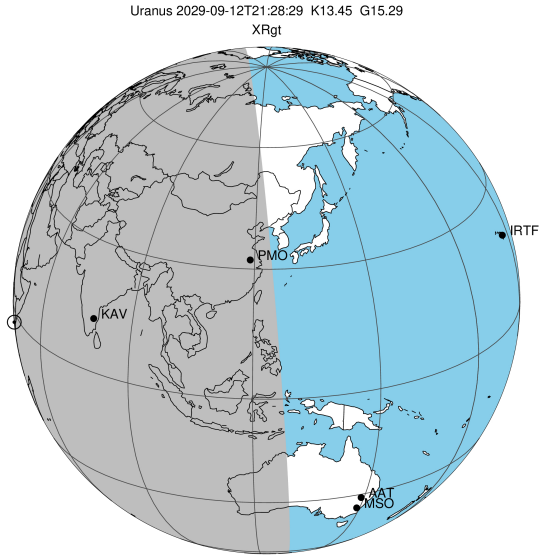


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-09-12T21:28:29.630
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3415380744223125888
 2Mass ID (if available) : 05081065+2255073

ICRS Star Coord at Epoch: 05h 08m 10.65822s +22:55:07.27477s

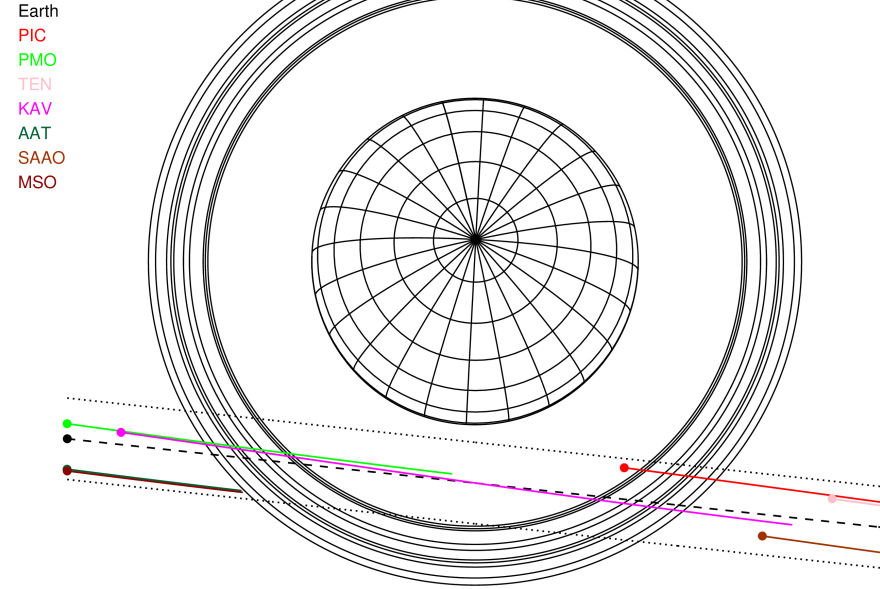
RUWE (>1.4 is poor) : 0.98
 K magnitude : 13.449
 G magnitude : 15.290
 RP magnitude : 14.658
 BP magnitude : 15.739
 DUPflag : 0
 Distance (au) : 19.181
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 5.33
 Sun-Target sep (deg) : 91.90
 Sun-Moon sep (deg) : 153.34
 B (ring opening deg) : 82.25
 PA of pole (deg) : -1.91

#	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



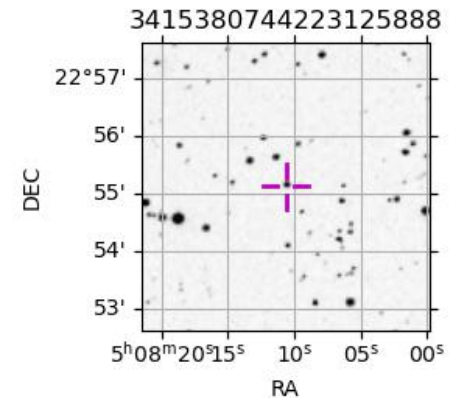
2029-09-12T21:28:29.6300 ra: 05 08 10.65822 s: +22 55 07.275 C/A 2.4777 PA 353.79 deg v_sky + 5.33 km/s D 19.18 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2029-09-12T21:28:29 K13.45 G15.29 XRgt

