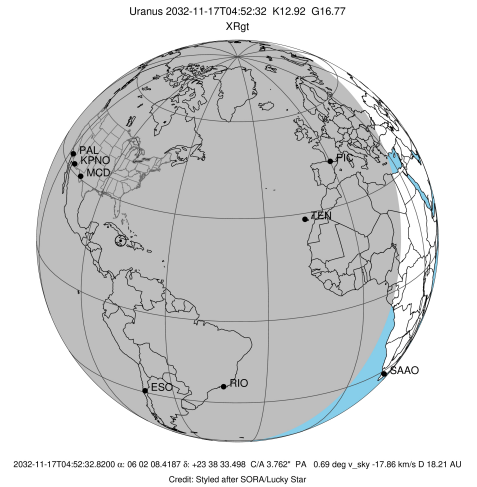
2032-11-17T04:52:32.8200 a: 06 02 08.4187 s: +23 38 33.498 C/A 3.762" PA 0.69 deg v\_sky -17.86 km/s D 18.21 AU  
 Credit: Styled after SORA/Lucky Star

Uranus 2032-11-17T04:52:32 K12.92 G16.77 XRgt

PIC  
 PAL  
 KPNO  
 MCD  
 TEN



target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-11-17T04:50:05.160  
 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 : 3424692095882393088  
 2Mass ID (if available) : 06020841+2338335  
 ICRS Star Coord at Epoch: 06h 02m 08.41871s +23:38:33.49779s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 12.918  
 G magnitude : 16.773  
 RP magnitude : 15.715  
 BP magnitude : 17.908  
 DUPflag : 0  
 Distance (au) : 18.212  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -17.86  
 Sun-Target sep (deg) : 144.44  
 Sun-Moon sep (deg) : 37.46  
 B (ring opening deg) : 74.94  
 PA of pole (deg) : 58.18  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 3.578  
 C/A sky separation (km) : 47256.0  
 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

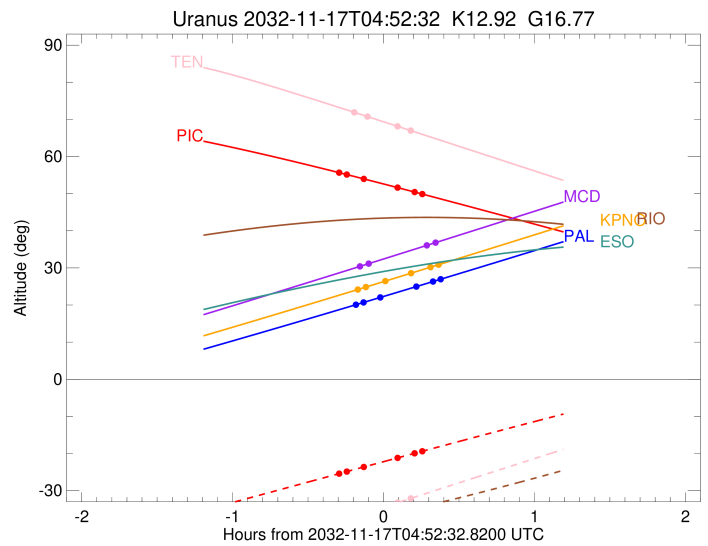
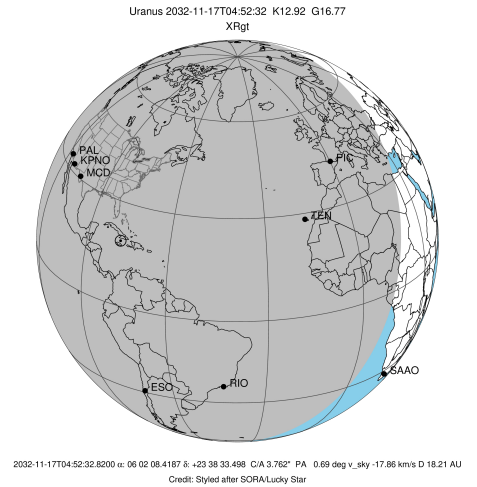


