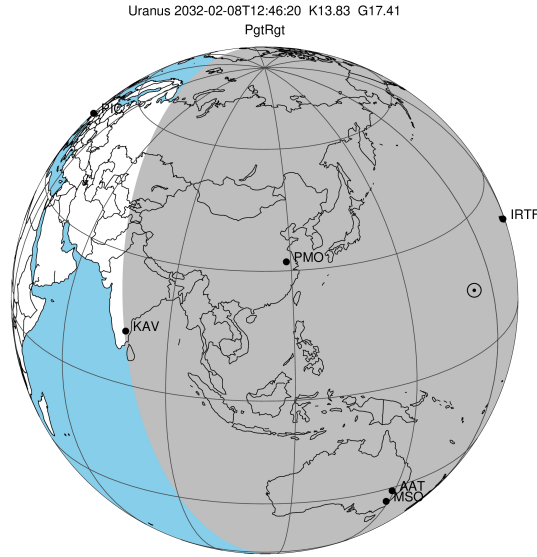


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-02-08T12:46:20.110  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3416227574334830848  
 2Mass ID (if available) : 05291482+2324306

Uranus 2032-02-08T12:46:20 K13.83 G17.41 PgtRgt

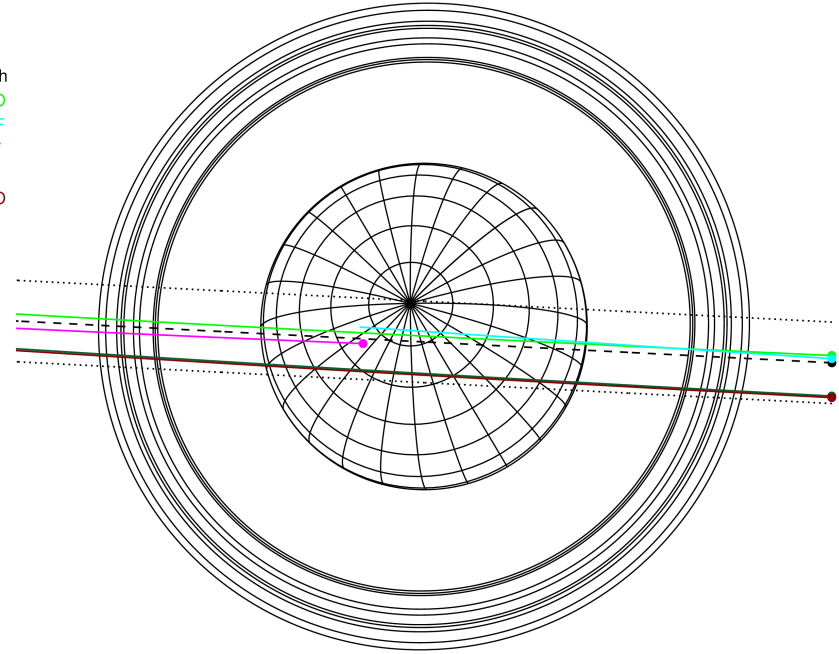
ICRS Star Coord at Epoch: 05h 29m 14.82367s +23:24:30.28317s

RUWE (>1.4 is poor) : 0.98  
 K magnitude : 13.833  
 G magnitude : 17.412  
 RP magnitude : 16.355  
 BP magnitude : 18.563  
 DUPflag : 0  
 Distance (au) : 18.507  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -10.37  
 Sun-Target sep (deg) : 124.09  
 Sun-Moon sep (deg) : 162.36  
 B (ring opening deg) : 80.51  
 PA of pole (deg) : 30.69  
 # a(km) ring



2032-02-08T12:46:20.1100 ex: 05 29 14.8237 s: +23 24 30.283 C/A 0.173° PA 357.07 deg v\_sky -10.37 km/s D 18.51 AU  
 Credit: Styled after SORA/Lucky Star

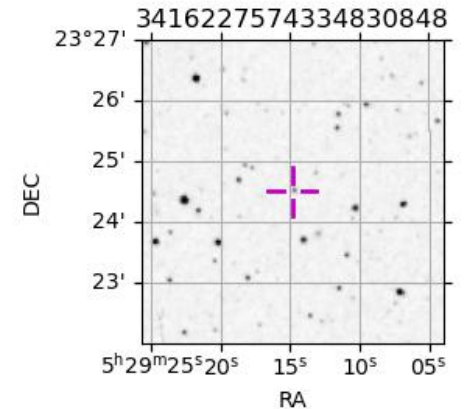
Earth  
 PMO  
 IRTF  
 KAV  
 AAT  
 MSO



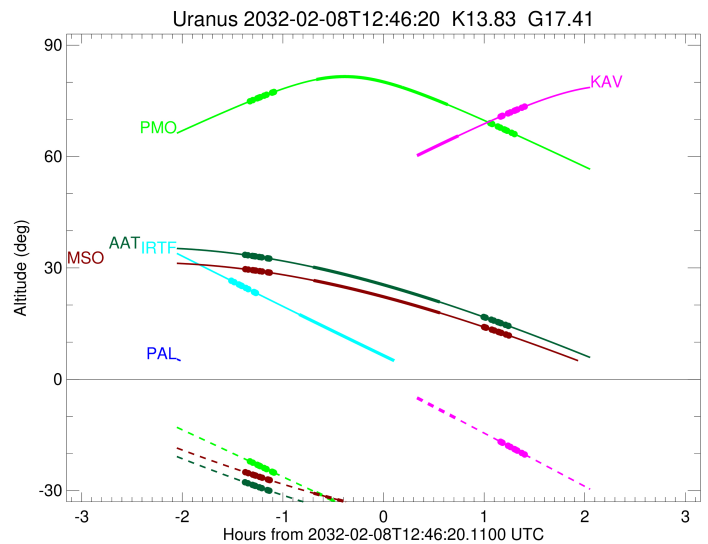
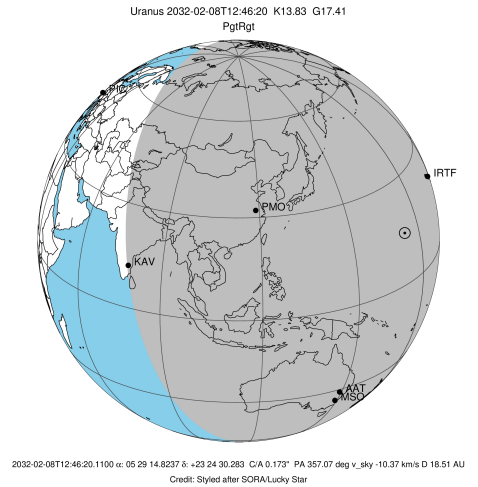
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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	+++++	+ +	+++++	FEB 08 11:26 - FEB 08 14:03	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	+++++	+		FEB 08 11:15 - FEB 08 11:56	PinRin
KAV	Kavalur Observatory	12.6	78.8		+	+++++	FEB 08 13:30 - FEB 08 14:09	PneRne
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	+++++	+ +	+++++	FEB 08 11:23 - FEB 08 14:00	PieRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++	+ +	+++++	FEB 08 11:23 - FEB 08 14:00	PieRie

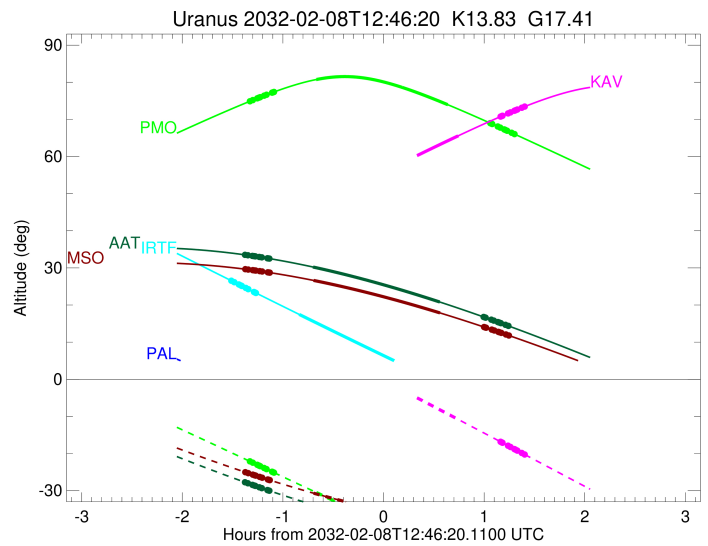
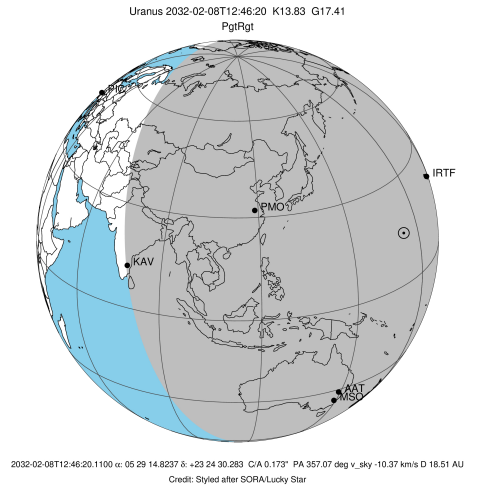


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-02-08T12:45:25.090  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PMO  
 Location : Purple Mtn Obs. Nanking  
