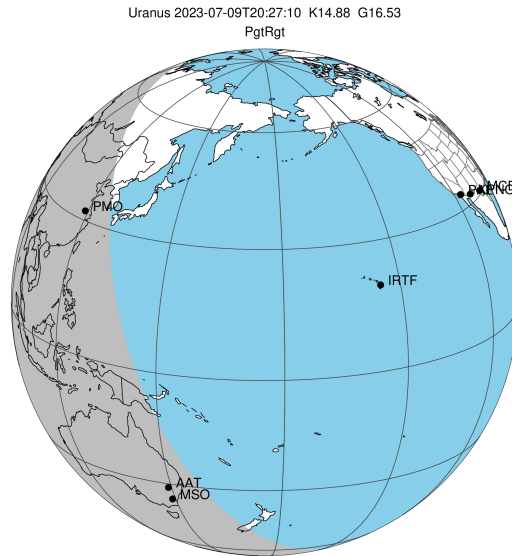


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2023-07-09T20:27:10.830
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 55709299242451072
 2Mass ID (if available) : 03173759+1753507

ICRS Star Coord at Epoch: 03h 17m 37.60990s +17:53:50.49298s

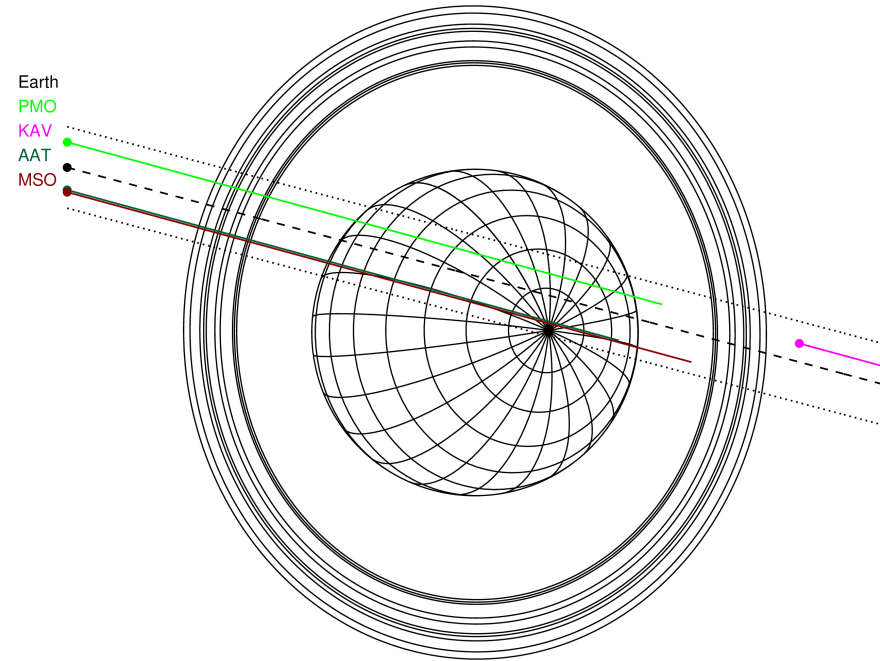
RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.882
 G magnitude : 16.525
 RP magnitude : 16.004
 BP magnitude : 16.870
 DUPflag : 0
 Distance (au) : 20.202
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.31
 Sun-Target sep (deg) : 55.32
 Sun-Moon sep (deg) : 37.53
 B (ring opening deg) : 63.14
 PA of pole (deg) : -88.35

#	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



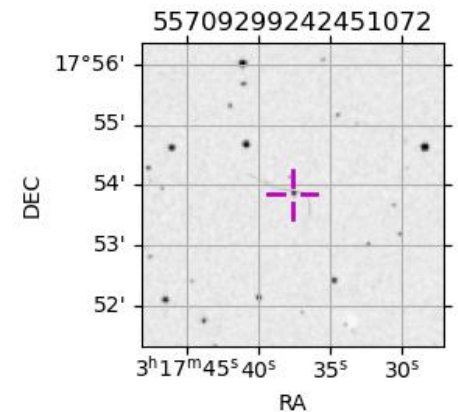
2023-07-09T20:27:10.8300 ex: 03 17 37.6099 8: +17 53 50.493 C/A 0.5877 PA 165.12 deg v_sky +23.31 km/s D 20.20 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2023-07-09T20:27:10 K14.88 G16.53 PgtRgt

