

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-07-22T18:03:17.200
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3412996728135577088
 2Mass ID (if available) : 04440265+2214308

Uranus 2028-07-22T18:03:17 K13.34 G15.54 PgtRgt

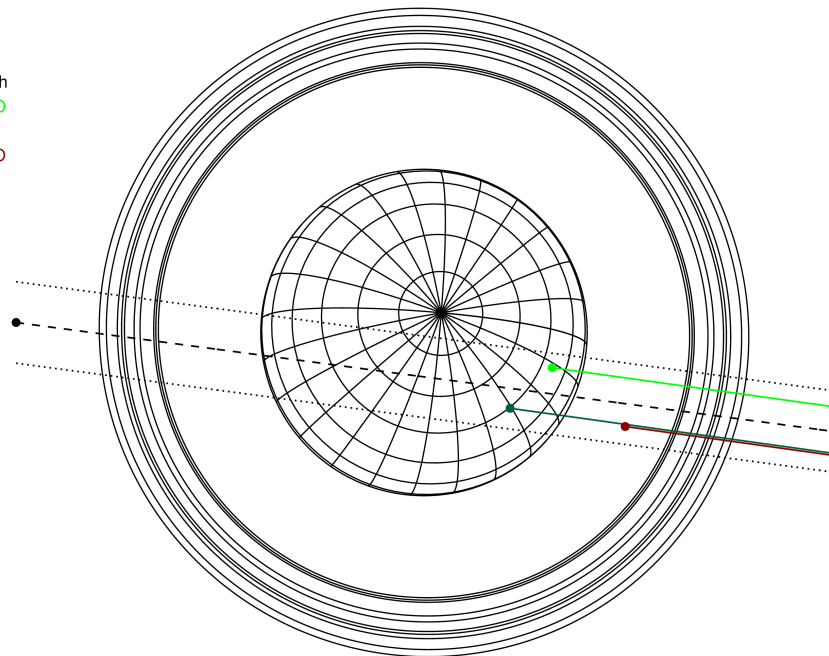
ICRS Star Coord at Epoch: 04h 44m 02.66453s +22:14:30.75229s

RUWE (>1.4 is poor) : 1.04
 K magnitude : 13.341
 G magnitude : 15.538
 RP magnitude : 14.794
 BP magnitude : 16.139
 DUPflag : 0
 Distance (au) : 19.990
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 26.43
 Sun-Target sep (deg) : 47.57
 Sun-Moon sep (deg) : 56.20
 B (ring opening deg) : 80.75
 PA of pole (deg) : -41.24



2028-07-22T18:03:17.2000 ex: 04 44 02.6645 s: +22 14 30.752 C/A 0.4711 PA 352.40 deg v_sky +26.43 km/s D 19.99 AU
 Credit: Styled after SORA/Lucky Star

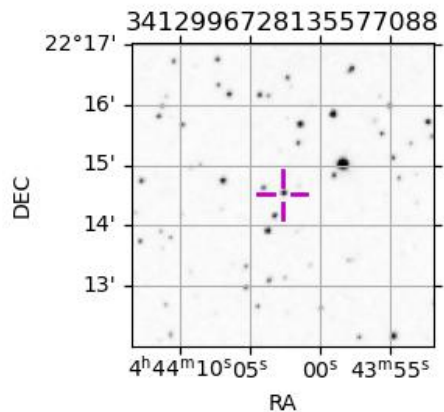
Earth
 PMO
 AAT
 MSO



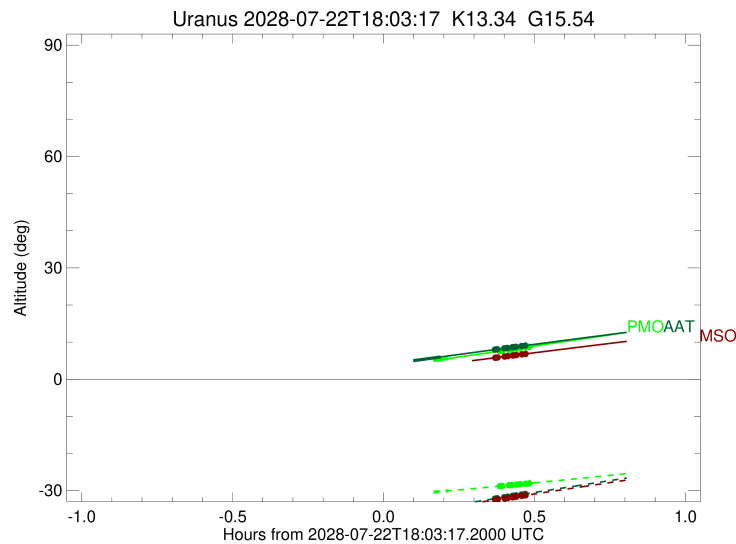
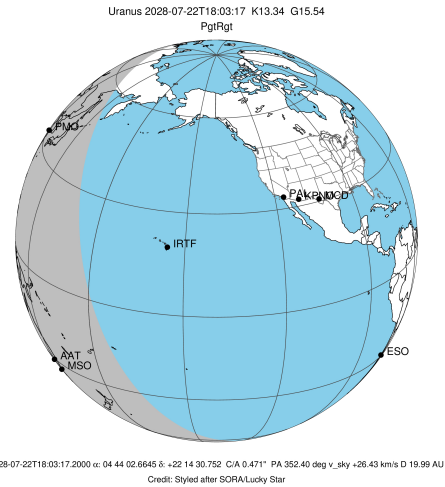
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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		+	+++++++	JUL 22 18:16 - JUL 22 18:32	PneRne
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 22 18:14 - JUL 22 18:31	PneRne
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0			+++++++	JUL 22 18:25 - JUL 22 18:31	PnnRne

