

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2049-11-10T05:32:30.490  
 Event type : PgtX  
 : Uranus occs: geocentric, topocentric  
 : No ring occs  
 Gaia source ID : 3813855195625011328  
 2Mass ID (if available) : 11210813+0500049

ICRS Star Coord at Epoch: 11h 21m 07.95330s +05:00:04.97075s

RUWE (>1.4 is poor) : 1.11  
 K magnitude : 11.761  
 G magnitude : 15.491  
 RP magnitude : 14.280  
 BP magnitude : 16.824  
 DUPflag : 0  
 Distance (au) : 18.783  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 22.51  
 Sun-Target sep (deg) : 58.46  
 Sun-Moon sep (deg) : 114.50  
 B (ring opening deg) : -1.55  
 PA of pole (deg) : 105.38

# a(km) ring

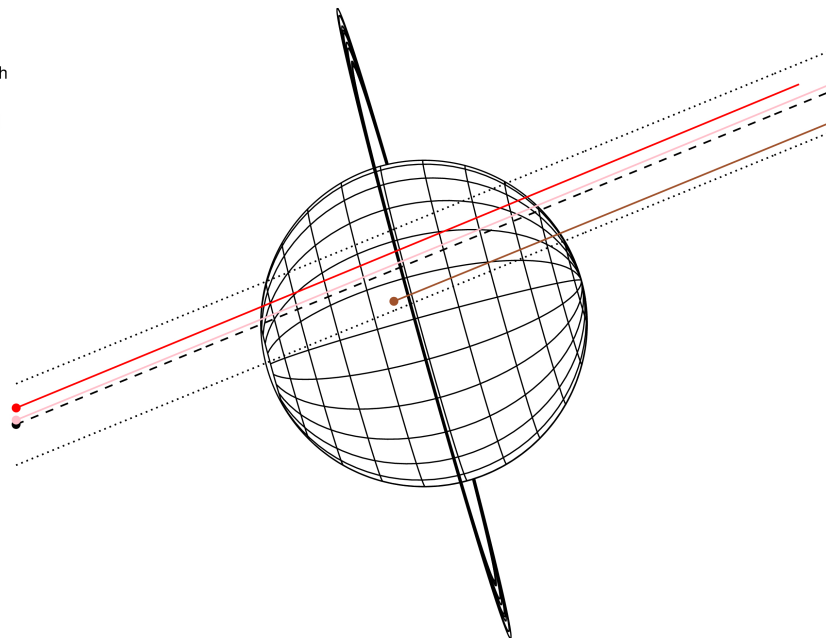
- 1 41837.2 6
- 2 42235.0 5
- 3 42571.2 4
- 4 44718.5 alpha
- 5 45661.1 beta
- 6 47176.1 eta
- 7 47626.3 gamma
- 8 48300.3 delta
- 9 50026.7 lambda
- 10 51149.4 epsilon



2049-11-10T05:32:30.4900 ex: 11 21 07.9533 s: +05 00 04.971 C/A 0.698° PA 202.25 deg v\_sky +22.51 km/s D 18.78 AU  
 Credit: Styled after SORA/Lucky Star

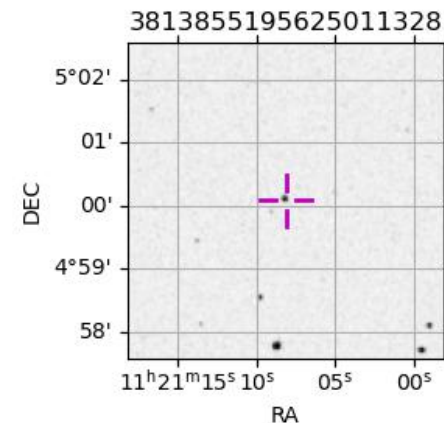
Uranus 2049-11-10T05:32:30 K11.76 G15.49 PgtX

