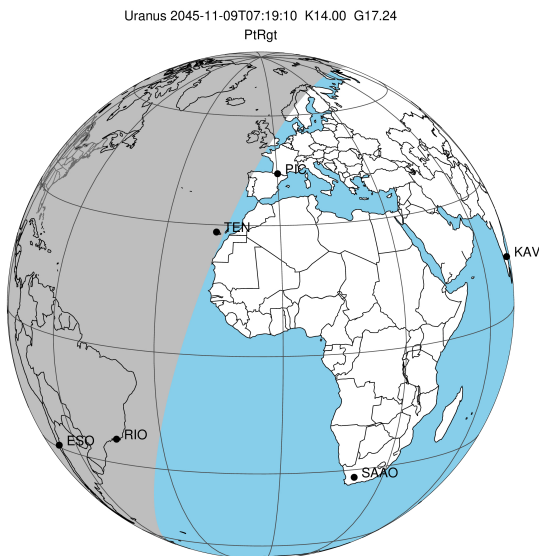


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2045-11-09T07:19:10.430
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3880737869467881088
 2Mass ID (if available) : 10115464+1155378

ICRS Star Coord at Epoch: 10h 11m 54.59532s +11:55:37.53277s

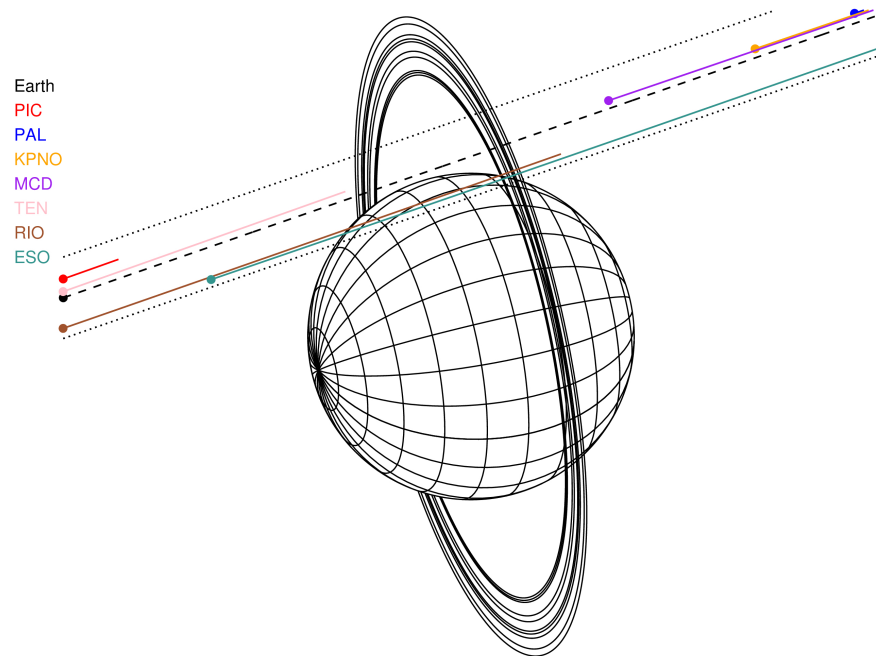
RUWE (>1.4 is poor) : 1.30
 K magnitude : 14.002
 G magnitude : 17.241
 RP magnitude : 16.214
 BP magnitude : 18.201
 DUPflag : 0
 Distance (au) : 18.558
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 13.97
 Sun-Target sep (deg) : 76.00
 Sun-Moon sep (deg) : 81.18
 B (ring opening deg) : 16.73
 PA of pole (deg) : 102.47

#	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



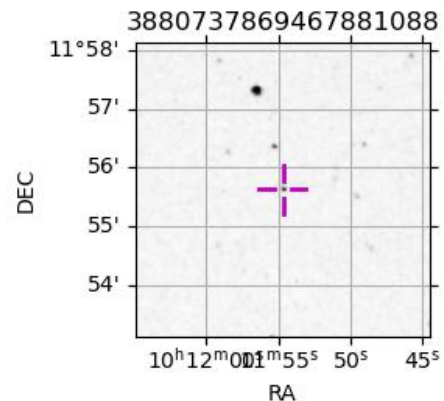
2045-11-09T07:19:10.4300 ex: 10 11 54.59532 s +11 55 37.533 C/A 1.975° PA 199.12 deg v_sky +13.97 km/s D 18.56 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2045-11-09T07:19:10 K14.00 G17.24 PtRgt

