

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-12-07T15:08:17.330  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3382771286633272704  
 2Mass ID (if available) : 06391021+2327408

Uranus 2034-12-07T15:08:17 K14.99 G18.01 PgtRgt

ICRS Star Coord at Epoch: 06h 39m 10.21724s +23:27:40.65317s

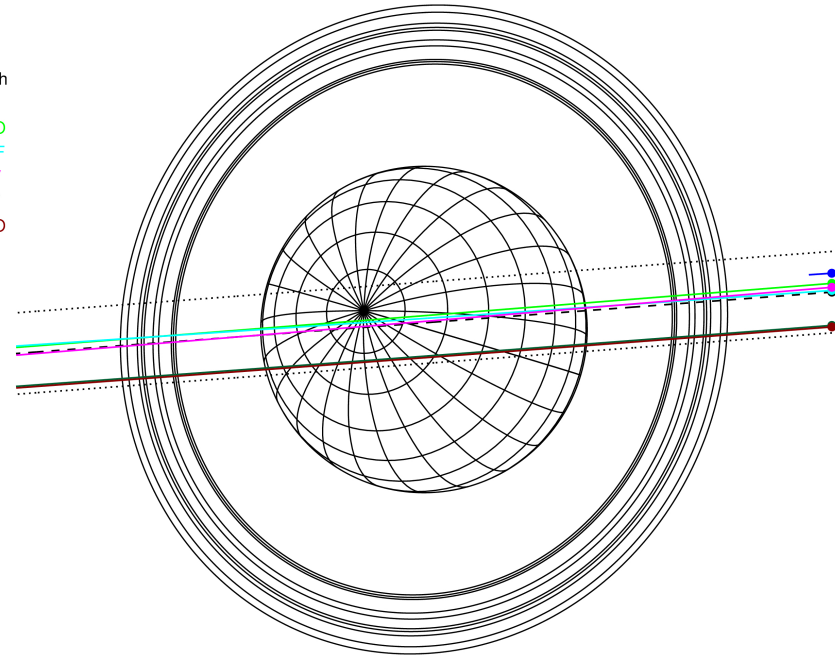
RUWE (>1.4 is poor) : 0.97  
 K magnitude : 14.992  
 G magnitude : 18.015  
 RP magnitude : 17.024  
 BP magnitude : 19.055  
 DUPflag : 0  
 Distance (au) : 17.988  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -20.83  
 Sun-Target sep (deg) : 156.11  
 Sun-Moon sep (deg) : 121.16  
 B (ring opening deg) : 67.26  
 PA of pole (deg) : 72.70

Uranus 2034-12-07T15:08:17 K14.99 G18.01  
 PgtRgt



2034-12-07T15:08:17.3300 ra: 06 39 10.2172 s: +23 27 40.653 C/A 0.088° PA 184.30 deg v\_sky -20.83 km/s D 17.99 AU  
 Credit: Styled after SORA/Lucky Star

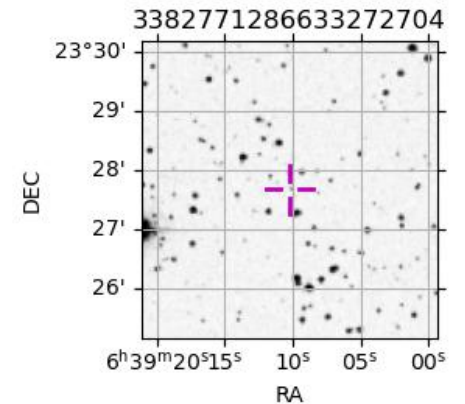
Earth  
 PAL  
 PMO  
 IRTF  
 KAV  
 AAT  
 MSO