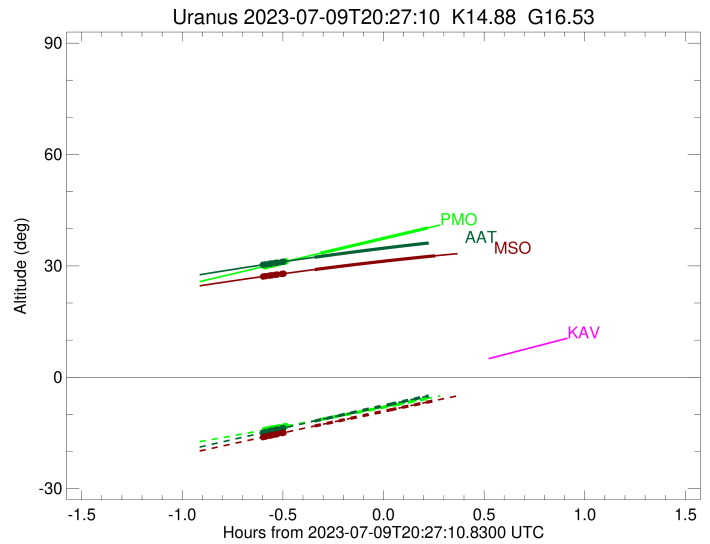
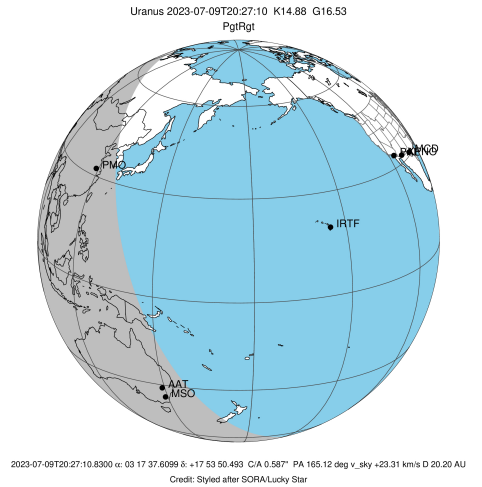


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEncode
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	+++++	+ +		JUL 09 19:51 - JUL 09 20:40	PieRin
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					PnnRnn
ESO	European Southern Obs	-29.3	289.3					PnnRnn
AAT	Siding Spring (AAT)	-31.3	149.1	+++++	+		JUL 09 19:51 - JUL 09 20:06	PinRin
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++	+ +		JUL 09 19:51 - JUL 09 20:42	PieRin

