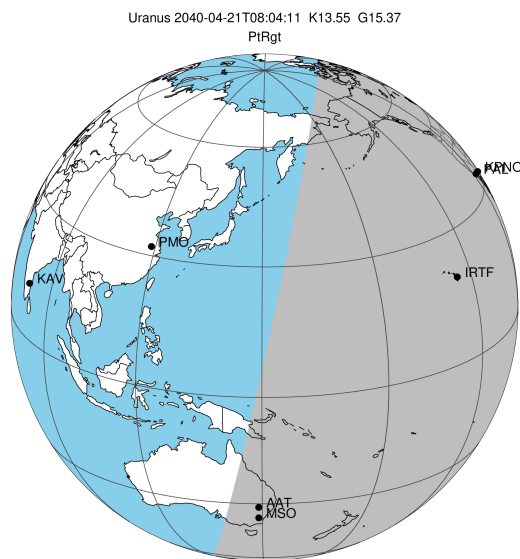


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-04-21T08:04:11.560
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 670904819696439424
 2Mass ID (if available) : 08042554+2057043

ICRS Star Coord at Epoch: 08h 04m 25.54056s +20:57:04.66201s

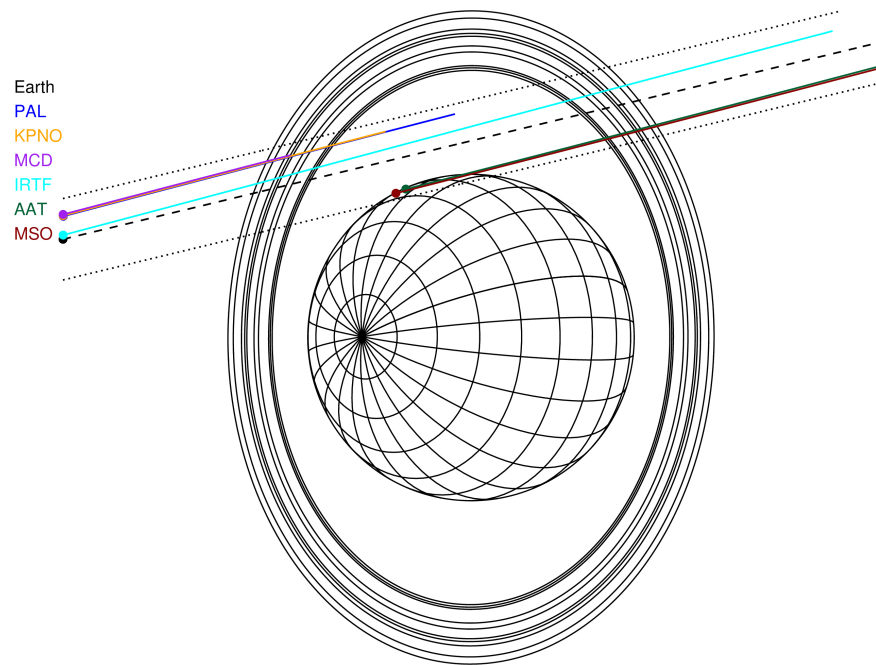
RUWE (>1.4 is poor) : 0.97
 K magnitude : 13.549
 G magnitude : 15.370
 RP magnitude : 14.771
 BP magnitude : 15.804
 DUPflag : 0
 Distance (au) : 18.590
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.80
 Sun-Target sep (deg) : 87.57
 Sun-Moon sep (deg) : 22.43
 B (ring opening deg) : 48.09
 PA of pole (deg) : 89.60

#	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



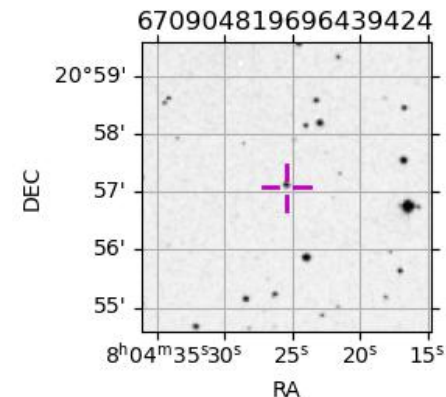
2040-04-21T08:04:11.5600 ra: 08 04 25.5406 s: +20 57 04.6662 C/A 2.236° PA 193.55 deg v_sky + 7.81 km/s D 18.59 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2040-04-21T08:04:11 K13.55 G15.37 PtRgt