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-17T04:35:28.964		55.56	-25.32	50938.28	-6.37		
lambda	I	2032-11-17T04:38:00.079		55.13	-24.86	50026.71	-5.56		
delta	I	2032-11-17T04:44:48.364		53.96	-23.62	48300.35	-2.84		

No planet occultations

delta	E	2032-11-17T04:58:04.261		51.64	-21.19	48300.35	2.84		
lambda	E	2032-11-17T05:04:52.853		50.44	-19.96	50026.71	5.56		
epsilon	E	2032-11-17T05:06:56.987		50.07	-19.58	50764.48	6.37		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-11-17T04:57:03.830  
 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 : 3424692095882393088  
 2Mass ID (if available) : 06020841+2338335  
 ICRS Star Coord at Epoch: 06h 02m 08.41871s +23:38:33.49779s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 12.918  
 G magnitude : 16.773  
 RP magnitude : 15.715  
 BP magnitude : 17.908  
 DUPflag : 0  
 Distance (au) : 18.212  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -17.86  
 Sun-Target sep (deg) : 144.44  
 Sun-Moon sep (deg) : 36.21  
 B (ring opening deg) : 74.94  
 PA of pole (deg) : 58.18  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 3.571  
 C/A sky separation (km) : 47168.0  
 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

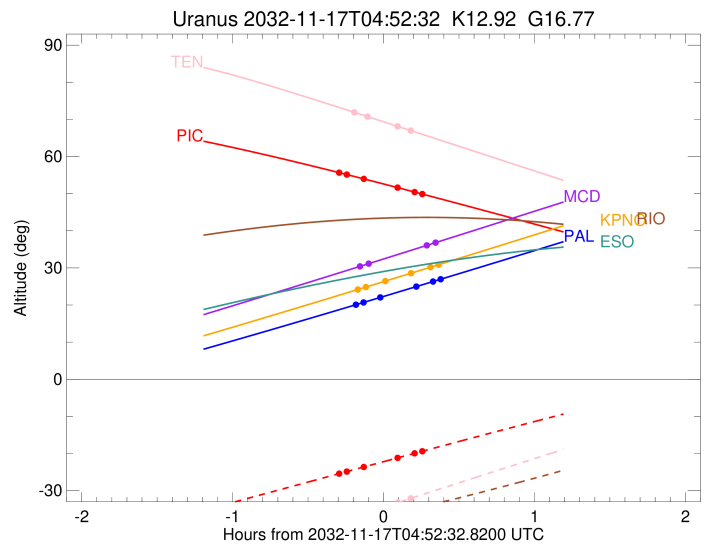
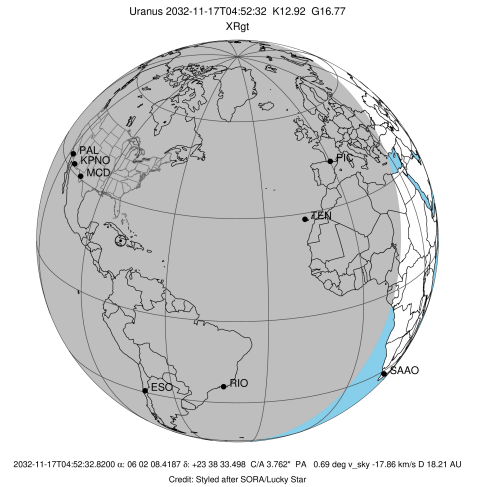


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-17T04:42:08.124		20.19	-49.60	50944.21	-6.37		
lambda	I	2032-11-17T04:44:40.060		20.71	-50.12	50026.71	-5.58		
delta	I	2032-11-17T04:51:21.170		22.06	-51.50	48300.35	-2.98		