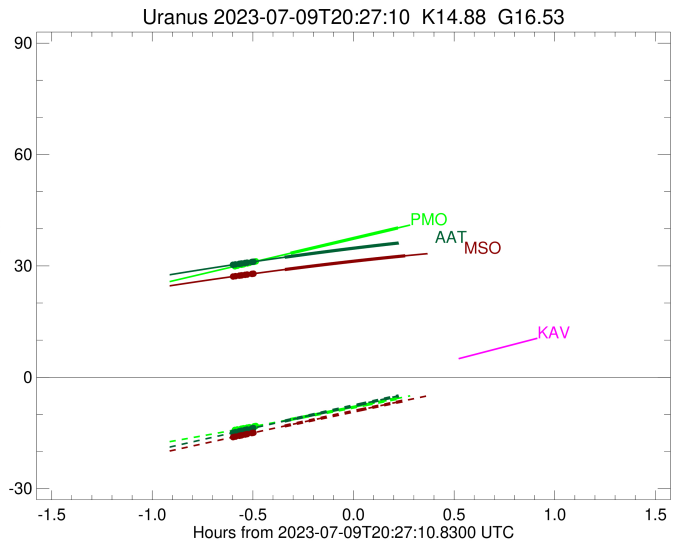
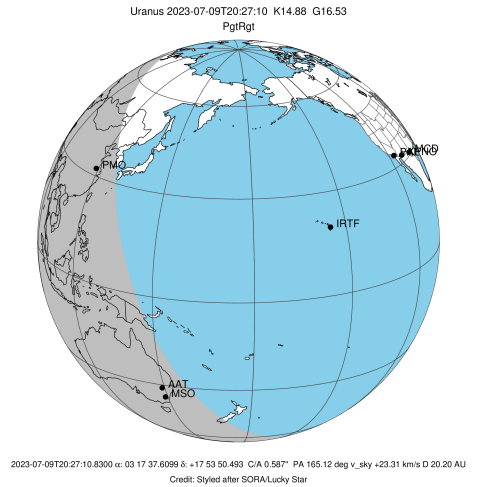


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2023-07-09T20:24:30.590
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 55709299242451072
 2Mass ID (if available) : 03173759+1753507
 ICRS Star Coord at Epoch: 03h 17m 37.60990s +17:53:50.49298s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.882
 G magnitude : 16.525
 RP magnitude : 16.004
 BP magnitude : 16.870
 DUPflag : 0
 Distance (au) : 20.202
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.31
 Sun-Target sep (deg) : 55.32
 Sun-Moon sep (deg) : 37.45
 B (ring opening deg) : 63.14
 PA of pole (deg) : -88.35
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.816
 C/A sky separation (km) : 11957.1
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