Earth  
 PIC  
 TEN  
 RIO

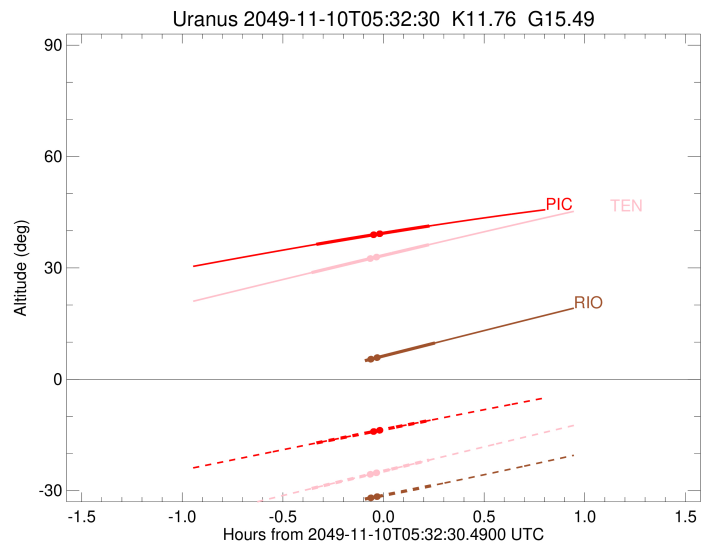
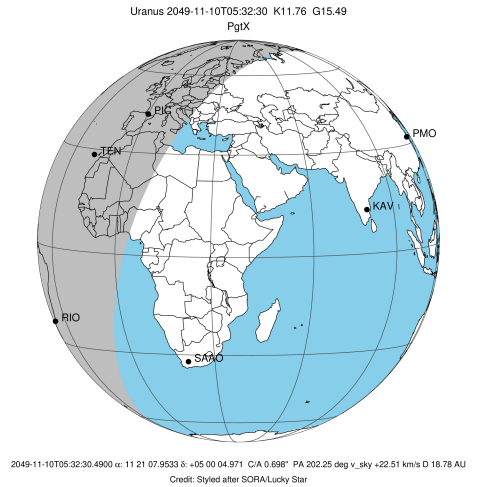


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1		+	+	NOV 10 05:12 - NOV 10 05:46	PieRnn
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4					PnnRnn
MCD	McDonald Obs. 2.7m	30.7	256.0					PnnRnn
TEN	Teide Obs./Tenerife	28.3	343.5		+	+	NOV 10 05:11 - NOV 10 05:46	PieRnn
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			+	NOV 10 05:47 - NOV 10 05:47	PneRnn
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



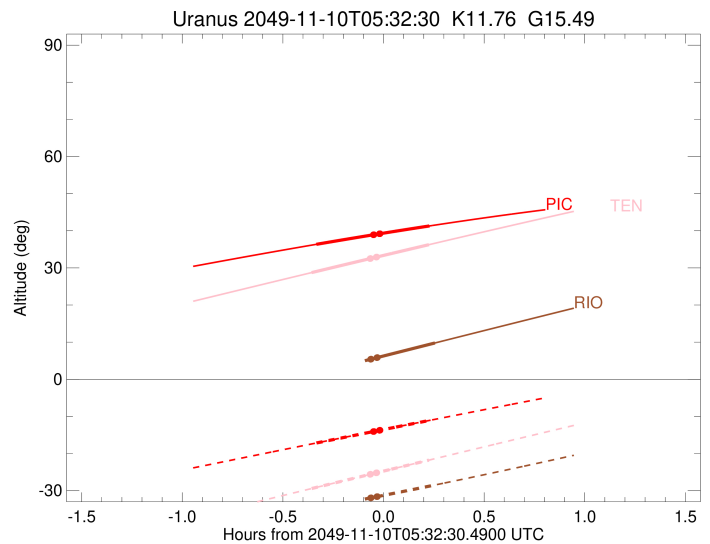
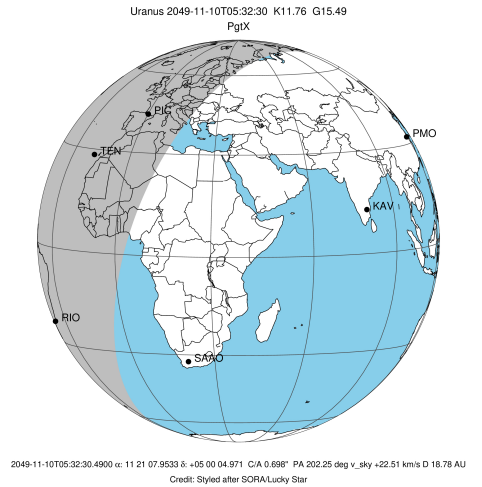
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2049-11-10T05:29:20.940  
 Event type : PgtX  
 : Uranus occs: geocentric, topocentric  
 : No ring occs  
 Observer code : PIC  
 Location : Pic du Midi  
 Latitude (deg) : 42.93656  
 E. Longitude (deg) : 0.14231  
 Altitude (km) : 2.890  
 Gaia source ID : 3813855195625011328  
 2Mass ID (if available) : 11210813+0500049  
 ICRS Star Coord at Epoch: 11h 21m 07.95330s +05:00:04.97075s  
 RUWE (>1.4 is poor) : 1.11  
 K magnitude : 11.761  
 G magnitude : 15.491  
 RP magnitude : 14.280  
 BP magnitude : 16.824  
 DUPflag : 0  
 Distance (au) : 18.783  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 22.51  
 Sun-Target sep (deg) : 58.46  
 Sun-Moon sep (deg) : 115.31  
 B (ring opening deg) : -1.55  
 PA of pole (deg) : 105.38  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.892  
 C/A sky separation (km) : 12147.3  
 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