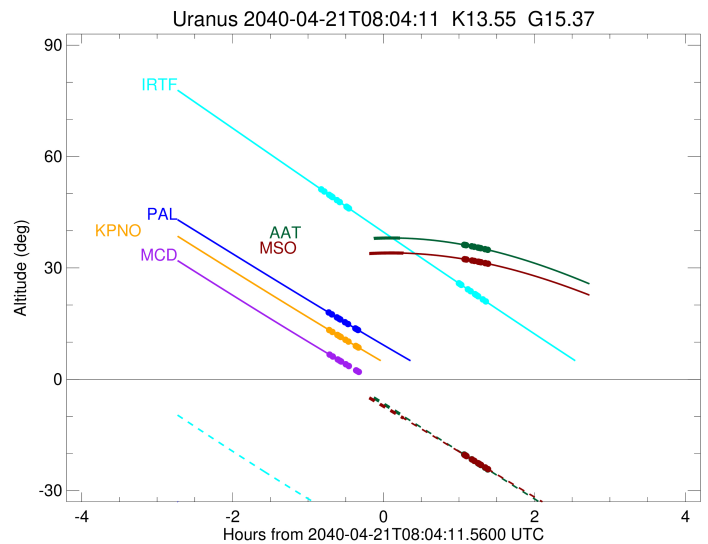
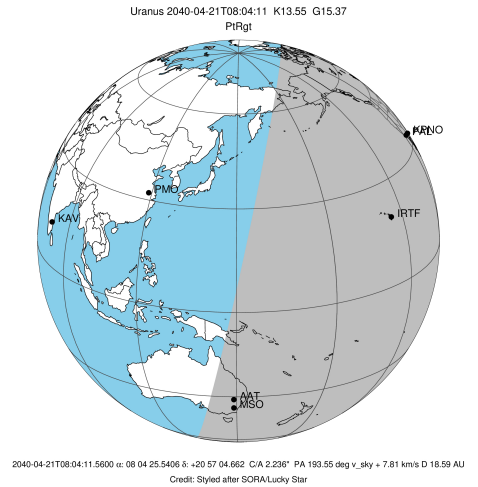


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++			APR 21 07:19 - APR 21 07:44	PnnRin
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++			APR 21 07:20 - APR 21 07:44	PnnRin
MCD	McDonald Obs. 2.7m	30.7	256.0	+++			APR 21 07:20 - APR 21 07:27	PnnRin
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++		+++++	APR 21 07:13 - APR 21 09:25	PnnRie
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		+	+++++	APR 21 08:17 - APR 21 09:26	PneRne
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0		+	+++++	APR 21 08:20 - APR 21 09:26	PneRne



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-04-21T08:12:18.210
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 670904819696439424
 2Mass ID (if available) : 08042554+2057043
 ICRS Star Coord at Epoch: 08h 04m 25.54056s +20:57:04.66201s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 13.549
 G magnitude : 15.370
 RP magnitude : 14.771
 BP magnitude : 15.804
 DUPflag : 0
 Distance (au) : 18.591
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.80
 Sun-Target sep (deg) : 87.57
 Sun-Moon sep (deg) : 21.78
 B (ring opening deg) : 48.09
 PA of pole (deg) : 89.60
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.560
 C/A sky separation (km) : 34517.3
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

