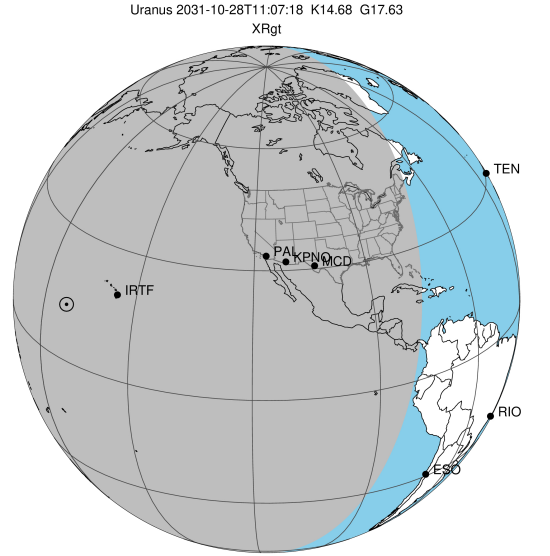


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2031-10-28T11:07:18.650  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3427621809036892672  
 2Mass ID (if available) : 05445356+2332085

ICRS Star Coord at Epoch: 05h 44m 53.57171s +23:32:08.61654s

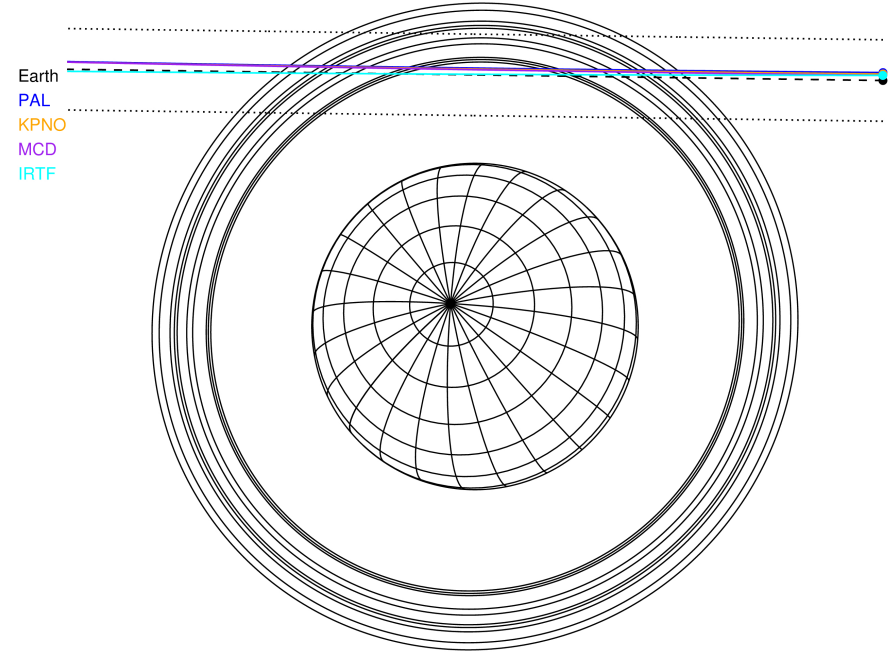
RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.675  
 G magnitude : 17.631  
 RP magnitude : 16.727  
 BP magnitude : 18.434  
 DUPflag : 0  
 Distance (au) : 18.470  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -11.93  
 Sun-Target sep (deg) : 127.85  
 Sun-Moon sep (deg) : 75.15  
 B (ring opening deg) : 78.15  
 PA of pole (deg) : 46.73

#	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



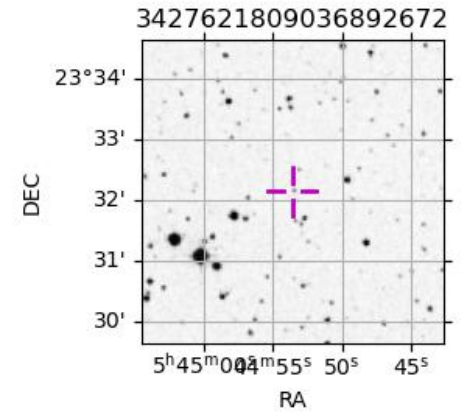
2031-10-28T11:07:18.6500 ra: 05 44 53.5717 s: +23 32 08.617 C/A 2.949° PA 179.21 deg v\_sky -11.93 km/s D 18.47 AU  
 Credit: Styled after SORA/Lucky Star