No planet occultations

delta	E	2032-11-17T05:05:31.710		24.95	-54.39	48300.35	2.98		
lambda	E	2032-11-17T05:12:11.964		26.32	-55.75	50026.71	5.60		
epsilon	E	2032-11-17T05:14:15.650		26.74	-56.16	50765.65	6.39		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-11-17T04:57:00.760  
 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 : 3424692095882393088  
 2Mass ID (if available) : 06020841+2338335  
 ICRS Star Coord at Epoch: 06h 02m 08.41871s +23:38:33.49779s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 12.918  
 G magnitude : 16.773  
 RP magnitude : 15.715  
 BP magnitude : 17.908  
 DUPflag : 0  
 Distance (au) : 18.212  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -17.86  
 Sun-Target sep (deg) : 144.44  
 Sun-Moon sep (deg) : 36.25  
 B (ring opening deg) : 74.94  
 PA of pole (deg) : 58.18  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 3.595  
 C/A sky separation (km) : 47485.2  
 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

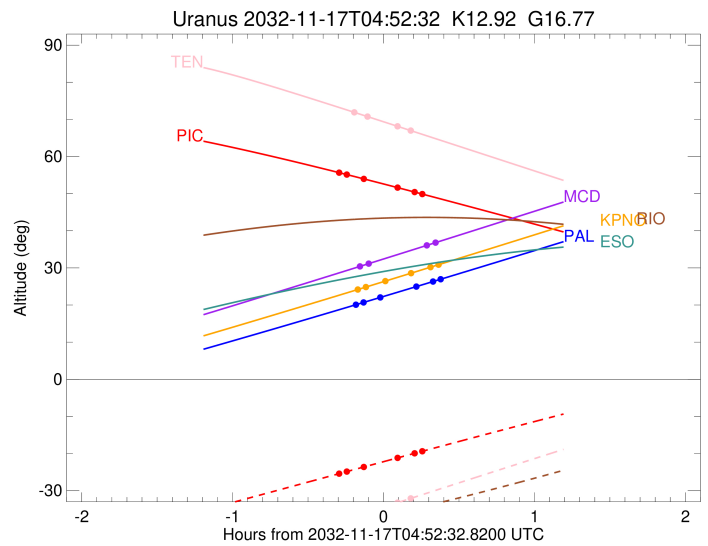
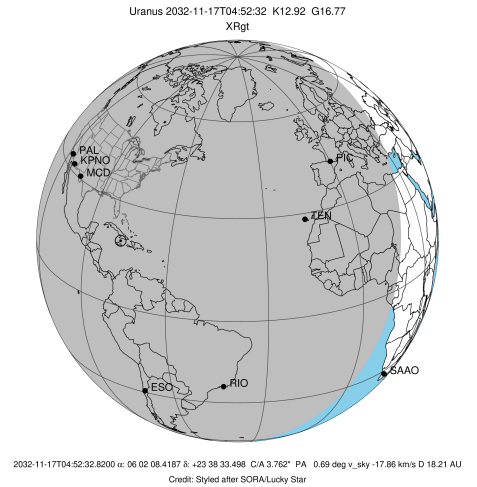


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-17T04:42:55.779		24.30	-54.39	50937.71	-6.06		
lambda	I	2032-11-17T04:45:35.639		24.85	-54.94	50026.71	-5.21		
delta	I	2032-11-17T04:53:23.706		26.47	-56.55	48300.35	-2.11		

No planet occultations

delta	E	2032-11-17T05:03:23.967		28.56	-58.61	48300.35	2.11		
lambda	E	2032-11-17T05:11:11.190		30.18	-60.19	50026.71	5.22		
epsilon	E	2032-11-17T05:13:22.865		30.64	-60.64	50768.15	6.08		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-11-17T04:56:49.980  
 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 : 3424692095882393088  
 2Mass ID (if available) : 06020841+2338335  
 ICRS Star Coord at Epoch: 06h 02m 08.41871s +23:38:33.49779s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 12.918  
 G magnitude : 16.773  
 RP magnitude : 15.715  
 BP magnitude : 17.908  
 DUPflag : 0  
 Distance (au) : 18.212  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -17.86  
 Sun-Target sep (deg) : 144.44  
 Sun-Moon sep (deg) : 36.33  
 B (ring opening deg) : 74.94  
 PA of pole (deg) : 58.18  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 3.624  
 C/A sky separation (km) : 47871.3  
 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