 Latitude (deg) : 32.06667  
 E. Longitude (deg) : 118.82089  
 Altitude (km) : 0.364  
 Gaia source ID : 3416227574334830848  
 2Mass ID (if available) : 05291482+2324306  
 ICRS Star Coord at Epoch: 05h 29m 14.82367s +23:24:30.28317s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 13.833  
 G magnitude : 17.412  
 RP magnitude : 16.355  
 BP magnitude : 18.563  
 DUPflag : 0  
 Distance (au) : 18.507  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -10.37  
 Sun-Target sep (deg) : 124.09  
 Sun-Moon sep (deg) : 162.60  
 B (ring opening deg) : 80.51  
 PA of pole (deg) : 30.69  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.111  
 C/A sky separation (km) : 1490.5  
 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



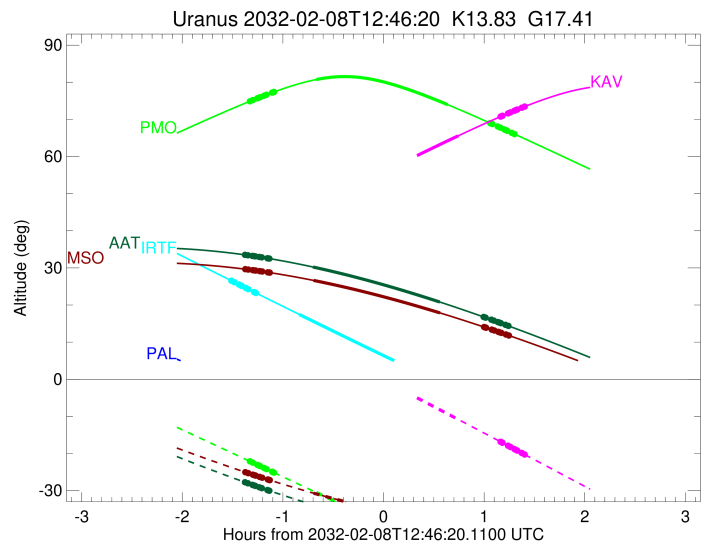
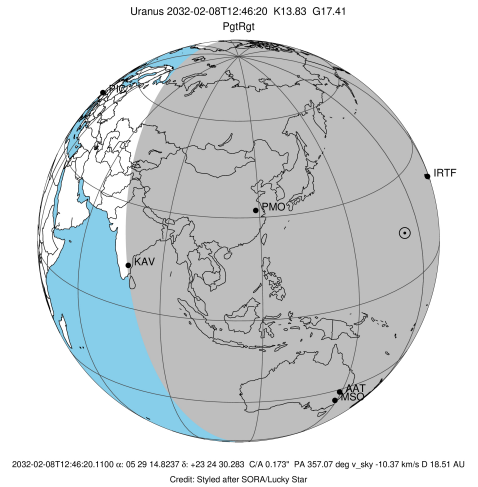
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-02-08T11:26:08.842		74.79	-22.00	51508.75	-10.81		
lambda	I	2032-02-08T11:28:25.916		75.21	-22.48	50026.71	-10.81		
delta	I	2032-02-08T11:31:05.591		75.69	-23.04	48300.35	-10.81		
gamma	I	2032-02-08T11:32:08.428		75.87	-23.27	47620.98	-10.81		
eta	I	2032-02-08T11:32:49.575		76.00	-23.41	47176.12	-10.81		
beta	I	2032-02-08T11:35:10.186		76.40	-23.91	45656.12	-10.81		
alpha	I	2032-02-08T11:36:35.985		76.65	-24.21	44729.36	-10.81		
4	I	2032-02-08T11:39:58.708		77.22	-24.93	42539.10	-10.81		
5	I	2032-02-08T11:40:22.337		77.29	-25.01	42277.44	-10.81		
6	I	2032-02-08T11:40:59.874		77.39	-25.14	41874.84	-10.81		
Uranus	I	2032-02-08T12:06:15.402		80.74	-30.50	25349.06		-5.68	-5.95
Uranus	E	2032-02-08T13:24:44.233		73.95	-47.01	25410.13		4.77	5.00
6	E	2032-02-08T13:49:56.745		69.01	-52.17	41798.45	10.75		
5	E	2032-02-08T13:50:34.024		68.88	-52.30	42196.77	10.75		
4	E	2032-02-08T13:51:11.486		68.76	-52.43	42605.28	10.75		
alpha	E	2032-02-08T13:54:26.945		68.10	-53.08	44705.75	10.75		