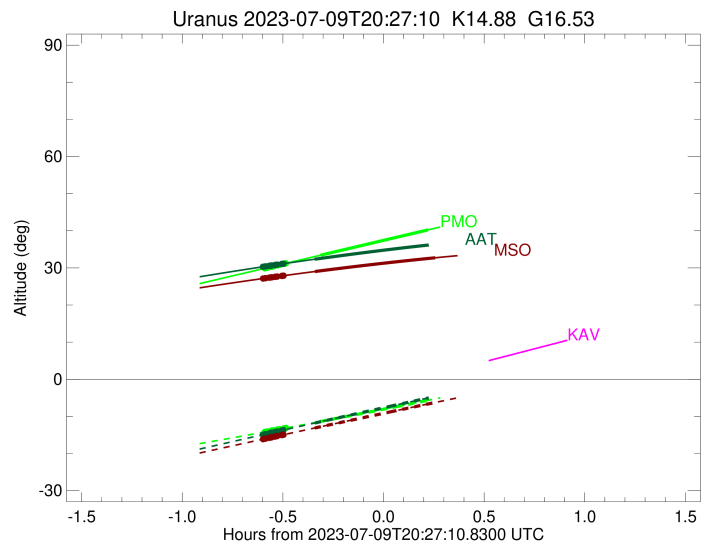
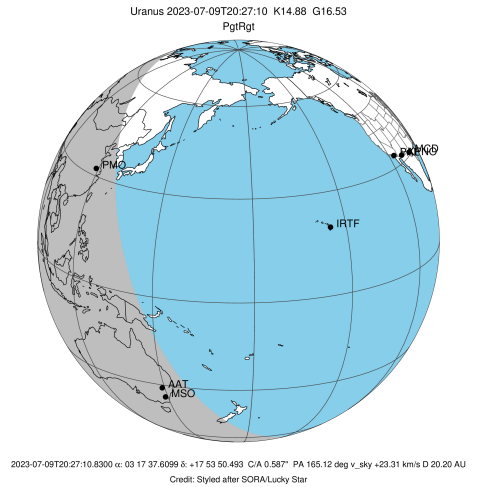
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2023-07-09T19:51:51.567		29.90	-14.17	51109.99	-25.08		
lambda	I	2023-07-09T19:52:34.873		30.06	-14.05	50026.71	-25.00		
delta	I	2023-07-09T19:53:44.015		30.30	-13.86	48300.35	-24.94		
gamma	I	2023-07-09T19:54:11.032		30.40	-13.78	47626.91	-24.91		
eta	I	2023-07-09T19:54:29.133		30.46	-13.73	47176.12	-24.90		
beta	I	2023-07-09T19:55:29.496		30.67	-13.56	45673.89	-24.83		
alpha	I	2023-07-09T19:56:08.237		30.81	-13.45	44708.78	-24.80		
4	I	2023-07-09T19:57:36.823		31.13	-13.21	42527.12	-24.69		
5	I	2023-07-09T19:57:45.866		31.16	-13.18	42296.43	-24.67		
6	I	2023-07-09T19:58:06.071		31.23	-13.12	41797.95	-24.65		
Uranus	I	2023-07-09T20:08:26.067		33.43	-11.36	25323.88		-18.60	-19.42
Uranus	E	2023-07-09T20:40:25.870		40.23	-5.67	25111.83		26.28	27.35
6	E	2023-07-09T20:50:01.118		42.27	-3.91x	41878.96	24.55		
5	E	2023-07-09T20:50:12.412		42.31	-3.88x	42155.40	24.57		
4	E	2023-07-09T20:50:30.997		42.38	-3.82x	42613.92	24.59		
alpha	E	2023-07-09T20:51:58.021		42.68	-3.55x	44743.66	24.69		
beta	E	2023-07-09T20:52:34.251		42.81	-3.44x	45642.27	24.72		
eta	E	2023-07-09T20:53:36.193		43.03	-3.25x	47176.12	24.78		
gamma	E	2023-07-09T20:53:54.432		43.10	-3.19x	47628.28	24.80		
delta	E	2023-07-09T20:54:21.519		43.19	-3.11x	48300.35	24.82		
lambda	E	2023-07-09T20:55:30.989		43.44	-2.89x	50026.71	24.88		
epsilon	E	2023-07-09T20:56:24.700		43.63	-2.72x	51363.94	24.96		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2023-07-09T20:24:38.640
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 55709299242451072
 2Mass ID (if available) : 03173759+1753507
 ICRS Star Coord at Epoch: 03h 17m 37.60990s +17:53:50.49298s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.882
 G magnitude : 16.525
 RP magnitude : 16.004
 BP magnitude : 16.870
 DUPflag : 0
 Distance (au) : 20.202
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.31
 Sun-Target sep (deg) : 55.32
 Sun-Moon sep (deg) : 37.43
 B (ring opening deg) : 63.14
 PA of pole (deg) : -88.35
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.322
 C/A sky separation (km) : 4724.6
 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	2023-07-09T19:51:19.001		30.31	-14.91	51052.15	-25.48		
lambda	I	2023-07-09T19:51:59.275		30.41	-14.78	50026.71	-25.46		
delta	I	2023-07-09T19:53:07.100		30.56	-14.55	48300.35	-25.45		
gamma	I	2023-07-09T19:53:33.599		30.62	-14.46	47626.08	-25.44		
eta	I	2023-07-09T19:53:51.285		30.66	-14.40	47176.12	-25.44		
beta	I	2023-07-09T19:54:50.213		30.79	-14.20	45676.24	-25.43		
alpha	I	2023-07-09T19:55:28.314		30.88	-14.07	44703.53	-25.42		
4	I	2023-07-09T19:56:54.480		31.07	-13.77	42526.00	-25.41		
5	I	2023-07-09T19:57:02.946		31.09	-13.75	42304.56	-25.40		
6	I	2023-07-09T19:57:22.985		31.13	-13.68	41795.70	-25.40		
Uranus	I	2023-07-09T20:06:42.434		32.34	-11.78	25192.19		-23.58	-24.57