Uranus 2031-10-28T11:07:18 K14.68 G17.63 XRgt

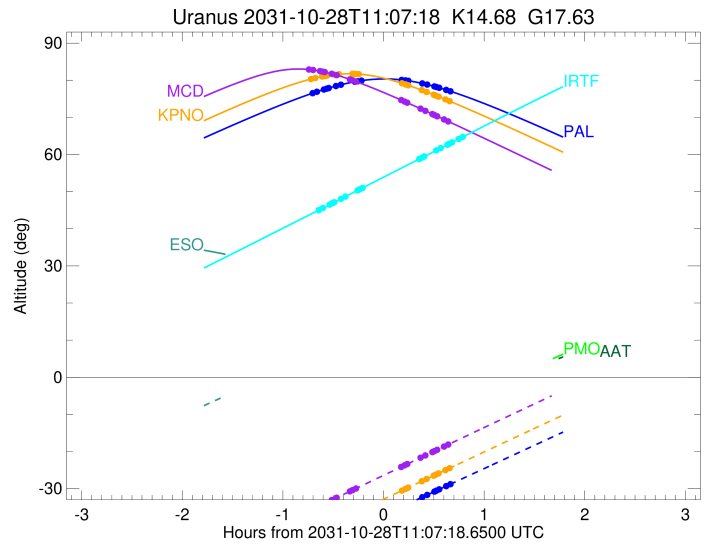
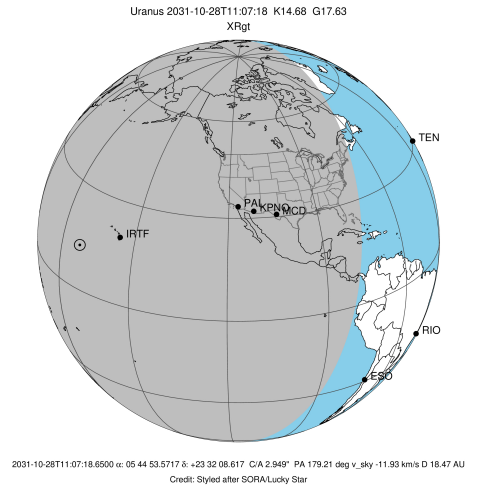


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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 28 10:25 - OCT 28 11:46	PnnRie
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++		+++++	OCT 28 10:25 - OCT 28 11:46	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++		+++++	OCT 28 10:23 - OCT 28 11:45	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++		+++++	OCT 28 10:29 - OCT 28 11:54	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 : 2031-10-28T11:07:19.950  
 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 : 3427621809036892672  
 2Mass ID (if available) : 05445356+2332085  
 ICRS Star Coord at Epoch: 05h 44m 53.57171s +23:32:08.61654s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.675  
 G magnitude : 17.631  
 RP magnitude : 16.727  
 BP magnitude : 18.434  
 DUPflag : 0  
 Distance (au) : 18.470  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -11.93  
 Sun-Target sep (deg) : 127.85  
 Sun-Moon sep (deg) : 76.08  
 B (ring opening deg) : 78.15  
 PA of pole (deg) : 46.73  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 3.021  
 C/A sky separation (km) : 40466.7  
 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\_itrff93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



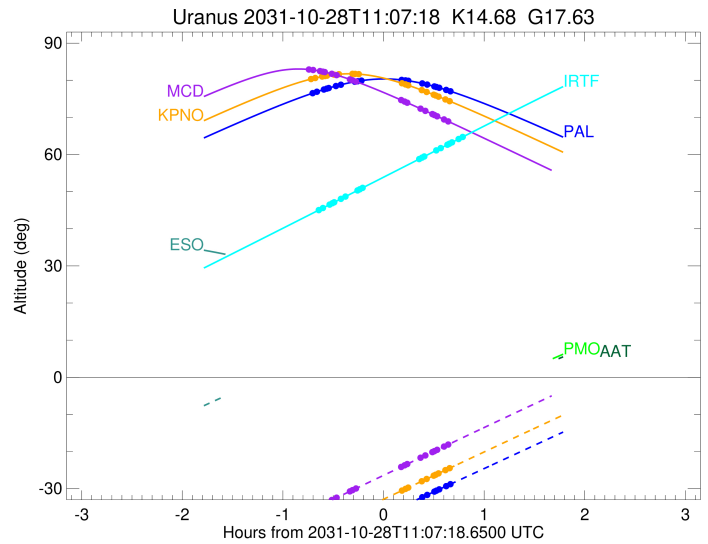
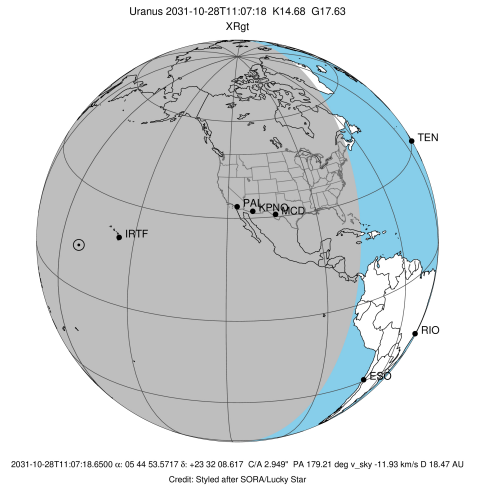
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2031-10-28T10:25:58.475		76.67	-45.54	50751.10	-7.37		
lambda	I	2031-10-28T10:27:37.904		76.92	-45.20	50026.71	-7.18		
delta	I	2031-10-28T10:31:47.500		77.52	-44.37	48300.35	-6.64		
gamma	I	2031-10-28T10:33:30.577		77.75	-44.02	47628.36	-6.40		
eta	I	2031-10-28T10:34:42.243		77.91	-43.78	47176.12	-6.22		
beta	I	2031-10-28T10:39:02.862		78.47	-42.90	45641.31	-5.54		
alpha	I	2031-10-28T10:42:01.881		78.81	-42.29	44693.48	-5.05		
4	I	2031-10-28T10:50:24.532		79.63	-40.58	42549.06	-3.45		
5	I	2031-10-28T10:51:42.062		79.73	-40.31	42285.50	-3.18		
6	I	2031-10-28T10:54:02.340		79.90	-39.84	41876.31	-2.71		

