

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2034-01-16T14:49:26.590
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3425424782943736576
 2Mass ID (if available) : 06113877+2341150

ICRS Star Coord at Epoch: 06h 11m 38.77162s +23:41:14.83459s

RUWE (>1.4 is poor) : 1.01
 K magnitude : 11.099
 G magnitude : 13.671
 RP magnitude : 12.871
 BP magnitude : 14.353
 DUPflag : 0
 Distance (au) : 18.043
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.97
 Sun-Target sep (deg) : 156.60
 Sun-Moon sep (deg) : 157.46
 B (ring opening deg) : 73.02
 PA of pole (deg) : 62.74

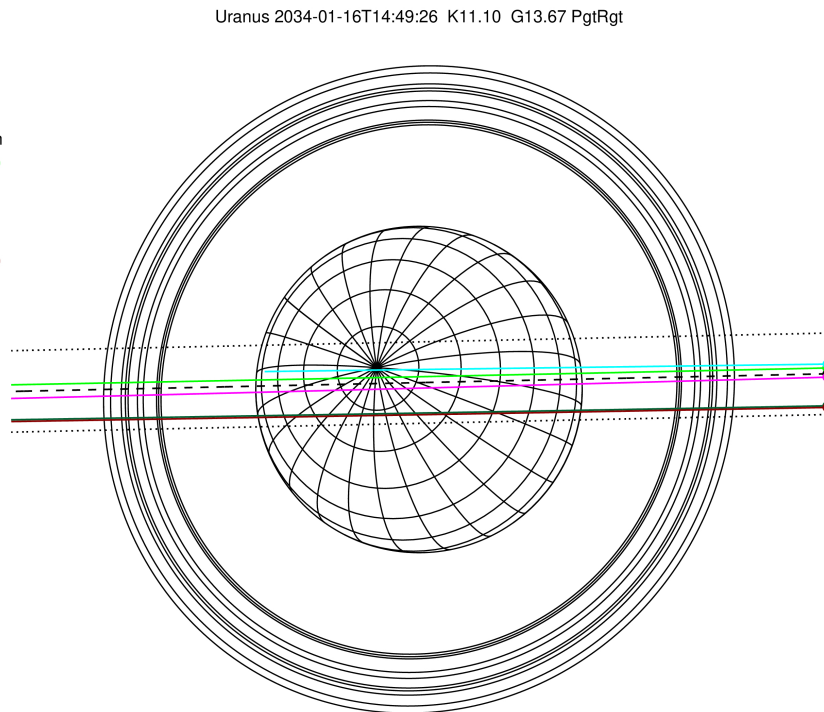
a(km) ring

- 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



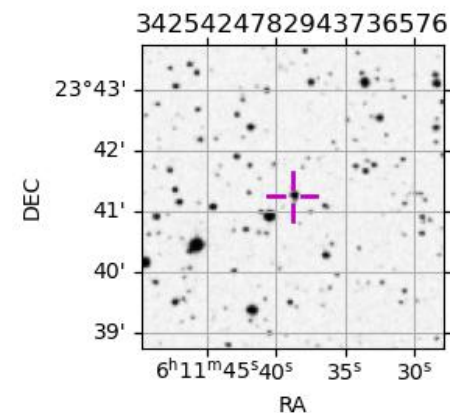
2034-01-16T14:49:26.5900 ra: 06 11 38.7716 s: +23 41 14.835 C/A 0.089° PA 181.21 deg v_sky -20.97 km/s D 18.04 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PMO
 IRTF
 KAV
 AAT
 MSO