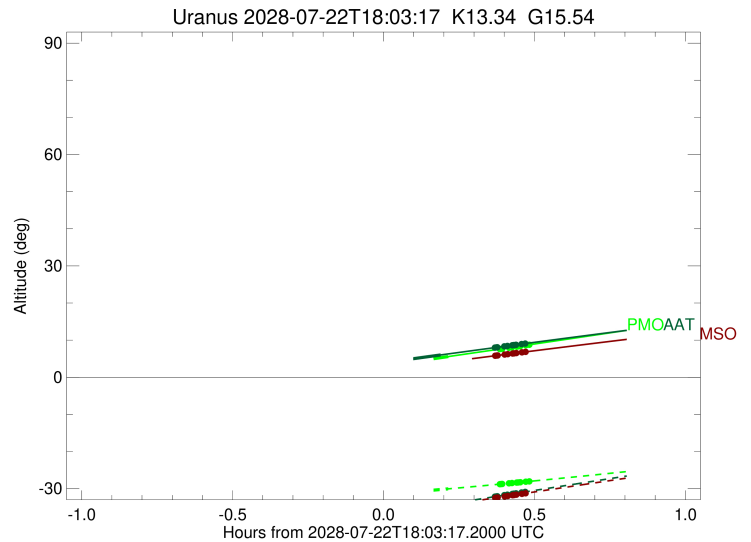
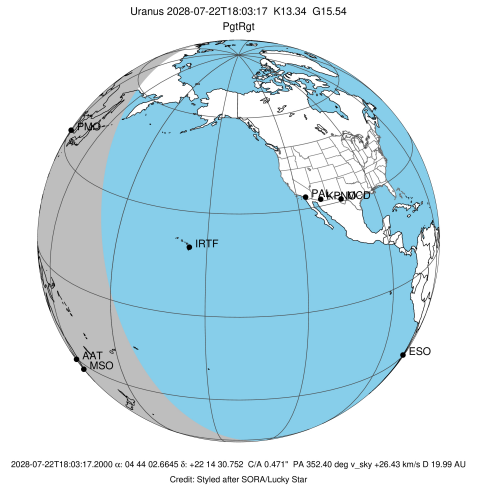


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-07-22T18:00:15.050
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3412996728135577088
 2Mass ID (if available) : 04440265+2214308
 ICRS Star Coord at Epoch: 04h 44m 02.66453s +22:14:30.75229s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 13.341
 G magnitude : 15.538
 RP magnitude : 14.794
 BP magnitude : 16.139
 DUPflag : 0
 Distance (au) : 19.990
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 26.43
 Sun-Target sep (deg) : 47.57
 Sun-Moon sep (deg) : 56.67
 B (ring opening deg) : 80.75
 PA of pole (deg) : -41.24
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.187
 C/A sky separation (km) : 2706.8
 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