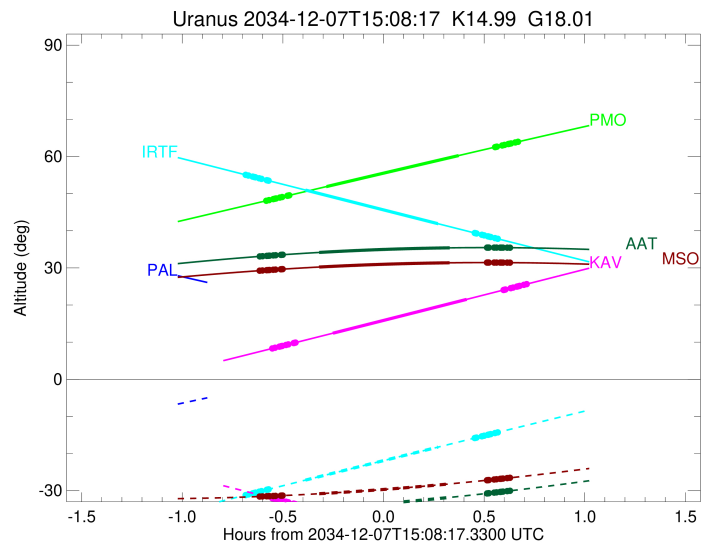
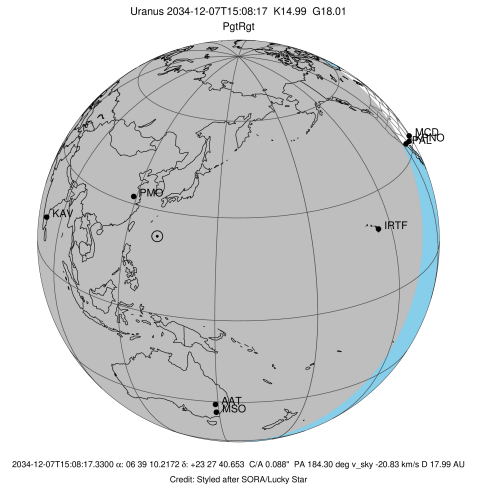
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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	+++++	+ +	+++++	DEC 07 14:33 - DEC 07 15:48	PieRie
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	+++++	+ +	+++++	DEC 07 14:26 - DEC 07 15:42	PieRie
KAV	Kavalur Observatory	12.6	78.8	+++++	+ +	+++++	DEC 07 14:34 - DEC 07 15:50	PieRie
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	+++++	+ +	+++++	DEC 07 14:31 - DEC 07 15:45	PieRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++	+ +	+++++	DEC 07 14:31 - DEC 07 15:45	PieRie

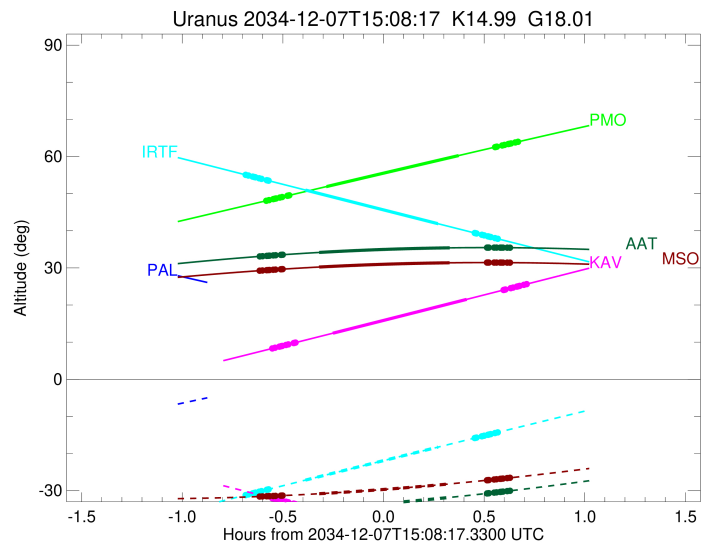
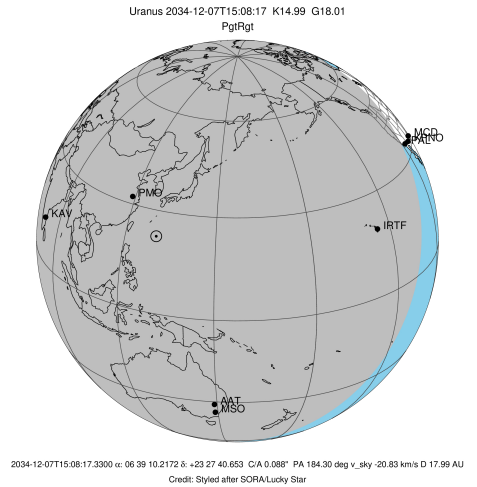