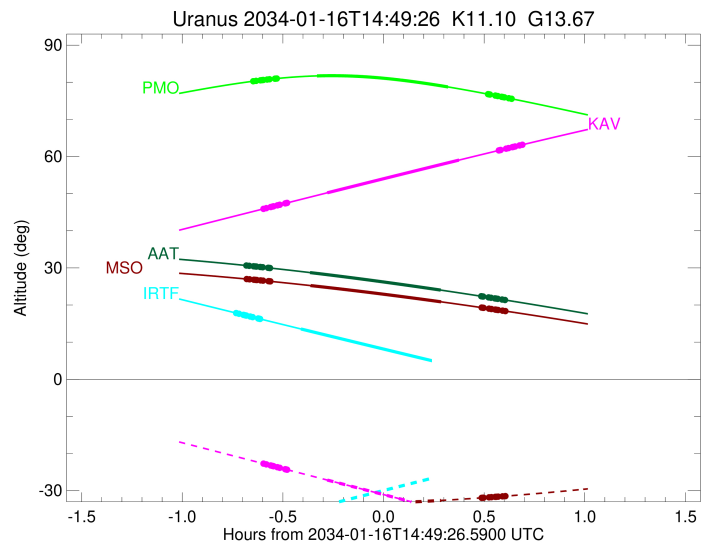
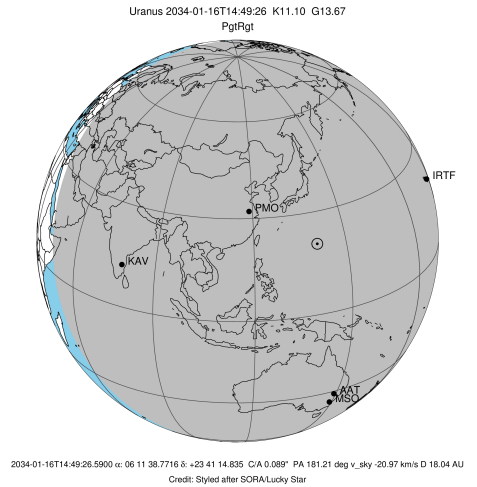


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++	+ +	+++++	JAN 16 14:10 - JAN 16 15:27	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	+++++	+		JAN 16 14:05 - JAN 16 14:24	PinRin
KAV	Kavalur Observatory	12.6	78.8	+++++	+ +	+++++	JAN 16 14:13 - JAN 16 15:30	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	+++++	+ +	+++++	JAN 16 14:08 - JAN 16 15:25	PieRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++	+ +	+++++	JAN 16 14:08 - JAN 16 15:25	PieRie

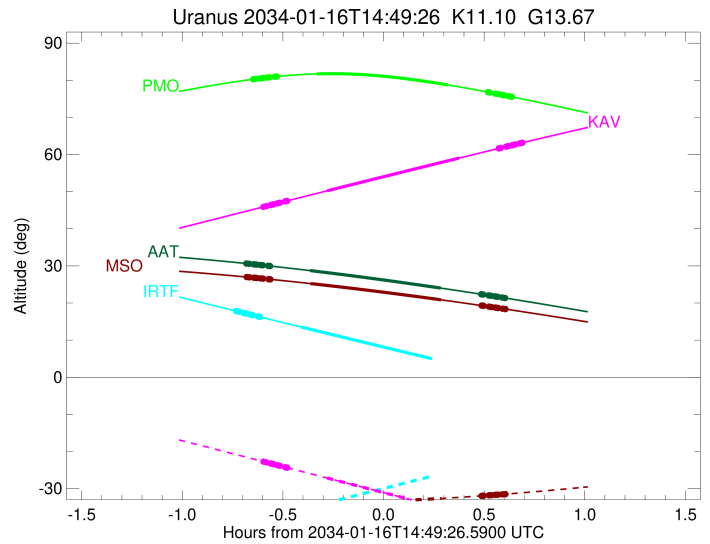
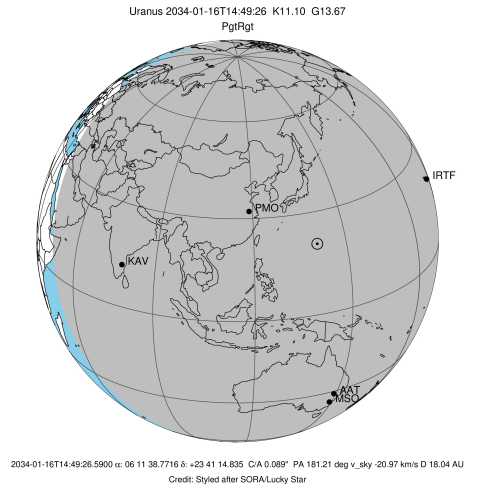