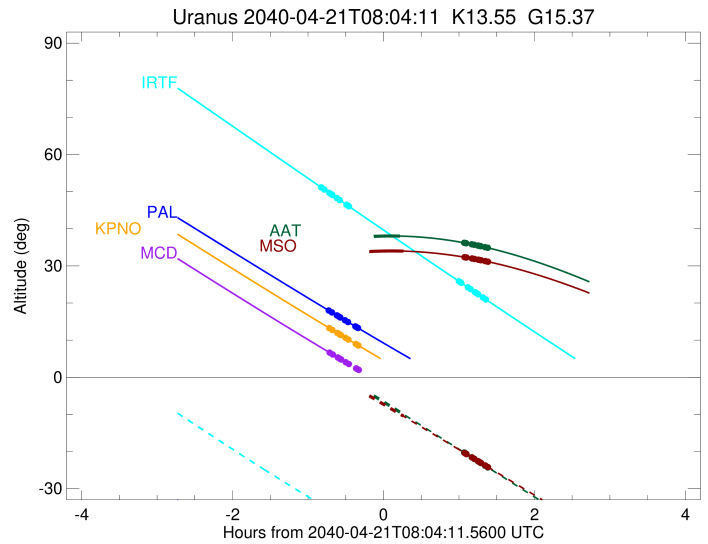
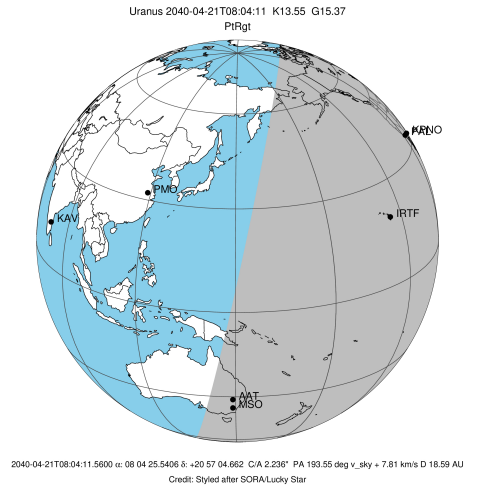


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-04-21T07:19:47.591		18.16	-44.29	51548.41	-7.52		
lambda	I	2040-04-21T07:23:12.392		17.47	-44.39	50026.71	-7.33		
delta	I	2040-04-21T07:27:11.979		16.66	-44.50	48300.35	-7.08		
gamma	I	2040-04-21T07:28:48.315		16.33	-44.53	47623.97	-6.97		
eta	I	2040-04-21T07:29:52.969		16.11	-44.56	47176.12	-6.89		
beta	I	2040-04-21T07:33:35.902		15.36	-44.62	45669.05	-6.61		
alpha	I	2040-04-21T07:35:58.184		14.88	-44.65	44752.34	-6.41		
4	I	2040-04-21T07:41:44.665		13.71	-44.70	42604.71	-5.87		
5	I	2040-04-21T07:42:49.271		13.49	-44.71	42214.99	-5.77		
6	I	2040-04-21T07:44:06.811		13.23	-44.71	41824.77	-5.64		

No planet occultations

6	E	2040-04-21T08:57:06.347	-1.04x	-41.63	41869.50	5.75			
5	E	2040-04-21T08:58:16.997	-1.26x	-41.53	42299.73	5.88			
4	E	2040-04-21T08:59:11.285	-1.43x	-41.45	42611.55	5.99			
alpha	E	2040-04-21T09:04:48.099	-2.48x	-40.96	44723.68	6.55			
beta	E	2040-04-21T09:07:11.129	-2.93x	-40.74	45680.70	6.77			
eta	E	2040-04-21T09:10:47.446	-3.60x	-40.39	47176.12	7.07			
gamma	E	2040-04-21T09:11:51.420	-3.80x	-40.29	47630.86	7.15			
delta	E	2040-04-21T09:13:24.281	-4.08x	-40.13	48300.35	7.27			
lambda	E	2040-04-21T09:17:17.303	-4.80x	-39.74	50026.71	7.54			
epsilon	E	2040-04-21T09:19:30.872	-5.21x	-39.51	51044.28	7.75			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-04-21T08:12:23.860
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 670904819696439424
 2Mass ID (if available) : 08042554+2057043
 ICRS Star Coord at Epoch: 08h 04m 25.54056s +20:57:04.66201s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 13.549
 G magnitude : 15.370
 RP magnitude : 14.771
 BP magnitude : 15.804
 DUPflag : 0
 Distance (au) : 18.591
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.80
 Sun-Target sep (deg) : 87.57
 Sun-Moon sep (deg) : 21.75
 B (ring opening deg) : 48.09
 PA of pole (deg) : 89.60
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.564
 C/A sky separation (km) : 34577.5
 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