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-12-07T15:10:59.730  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PMO  
 Location : Purple Mtn Obs. Nanking  
 Latitude (deg) : 32.06667  
 E. Longitude (deg) : 118.82089  
 Altitude (km) : 0.364  
 Gaia source ID : 3382771286633272704  
 2Mass ID (if available) : 06391021+2327408  
 ICRS Star Coord at Epoch: 06h 39m 10.21724s +23:27:40.65317s  
 RUWE (>1.4 is poor) : 0.97  
 K magnitude : 14.992  
 G magnitude : 18.015  
 RP magnitude : 17.024  
 BP magnitude : 19.055  
 DUPflag : 0  
 Distance (au) : 17.988  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -20.83  
 Sun-Target sep (deg) : 156.11  
 Sun-Moon sep (deg) : 121.55  
 B (ring opening deg) : 67.26  
 PA of pole (deg) : 72.70  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.165  
 C/A sky separation (km) : 2154.6  
 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\_itrff93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



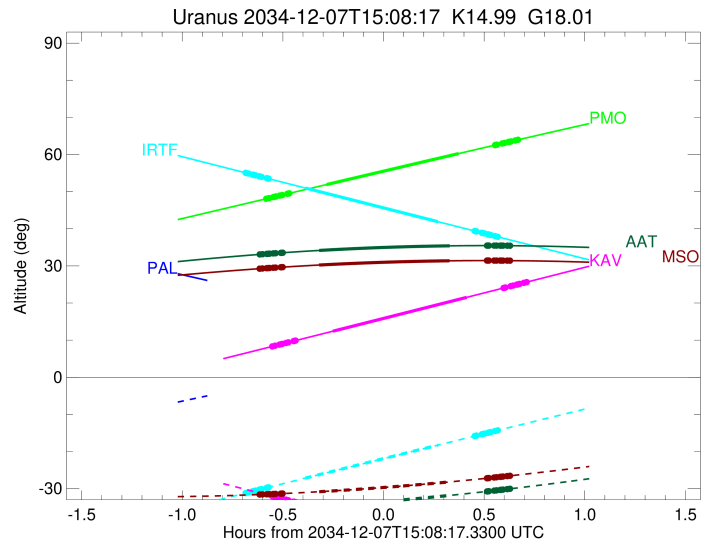
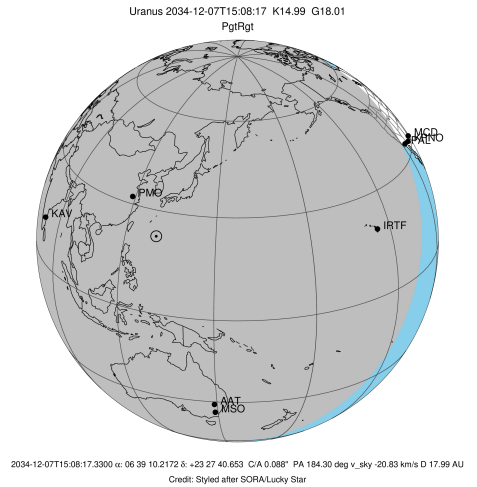
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-12-07T14:33:02.960		48.02	-69.39	51551.06	-22.61		
lambda	I	2034-12-07T14:34:10.366		48.26	-69.62	50026.71	-22.61		
delta	I	2034-12-07T14:35:26.704		48.53	-69.87	48300.35	-22.61		
gamma	I	2034-12-07T14:35:56.747		48.64	-69.96	47620.96	-22.61		
eta	I	2034-12-07T14:36:16.418		48.71	-70.03	47176.12	-22.61		
beta	I	2034-12-07T14:37:22.670		48.95	-70.25	45677.04	-22.61		
alpha	I	2034-12-07T14:38:06.398		49.10	-70.39	44685.92	-22.61		
4	I	2034-12-07T14:39:37.873		49.43	-70.68	42612.70	-22.61		
5	I	2034-12-07T14:39:58.834		49.50	-70.75	42154.94	-22.62		