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2034-01-16T14:49:10.470
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3425424782943736576
 2Mass ID (if available) : 06113877+2341150
 ICRS Star Coord at Epoch: 06h 11m 38.77162s +23:41:14.83459s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 11.099
 G magnitude : 13.671
 RP magnitude : 12.871
 BP magnitude : 14.353
 DUPflag : 0
 Distance (au) : 18.043
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.97
 Sun-Target sep (deg) : 156.60
 Sun-Moon sep (deg) : 157.88
 B (ring opening deg) : 73.02
 PA of pole (deg) : 62.74
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.153
 C/A sky separation (km) : 1998.3
 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



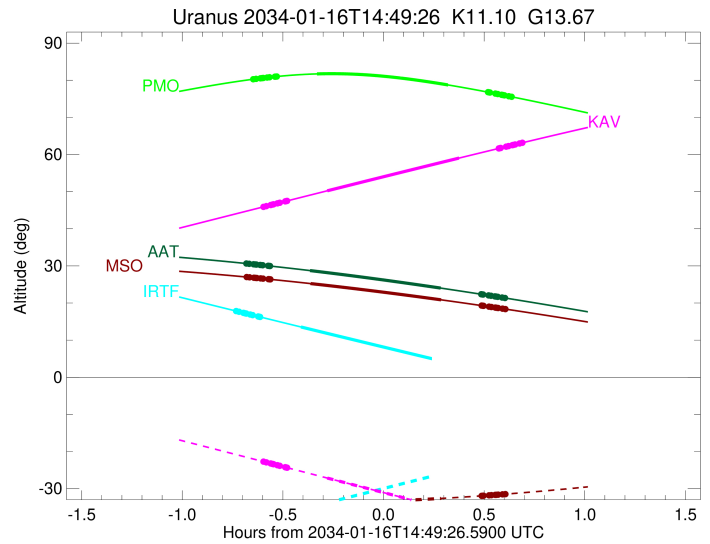
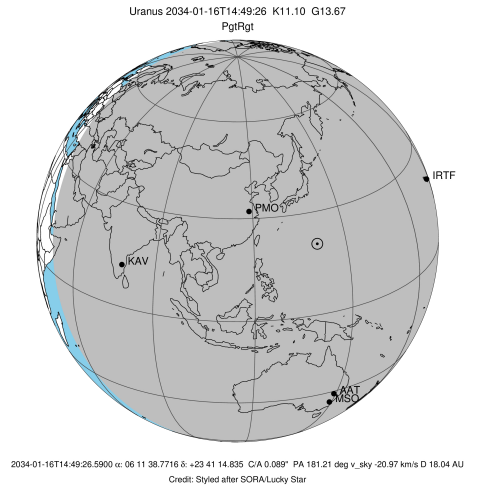
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-01-16T14:10:37.432		80.29	-60.28	51141.28	-22.09		
lambda	I	2034-01-16T14:11:27.874		80.39	-60.45	50026.71	-22.10		
delta	I	2034-01-16T14:12:46.008		80.53	-60.72	48300.35	-22.09		
gamma	I	2034-01-16T14:13:16.308		80.59	-60.82	47630.93	-22.09		
eta	I	2034-01-16T14:13:36.894		80.62	-60.89	47176.12	-22.09		
beta	I	2034-01-16T14:14:45.624		80.74	-61.13	45658.22	-22.09		
alpha	I	2034-01-16T14:15:29.555		80.82	-61.28	44684.77	-22.09		
4	I	2034-01-16T14:17:05.961		80.97	-61.61	42563.42	-22.09		
5	I	2034-01-16T14:17:17.419		80.99	-61.64	42304.97	-22.09		
6	I	2034-01-16T14:17:40.398		81.02	-61.72	41794.75	-22.08		
Uranus	I	2034-01-16T14:29:35.507		81.72	-64.14	25178.95		-14.17	-14.82
Uranus	E	2034-01-16T15:08:42.443		78.75	-71.62	25108.83		15.49	16.18
6	E	2034-01-16T15:20:38.330		76.80	-73.67	41879.60	22.07		
5	E	2034-01-16T15:20:51.321		76.76	-73.70	42169.22	22.07		
4	E	2034-01-16T15:21:09.371		76.71	-73.75	42574.58	22.07		
alpha	E	2034-01-16T15:22:48.434		76.42	-74.02	44752.43	22.07		
beta	E	2034-01-16T15:23:29.686		76.30	-74.13	45665.84	22.07		
eta	E	2034-01-16T15:24:38.125		76.10	-74.31	47176.12	22.07		
gamma	E	2034-01-16T15:24:58.297		76.04	-74.36	47621.40	22.07		
delta	E	2034-01-16T15:25:29.053		75.95	-74.44	48300.35	22.07		
lambda	E	2034-01-16T15:26:47.256		75.71	-74.65	50026.71	22.08		
epsilon	E	2034-01-16T15:27:36.692		75.56	-74.77	51118.07	22.07		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2034-01-16T14:44:41.360
 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 : 3425424782943736576
 2Mass ID (if available) : 06113877+2341150
 ICRS Star Coord at Epoch: 06h 11m 38.77162s +23:41:14.83459s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 11.099
 G magnitude : 13.671
 RP magnitude : 12.871
 BP magnitude : 14.353
 DUPflag : 0
 Distance (au) : 18.043
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.97
 Sun-Target sep (deg) : 156.60
 Sun-Moon sep (deg) : 158.35
 B (ring opening deg) : 73.02
 PA of pole (deg) : 62.74
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.239
 C/A sky separation (km) : 3127.0
 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