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

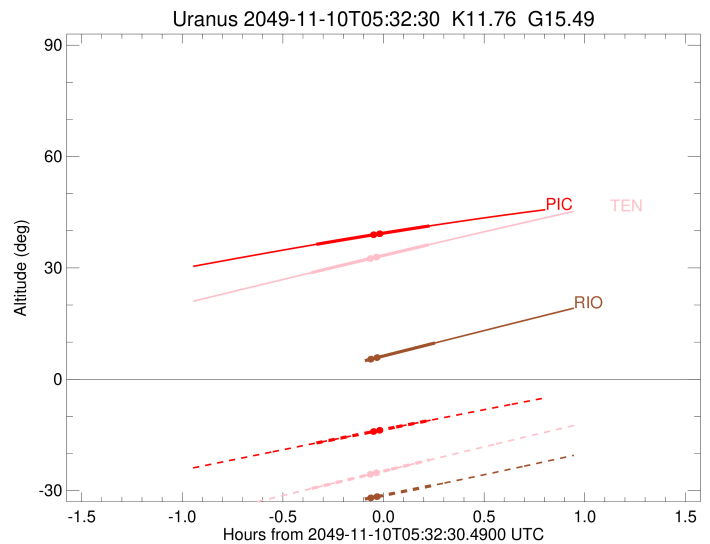
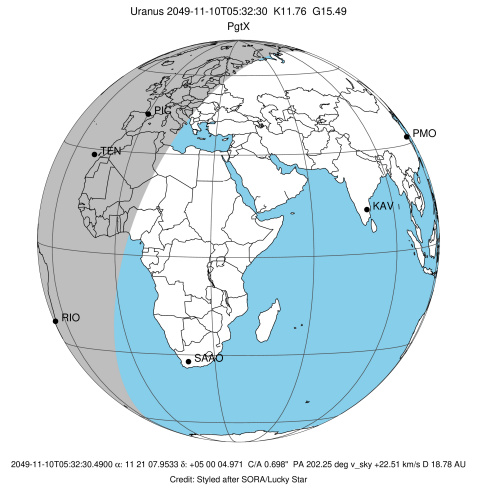
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2049-11-10T05:29:28.602	b	38.92	-14.09	50813.12	-795.41		
lambda	I	2049-11-10T05:29:29.590	b	38.92	-14.09	50026.73	-795.51		
delta	I	2049-11-10T05:29:31.762	b	38.93	-14.08	48300.30	-793.64		
gamma	I	2049-11-10T05:29:32.605	b	38.93	-14.08	47631.55	-792.86		
eta	I	2049-11-10T05:29:33.180	b	38.93	-14.08	47176.10	-792.31		
beta	I	2049-11-10T05:29:35.222	b	38.93	-14.07	45670.35	-791.76		
alpha	I	2049-11-10T05:29:36.831	b	38.94	-14.07	44684.70	-795.13		
4	I	2049-11-10T05:29:39.243	b	38.94	-14.06	42539.21	-793.15		
5	I	2049-11-10T05:29:41.002	b	38.95	-14.05	42303.38	-813.67		
6	I	2049-11-10T05:29:37.933	b	38.94	-14.06	41844.93	-756.59		
Uranus	I	2049-11-10T05:12:31.210		36.36	-17.16	25558.63		68.64	69.51
Uranus	E	2049-11-10T05:46:11.535		41.30	-11.09	25558.72		-54.50	-55.73
6	E	2049-11-10T05:31:18.919	b	39.19	-13.76	41807.40	756.31		
5	E	2049-11-10T05:31:15.990	b	39.18	-13.77	42154.88	813.40		
4	E	2049-11-10T05:31:17.670	b	39.18	-13.76	42615.63	792.86		
alpha	E	2049-11-10T05:31:20.796	b	39.19	-13.75	44745.43	794.80		
beta	E	2049-11-10T05:31:22.186	b	39.20	-13.75	45644.07	791.41		
eta	E	2049-11-10T05:31:24.183	b	39.20	-13.74	47176.18	791.93		
gamma	E	2049-11-10T05:31:24.746	b	39.20	-13.74	47621.45	792.48		
delta	E	2049-11-10T05:31:25.602	b	39.20	-13.74	48300.34	793.25		
lambda	E	2049-11-10T05:31:27.776	b	39.21	-13.73	50026.72	795.09		
epsilon	E	2049-11-10T05:31:29.422	b	39.21	-13.73	51336.35	794.97		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2049-11-10T05:28:32.850  
 Event type : PgtX  
 : Uranus occs: geocentric, topocentric  
 : No ring occs  
 Observer code : TEN  
 Location : Teide Obs./Tenerife  
 Latitude (deg) : 28.30050  
 E. Longitude (deg) : 343.48909  
 Altitude (km) : 2.395  
 Gaia source ID : 3813855195625011328  
 2Mass ID (if available) : 11210813+0500049  
 ICRS Star Coord at Epoch: 11h 21m 07.95330s +05:00:04.97075s  
 RUWE (>1.4 is poor) : 1.11  
 K magnitude : 11.761  