6	I	2034-12-07T14:40:10.851		49.54	-70.79	41879.64	-22.61		
Uranus	I	2034-12-07T14:51:13.804		51.89	-72.89	25159.66		-20.20	-21.07
Uranus	E	2034-12-07T15:30:41.665		60.26	-79.17	25102.11		21.71	22.64
6	E	2034-12-07T15:41:30.913		62.53	-80.20	41794.78	22.69		
5	E	2034-12-07T15:41:53.698		62.61	-80.23	42315.15	22.69		
4	E	2034-12-07T15:42:04.033		62.65	-80.24	42531.93	22.69		
alpha	E	2034-12-07T15:43:41.649		62.99	-80.35	44751.89	22.69		
beta	E	2034-12-07T15:44:20.982		63.12	-80.39	45646.52	22.70		
eta	E	2034-12-07T15:45:28.322		63.36	-80.46	47176.12	22.70		
gamma	E	2034-12-07T15:45:48.384		63.43	-80.48	47631.55	22.70		
delta	E	2034-12-07T15:46:17.842		63.53	-80.50	48300.35	22.70		
lambda	E	2034-12-07T15:47:33.875		63.79	-80.56	50026.71	22.71		
epsilon	E	2034-12-07T15:48:05.469		63.90	-80.59	50744.14	22.71		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-12-07T15:04:48.200  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : 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 : 3382771286633272704  
 2Mass ID (if available) : 06391021+2327408  
 ICRS Star Coord at Epoch: 06h 39m 10.21724s +23:27:40.65317s  
 RUWE (>1.4 is poor) : 0.97  
 K magnitude : 14.992  
 G magnitude : 18.015  
 RP magnitude : 17.024  
 BP magnitude : 19.055  
 DUPflag : 0  
 Distance (au) : 17.988  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -20.83  
 Sun-Target sep (deg) : 156.11  
 Sun-Moon sep (deg) : 122.04  
 B (ring opening deg) : 67.26  
 PA of pole (deg) : 72.70  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.132  
 C/A sky separation (km) : 1724.2  
 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