beta	E	2032-02-08T13:55:56.234		67.79	-53.38	45665.01	10.75		
eta	E	2032-02-08T13:58:16.823		67.31	-53.85	47176.12	10.75		
gamma	E	2032-02-08T13:58:59.192		67.17	-53.99	47631.53	10.75		
delta	E	2032-02-08T14:00:01.420		66.96	-54.20	48300.35	10.75		
lambda	E	2032-02-08T14:02:42.064		66.41	-54.73	50026.71	10.75		
epsilon	E	2032-02-08T14:03:52.141		66.17	-54.96	50779.70	10.74		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-02-08T12:36:34.090  
 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 : 3416227574334830848  
 2Mass ID (if available) : 05291482+2324306  
 ICRS Star Coord at Epoch: 05h 29m 14.82367s +23:24:30.28317s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 13.833  
 G magnitude : 17.412  
 RP magnitude : 16.355  
 BP magnitude : 18.563  
 DUPflag : 0  
 Distance (au) : 18.507  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -10.37  
 Sun-Target sep (deg) : 124.09  
 Sun-Moon sep (deg) : 161.57  
 B (ring opening deg) : 80.51  
 PA of pole (deg) : 30.69  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.057  
 C/A sky separation (km) : 766.9  
 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\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



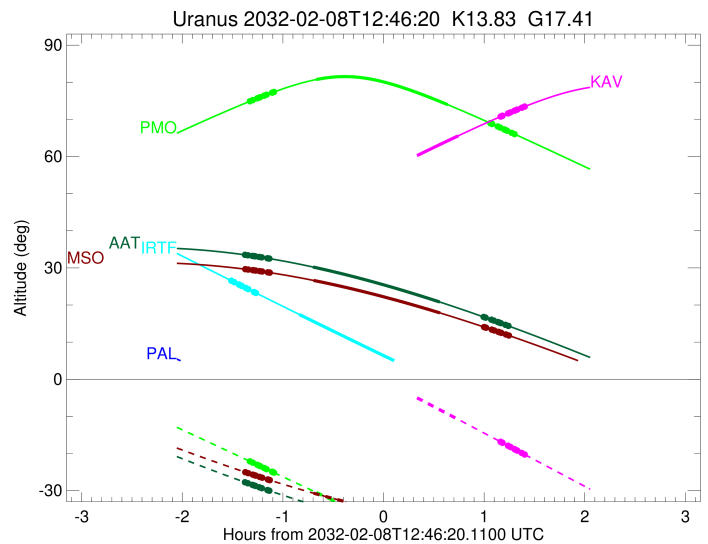
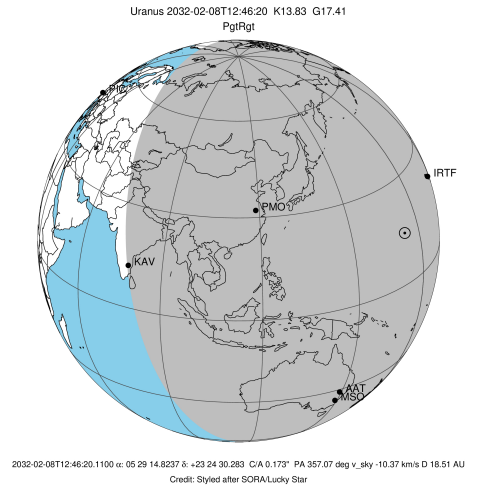
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-02-08T11:15:03.624		26.67	-79.59	51507.91	-10.61		
lambda	I	2032-02-08T11:17:23.270		26.14	-79.09	50026.71	-10.60		
delta	I	2032-02-08T11:20:06.115		25.53	-78.50	48300.35	-10.60		
gamma	I	2032-02-08T11:21:10.224		25.29	-78.26	47620.97	-10.60		
eta	I	2032-02-08T11:21:52.210		25.13	-78.11	47176.12	-10.59		
beta	I	2032-02-08T11:24:15.739		24.60	-77.58	45656.08	-10.59		
alpha	I	2032-02-08T11:25:43.352		24.27	-77.26	44729.30	-10.59		
4	I	2032-02-08T11:29:10.443		23.49	-76.49	42539.13	-10.58		
5	I	2032-02-08T11:29:34.588		23.40	-76.40	42277.50	-10.58		