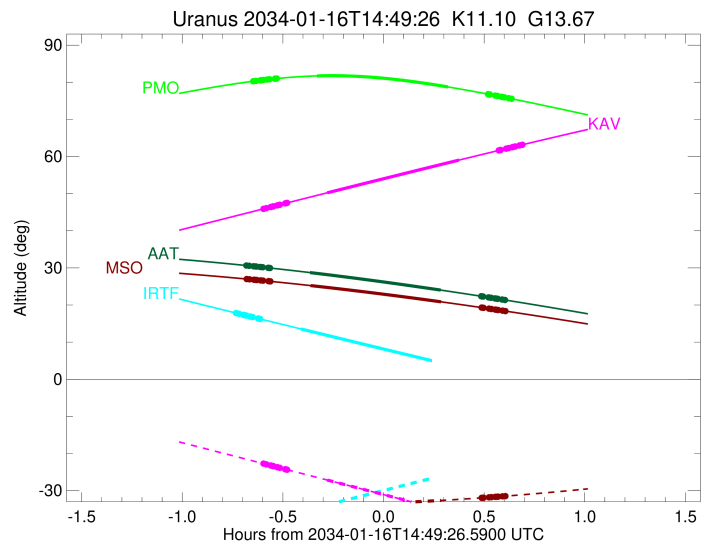
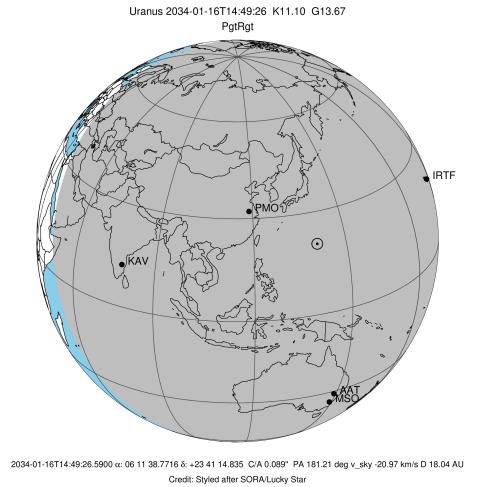
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-01-16T14:05:31.748		17.83	-40.06	51135.37	-21.75		
lambda	I	2034-01-16T14:06:22.704		17.64	-39.87	50026.71	-21.76		
delta	I	2034-01-16T14:07:42.070		17.35	-39.56	48300.35	-21.75		
gamma	I	2034-01-16T14:08:12.854		17.23	-39.44	47630.89	-21.75		
eta	I	2034-01-16T14:08:33.767		17.16	-39.36	47176.12	-21.74		
beta	I	2034-01-16T14:09:43.590		16.90	-39.10	45658.57	-21.74		
alpha	I	2034-01-16T14:10:28.250		16.73	-38.92	44684.83	-21.73		
4	I	2034-01-16T14:12:06.286		16.37	-38.55	42562.56	-21.73		
5	I	2034-01-16T14:12:17.875		16.33	-38.50	42305.72	-21.72		
6	I	2034-01-16T14:12:41.275		16.24	-38.41	41794.78	-21.72		
Uranus	I	2034-01-16T14:24:50.513		13.55	-35.61	25197.22		-13.81	-14.44
Uranus	E	2034-01-16T15:04:29.345		4.87x	-26.52	25089.54		15.83	16.54
6	E	2034-01-16T15:16:40.723		2.24x	-23.74	41879.46	21.58		
5	E	2034-01-16T15:16:54.082		2.19x	-23.69	42170.80	21.59		
4	E	2034-01-16T15:17:12.368		2.13x	-23.62	42573.07	21.59		
alpha	E	2034-01-16T15:18:53.725		1.76x	-23.24	44752.42	21.59		
beta	E	2034-01-16T15:19:35.933		1.61x	-23.08	45666.46	21.59		
eta	E	2034-01-16T15:20:45.875		1.36x	-22.82	47176.12	21.59		
gamma	E	2034-01-16T15:21:06.495		1.29x	-22.74	47621.34	21.59		
delta	E	2034-01-16T15:21:37.944		1.18x	-22.62	48300.35	21.59		
lambda	E	2034-01-16T15:22:57.898		0.89x	-22.32	50026.71	21.59		
epsilon	E	2034-01-16T15:23:47.901		0.71x	-22.13	51106.41	21.58		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2034-01-16T14:52:17.700
 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 : 3425424782943736576
 2Mass ID (if available) : 06113877+2341150
 ICRS Star Coord at Epoch: 06h 11m 38.77162s +23:41:14.83459s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 11.099
 G magnitude : 13.671
 RP magnitude : 12.871
 BP magnitude : 14.353
 DUPflag : 0
 Distance (au) : 18.043
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.97
 Sun-Target sep (deg) : 156.60
 Sun-Moon sep (deg) : 157.25
 B (ring opening deg) : 73.02
 PA of pole (deg) : 62.74
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.016
 C/A sky separation (km) : 209.4
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