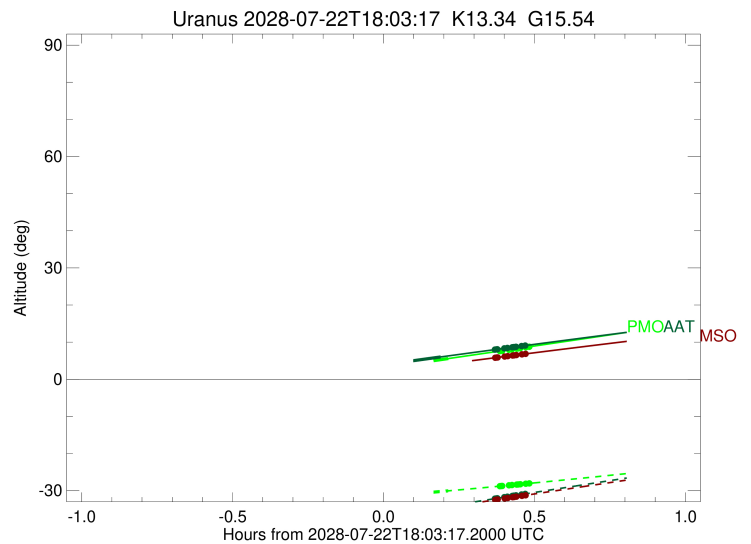
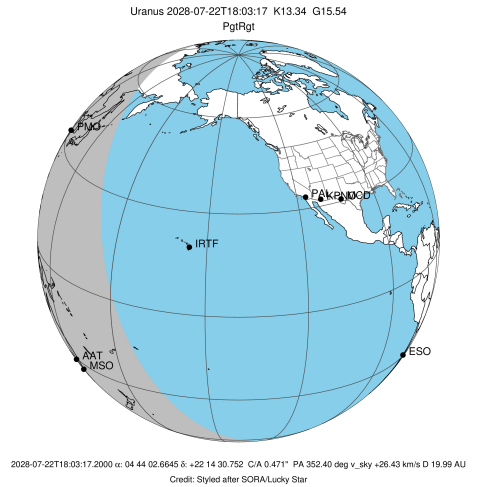
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2028-07-22T17:28:29.840	-3.54x	-34.85	50924.85	-26.64			
lambda	I	2028-07-22T17:29:03.544	-3.44x	-34.81	50026.71	-26.65			
delta	I	2028-07-22T17:30:08.339	-3.24x	-34.72	48300.35	-26.64			
gamma	I	2028-07-22T17:30:33.738	-3.16x	-34.69	47623.72	-26.64			
eta	I	2028-07-22T17:30:50.542	-3.11x	-34.66	47176.12	-26.64			
beta	I	2028-07-22T17:31:48.176	-2.93x	-34.58	45641.47	-26.63			
alpha	I	2028-07-22T17:32:22.285	-2.82x	-34.54	44732.81	-26.63			
4	I	2028-07-22T17:33:43.431	-2.57x	-34.42	42573.82	-26.62			
5	I	2028-07-22T17:33:56.750	-2.53x	-34.40	42214.43	-26.61			
6	I	2028-07-22T17:34:12.320	-2.48x	-34.38	41806.52	-26.62			
Uranus	I	2028-07-22T17:44:26.508	-0.55x	-33.46	25323.50	-5.86		-5.86	-6.14
Uranus	E	2028-07-22T18:16:08.953	5.57	-30.06	25436.23	4.22		4.22	4.42
6	E	2028-07-22T18:26:25.390	7.60	-28.80	41863.76	26.52			
5	E	2028-07-22T18:26:39.947	7.64	-28.77	42245.00	26.51			
4	E	2028-07-22T18:26:51.779	7.68	-28.74	42562.71	26.52			
alpha	E	2028-07-22T18:28:12.448	7.95	-28.57	44700.50	26.52			
beta	E	2028-07-22T18:28:49.409	8.07	-28.49	45681.17	26.52			
eta	E	2028-07-22T18:29:45.785	8.26	-28.37	47176.12	26.52			
gamma	E	2028-07-22T18:30:02.831	8.31	-28.33	47628.25	26.52			
delta	E	2028-07-22T18:30:28.170	8.40	-28.28	48300.35	26.52			
lambda	E	2028-07-22T18:31:33.253	8.61	-28.14	50026.71	26.53			
epsilon	E	2028-07-22T18:32:22.425	8.78	-28.03	51331.10	26.52			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-07-22T17:59:42.740
 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 : 3412996728135577088
 2Mass ID (if available) : 04440265+2214308
 ICRS Star Coord at Epoch: 04h 44m 02.66453s +22:14:30.75229s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 13.341
 G magnitude : 15.538
 RP magnitude : 14.794
 BP magnitude : 16.139
 DUPflag : 0
 Distance (au) : 19.990
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 26.43
 Sun-Target sep (deg) : 47.57
 Sun-Moon sep (deg) : 56.73
 B (ring opening deg) : 80.75
 PA of pole (deg) : -41.24
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.682
 C/A sky separation (km) : 9894.6
 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	2028-07-22T17:28:22.410	-2.79x	-44.36	50879.23	-25.94			
lambda	I	2028-07-22T17:28:55.252	-2.69x	-44.25	50026.71	-25.95			
delta	I	2028-07-22T17:30:01.835	-2.47x	-44.01	48300.35	-25.91			
gamma	I	2028-07-22T17:30:27.987	-2.39x	-43.92	47623.05	-25.89			
eta	I	2028-07-22T17:30:45.255	-2.33x	-43.86	47176.12	-25.88			
beta	I	2028-07-22T17:31:44.592	-2.14x	-43.64	45642.36	-25.83			
alpha	I	2028-07-22T17:32:20.015	-2.02x	-43.52	44727.63	-25.80			
4	I	2028-07-22T17:33:43.943	-1.75x	-43.22	42566.06	-25.72			
5	I	2028-07-22T17:33:57.891	-1.71x	-43.17	42201.39	-25.70			
6	I	2028-07-22T17:34:13.776	-1.65x	-43.11	41801.88	-25.70			