Uranus	E	2023-07-09T20:42:31.679		36.36	-4.64x	25098.77		26.70	27.78
6	E	2023-07-09T20:51:35.834		37.20	-2.86x	41879.74	25.33		
5	E	2023-07-09T20:51:46.855		37.22	-2.83x	42158.31	25.33		
4	E	2023-07-09T20:52:04.762		37.24	-2.77x	42615.92	25.34		
alpha	E	2023-07-09T20:53:29.119		37.36	-2.49x	44739.56	25.35		
beta	E	2023-07-09T20:54:04.631		37.42	-2.38x	45643.63	25.35		
eta	E	2023-07-09T20:55:05.036		37.50	-2.18x	47176.12	25.36		
gamma	E	2023-07-09T20:55:22.833		37.53	-2.12x	47627.50	25.36		
delta	E	2023-07-09T20:55:49.359		37.57	-2.04x	48300.35	25.37		
lambda	E	2023-07-09T20:56:57.403		37.66	-1.82x	50026.71	25.38		
epsilon	E	2023-07-09T20:57:48.058		37.73	-1.66x	51312.24	25.40		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2023-07-09T20:24:39.810
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MSO
 Location : Mt. Stromlo Observatory
 Latitude (deg) : -35.32000
 E. Longitude (deg) : 149.00833
 Altitude (km) : 0.770
 Gaia source ID : 55709299242451072
 2Mass ID (if available) : 03173759+1753507
 ICRS Star Coord at Epoch: 03h 17m 37.60990s +17:53:50.49298s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.882
 G magnitude : 16.525
 RP magnitude : 16.004
 BP magnitude : 16.870
 DUPflag : 0
 Distance (au) : 20.202
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.31
 Sun-Target sep (deg) : 55.32
 Sun-Moon sep (deg) : 37.40
 B (ring opening deg) : 63.14
 PA of pole (deg) : -88.35
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.302
 C/A sky separation (km) : 4418.9
 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_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	2023-07-09T19:51:21.230		27.15	-16.12	51049.66	-25.51		
lambda	I	2023-07-09T19:52:01.360		27.24	-15.99	50026.71	-25.49		
delta	I	2023-07-09T19:53:09.104		27.38	-15.77	48300.35	-25.48		
gamma	I	2023-07-09T19:53:35.571		27.43	-15.68	47626.05	-25.47		
eta	I	2023-07-09T19:53:53.234		27.47	-15.62	47176.12	-25.47		
beta	I	2023-07-09T19:54:52.083		27.59	-15.43	45676.33	-25.46		
alpha	I	2023-07-09T19:55:30.147		27.67	-15.31	44703.31	-25.45		
4	I	2023-07-09T19:56:56.189		27.85	-15.03	42525.98	-25.44		
5	I	2023-07-09T19:57:04.634		27.87	-15.00	42304.86	-25.44		
6	I	2023-07-09T19:57:24.659		27.91	-14.93	41795.63	-25.44		
Uranus	I	2023-07-09T20:06:42.049		29.02	-13.12	25187.49		-23.74	-24.74
Uranus	E	2023-07-09T20:42:34.663		32.72	-6.26	25099.98		26.66	27.74
6	E	2023-07-09T20:51:38.025		33.49	-4.56x	41879.75	25.37		
5	E	2023-07-09T20:51:49.036		33.51	-4.52x	42158.48	25.37		
4	E	2023-07-09T20:52:06.907		33.53	-4.47x	42615.98	25.38		
alpha	E	2023-07-09T20:53:31.131		33.65	-4.21x	44739.38	25.38		
beta	E	2023-07-09T20:54:06.602		33.69	-4.10x	45643.70	25.39		
eta	E	2023-07-09T20:55:06.921		33.77	-3.91x	47176.12	25.40		
gamma	E	2023-07-09T20:55:24.692		33.79	-3.86x	47627.47	25.40		
delta	E	2023-07-09T20:55:51.184		33.83	-3.77x	48300.35	25.40		
lambda	E	2023-07-09T20:56:59.139		33.92	-3.56x	50026.71	25.41		
epsilon	E	2023-07-09T20:57:49.644		33.98	-3.41x	51310.08	25.43		