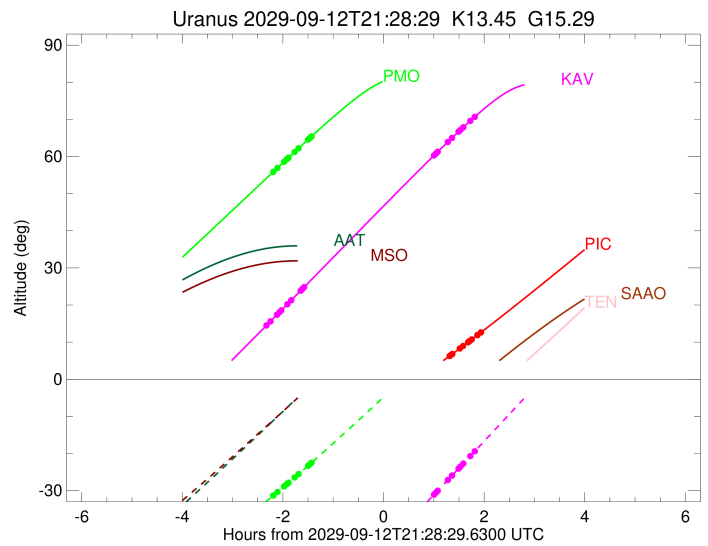
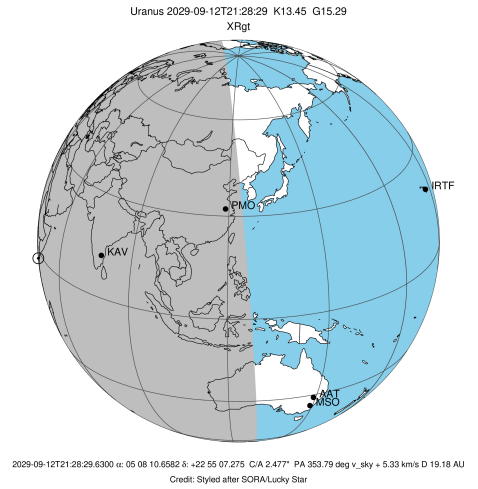


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1			+++++	SEP 12 22:47 - SEP 12 23:25	PnnRne
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++			SEP 12 19:15 - SEP 12 20:02	PnnRin
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	+++++		+++++	SEP 12 19:07 - SEP 12 23:18	PnnRie
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 : 2029-09-12T21:16:57.950
 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 : 3415380744223125888
 2Mass ID (if available) : 05081065+2255073
 ICRS Star Coord at Epoch: 05h 08m 10.65822s +22:55:07.27477s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 13.449
 G magnitude : 15.290
 RP magnitude : 14.658
 BP magnitude : 15.739
 DUPflag : 0
 Distance (au) : 19.181
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 5.33
 Sun-Target sep (deg) : 91.90
 Sun-Moon sep (deg) : 152.71
 B (ring opening deg) : 82.25
 PA of pole (deg) : -1.91
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.090
 C/A sky separation (km) : 29074.8
 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

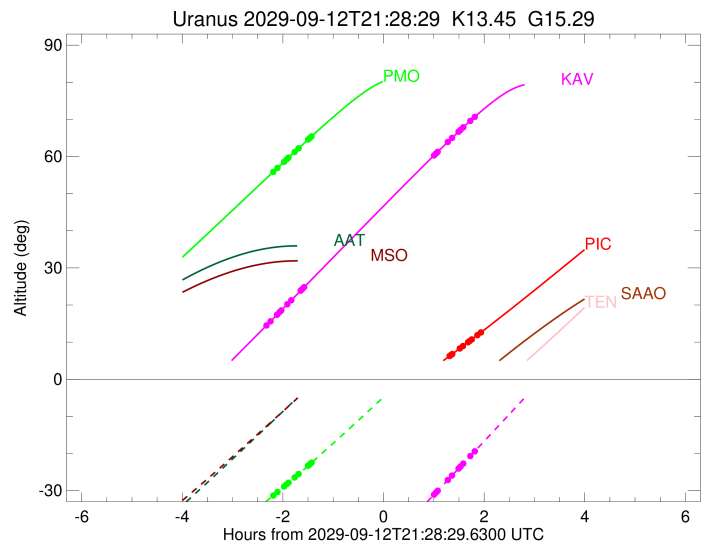
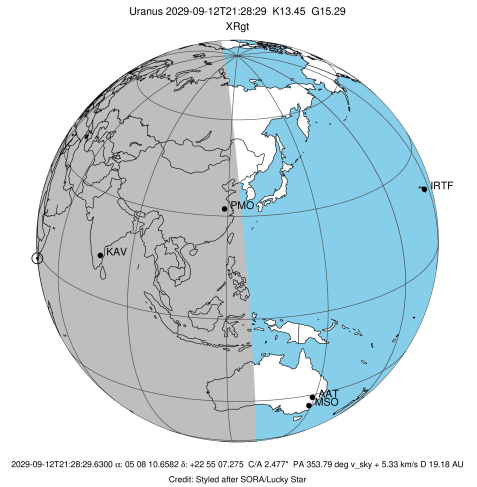