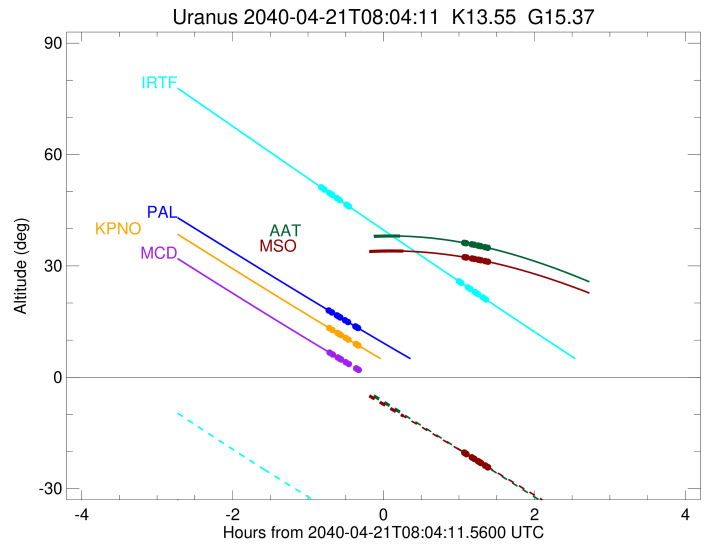
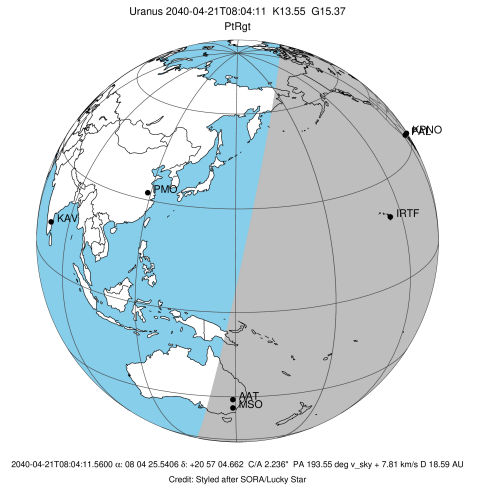


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-04-21T07:20:11.459		13.44	-46.09	51548.24	-7.54		
lambda	I	2040-04-21T07:23:35.613		12.74	-46.11	50026.71	-7.35		
delta	I	2040-04-21T07:27:34.517		11.93	-46.10	48300.35	-7.10		
gamma	I	2040-04-21T07:29:10.593		11.60	-46.10	47623.98	-6.98		
eta	I	2040-04-21T07:30:15.082		11.39	-46.09	47176.12	-6.91		
beta	I	2040-04-21T07:33:57.474		10.63	-46.05	45669.10	-6.62		
alpha	I	2040-04-21T07:36:19.464		10.15	-46.02	44752.34	-6.42		
4	I	2040-04-21T07:42:05.381		8.99	-45.91	42604.81	-5.88		
5	I	2040-04-21T07:43:09.891		8.77	-45.89	42215.24	-5.78		
6	I	2040-04-21T07:44:27.364		8.51	-45.86	41824.90	-5.65		

No planet occultations

6	E	2040-04-21T08:56:50.832	-5.57x	-40.88	41869.46	5.75			
5	E	2040-04-21T08:58:01.439	-5.79x	-40.76	42299.66	5.89			
4	E	2040-04-21T08:58:55.695	-5.96x	-40.66	42611.58	5.99			
alpha	E	2040-04-21T09:04:32.068	-7.00x	-40.03	44723.71	6.56			
beta	E	2040-04-21T09:06:54.836	-7.44x	-39.75	45680.70	6.78			
eta	E	2040-04-21T09:10:30.701	-8.10x	-39.33	47176.12	7.08			
gamma	E	2040-04-21T09:11:34.530	-8.30x	-39.20	47630.86	7.17			
delta	E	2040-04-21T09:13:07.173	-8.58x	-39.02	48300.35	7.29			
lambda	E	2040-04-21T09:16:59.609	-9.28x	-38.54	50026.71	7.56			
epsilon	E	2040-04-21T09:19:12.848	-9.68x	-38.26	51044.48	7.77			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-04-21T08:12:16.030
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 670904819696439424
 2Mass ID (if available) : 08042554+2057043
 ICRS Star Coord at Epoch: 08h 04m 25.54056s +20:57:04.66201s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 13.549
 G magnitude : 15.370
 RP magnitude : 14.771
 BP magnitude : 15.804
 DUPflag : 0
 Distance (au) : 18.591
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.80
 Sun-Target sep (deg) : 87.57
 Sun-Moon sep (deg) : 21.72
 B (ring opening deg) : 48.09
 PA of pole (deg) : 89.60
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.573
 C/A sky separation (km) : 34689.5
 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_itrff93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