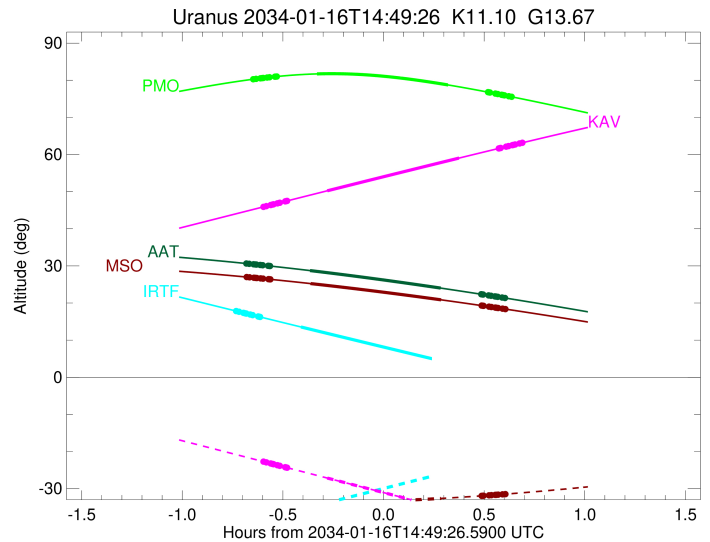
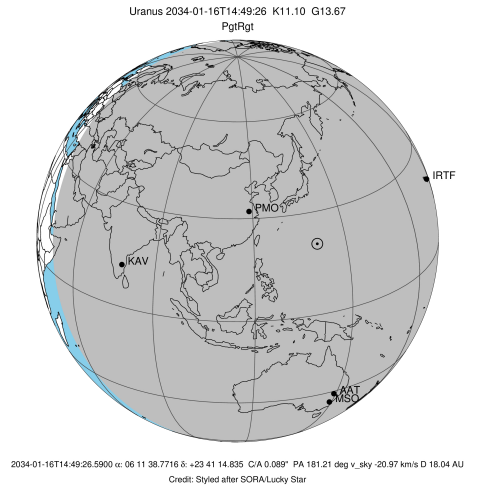
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-01-16T14:13:39.970		45.91	-22.72	51153.49	-22.04		
lambda	I	2034-01-16T14:14:31.099		46.10	-22.92	50026.71	-22.04		
delta	I	2034-01-16T14:15:49.432		46.40	-23.23	48300.35	-22.04		
gamma	I	2034-01-16T14:16:19.802		46.51	-23.34	47631.01	-22.04		
eta	I	2034-01-16T14:16:40.441		46.59	-23.42	47176.12	-22.04		
beta	I	2034-01-16T14:17:49.361		46.85	-23.69	45657.54	-22.04		
alpha	I	2034-01-16T14:18:33.365		47.02	-23.86	44684.68	-22.04		
4	I	2034-01-16T14:20:09.900		47.39	-24.24	42565.09	-22.05		
5	I	2034-01-16T14:20:21.496		47.43	-24.28	42303.45	-22.04		
6	I	2034-01-16T14:20:44.446		47.52	-24.37	41794.75	-22.04		
Uranus	I	2034-01-16T14:32:38.627		50.22	-27.14	25148.29		-14.76	-15.43
Uranus	E	2034-01-16T15:11:55.338		59.03	-36.31	25140.65		14.90	15.58
6	E	2034-01-16T15:23:51.256		61.65	-39.10	41879.72	22.11		
5	E	2034-01-16T15:24:04.127		61.70	-39.15	42167.10	22.11		
4	E	2034-01-16T15:24:22.374		61.77	-39.22	42576.73	22.11		
alpha	E	2034-01-16T15:26:01.148		62.12	-39.60	44752.39	22.11		
beta	E	2034-01-16T15:26:42.284		62.27	-39.76	45664.96	22.11		
eta	E	2034-01-16T15:27:50.641		62.52	-40.03	47176.12	22.11		
gamma	E	2034-01-16T15:28:10.781		62.59	-40.11	47621.50	22.11		
delta	E	2034-01-16T15:28:41.477		62.70	-40.23	48300.35	22.12		
lambda	E	2034-01-16T15:29:59.536		62.99	-40.53	50026.71	22.12		
epsilon	E	2034-01-16T15:30:49.625		63.17	-40.73	51134.53	22.12		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2034-01-16T14:46:57.950
 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 : 3425424782943736576
 2Mass ID (if available) : 06113877+2341150
 ICRS Star Coord at Epoch: 06h 11m 38.77162s +23:41:14.83459s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 11.099
 G magnitude : 13.671
 RP magnitude : 12.871
 BP magnitude : 14.353
 DUPflag : 0