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-09-12T19:12:27.806		-21.01x	-11.31	51380.71	-4.72		
lambda	I	2029-09-12T19:17:18.278		-20.66x	-12.16	50026.71	-4.63		
delta	I	2029-09-12T19:23:35.088		-20.18x	-13.26	48300.35	-4.53		
gamma	I	2029-09-12T19:26:05.349		-19.98x	-13.70	47622.10	-4.49		
eta	I	2029-09-12T19:27:44.903		-19.85x	-13.99	47176.12	-4.47		
beta	I	2029-09-12T19:33:28.654		-19.37x	-14.98	45657.69	-4.36		
alpha	I	2029-09-12T19:37:05.431		-19.06x	-15.60	44718.39	-4.30		
4	I	2029-09-12T19:45:41.465		-18.29x	-17.08	42547.42	-4.11		
5	I	2029-09-12T19:47:03.571		-18.17x	-17.31	42208.10	-4.08		
6	I	2029-09-12T19:48:38.358		-18.02x	-17.58	41827.10	-4.04		

No planet occultations

6	E	2029-09-12T22:47:05.953	6.23	-40.97	41795.97	3.85
5	E	2029-09-12T22:48:38.276	6.49	-41.08	42159.90	3.88
4	E	2029-09-12T22:50:15.487	6.76	-41.20	42533.49	3.91
alpha	E	2029-09-12T22:59:30.911	8.31	-41.79	44752.18	4.07
beta	E	2029-09-12T23:03:08.113	8.92	-42.00	45642.15	4.12
eta	E	2029-09-12T23:09:16.588	9.96	-42.32	47176.12	4.20
gamma	E	2029-09-12T23:11:02.846	10.27	-42.41	47624.00	4.23
delta	E	2029-09-12T23:13:42.281	10.72	-42.53	48300.35	4.26
lambda	E	2029-09-12T23:20:24.169	11.87	-42.81	50026.71	4.33
epsilon	E	2029-09-12T23:25:35.318	12.77	-43.00	51382.55	4.40

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-09-12T21:26:12.970
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3415380744223125888
 2Mass ID (if available) : 05081065+2255073
 ICRS Star Coord at Epoch: 05h 08m 10.65822s +22:55:07.27477s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 13.449
 G magnitude : 15.290
 RP magnitude : 14.658
 BP magnitude : 15.739
 DUPflag : 0
 Distance (au) : 19.181
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 5.33
 Sun-Target sep (deg) : 91.90
 Sun-Moon sep (deg) : 153.71
 B (ring opening deg) : 82.25
 PA of pole (deg) : -1.91
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.405
 C/A sky separation (km) : 33454.8
 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

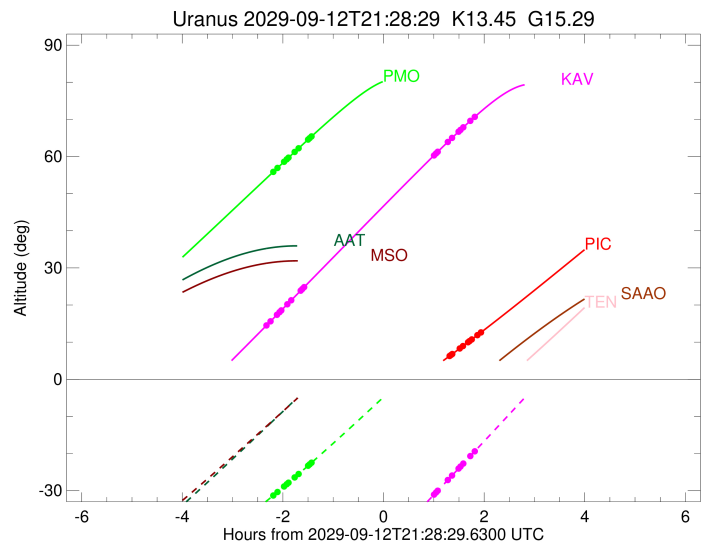
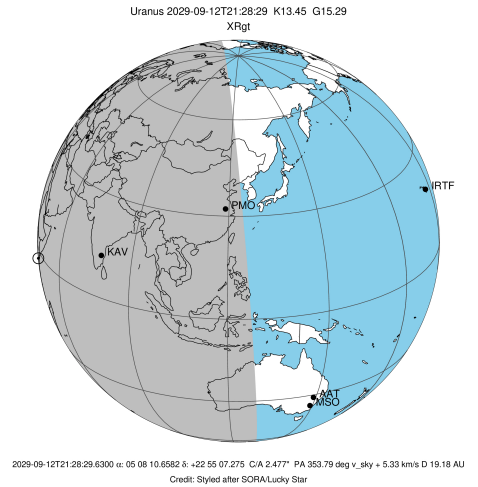