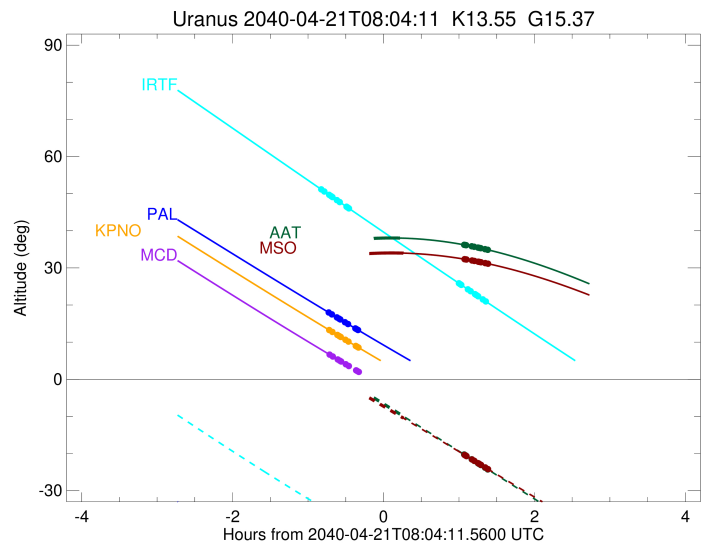
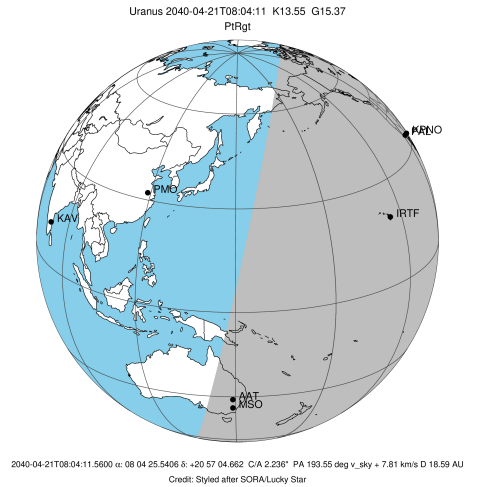


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-04-21T07:20:31.569		6.81	-46.95	51547.92	-7.57		
lambda	I	2040-04-21T07:23:54.897		6.12	-46.82	50026.71	-7.38		
delta	I	2040-04-21T07:27:52.975		5.32	-46.65	48300.35	-7.12		
gamma	I	2040-04-21T07:29:28.749		5.00x	-46.58	47624.01	-7.01		
eta	I	2040-04-21T07:30:33.052		4.78x	-46.53	47176.12	-6.93		
beta	I	2040-04-21T07:34:14.864		4.04x	-46.34	45669.19	-6.64		
alpha	I	2040-04-21T07:36:36.587		3.57x	-46.22	44752.32	-6.43		
4	I	2040-04-21T07:42:22.144		2.42x	-45.88	42604.98	-5.88		
5	I	2040-04-21T07:43:26.606		2.20x	-45.81	42215.70	-5.78		
6	I	2040-04-21T07:44:44.111		1.95x	-45.72	41825.15	-5.64		