 Distance (au) : 18.043
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.97
 Sun-Target sep (deg) : 156.60
 Sun-Moon sep (deg) : 157.88
 B (ring opening deg) : 73.02
 PA of pole (deg) : 62.74
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.282
 C/A sky separation (km) : 3691.7
 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	2034-01-16T14:08:31.913		30.64	-38.04	51188.29	-22.04		
lambda	I	2034-01-16T14:09:24.655		30.56	-38.04	50026.71	-22.02		
delta	I	2034-01-16T14:10:43.060		30.44	-38.05	48300.35	-22.02		
gamma	I	2034-01-16T14:11:13.455		30.39	-38.05	47631.21	-22.01		
eta	I	2034-01-16T14:11:34.130		30.36	-38.05	47176.12	-22.01		
beta	I	2034-01-16T14:12:43.231		30.25	-38.05	45655.68	-22.00		
alpha	I	2034-01-16T14:13:27.238		30.18	-38.05	44684.64	-22.00		
4	I	2034-01-16T14:15:03.786		30.02	-38.05	42569.66	-22.00		
5	I	2034-01-16T14:15:15.750		30.00	-38.05	42298.82	-21.99		
6	I	2034-01-16T14:15:38.524		29.96	-38.05	41795.07	-21.99		
Uranus	I	2034-01-16T14:27:33.462		28.74	-37.94	25083.19		-15.95	-16.66
Uranus	E	2034-01-16T15:06:29.669		24.02	-36.52	25210.39		13.55	14.17
6	E	2034-01-16T15:18:36.756		22.36	-35.76	41879.69	21.91		
5	E	2034-01-16T15:18:49.596		22.33	-35.75	42163.73	21.92		
4	E	2034-01-16T15:19:08.393		22.29	-35.72	42580.49	21.92		
alpha	E	2034-01-16T15:20:47.814		22.05	-35.61	44752.15	21.92		
beta	E	2034-01-16T15:21:29.235		21.95	-35.56	45663.42	21.93		
eta	E	2034-01-16T15:22:38.237		21.79	-35.47	47176.12	21.93		
gamma	E	2034-01-16T15:22:58.553		21.74	-35.45	47621.68	21.93		
delta	E	2034-01-16T15:23:29.496		21.67	-35.41	48300.35	21.93		
lambda	E	2034-01-16T15:24:48.198		21.48	-35.31	50026.71	21.94		
epsilon	E	2034-01-16T15:25:39.963		21.36	-35.25	51162.31	21.95		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2034-01-16T14:47:04.250
 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 : 3425424782943736576
 2Mass ID (if available) : 06113877+2341150