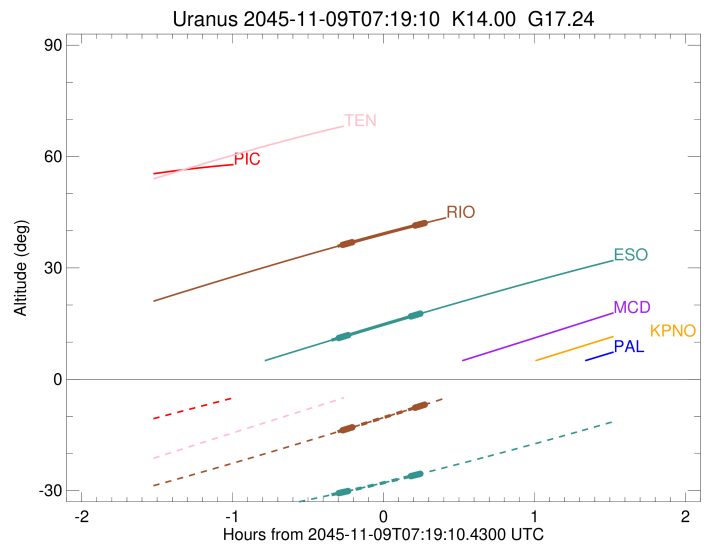
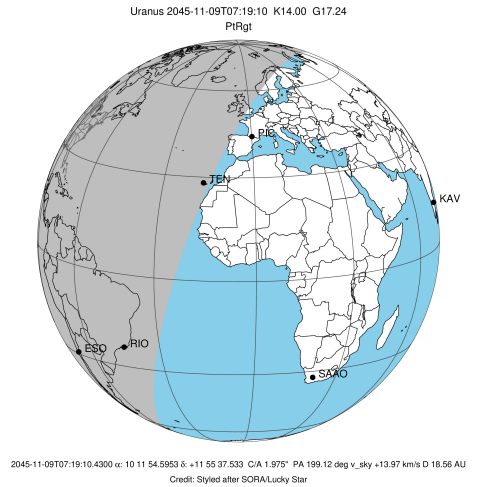


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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					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					PnnRnn
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 09 07:00 - NOV 09 07:35	PieRne
ESO	European Southern Obs	-29.3	289.3		+	+	NOV 09 06:58 - NOV 09 07:33	PieRne
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

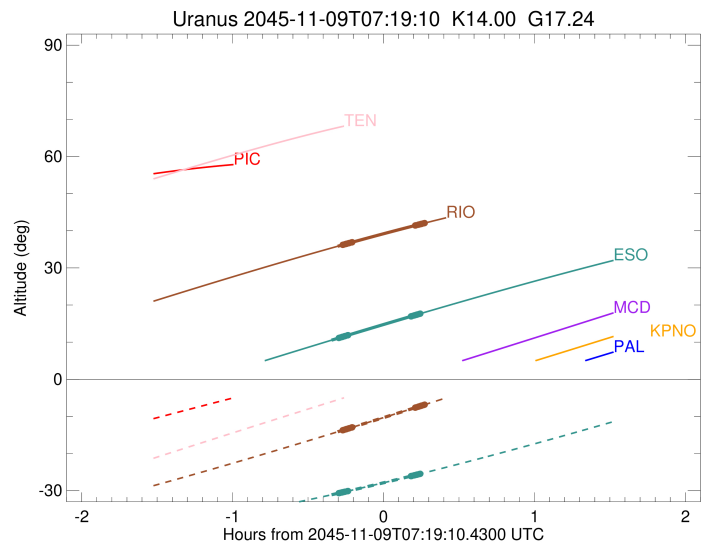
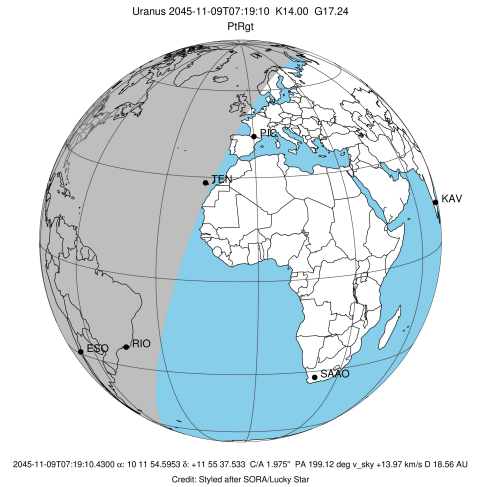