6	I	2032-02-08T11:30:12.961		23.26	-76.26	41874.83	-10.58		
Uranus	I	2032-02-08T11:56:05.378		17.47	-70.35	25354.93		-5.60	-5.86
Uranus	E	2032-02-08T13:17:27.006		-0.33x	-51.28	25387.19		5.13	5.37
6	E	2032-02-08T13:43:46.480		-5.90x	-45.09	41799.03	10.28		
5	E	2032-02-08T13:44:25.220		-6.03x	-44.94	42194.51	10.28		
4	E	2032-02-08T13:45:04.502		-6.17x	-44.78	42604.30	10.28		
alpha	E	2032-02-08T13:48:29.208		-6.88x	-43.98	44706.74	10.27		
beta	E	2032-02-08T13:50:02.632		-7.21x	-43.61	45665.62	10.27		
eta	E	2032-02-08T13:52:29.763		-7.72x	-43.04	47176.12	10.27		
gamma	E	2032-02-08T13:53:14.133		-7.87x	-42.86	47631.55	10.26		
delta	E	2032-02-08T13:54:19.303		-8.10x	-42.61	48300.35	10.26		
lambda	E	2032-02-08T13:57:07.588		-8.68x	-41.95	50026.71	10.26		
epsilon	E	2032-02-08T13:58:21.505		-8.93x	-41.66	50784.69	10.25		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-02-08T12:51:45.810  
 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 : 3416227574334830848  
 2Mass ID (if available) : 05291482+2324306  
 ICRS Star Coord at Epoch: 05h 29m 14.82367s +23:24:30.28317s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 13.833  
 G magnitude : 17.412  
 RP magnitude : 16.355  
 BP magnitude : 18.563  
 DUPflag : 0  
 Distance (au) : 18.507  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -10.37  
 Sun-Target sep (deg) : 124.09  
 Sun-Moon sep (deg) : 163.10  
 B (ring opening deg) : 80.51  
 PA of pole (deg) : 30.69  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.228  
 C/A sky separation (km) : 3065.1  
 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



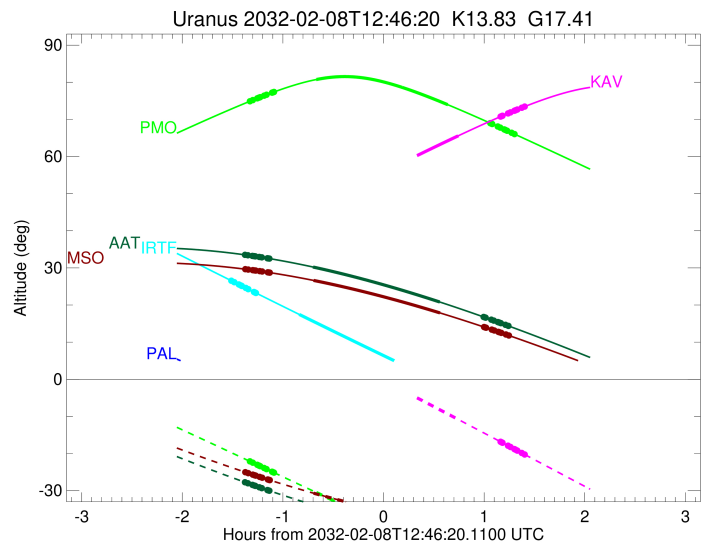
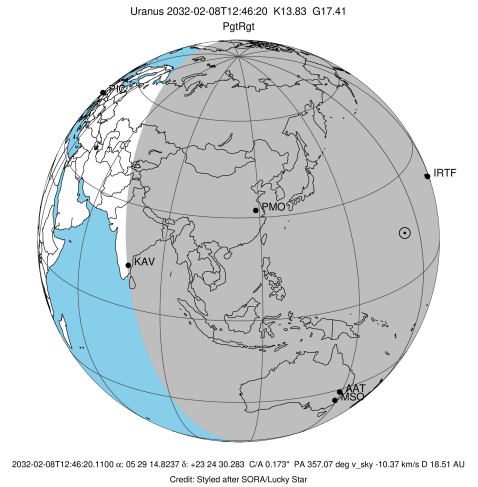
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-02-08T11:32:08.136		38.89	16.97x	51504.69	-10.68		
lambda	I	2032-02-08T11:34:26.490		39.42	16.44x	50026.71	-10.68		