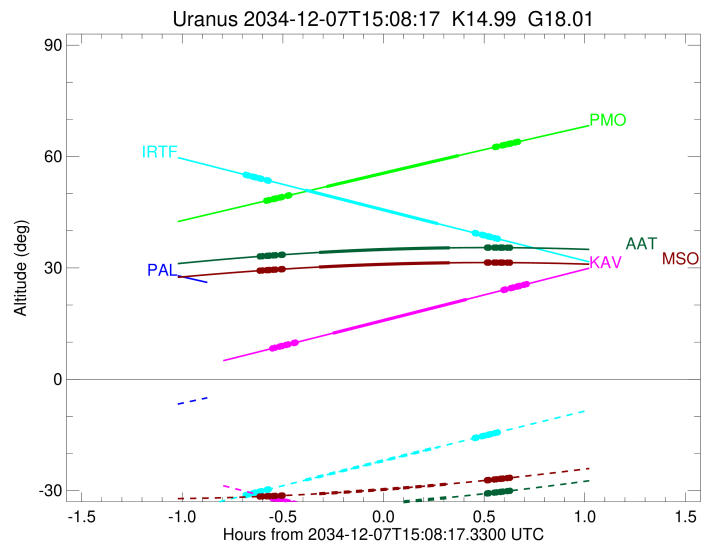
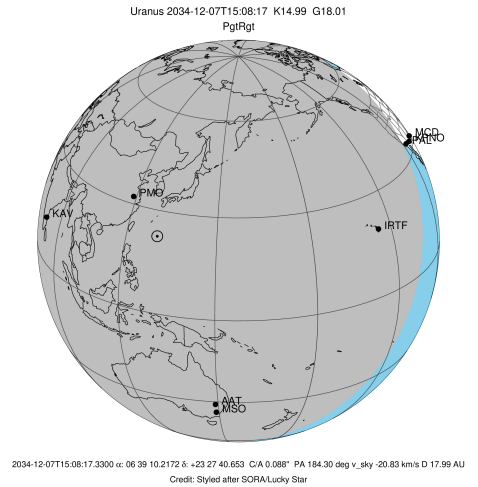
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-12-07T14:26:54.516		55.14	-31.27	51552.07	-22.70		
lambda	I	2034-12-07T14:28:01.721		54.88	-31.01	50026.71	-22.70		
delta	I	2034-12-07T14:29:17.791		54.59	-30.73	48300.35	-22.69		
gamma	I	2034-12-07T14:29:47.731		54.47	-30.61	47620.96	-22.69		
eta	I	2034-12-07T14:30:07.335		54.40	-30.54	47176.12	-22.69		
beta	I	2034-12-07T14:31:13.376		54.14	-30.29	45676.80	-22.69		
alpha	I	2034-12-07T14:31:56.962		53.98	-30.12	44685.74	-22.68		
4	I	2034-12-07T14:33:28.157		53.63	-29.78	42612.33	-22.68		
5	I	2034-12-07T14:33:49.054		53.55	-29.70	42154.87	-22.69		
6	I	2034-12-07T14:34:01.031		53.50	-29.66	41879.69	-22.68		
Uranus	I	2034-12-07T14:45:00.711		50.97	-27.17	25149.04		-20.48	-21.37
Uranus	E	2034-12-07T15:24:34.973		41.90	-18.27	25103.98		21.66	22.59
6	E	2034-12-07T15:35:26.527		39.42	-15.85	41794.77	22.60		
5	E	2034-12-07T15:35:49.405		39.33	-15.76	42315.15	22.60		
4	E	2034-12-07T15:35:59.781		39.29	-15.72	42531.91	22.59		
alpha	E	2034-12-07T15:37:37.811		38.92	-15.36	44751.89	22.60		
beta	E	2034-12-07T15:38:17.317		38.77	-15.21	45646.52	22.60		
eta	E	2034-12-07T15:39:24.962		38.51	-14.96	47176.12	22.60		
gamma	E	2034-12-07T15:39:45.117		38.43	-14.89	47631.55	22.60		
delta	E	2034-12-07T15:40:14.713		38.32	-14.78	48300.35	22.60		
lambda	E	2034-12-07T15:41:31.111		38.03	-14.49	50026.71	22.60		
epsilon	E	2034-12-07T15:42:02.859		37.91	-14.38	50744.12	22.60		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-12-07T15:13:10.520  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : 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 : 3382771286633272704  
 2Mass ID (if available) : 06391021+2327408  
 ICRS Star Coord at Epoch: 06h 39m 10.21724s +23:27:40.65317s  
 RUWE (>1.4 is poor) : 0.97  
 K magnitude : 14.992  
 G magnitude : 18.015  
 RP magnitude : 17.024  
 BP magnitude : 19.055  
 DUPflag : 0  
 Distance (au) : 17.988  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -20.83  
 Sun-Target sep (deg) : 156.11  
 Sun-Moon sep (deg) : 120.93  
 B (ring opening deg) : 67.26  
 PA of pole (deg) : 72.70  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.096  
 C/A sky separation (km) : 1257.4  
 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