No planet occultations

6	E	2040-04-21T08:56:09.490		-11.67x	-38.33	41869.38	5.74		
5	E	2040-04-21T08:57:20.182		-11.89x	-38.17	42299.52	5.88		
4	E	2040-04-21T08:58:14.502		-12.05x	-38.04	42611.64	5.99		
alpha	E	2040-04-21T09:03:50.822		-13.06x	-37.26	44723.79	6.57		
beta	E	2040-04-21T09:06:13.424		-13.48x	-36.92	45680.71	6.79		
eta	E	2040-04-21T09:09:48.937		-14.12x	-36.40	47176.12	7.10		
gamma	E	2040-04-21T09:10:52.640		-14.31x	-36.25	47630.85	7.18		
delta	E	2040-04-21T09:12:25.085		-14.58x	-36.02	48300.35	7.30		
lambda	E	2040-04-21T09:16:16.954		-15.26x	-35.45	50026.71	7.58		
epsilon	E	2040-04-21T09:18:29.889		-15.64x	-35.11	51044.94	7.79		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-04-21T08:12:27.440
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 670904819696439424
 2Mass ID (if available) : 08042554+2057043
 ICRS Star Coord at Epoch: 08h 04m 25.54056s +20:57:04.66201s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 13.549
 G magnitude : 15.370
 RP magnitude : 14.771
 BP magnitude : 15.804
 DUPflag : 0
 Distance (au) : 18.591
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.80
 Sun-Target sep (deg) : 87.57
 Sun-Moon sep (deg) : 22.00
 B (ring opening deg) : 48.09
 PA of pole (deg) : 89.60
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.367
 C/A sky separation (km) : 31920.7
 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

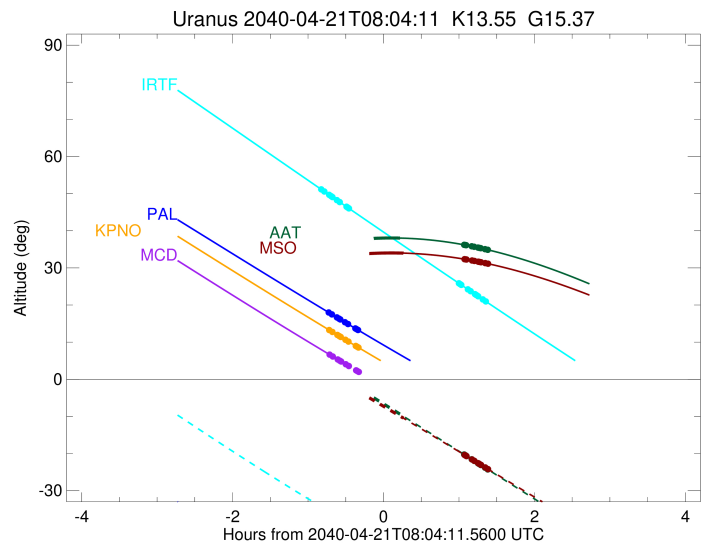
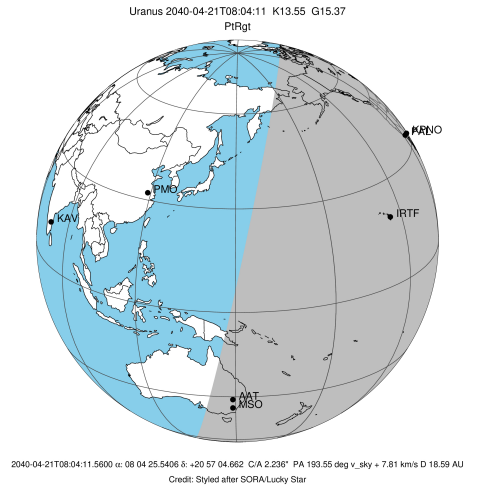


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-04-21T07:13:52.312		51.35	-34.14	51552.77	-7.70		
lambda	I	2040-04-21T07:17:12.391		50.57	-34.82	50026.71	-7.55		
delta	I	2040-04-21T07:21:04.004		49.67	-35.59	48300.35	-7.35		
gamma	I	2040-04-21T07:22:36.560		49.31	-35.90	47623.58	-7.27		
eta	I	2040-04-21T07:23:38.364		49.07	-36.10	47176.12	-7.21		
beta	I	2040-04-21T07:27:10.341		48.25	-36.80	45667.35	-7.00		
alpha	I	2040-04-21T07:29:23.807		47.73	-37.24	44752.42	-6.85		
4	I	2040-04-21T07:34:43.888		46.49	-38.28	42601.28	-6.46		
5	I	2040-04-21T07:35:43.273		46.26	-38.47	42206.69	-6.38		
6	I	2040-04-21T07:36:52.942		45.99	-38.69	41820.32	-6.29		