Uranus	I	2028-07-22T17:45:04.539	0.44x	-40.79	25158.48	-7.70		-8.06	
Uranus	E	2028-07-22T18:14:37.621	6.01	-34.47	25539.40	1.68		1.76	
6	E	2028-07-22T18:25:25.953	7.99	-32.16	41857.52	25.60			
5	E	2028-07-22T18:25:40.635	8.03	-32.11	42231.01	25.61			
4	E	2028-07-22T18:25:53.185	8.07	-32.07	42555.17	25.63			
alpha	E	2028-07-22T18:27:16.643	8.32	-31.77	44696.03	25.70			
beta	E	2028-07-22T18:27:54.938	8.44	-31.63	45681.17	25.73			
eta	E	2028-07-22T18:28:53.007	8.61	-31.43	47176.12	25.77			
gamma	E	2028-07-22T18:29:10.520	8.67	-31.37	47627.47	25.78			
delta	E	2028-07-22T18:29:36.614	8.74	-31.27	48300.35	25.79			
lambda	E	2028-07-22T18:30:43.492	8.95	-31.04	50026.71	25.83			
epsilon	E	2028-07-22T18:31:31.875	9.09	-30.86	51277.16	25.82			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-07-22T17:59:49.960
 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 : 3412996728135577088
 2Mass ID (if available) : 04440265+2214308
 ICRS Star Coord at Epoch: 04h 44m 02.66453s +22:14:30.75229s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 13.341
 G magnitude : 15.538
 RP magnitude : 14.794
 BP magnitude : 16.139
 DUPflag : 0
 Distance (au) : 19.990
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 26.43
 Sun-Target sep (deg) : 47.57
 Sun-Moon sep (deg) : 56.68
 B (ring opening deg) : 80.75
 PA of pole (deg) : -41.24
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.706
 C/A sky separation (km) : 10237.9
 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	2028-07-22T17:28:32.809	-4.47x	-44.12	50877.05	-25.90			
lambda	I	2028-07-22T17:29:05.611	-4.37x	-44.01	50026.71	-25.91			
delta	I	2028-07-22T17:30:12.289	-4.16x	-43.78	48300.35	-25.87			
gamma	I	2028-07-22T17:30:38.482	-4.08x	-43.69	47623.01	-25.85			
eta	I	2028-07-22T17:30:55.775	-4.02x	-43.63	47176.12	-25.84			
beta	I	2028-07-22T17:31:55.206	-3.84x	-43.43	45642.42	-25.79			
alpha	I	2028-07-22T17:32:30.702	-3.73x	-43.31	44727.36	-25.75			
4	I	2028-07-22T17:33:54.790	-3.47x	-43.03	42565.67	-25.67			
5	I	2028-07-22T17:34:08.773	-3.42x	-42.98	42200.76	-25.65			
6	I	2028-07-22T17:34:24.678	-3.38x	-42.92	41801.68	-25.65			
Uranus	I	2028-07-22T17:45:17.918	-1.37x	-40.70	25150.60	-7.77		-8.14	
Uranus	E	2028-07-22T18:14:39.176	3.91x	-34.70	25542.31	1.55		1.62	
6	E	2028-07-22T18:25:29.683	5.80	-32.49	41857.21	25.56			
5	E	2028-07-22T18:25:44.376	5.84	-32.44	42230.35	25.56			
4	E	2028-07-22T18:25:56.962	5.88	-32.39	42554.82	25.58			
alpha	E	2028-07-22T18:27:20.567	6.12	-32.11	44695.83	25.66			
beta	E	2028-07-22T18:27:58.928	6.23	-31.98	45681.15	25.69			
eta	E	2028-07-22T18:28:57.081	6.40	-31.78	47176.12	25.73			
gamma	E	2028-07-22T18:29:14.616	6.45	-31.72	47627.43	25.74			
delta	E	2028-07-22T18:29:40.747	6.52	-31.63	48300.35	25.76			
lambda	E	2028-07-22T18:30:47.708	6.71	-31.40	50026.71	25.80			
epsilon	E	2028-07-22T18:31:36.048	6.85	-31.24	51274.60	25.79			