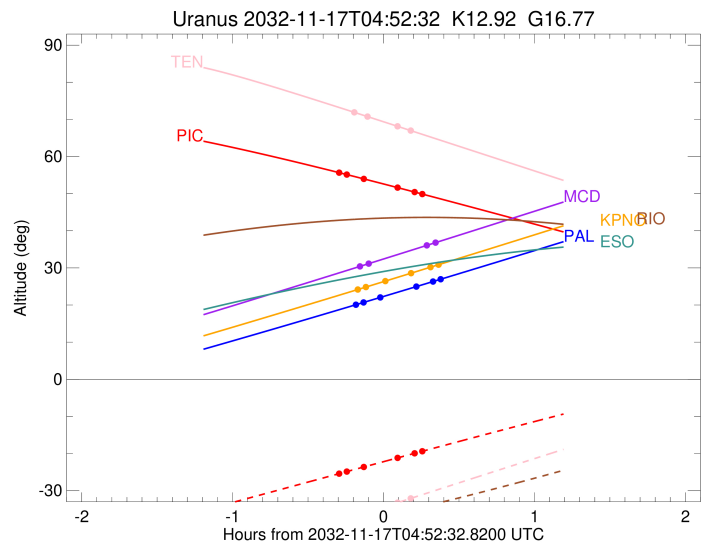
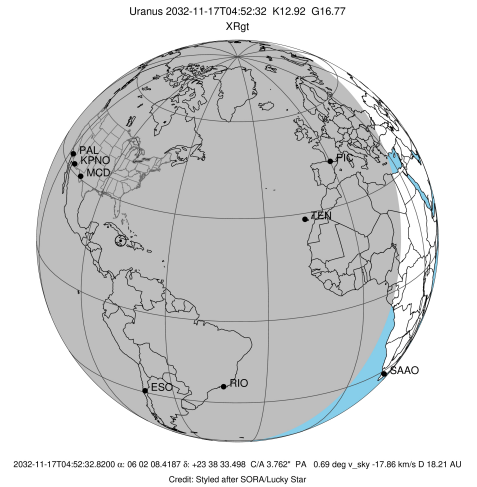


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-17T04:43:50.874		30.55	-61.18	50929.35	-5.66		
lambda	I	2032-11-17T04:46:42.861		31.16	-61.77	50026.71	-4.71		

No planet occultations

lambda	E	2032-11-17T05:09:43.496		36.06	-66.42	50026.71	4.72		
epsilon	E	2032-11-17T05:12:07.403		36.57	-66.89	50771.54	5.68		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-11-17T04:50:45.780  
 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 : 3424692095882393088  
 2Mass ID (if available) : 06020841+2338335  
 ICRS Star Coord at Epoch: 06h 02m 08.41871s +23:38:33.49779s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 12.918  
 G magnitude : 16.773  
 RP magnitude : 15.715  
 BP magnitude : 17.908  
 DUPflag : 0  
 Distance (au) : 18.212  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -17.86  
 Sun-Target sep (deg) : 144.44  
 Sun-Moon sep (deg) : 37.44  
 B (ring opening deg) : 74.94  
 PA of pole (deg) : 58.18  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 3.717  
 C/A sky separation (km) : 49096.9  
 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\_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	2032-11-17T04:41:57.043		71.69	-36.80	50895.72	-4.09		
lambda	I	2032-11-17T04:46:17.108		70.74	-35.85	50026.71	-2.46		

No planet occultations

lambda	E	2032-11-17T04:58:02.432		68.16	-33.26	50026.71	2.46		
epsilon	E	2032-11-17T05:01:55.578		67.31	-32.41	50784.60	4.09		