delta	I	2032-02-08T11:37:08.071		40.04	15.82x	48300.35	-10.69		
gamma	I	2032-02-08T11:38:11.651		40.28	15.58x	47620.97	-10.69		
eta	I	2032-02-08T11:38:53.281		40.44	15.42x	47176.12	-10.69		
beta	I	2032-02-08T11:41:15.575		40.98	14.88x	45655.64	-10.69		
alpha	I	2032-02-08T11:42:42.403		41.32	14.54x	44728.53	-10.69		
4	I	2032-02-08T11:46:07.279		42.10	13.76x	42539.99	-10.69		
5	I	2032-02-08T11:46:31.064		42.19	13.67x	42279.31	-10.69		
6	I	2032-02-08T11:47:09.275		42.34	13.52x	41874.27	-10.69		
Uranus	I	2032-02-08T12:12:42.820		48.18	7.59x	25319.88		-6.07	-6.35
Uranus	E	2032-02-08T13:30:53.808		65.58	-10.82	25445.23		4.17	4.36
6	E	2032-02-08T13:56:04.032		70.74	-16.82	41797.65	10.79		
5	E	2032-02-08T13:56:41.539		70.86	-16.96	42200.20	10.79		
4	E	2032-02-08T13:57:18.719		70.98	-17.11	42606.67	10.79		
alpha	E	2032-02-08T14:00:33.153		71.61	-17.89	44704.32	10.80		
beta	E	2032-02-08T14:02:02.100		71.89	-18.24	45664.12	10.80		
eta	E	2032-02-08T14:04:22.128		72.33	-18.80	47176.12	10.80		
gamma	E	2032-02-08T14:05:04.289		72.46	-18.97	47631.49	10.80		
delta	E	2032-02-08T14:06:06.212		72.65	-19.21	48300.35	10.80		
lambda	E	2032-02-08T14:08:46.013		73.14	-19.85	50026.71	10.80		
epsilon	E	2032-02-08T14:09:55.089		73.35	-20.12	50773.06	10.80		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-02-08T12:41:46.430  
 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 : 3416227574334830848  
 2Mass ID (if available) : 05291482+2324306  
 ICRS Star Coord at Epoch: 05h 29m 14.82367s +23:24:30.28317s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 13.833  
 G magnitude : 17.412  
 RP magnitude : 16.355  
 BP magnitude : 18.563  
 DUPflag : 0  
 Distance (au) : 18.507  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -10.37  
 Sun-Target sep (deg) : 124.09  
 Sun-Moon sep (deg) : 161.87  
 B (ring opening deg) : 80.51  
 PA of pole (deg) : 30.69  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.548  