 G magnitude : 15.491  
 RP magnitude : 14.280  
 BP magnitude : 16.824  
 DUPflag : 0  
 Distance (au) : 18.783  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 22.51  
 Sun-Target sep (deg) : 58.46  
 Sun-Moon sep (deg) : 115.31  
 B (ring opening deg) : -1.55  
 PA of pole (deg) : 105.38  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.757  
 C/A sky separation (km) : 10318.3  
 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	2049-11-10T05:28:29.428	b	32.50	-25.62	50821.70	-805.08		
lambda	I	2049-11-10T05:28:30.415	b	32.50	-25.62	50026.71	-805.31		
delta	I	2049-11-10T05:28:32.560	b	32.51	-25.61	48300.34	-803.97		
gamma	I	2049-11-10T05:28:33.393	b	32.51	-25.60	47631.57	-803.41		
eta	I	2049-11-10T05:28:33.960	b	32.52	-25.60	47176.13	-803.01		
beta	I	2049-11-10T05:28:35.970	b	32.52	-25.60	45671.02	-803.05		
alpha	I	2049-11-10T05:28:37.556	b	32.53	-25.59	44684.87	-806.86		
4	I	2049-11-10T05:28:39.985	b	32.54	-25.58	42537.74	-805.83		
5	I	2049-11-10T05:28:41.720	b	32.54	-25.57	42305.27	-826.90		
6	I	2049-11-10T05:28:38.629	b	32.53	-25.59	41846.78	-769.11		
Uranus	I	2049-11-10T05:11:04.460		28.73	-29.44	25558.61		73.13	73.84
Uranus	E	2049-11-10T05:46:02.602		36.25	-21.79	25558.69		-59.12	-60.26
6	E	2049-11-10T05:30:20.584	b	32.90	-25.21	41808.80	768.52		
5	E	2049-11-10T05:30:17.592	b	32.89	-25.22	42154.81	826.32		
4	E	2049-11-10T05:30:19.302	b	32.89	-25.22	42615.23	805.23		
alpha	E	2049-11-10T05:30:22.335	b	32.90	-25.21	44746.33	806.21		
beta	E	2049-11-10T05:30:23.719	b	32.91	-25.20	45644.49	802.37		
eta	E	2049-11-10T05:30:25.697	b	32.92	-25.20	47176.14	802.31		
gamma	E	2049-11-10T05:30:26.252	b	32.92	-25.19	47621.43	802.69		
delta	E	2049-11-10T05:30:27.098	b	32.92	-25.19	48300.31	803.24		
lambda	E	2049-11-10T05:30:29.245	b	32.93	-25.18	50026.79	804.55		
epsilon	E	2049-11-10T05:30:30.889	b	32.94	-25.18	51349.45	804.30		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2049-11-10T05:29:13.860  
 Event type : PgtX  
 : Uranus occs: geocentric, topocentric  
 : No ring occs  
 Observer code : RIO  
 Location : Rio de Janeiro  
 Latitude (deg) : -22.89506  