 ICRS Star Coord at Epoch: 06h 11m 38.77162s +23:41:14.83459s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 11.099
 G magnitude : 13.671
 RP magnitude : 12.871
 BP magnitude : 14.353
 DUPflag : 0
 Distance (au) : 18.043
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.97
 Sun-Target sep (deg) : 156.60
 Sun-Moon sep (deg) : 157.83
 B (ring opening deg) : 73.02
 PA of pole (deg) : 62.74
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.302
 C/A sky separation (km) : 3956.3
 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	2034-01-16T14:08:37.789		27.00	-34.01	51190.33	-22.01		
lambda	I	2034-01-16T14:09:30.686		26.92	-34.01	50026.71	-22.00		
delta	I	2034-01-16T14:10:49.184		26.81	-34.01	48300.35	-21.99		
gamma	I	2034-01-16T14:11:19.616		26.77	-34.02	47631.22	-21.99		
eta	I	2034-01-16T14:11:40.317		26.74	-34.02	47176.12	-21.98		
beta	I	2034-01-16T14:12:49.509		26.64	-34.02	45655.57	-21.98		
alpha	I	2034-01-16T14:13:33.567		26.57	-34.02	44684.64	-21.97		
4	I	2034-01-16T14:15:10.230		26.43	-34.02	42569.94	-21.97		
5	I	2034-01-16T14:15:22.232		26.41	-34.02	42298.52	-21.96		
6	I	2034-01-16T14:15:45.021		26.37	-34.02	41795.10	-21.96		
Uranus	I	2034-01-16T14:27:41.013		25.24	-33.92	25079.74		-16.01	-16.72
Uranus	E	2034-01-16T15:06:35.118		20.86	-32.64	25215.89		13.44	14.05
6	E	2034-01-16T15:18:43.657		19.31	-31.94	41879.67	21.89		
5	E	2034-01-16T15:18:56.504		19.28	-31.93	42163.49	21.89		
4	E	2034-01-16T15:19:15.353		19.24	-31.91	42580.78	21.90		
alpha	E	2034-01-16T15:20:54.874		19.02	-31.80	44752.12	21.90		
beta	E	2034-01-16T15:21:36.338		18.93	-31.76	45663.30	21.90		
eta	E	2034-01-16T15:22:45.423		18.77	-31.68	47176.12	21.91		
gamma	E	2034-01-16T15:23:05.761		18.73	-31.66	47621.70	21.91		
delta	E	2034-01-16T15:23:36.736		18.66	-31.62	48300.35	21.91		
lambda	E	2034-01-16T15:24:55.522		18.48	-31.53	50026.71	21.91		
epsilon	E	2034-01-16T15:25:47.440		18.36	-31.48	51164.53	21.93		