 C/A sky separation (km) : 7357.0  
 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\_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	2032-02-08T11:23:14.316		33.55	-27.66	51482.68	-10.70		
lambda	I	2032-02-08T11:25:30.346		33.40	-28.02	50026.71	-10.70		
delta	I	2032-02-08T11:28:11.786		33.23	-28.45	48300.35	-10.69		
gamma	I	2032-02-08T11:29:15.365		33.16	-28.62	47620.96	-10.68		
eta	I	2032-02-08T11:29:57.010		33.11	-28.73	47176.12	-10.68		
beta	I	2032-02-08T11:32:19.662		32.95	-29.10	45653.50	-10.67		
alpha	I	2032-02-08T11:33:46.848		32.84	-29.33	44724.75	-10.66		
4	I	2032-02-08T11:37:11.676		32.59	-29.86	42544.14	-10.64		
5	I	2032-02-08T11:37:35.155		32.56	-29.92	42287.05	-10.64		
6	I	2032-02-08T11:38:14.643		32.51	-30.02	41871.46	-10.63		
Uranus	I	2032-02-08T12:04:17.239		30.24	-33.81	25210.94		-7.35	-7.70
Uranus	E	2032-02-08T13:19:54.650		20.81	-41.82	25506.91		2.81	2.95
6	E	2032-02-08T13:45:57.488		16.80	-43.25	41796.46	10.48		
5	E	2032-02-08T13:46:36.769		16.69	-43.28	42206.54	10.48		
4	E	2032-02-08T13:47:14.741		16.59	-43.30	42608.95	10.48		
alpha	E	2032-02-08T13:50:34.388		16.06	-43.42	44701.90	10.49		
beta	E	2032-02-08T13:52:05.963		15.81	-43.47	45662.56	10.50		
eta	E	2032-02-08T13:54:30.131		15.42	-43.54	47176.12	10.50		
gamma	E	2032-02-08T13:55:13.479		15.30	-43.56	47631.40	10.50		
delta	E	2032-02-08T13:56:17.159		15.12	-43.59	48300.35	10.51		
lambda	E	2032-02-08T13:59:01.450		14.67	-43.66	50026.71	10.51		
epsilon	E	2032-02-08T14:00:11.558		14.48	-43.69	50763.61	10.51		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-02-08T12:42:01.150  
 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 : 3416227574334830848  
 2Mass ID (if available) : 05291482+2324306  
 ICRS Star Coord at Epoch: 05h 29m 14.82367s +23:24:30.28317s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 13.833  