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2045-11-09T07:16:13.210
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 3880737869467881088
 2Mass ID (if available) : 10115464+1155378
 ICRS Star Coord at Epoch: 10h 11m 54.59532s +11:55:37.53277s
 RUWE (>1.4 is poor) : 1.30
 K magnitude : 14.002
 G magnitude : 17.241
 RP magnitude : 16.214
 BP magnitude : 18.201
 DUPflag : 0
 Distance (au) : 18.558
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 13.97
 Sun-Target sep (deg) : 76.00
 Sun-Moon sep (deg) : 81.82
 B (ring opening deg) : 16.73
 PA of pole (deg) : 102.47
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.655
 C/A sky separation (km) : 22275.5
 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	2045-11-09T07:03:04.152	b	36.23	-13.71	50953.83	-42.48		
lambda	I	2045-11-09T07:03:26.102	b	36.30	-13.63	50026.71	-42.14		
delta	I	2045-11-09T07:04:07.254	b	36.43	-13.49	48300.35	-41.75		
gamma	I	2045-11-09T07:04:23.558	b	36.48	-13.43	47620.96	-41.59		
eta	I	2045-11-09T07:04:34.270	b	36.51	-13.40	47176.12	-41.47		
beta	I	2045-11-09T07:05:11.122	b	36.63	-13.27	45666.77	-41.06		
alpha	I	2045-11-09T07:05:33.294	b	36.70	-13.19	44714.25	-40.72		
4	I	2045-11-09T07:06:29.813	b	36.87	-13.00	42527.31	-40.08		
5	I	2045-11-09T07:06:33.869	b	36.88	-12.98	42210.51	-39.93		
6	I	2045-11-09T07:06:43.326	b	36.91	-12.95	41850.00	-39.76		
Uranus	I	2045-11-09T07:00:58.150		35.83	-14.15	25542.22		34.42	35.66
Uranus	E	2045-11-09T07:31:31.138		41.38	-7.70	25552.00		-21.42	-22.33
6	E	2045-11-09T07:31:41.651		41.41	-7.67	41795.12	39.65		
5	E	2045-11-09T07:31:55.572		41.45	-7.62	42314.44	39.82		
4	E	2045-11-09T07:32:02.733		41.47	-7.59	42580.72	39.97		
alpha	E	2045-11-09T07:32:55.910		41.63	-7.40	44691.40	40.60		
beta	E	2045-11-09T07:33:18.488		41.69	-7.32	45641.72	40.93		
eta	E	2045-11-09T07:33:55.880		41.80	-7.19	47176.12	41.34		
gamma	E	2045-11-09T07:34:06.825		41.83	-7.15	47629.19	41.45		
delta	E	2045-11-09T07:34:22.984		41.88	-7.09	48300.35	41.61		
lambda	E	2045-11-09T07:35:04.275		41.99	-6.94	50026.71	42.00		
epsilon	E	2045-11-09T07:35:40.401		42.10	-6.82	51549.45	42.33		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2045-11-09T07:14:48.850
 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 : 3880737869467881088
 2Mass ID (if available) : 10115464+1155378
 ICRS Star Coord at Epoch: 10h 11m 54.59532s +11:55:37.53277s
 RUWE (>1.4 is poor) : 1.30
 K magnitude : 14.002
 G magnitude : 17.241
 RP magnitude : 16.214
 BP magnitude : 18.201
 DUPflag : 0
 Distance (au) : 18.558
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 13.97
 Sun-Target sep (deg) : 76.00
 Sun-Moon sep (deg) : 81.49
 B (ring opening deg) : 16.73
 PA of pole (deg) : 102.47
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.610
 C/A sky separation (km) : 21672.7
 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_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	2045-11-09T07:01:30.372	b	11.15	-30.66	50949.64	-43.29		
lambda	I	2045-11-09T07:01:51.808	b	11.22	-30.61	50026.71	-42.96		
delta	I	2045-11-09T07:02:32.163	b	11.36	-30.50	48300.35	-42.59		
gamma	I	2045-11-09T07:02:48.144	b	11.41	-30.46	47620.96	-42.43		
eta	I	2045-11-09T07:02:58.640	b	11.45	-30.44	47176.12	-42.32		
beta	I	2045-11-09T07:03:34.733	b	11.57	-30.34	45667.04	-41.93		
alpha	I	2045-11-09T07:03:56.423	b	11.65	-30.29	44714.74	-41.61		
4	I	2045-11-09T07:04:51.725	b	11.83	-30.15	42527.49	-41.01		
5	I	2045-11-09T07:04:55.728	b	11.85	-30.14	42209.33	-40.86		
6	I	2045-11-09T07:05:04.939	b	11.88	-30.11	41850.64	-40.70		
Uranus	I	2045-11-09T06:58:31.030		10.53	-31.11	25540.34		36.60	37.86
Uranus	E	2045-11-09T07:31:10.147		17.15	-25.91	25550.15		-24.23	-25.24
6	E	2045-11-09T07:30:01.592	b	16.93	-26.10	41795.23	40.55		
5	E	2045-11-09T07:30:15.209	b	16.97	-26.06	42314.21	40.71		
4	E	2045-11-09T07:30:22.164	b	16.99	-26.04	42581.55	40.86		
alpha	E	2045-11-09T07:31:14.262		17.17	-25.90	44691.77	41.45		
beta	E	2045-11-09T07:31:36.357		17.24	-25.84	45641.81	41.76		
eta	E	2045-11-09T07:32:13.022		17.36	-25.74	47176.12	42.15		
gamma	E	2045-11-09T07:32:23.759		17.40	-25.71	47629.26	42.25		
delta	E	2045-11-09T07:32:39.612		17.45	-25.66	48300.35	42.41		
lambda	E	2045-11-09T07:33:20.145		17.59	-25.55	50026.71	42.77		
epsilon	E	2045-11-09T07:33:55.602		17.70	-25.45	51548.38	43.09		