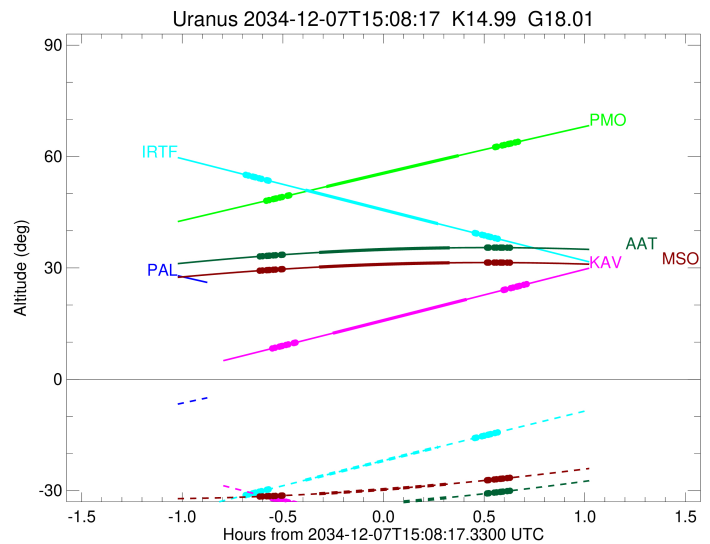
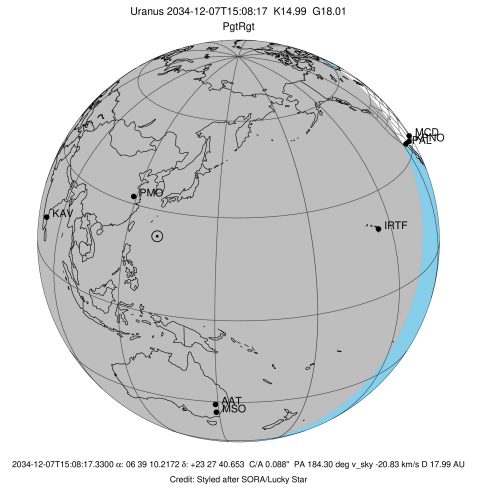
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-12-07T14:34:50.218		8.24	-31.97	51551.82	-22.37		
lambda	I	2034-12-07T14:35:58.388		8.50	-32.23	50026.71	-22.37		
delta	I	2034-12-07T14:37:15.546		8.79	-32.52	48300.35	-22.38		
gamma	I	2034-12-07T14:37:45.910		8.90	-32.64	47620.96	-22.38		
eta	I	2034-12-07T14:38:05.790		8.98	-32.72	47176.12	-22.38		
beta	I	2034-12-07T14:39:12.751		9.23	-32.97	45676.85	-22.38		
alpha	I	2034-12-07T14:39:56.940		9.40	-33.14	44685.77	-22.38		
4	I	2034-12-07T14:41:29.374		9.75	-33.50	42612.38	-22.38		
5	I	2034-12-07T14:41:50.552		9.83	-33.58	42154.88	-22.39		
6	I	2034-12-07T14:42:02.690		9.87	-33.63	41879.69	-22.38		
Uranus	I	2034-12-07T14:53:10.282		12.40	-36.19	25147.71		-20.52	-21.40
Uranus	E	2034-12-07T15:33:06.781		21.53	-45.39	25113.71		21.41	22.33
6	E	2034-12-07T15:44:02.420		24.04	-47.90	41794.75	22.52		
5	E	2034-12-07T15:44:25.378		24.12	-47.99	42315.23	22.52		
4	E	2034-12-07T15:44:35.747		24.16	-48.03	42531.36	22.52		
alpha	E	2034-12-07T15:46:14.117		24.54	-48.40	44751.73	22.52		
beta	E	2034-12-07T15:46:53.734		24.69	-48.55	45646.19	22.53		
eta	E	2034-12-07T15:48:01.599		24.95	-48.81	47176.12	22.53		
gamma	E	2034-12-07T15:48:21.812		25.03	-48.89	47631.57	22.53		
delta	E	2034-12-07T15:48:51.492		25.14	-49.00	48300.35	22.53		
lambda	E	2034-12-07T15:50:08.097		25.44	-49.29	50026.71	22.54		
epsilon	E	2034-12-07T15:50:39.954		25.56	-49.42	50744.74	22.54		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-12-07T15:08:32.660  
 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 : 3382771286633272704  
 2Mass ID (if available) : 06391021+2327408  
 ICRS Star Coord at Epoch: 06h 39m 10.21724s +23:27:40.65317s  
 RUWE (>1.4 is poor) : 0.97  
 K magnitude : 14.992  
 G magnitude : 18.015  
 RP magnitude : 17.024  
 BP magnitude : 19.055  
 DUPflag : 0  
 Distance (au) : 17.988  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -20.83  
 Sun-Target sep (deg) : 156.11  
 Sun-Moon sep (deg) : 121.54  
 B (ring opening deg) : 67.26  
 PA of pole (deg) : 72.70  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.320  
 C/A sky separation (km) : 4174.0  
 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	2034-12-07T14:31:06.734		33.08	-35.56	51555.25	-22.67		
lambda	I	2034-12-07T14:32:14.157		33.16	-35.52	50026.71	-22.67		
delta	I	2034-12-07T14:33:30.323		33.24	-35.47	48300.35	-22.66		
gamma	I	2034-12-07T14:34:00.301		33.27	-35.45	47621.01	-22.66		
eta	I	2034-12-07T14:34:19.934		33.30	-35.43	47176.12	-22.66		
beta	I	2034-12-07T14:35:26.139		33.37	-35.39	45675.12	-22.65		
alpha	I	2034-12-07T14:36:09.783		33.42	-35.36	44684.91	-22.65		
4	I	2034-12-07T14:37:41.232		33.51	-35.29	42609.40	-22.63		
5	I	2034-12-07T14:38:02.105		33.53	-35.27	42155.23	-22.64		
6	I	2034-12-07T14:38:14.142		33.55	-35.27	41879.59	-22.64		