 E. Longitude (deg) : 316.77708  
 Altitude (km) : 0.033  
 Gaia source ID : 3813855195625011328  
 2Mass ID (if available) : 11210813+0500049  
 ICRS Star Coord at Epoch: 11h 21m 07.95330s +05:00:04.97075s  
 RUWE (>1.4 is poor) : 1.11  
 K magnitude : 11.761  
 G magnitude : 15.491  
 RP magnitude : 14.280  
 BP magnitude : 16.824  
 DUPflag : 0  
 Distance (au) : 18.783  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 22.51  
 Sun-Target sep (deg) : 58.46  
 Sun-Moon sep (deg) : 114.86  
 B (ring opening deg) : -1.55  
 PA of pole (deg) : 105.38  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.367  
 C/A sky separation (km) : 5001.1  
 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	2049-11-10T05:28:41.242	b	5.40	-31.96	50848.43	-844.19		
lambda	I	2049-11-10T05:28:42.214	b	5.40	-31.95	50026.72	-844.71		
delta	I	2049-11-10T05:28:44.258	b	5.41	-31.95	48300.31	-844.78		
gamma	I	2049-11-10T05:28:45.050	b	5.41	-31.95	47631.57	-844.80		
eta	I	2049-11-10T05:28:45.589	b	5.41	-31.94	47176.14	-844.80		
beta	I	2049-11-10T05:28:47.484	b	5.42	-31.94	45673.00	-846.36		
alpha	I	2049-11-10T05:28:48.980	b	5.43	-31.93	44685.74	-851.42		
4	I	2049-11-10T05:28:51.432	b	5.44	-31.93	42534.20	-852.64		
5	I	2049-11-10T05:28:53.051	b	5.44	-31.92	42309.53	-875.68		
6	I	2049-11-10T05:28:50.018	b	5.43	-31.93	41852.07	-814.42		
Uranus	I	2049-11-10T05:10:38.089		1.25x	-35.07	25558.58		85.28	85.48
Uranus	E	2049-11-10T05:47:51.491		9.78	-28.48	25558.62		-71.80	-72.56
6	E	2049-11-10T05:30:31.058	b	5.82	-31.63	41813.07	808.78		
5	E	2049-11-10T05:30:27.988	b	5.80	-31.64	42155.48	869.81		
4	E	2049-11-10T05:30:29.741	b	5.81	-31.64	42613.53	846.78		
alpha	E	2049-11-10T05:30:32.492	b	5.82	-31.63	44748.46	845.40		
beta	E	2049-11-10T05:30:33.847	b	5.83	-31.62	45645.93	840.33		
eta	E	2049-11-10T05:30:35.756	b	5.83	-31.62	47176.07	838.70		
gamma	E	2049-11-10T05:30:36.287	b	5.84	-31.62	47621.16	838.68		
delta	E	2049-11-10T05:30:37.096	b	5.84	-31.61	48300.31	838.63		
lambda	E	2049-11-10T05:30:39.155	b	5.85	-31.61	50026.67	838.49		
epsilon	E	2049-11-10T05:30:40.776	b	5.85	-31.60	51385.43	837.81		