No planet occultations

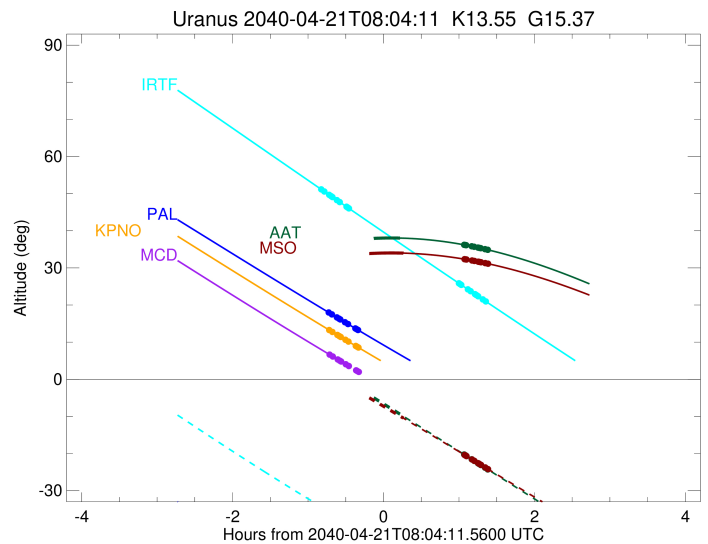
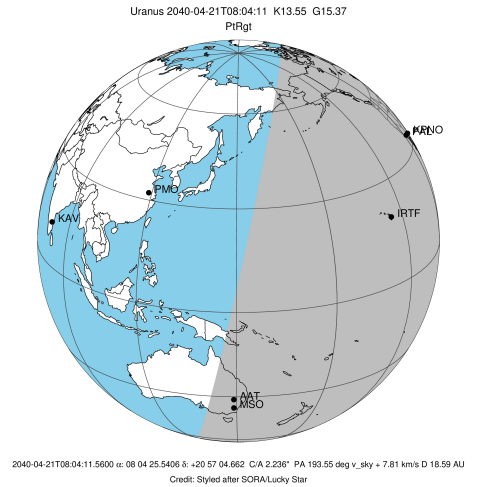
6	E	2040-04-21T09:04:13.288		25.84	-53.05	41872.07	6.44		
5	E	2040-04-21T09:05:16.685		25.59	-53.18	42303.96	6.53		
4	E	2040-04-21T09:06:05.018		25.41	-53.28	42609.44	6.61		
alpha	E	2040-04-21T09:11:14.452		24.23	-53.90	44720.92	7.03		
beta	E	2040-04-21T09:13:28.650		23.72	-54.15	45680.28	7.19		
eta	E	2040-04-21T09:16:53.406		22.94	-54.53	47176.12	7.42		
gamma	E	2040-04-21T09:17:54.411		22.71	-54.64	47631.04	7.49		
delta	E	2040-04-21T09:19:23.229		22.37	-54.80	48300.35	7.58		
lambda	E	2040-04-21T09:23:07.678		21.52	-55.18	50026.71	7.80		
epsilon	E	2040-04-21T09:25:14.244		21.04	-55.39	51020.93	7.96		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-04-21T08:05:51.320
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 670904819696439424
 2Mass ID (if available) : 08042554+2057043
 ICRS Star Coord at Epoch: 08h 04m 25.54056s +20:57:04.66201s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 13.549
 G magnitude : 15.370
 RP magnitude : 14.771
 BP magnitude : 15.804
 DUPflag : 0
 Distance (au) : 18.590
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.80
 Sun-Target sep (deg) : 87.57
 Sun-Moon sep (deg) : 22.68
 B (ring opening deg) : 48.09
 PA of pole (deg) : 89.60
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.857
 C/A sky separation (km) : 25037.7
 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	2040-04-21T06:56:08.558		35.07	7.48x	51554.90	-8.55		
lambda	I	2040-04-21T06:59:08.255		35.30	6.87x	50026.71	-8.46		
delta	I	2040-04-21T07:02:33.595		35.56	6.17x	48300.35	-8.35		
gamma	I	2040-04-21T07:03:54.937		35.65	5.90x	47622.82	-8.31		
eta	I	2040-04-21T07:04:48.819		35.72	5.71x	47176.12	-8.27		
beta	I	2040-04-21T07:07:52.550		35.92	5.09x	45663.63	-8.16		
alpha	I	2040-04-21T07:09:45.869		36.05	4.70x	44751.62	-8.08		
4	I	2040-04-21T07:14:13.236		36.33	3.79x	42593.28	-7.88		
5	I	2040-04-21T07:15:03.012		36.38	3.62x	42190.98	-7.85		
6	I	2040-04-21T07:15:58.559		36.43	3.43x	41812.05	-7.80		
Uranus	I	2040-04-21T07:55:02.393		37.93	-4.70x	25498.05		16.74	17.48
Uranus	E	2040-04-21T08:17:21.180		38.03	-9.40	25558.04		2.07	2.17
6	E	2040-04-21T09:08:24.172		36.21	-20.28	41876.89	7.86		
5	E	2040-04-21T09:09:17.043		36.16	-20.47	42311.67	7.90		
4	E	2040-04-21T09:09:55.642		36.12	-20.61	42602.77	7.94		
alpha	E	2040-04-21T09:14:17.634		35.83	-21.54	44713.69	8.14		