Uranus	I	2034-12-07T14:49:06.984		34.17	-34.71	25082.38		-22.21	-23.16
Uranus	E	2034-12-07T15:28:03.180		35.40	-31.82	25191.26		19.33	20.17
6	E	2034-12-07T15:39:07.182		35.47	-30.76	41795.01	22.66		
5	E	2034-12-07T15:39:29.961		35.47	-30.72	42314.88	22.67		
4	E	2034-12-07T15:39:40.095		35.47	-30.70	42529.05	22.66		
alpha	E	2034-12-07T15:41:17.895		35.47	-30.53	44750.73	22.67		
beta	E	2034-12-07T15:41:57.214		35.46	-30.47	45644.78	22.68		
eta	E	2034-12-07T15:43:04.692		35.46	-30.35	47176.12	22.69		
gamma	E	2034-12-07T15:43:24.767		35.46	-30.32	47631.57	22.69		
delta	E	2034-12-07T15:43:54.243		35.46	-30.27	48300.35	22.69		
lambda	E	2034-12-07T15:45:10.315		35.45	-30.13	50026.71	22.70		
epsilon	E	2034-12-07T15:45:42.175		35.44	-30.08	50749.86	22.70		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-12-07T15:08:30.440  
 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 : 3382771286633272704  
 2Mass ID (if available) : 06391021+2327408  
 ICRS Star Coord at Epoch: 06h 39m 10.21724s +23:27:40.65317s  
 RUWE (>1.4 is poor) : 0.97  
 K magnitude : 14.992  
 G magnitude : 18.015  
 RP magnitude : 17.024  
 BP magnitude : 19.055  
 DUPflag : 0  
 Distance (au) : 17.988  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -20.83  
 Sun-Target sep (deg) : 156.11  
 Sun-Moon sep (deg) : 121.50  
 B (ring opening deg) : 67.26  
 PA of pole (deg) : 72.70  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.339  
 C/A sky separation (km) : 4417.4  
 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	2034-12-07T14:31:04.157		29.23	-31.60	51555.27	-22.65		
lambda	I	2034-12-07T14:32:11.665		29.31	-31.56	50026.71	-22.64		
delta	I	2034-12-07T14:33:27.928		29.38	-31.52	48300.35	-22.63		
gamma	I	2034-12-07T14:33:57.945		29.41	-31.50	47621.01	-22.63		
eta	I	2034-12-07T14:34:17.604		29.43	-31.48	47176.12	-22.63		
beta	I	2034-12-07T14:35:23.899		29.50	-31.44	45675.04	-22.62		
alpha	I	2034-12-07T14:36:07.601		29.54	-31.41	44684.88	-22.62		
4	I	2034-12-07T14:37:39.183		29.63	-31.35	42609.26	-22.60		
5	I	2034-12-07T14:38:00.081		29.65	-31.34	42155.28	-22.61		
6	I	2034-12-07T14:38:12.139		29.66	-31.33	41879.57	-22.60		
Uranus	I	2034-12-07T14:49:05.879		30.23	-30.83	25080.48		-22.26	-23.21
Uranus	E	2034-12-07T15:28:00.178		31.38	-28.19	25195.55		19.21	20.05
6	E	2034-12-07T15:39:06.004		31.44	-27.20	41795.05	22.63		
5	E	2034-12-07T15:39:28.812		31.44	-27.17	42314.83	22.63		
4	E	2034-12-07T15:39:38.954		31.44	-27.15	42528.96	22.62		
alpha	E	2034-12-07T15:41:16.895		31.43	-27.00	44750.67	22.64		
beta	E	2034-12-07T15:41:56.267		31.43	-26.94	45644.71	22.65		
eta	E	2034-12-07T15:43:03.839		31.43	-26.83	47176.12	22.66		
gamma	E	2034-12-07T15:43:23.941		31.43	-26.80	47631.57	22.66		
delta	E	2034-12-07T15:43:53.456		31.43	-26.75	48300.35	22.66		
lambda	E	2034-12-07T15:45:09.627		31.42	-26.63	50026.71	22.67		
epsilon	E	2034-12-07T15:45:41.542		31.42	-26.58	50750.21	22.67		