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-09-12T19:15:58.406		55.64	-31.51	51412.82	-3.83		
lambda	I	2029-09-12T19:22:06.870		56.94	-30.36	50026.71	-3.72		
delta	I	2029-09-12T19:29:59.076		58.60	-28.86	48300.35	-3.59		
gamma	I	2029-09-12T19:33:09.325		59.27	-28.26	47621.75	-3.54		
eta	I	2029-09-12T19:35:15.847		59.71	-27.85	47176.12	-3.50		
beta	I	2029-09-12T19:42:38.154		61.26	-26.42	45655.20	-3.37		
alpha	I	2029-09-12T19:47:18.412		62.23	-25.51	44722.90	-3.28		
4	I	2029-09-12T19:58:49.239		64.63	-23.24	42541.92	-3.03		
5	I	2029-09-12T20:00:43.107		65.02	-22.86	42196.88	-2.98		
6	I	2029-09-12T20:02:51.455		65.46	-22.44	41820.78	-2.93		

No planet occultations

6	E	2029-09-12T22:49:58.784		73.21	12.44x	41794.93	2.87		
5	E	2029-09-12T22:52:01.330		72.83	12.87x	42156.63	2.92		
4	E	2029-09-12T22:54:10.141		72.42	13.33x	42530.33	2.96		
alpha	E	2029-09-12T23:06:09.636		70.09	15.86x	44752.43	3.20		
beta	E	2029-09-12T23:10:43.573		69.18	16.83x	45641.51	3.28		
eta	E	2029-09-12T23:18:22.113		67.64	18.44x	47176.12	3.41		
gamma	E	2029-09-12T23:20:32.706		67.20	18.90x	47623.50	3.44		
delta	E	2029-09-12T23:23:47.925		66.54	19.58x	48300.35	3.49		
lambda	E	2029-09-12T23:31:54.340		64.87	21.28x	50026.71	3.61		
epsilon	E	2029-09-12T23:38:14.191		63.56	22.61x	51411.71	3.71		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-09-12T21:10:18.790
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 3415380744223125888
 2Mass ID (if available) : 05081065+2255073
 ICRS Star Coord at Epoch: 05h 08m 10.65822s +22:55:07.27477s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 13.449
 G magnitude : 15.290
 RP magnitude : 14.658
 BP magnitude : 15.739
 DUPflag : 0
 Distance (au) : 19.181
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 5.33
 Sun-Target sep (deg) : 91.90
 Sun-Moon sep (deg) : 153.07
 B (ring opening deg) : 82.25
 PA of pole (deg) : -1.91
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.469
 C/A sky separation (km) : 34342.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.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	2029-09-12T19:07:50.781		14.26	-72.33	51415.21	-3.95		
lambda	I	2029-09-12T19:13:49.003		15.62	-71.72	50026.71	-3.82		
delta	I	2029-09-12T19:21:29.037		17.38	-70.79	48300.35	-3.68		
gamma	I	2029-09-12T19:24:35.012		18.09	-70.37	47621.72	-3.62		
eta	I	2029-09-12T19:26:38.897		18.57	-70.08	47176.12	-3.58		
beta	I	2029-09-12T19:33:53.612		20.23	-69.00	45654.95	-3.42		
alpha	I	2029-09-12T19:38:30.183		21.29	-68.27	44723.37	-3.32		
4	I	2029-09-12T19:49:58.554		23.93	-66.29	42541.31	-3.02		
5	I	2029-09-12T19:51:53.166		24.37	-65.94	42195.56	-2.96		
6	I	2029-09-12T19:54:02.236		24.86	-65.55	41820.01	-2.91		

No planet occultations

6	E	2029-09-12T22:28:24.583		60.23	-31.15	41794.77	2.73		
5	E	2029-09-12T22:30:33.004		60.70	-30.64	42155.76	2.78		
4	E	2029-09-12T22:32:47.827		61.20	-30.11	42529.25	2.83		
alpha	E	2029-09-12T22:45:18.144		63.95	-27.11	44752.37	3.08		
beta	E	2029-09-12T22:50:02.427		64.97	-25.98	45641.31	3.16		
eta	E	2029-09-12T22:57:57.538		66.67	-24.08	47176.12	3.29		
gamma	E	2029-09-12T23:00:12.610		67.15	-23.54	47623.27	3.33		
delta	E	2029-09-12T23:03:34.606		67.86	-22.73	48300.35	3.38		
lambda	E	2029-09-12T23:11:57.406		69.60	-20.71	50026.71	3.49		
epsilon	E	2029-09-12T23:18:33.998		70.93	-19.11	51426.35	3.59		