No planet occultations

6	E	2031-10-28T11:18:19.131		80.09	-34.82	41879.72	2.71		
5	E	2031-10-28T11:20:26.448		79.97	-34.38	42248.35	3.18		
4	E	2031-10-28T11:21:48.837		79.89	-34.10	42531.50	3.45		
alpha	E	2031-10-28T11:30:21.861		79.16	-32.32	44718.53	5.05		
beta	E	2031-10-28T11:33:16.345		78.86	-31.71	45646.56	5.55		
eta	E	2031-10-28T11:37:35.722		78.35	-30.81	47176.12	6.23		
gamma	E	2031-10-28T11:38:46.430		78.20	-30.57	47622.98	6.41		
delta	E	2031-10-28T11:40:30.173		77.98	-30.20	48300.35	6.65		
lambda	E	2031-10-28T11:44:39.307		77.41	-29.34	50026.71	7.20		
epsilon	E	2031-10-28T11:46:45.863		77.11	-28.90	50954.06	7.39		



target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2031-10-28T11:05:31.970  
 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 : 3427621809036892672  
 2Mass ID (if available) : 05445356+2332085  
 ICRS Star Coord at Epoch: 05h 44m 53.57171s +23:32:08.61654s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.675  
 G magnitude : 17.631  
 RP magnitude : 16.727  
 BP magnitude : 18.434  
 DUPflag : 0  
 Distance (au) : 18.470  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -11.93  
 Sun-Target sep (deg) : 127.85  
 Sun-Moon sep (deg) : 76.11  
 B (ring opening deg) : 78.15  
 PA of pole (deg) : 46.73  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 3.002  
 C/A sky separation (km) : 40210.2  
 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	2031-10-28T10:23:44.869		82.86	-35.79	50752.00	-7.47		
lambda	I	2031-10-28T10:25:23.073		82.77	-35.44	50026.71	-7.29		
delta	I	2031-10-28T10:29:28.815		82.47	-34.56	48300.35	-6.75		
gamma	I	2031-10-28T10:31:10.046		82.32	-34.20	47628.43	-6.52		
eta	I	2031-10-28T10:32:20.342		82.21	-33.95	47176.12	-6.35		
beta	I	2031-10-28T10:36:35.028		81.74	-33.04	45641.37	-5.69		
alpha	I	2031-10-28T10:39:28.959		81.37	-32.42	44693.10	-5.21		
4	I	2031-10-28T10:47:27.524		80.22	-30.70	42550.02	-3.70		
5	I	2031-10-28T10:48:39.140		80.03	-30.44	42287.10	-3.46		
6	I	2031-10-28T10:50:46.831		79.68	-29.99	41875.80	-3.04		

No planet occultations

6	E	2031-10-28T11:17:59.966		74.65	-24.13	41879.68	3.04		
5	E	2031-10-28T11:19:54.816		74.27	-23.72	42246.72	3.46		
4	E	2031-10-28T11:21:11.341		74.01	-23.44	42531.10	3.70		
alpha	E	2031-10-28T11:29:20.909		72.36	-21.69	44718.92	5.21		
beta	E	2031-10-28T11:32:10.590		71.78	-21.08	45646.70	5.69		
eta	E	2031-10-28T11:36:24.517		70.91	-20.17	47176.12	6.35		
gamma	E	2031-10-28T11:37:33.996		70.67	-19.92	47622.94	6.52		
delta	E	2031-10-28T11:39:16.108		70.31	-19.55	48300.35	6.75		
lambda	E	2031-10-28T11:43:21.953		69.46	-18.67	50026.71	7.28		
epsilon	E	2031-10-28T11:45:27.395		69.02	-18.23	50956.13	7.46		