 G magnitude : 17.412  
 RP magnitude : 16.355  
 BP magnitude : 18.563  
 DUPflag : 0  
 Distance (au) : 18.507  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -10.37  
 Sun-Target sep (deg) : 124.09  
 Sun-Moon sep (deg) : 161.86  
 B (ring opening deg) : 80.51  
 PA of pole (deg) : 30.69  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.567  
 C/A sky separation (km) : 7613.2  
 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\_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	2032-02-08T11:23:25.809		29.68	-24.96	51481.54	-10.67		
lambda	I	2032-02-08T11:25:42.058		29.55	-25.30	50026.71	-10.67		
delta	I	2032-02-08T11:28:23.892		29.39	-25.70	48300.35	-10.66		
gamma	I	2032-02-08T11:29:27.629		29.32	-25.86	47620.97	-10.66		
eta	I	2032-02-08T11:30:09.379		29.28	-25.96	47176.12	-10.65		
beta	I	2032-02-08T11:32:32.403		29.13	-26.31	45653.39	-10.64		
alpha	I	2032-02-08T11:33:59.824		29.03	-26.52	44724.56	-10.63		
4	I	2032-02-08T11:37:25.159		28.80	-27.01	42544.36	-10.62		
5	I	2032-02-08T11:37:48.685		28.78	-27.07	42287.42	-10.61		
6	I	2032-02-08T11:38:28.335		28.73	-27.16	41871.31	-10.61		
Uranus	I	2032-02-08T12:04:36.648		26.63	-30.68	25205.16		-7.41	-7.76
Uranus	E	2032-02-08T13:20:05.354		17.86	-37.99	25510.45		2.71	2.84
6	E	2032-02-08T13:46:12.933		14.08	-39.28	41796.38	10.45		
5	E	2032-02-08T13:46:52.353		13.98	-39.31	42207.04	10.46		
4	E	2032-02-08T13:47:30.384		13.89	-39.33	42609.12	10.46		
alpha	E	2032-02-08T13:50:50.427		13.38	-39.44	44701.71	10.47		
beta	E	2032-02-08T13:52:22.196		13.15	-39.48	45662.43	10.47		
eta	E	2032-02-08T13:54:46.665		12.78	-39.55	47176.12	10.48		
gamma	E	2032-02-08T13:55:30.097		12.66	-39.57	47631.39	10.48		
delta	E	2032-02-08T13:56:33.901		12.50	-39.59	48300.35	10.49		
lambda	E	2032-02-08T13:59:18.501		12.07	-39.66	50026.71	10.49		
epsilon	E	2032-02-08T14:00:28.671		11.89	-39.68	50762.92	10.49		