beta	E	2040-04-21T09:16:14.963		35.69	-21.96	45678.63	8.22		
eta	E	2040-04-21T09:19:15.858		35.48	-22.61	47176.12	8.34		
gamma	E	2040-04-21T09:20:10.338		35.41	-22.80	47631.40	8.37		
delta	E	2040-04-21T09:21:30.003		35.31	-23.09	48300.35	8.42		
lambda	E	2040-04-21T09:24:53.639		35.05	-23.81	50026.71	8.53		
epsilon	E	2040-04-21T09:26:42.277		34.91	-24.20	50956.76	8.62		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-04-21T08:06:02.040
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 670904819696439424
 2Mass ID (if available) : 08042554+2057043
 ICRS Star Coord at Epoch: 08h 04m 25.54056s +20:57:04.66201s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 13.549
 G magnitude : 15.370
 RP magnitude : 14.771
 BP magnitude : 15.804
 DUPflag : 0
 Distance (au) : 18.590
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.80
 Sun-Target sep (deg) : 87.57
 Sun-Moon sep (deg) : 22.66
 B (ring opening deg) : 48.09
 PA of pole (deg) : 89.60
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.838
 C/A sky separation (km) : 24783.5
 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	2040-04-21T06:56:09.536		31.29	6.19x	51554.80	-8.60		
lambda	I	2040-04-21T06:59:08.211		31.50	5.61x	50026.71	-8.51		
delta	I	2040-04-21T07:02:32.331		31.73	4.95x	48300.35	-8.40		
gamma	I	2040-04-21T07:03:53.171		31.82	4.69x	47622.80	-8.36		
eta	I	2040-04-21T07:04:46.709		31.88	4.52x	47176.12	-8.33		
beta	I	2040-04-21T07:07:49.246		32.07	3.93x	45663.50	-8.22		
alpha	I	2040-04-21T07:09:41.764		32.18	3.56x	44751.57	-8.14		
4	I	2040-04-21T07:14:07.160		32.43	2.70x	42592.99	-7.94		
5	I	2040-04-21T07:14:56.583		32.48	2.53x	42190.49	-7.91		
6	I	2040-04-21T07:15:51.639		32.53	2.35x	41811.80	-7.87		
Uranus	I	2040-04-21T07:52:44.072		33.86	-4.97x	25486.37		18.33	19.14
Uranus	E	2040-04-21T08:20:00.178		33.98	-10.47	25558.98		0.34	0.36
6	E	2040-04-21T09:08:41.541		32.34	-20.40	41877.01	7.92		
5	E	2040-04-21T09:09:34.026		32.29	-20.58	42311.86	7.96		
4	E	2040-04-21T09:10:12.268		32.26	-20.71	42602.50	8.00		
alpha	E	2040-04-21T09:14:32.304		32.00	-21.59	44713.44	8.20		
beta	E	2040-04-21T09:16:28.852		31.87	-21.99	45678.56	8.28		
eta	E	2040-04-21T09:19:28.577		31.68	-22.60	47176.12	8.39		
gamma	E	2040-04-21T09:20:22.718		31.62	-22.79	47631.41	8.43		
delta	E	2040-04-21T09:21:41.894		31.53	-23.06	48300.35	8.47		
lambda	E	2040-04-21T09:25:04.338		31.29	-23.75	50026.71	8.58		
epsilon	E	2040-04-21T09:26:52.104		31.16	-24.12	50954.48	8.67		